# World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2021): Poster Abstracts

## P101
### OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURE: USE OF SUBLAMINAR MERSILENE TAPE AUGMENTED PEDICLE SCREWS

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**Objective:** To assess safety and efficacy of sublaminar mersilene tape augmented pedicle screws fixation as a novel and low cost modality of spinal instrumentation for osteoporotic vertebral compression fractures treatment.

**Methods:** A retrospective study of 40 consecutive patients of the osteoporotic vertebral compression fractures. All patients were operated with open surgery with decompression, pedicle screw fixation, and sublaminar mersilene tape augmentation. Clinical, functional, and radiological outcomes were compared to describe the utility of sublaminar mersilene tape augmented pedicle screws for the treatment of osteoporotic vertebral compression fractures.

**Results:** Compete neurological improvement was noted in 38 patients (Frankel Grade-D to Grade-E), two patients remain with Frankel Garde D neurology. Significant improvement was noted in VAS (preoperative $7.90\pm0.60$ to final follow-up $2.90\pm0.54$) and ODI (preoperative $77.10 \pm6.96$ to $21.30\pm6.70$ at final follow-up). Significant improvement was noted in local kyphosis angle (preoperative $22.14\pm2.60$ to $10.40 \pm1.40$ at postoperative) with a 10% loss of correction ($2.5\pm0.90$) at final follow-up. There were no pseudoarthrosis and implant failure noted. No iatrogenic dural or nerve injury. Superficial wound infection was noted in two patients that was managed with debridement and antibiotics.

**Conclusion:** There is a high chance of implant failure in the osteoporotic spine due to poor bone quality. Sublaminar mersilene tape augmented pedicle screws fixation is a novel and low-cost modality for osteoporotic vertebral compression fracture. It provides significant improvement in clinical, radiological, and functional outcomes. It is an alternative option for osteoporotic vertebral compression fractures fixation to avoid long construct or cement related complications. A mersilene tape is radiolucent material and does not affect postoperative MRI.

## P102
### EFFECT OF TERIPARATIDE VS. CALCITONIN ON SPINAL FUSION IN OSTEOPOROSIS PATIENTS

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**Objective:** Osteoporosis is a progressive metabolic bone disease that is characterized by a decrease in bone mass and density. TLIF is biomechanically a better technique for the treatment of degenerative lumbar disease. Teriparatide (rPTH) is the only anabolic agent that has been approved for the treatment of osteoporosis. The study aim was to evaluate the efficacy of teriparatide for TLIF in osteoporotic women.

**Methods:** 94 osteoporotic patients underwent TLIF surgery for degenerative lumbar spine disease. Patients were divided into two groups. The calcitonin group (n=48) was administered nasal calcitonin (200 IU) for 2 months. The teriparatide group (n=46) was injected subcutaneously with teriparatide (20 ug/d) for 3-month cycles. Serial plain x-rays, computed tomography, and BMD evaluations were performed. Fusion rate, bony fusion duration, and T-score changes were evaluated. VAS and ODI were evaluated.

**Results:** The teriparatide group showed earlier fusion than the calcitonin group. The mean bone fusion period was $5.8\pm4.7$ months in the teriparatide group but $9.4\pm5.2$ months in the calcitonin group. The bone fusion rate in the teriparatide group was higher than that in the calcitonin group at 5 months; however, there was no difference after 12 and 24 months surgery. Pain scores and ODI were not significantly different between groups. BMD scores in the teriparatide group were significantly improved compared with the calcitonin group 2 y after surgery.

**Conclusion:** There was no significant improvement in overall fusion rate and clinical outcome in our patients after injection of teriparatide, but the teriparatide group showed early bony union and highly improved BMD scores.

## P103
### OSTEOPOROTIC BURST FRACTURE: OUTCOMES OF THREE-COLUMN RECONSTRUCTION SURGERY

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**Objective:** To evaluate a novel effective procedure utilizing three-column reconstruction via a posterior approach with a technique that utilizes an arthroscope to visualize the anterior surface of the dura during decompression.

**Methods:** A prospective study. 80 Osteoporotic vertebral burst fracture patients with similar demographic data, clinical parameters (visual analog scale: VAS; Oswestry Disability Index: ODI; Frankel grade) and radiological parameters (BMD, kyphosis) managed by three-column reconstruction through single posterior approach surgery: pedicle screw fixation, corpectomy, arthroscope assisted transpedicular decompression and fusion (mesh cage + bone grafting). Preoperative data, postoperative data, surgical variables and complications were recorded analysed.

**Results:** No significant differences in demographic data. Significant improvement was noted in VAS (pre-operative, $7.90\pm0.60$; final follow-up $2.90\pm0.54$) and ODI (preoperative, $77.10\pm6.96$; final follow-up $21.30 \pm6.70$). Neurological improvement was noted in 74 patients (Frankel grade E) while six patients remained nonambulatory (Frankel grade C). Significant improvement was noted in local kyphosis angle (preoperative, $22.14\pm2.60$; postoperative, $10.40\pm1.40$) with a 10% loss of correction ($2.5\pm0.90$) at final follow-up. Implant failure in two patients and proximal junctional failure in two patients managed with revision surgery. No iatrogenic dural or nerve injury.

**Conclusion:** Osteoporotic burst fracture can be managed with single posterior surgery, three-column reconstruction with mesh cage. It provides a significant improvement in clinical, radiological and functional outcomes. The arthroscope can improve a surgeon's operative field and magnification thereby ensuring complete decompression without injuring the dura or spinal cord.

## P104
### THE OBESITY PARADOX AND BONE LOSS
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**Objective:** Most of the available evidence supports a lower risk of vertebral fracture in obese adults. This belief was partially suggested by the positive correlation between BMD and BMI. This study aimed to assess the association of BMI with BMD and to explore their relation with age and gender.
**Methods:** This is a cross-sectional study including Tunisian patients referred for an assessment of BMD through DXA. BMD was measured using standard methods over the lumbar spine L1-L4, the total proximal femur. The results were expressed as T-scores according to the WHO definition. Patients were subgrouped according to age ($\leq$50 and >50 y). Association between BMD and age as well as BMI was also assessed (G1: obese patients and G2: nonobese patients). The level of significance was fixed for $p<0.05$.
**Results:** The study included 100 patients with a female predominance (sex ratio=10.1). The mean age for women was 61.9±13 y [18-83] and the mean age for men was 59.7±7.5 y [47-72]. The mean BMI was 29.1±5 kg/m² [15-45] for women and 27.6±3.6 kg/m² [22.8-32.9] for men. 40% of all patients were obese with a mean BMI of 32.9±4.3 kg/m². Osteopenia was diagnosed in half of the men (55.5%) and most of the women (70%). 29% of patients suffered from osteoporosis. BMD of the spine was similar between men and women (p=0.53). Men had higher BMD of the hip than women (p=0,038). The mainstream of the subjects >50 y had more vertebral fractures, suffered more from osteoporosis and had a higher BMI than those < 50 y (95 vs. 5%; p=0.04), (92.3 vs. 77%; p=0.03) and (82.5 vs. 17.5%; p=0.05), respectively. There was no correlation between BMD of the spine and higher BMI (0.94 in G1 vs. 0.98 in G2, p=0.3). Similarly, there was no correlation between BMD of the hip and higher BMI (0.9 in G1 vs. 0.84 in G2, p=0.2). Moreover, Obese patients had less a vertebral fracture but with no statistically significant correlation (21% in G1 vs. 25% in G2; p=0.2).
**Conclusion:** Our study showed that obesity was frequent among Tunisian patients but was not associated with a higher BMD. Older age was directly associated with a lower BMD and higher risk for vertebral fracture.

## P105
### DENSITOMETRIC VERTEBRAL FRACTURE ASSESSMENT: FACTORS LIMITING GOOD VISIBILITY OF THE VERTEBRA
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**Objective:** The radiograph of the spine is the gold standard for identifying vertebral fractures (VF). Vertebral fracture assessment (VFA) is a new feature available on modern densitometers that could assess VF. This technique offers the advantage of low irradiation over standard radiography but at the cost of lower image quality. The aim of this study was to assess factors associated with good vertebra visibility when using VFA.

**Methods:** This is a cross-sectional study including patients referred by their physicians for BMD measurement. Anthropometric data were recorded. BMD was measured using standard methods over the lumbar spine L1-L4, the total proximal femur. Results were expressed as T-scores using DXA. The screening for VF was performed by VFA. A professional operator analyses VFA scans and assessed the good visibility of the vertebra.
**Results:** The study included 100 patients. The mean age was 61.7±12.6 y [18-83]. The average BMI was 28.9±24.2 kg/m² [14.2-45.3]. The mean T-score at the vertebral site was -1.5 SD [-4.9-1.5] with a mean mass of 0.95 g/cm² [0.58-1.371]. Osteoporosis was found in 27.7% of patients. A vertebral fracture was diagnosed in 25% of cases. The visualization of the vertebra was impaired in the upper thoracic region in 60% of cases. Poor visibility was observed in 19% of cases in the mid-thoracic spine and only in 2% of cases in the lumbar spine. No statistically significant correlation was found between good vertebral visibility and age (p=0.2), weight (p=0.5), or BMI (p=0.7). However, good visibility of the vertebra was associated with a lower height (1.7 vs. 1.5 m, p=0.03). A better vertebrae visualization was correlated neither to the BMD of the right hip (0.84 vs. 0.87, p=0.4) nor to the left hip (0.85 vs. 0.89, p=0.3). Similarly, the absence of vertebral osteoporosis was not correlated with a better vertebral visualization (p=0.6).
**Conclusion:** Visibility of the vertebra on VFA does not appear to be altered by the BMD and vertebral osteoporosis, suggesting safe use in the elderly. However, precautions may be taken when interpreting VFA in patients with high heights.

## P106
### RELIABILITY OF VERTEBRAL FRACTURE ASSESSMENT
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**Objective:** Vertebral fracture assessment (VFA) is a new feature available on modern densitometers. Yet, the assessment of vertebral fracture (VF) status has not become standard practice. Our study aimed to evaluate the reliability of VFA as assessed by a rheumatologist and a radiology technician
**Methods:** We conducted a cross-sectional study assessing the performance of low radiation single energy x-ray absorptiometry VFA for the detection of VF. We selected patients who were assessed for osteoporosis according to screening protocols. BMD was measured using standard methods over the lumbar spine L1-L4, the total proximal femur, and results were expressed as T-scores. All VFAs were independently evaluated by 2 experienced readers: a rheumatologist and a radiology technician for the identification of VF (T4-L4). VF was classified according to the Genant grading system: grade 1 for an anterior, mid or posterior reduction of 20-25% in vertebral height; grade 2 for a reduction of 25-40%; and grade 3 for a reduction of >40% in vertebral height. A score for the interrater reliability between the readers was expressed using the kappa statistic.
**Results:** 100 patients were included with a mean age of 66.9±9.5 y [46.7-83]. There was a female predominance (91%). Nearly half of patients had osteopenia (48.9%), 27.7% had osteoporosis and 23.4% had a normal BMD. On VFA scans, the nonvisible vertebra was mostly located in the upper thoracic spine (60%). The mean number of VF was 1.2 [0-3] for both readers. According to the doctor's evaluation, 25% of patients had at least one VF, of which 75.9% had a Genant grade 1, 17.2% had grade 2, and 6.9% had grade 3. According to the technician evaluation, at least one VF was found in 36% of patients. A grade 1 was assessed in 91.7% of cases, a grade 2 in 8.3% of patients, but no VF grade 3 was assessed. A kappa score for the interrater reliability between the readers for VFA was 0.545 (p=0.000). The overall agreement by grade between the readers was 0.785 (p=0,000). The exclusion of

nonvisible vertebra resulted in a better agreement (k=0.853). Further analysis excluding vertebra T4 to D10, revealed a very good agreement (k=0.9).

**Conclusion:** Our study showed a low agreement between the readers on VFA and a better agreement when nonvisible vertebrae were excluded. Thus, caution should be advocated when relying exclusively on this device.

## P107

### OUR EXPERIENCE WITH QUS OF PHALANX IN SECONDARY OSTEOPOROSIS IN IRAN

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**Objective:** DXA is gold standard of bone densitometry, but it is expensive, nonportable and uses radiation. Quantitative ultrasound (QUS) of bone has fewer burdens and is portable. QUS of phalanx, due to physical and structural characteristics of phalanx is one the most practical BMD machine. So we tried to assess its usefulness in osteoporosis diagnosis.

**Methods:** We entered 200 adult secondary osteoporosis patients (rheumatoid arthritis, hemodialysis, renal transplantation and levothyroxine users) to this study and compared their phalanx QUS results with normal age and sex matched controls. Also the results of QUS, compared with DXA results to find the correlation between these two methods in diagnosis of osteoporosis.

**Results:** Results was not significantly different between normal and patients except in hemodialysis patients (P value=0.00). Also the results of QUS compared with DXA results showed no significant correlation in diagnosis of osteoporosis except in hemodialysis in spine and femoral region (P value=0.023 and P value=0.21, respectively) and levothyroxine group in spinal region (P value=0.005).

**Conclusion:** Our results suggest that QUS of phalanx may be useful in screening secondary osteoporosis; but for establishment of diagnosis by QUA, DXA measurement is needed.

## P108

### PREDICTING RESPONSE TO VITAMIN D TREATMENT ON OSTEOARTHRITIS: A RADIOMICS NOMOGRAM BASED ON MRI

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**Objective:** To develop and validate a radiomics nomogram by combing the optimized radiomics features extracted from MRI images and clinical characteristics for predicting the treatment response of vitamin D supplementation defining as 20% improvement of knee pain on patients with osteoarthritis (OA). **Methods:** Participants were selected from the Vitamin D Effects on Osteoarthritis (VIDEO) study, which is a randomized, placebo controlled, and double blinded clinical trial. 216 patients in Hobart center underwent MR scans of the target knees using a 1.5 T MRI scanner were analyzed. We segmented and depicted tibial subchondral bone region of interests that beneath articular cartilage and above epiphyseal line. Radiomics-based predicting models incorporating the radiomics features and independent clinical risk factors were constructed using Relief (RELF) based feature selection method and logistic regression based classification method, and expressed as a nomogram in the training cohort (n=172). The performance of radiomics nomogram was assessed by discrimination, calibration and clinical constructive validity. The results were then validated in an independent validation cohort (n=44). **Results:** A total of 974 radiomics features were extracted from T1 and T2 images for each patient in the training cohort. The radiomics nomogram incorporating six selected radiomics features, sex, baseline total knee pain score, radiographic OA ROA) score, bone marrow lesions (BML) achieved a better discrimination performance than clinical model (sex, total knee pain score, ROA and BML) in both training (AUC: 0.77 vs. 0.70) and validating cohort (AUC: 0.80 vs. 0.71). The calibration curve showed satisfactory concordance between the observed and estimated frequencies in both cohorts. Additionally, radiomics nomogram outperformed the clinical model with favorable net reclassification index [0.20 (95%CI: 0.06-0.34) in training cohort and 0.24 (95%CI: 0.02-0.48) in validating cohort]. Decision curve analysis confirmed the clinical usefulness of radiomics nomogram for predicting treatment response of vitamin D supplementation on OA patients. **Conclusion:** The MRI based radiomics nomogram achieves a favorable predictive efficacy in differentiating responders from non-responders among OA patients treated with vitamin D. This proof-of-concept study provides a promising way to predict clinical outcomes of certain OA treatments.

## P109

### DO FRAILTY SCORES PREDICT OUTCOME AFTER PROXIMAL FEMORAL REPLACEMENT FOR MUSCULOSKELETAL TUMOURS?

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**Objective:** Frailty is a concept where an individual has exceptionally low physiological compensation, resilience and adaptive capacity to external stressors with unfavourable consequences. Frailty has a negative independent relationship with morbidity and mortality. The aim of this study was to investigate frailty in patients undergoing surgery for musculoskeletal tumours, by applying frailty scoring systems and exploring correlations with survival and secondary outcome measures.

**Methods:** This was a retrospective study of patients over 60 y of age undergoing proximal femoral replacement for musculoskeletal tumours. Patients were classified as fit, vulnerable or frail using the modified frailty index, Rockwood and ASA grading systems. Correlation was performed with outcomes including survival and length of hospital stay (LOS).

**Results:** 85 patients were identified of mean age 72.6 y. Median follow-up was 18.9 months (range 0.1-56.4). The overall median survival in frail groups was 19.8 months regardless of the scoring system used. Frail patients classified by the Rockwood score had a greater LOS and a trend to reduced survival.

**Conclusion:** There is a high prevalence of frailty in this cohort of patients. The Rockwood score is related to overall survival and LOS. Therefore, frailty scores should be considered when planning surgery as part of appropriate holistic care. Moreover, a median survival greater than 18 months in frail patients supports the decision to offer surgery which

may positively impact quality of life in the short term. Further research to identify the relationship between frailty and outcomes in musculoskeletal tumour patients is needed.

## P110
### WHAT IS THE ROLE OF RNA N6-METHYLADENOSINE IN OSTEOPOROSIS? A SYSTEMATIC REVIEW

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**Background:** RNA N6-methyladenosine (m6A) modification has been widely reported to play a significant role in oncology. Some recent studies suggested m6A was also involved in bone development and metabolism. Nevertheless there was no summarized evidence to reveal the impact of m6A on osteoporosis.

**Methods:** We conducted a systematic review to include studies assessing the role of m6A in osteoporosis by searching PubMed and EMBASE (up to July 2019). Studies that evaluated the association between m6A and bone metabolism and osteoporosis, and provided sufficient data for extraction, were eligible for inclusion.

**Results:** There were nine studies included for analyses, among which six were experimental research, two candidate gene association studies, and one genomewide association study. M6A methyltransferase METTL3 and demethyltransferase FTO were found to be involved in the delicate process between adipogenesis differentiation and osteogenic differentiation. Conditional knockdown of the METTL3 in bone marrow stem cells could suppress PI3K-Akt signaling, limit the expression of bone formation-related genes, restrain the expression of vascular endothelial growth factor and downregulate the decreased translation efficiency of PTH receptor-1 mRNA. Similarly, FTO prompted the shift of BMSC lineage commitment to adipocyte and inhibited bone formation during osteoporosis.

**Conclusion:** RNA m6A performs important functions in osteoporosis, which may be helpful in prevention, treatment, and management of osteoporosis.

## P111
### THE INFLUENCE OF ANTI-TNF DRUGS ON OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** In rheumatoid arthritis (RA), because of inflammation and steroid therapy, there is an elevated risk for the patients to develop osteoporosis. In fact, the more inflammation, the more severe the osteoporosis. AntiTNF drugs, because of the inhibition of TNF, could improve the bone turnover and eventually the bone densitometry in patients with RA. This study aimed to evaluate the impact of anti-TNF drugs on osteoporosis in patients with RA.

**Methods:** This is a case-control study including 123 patients with RA. The first group consisted of 63 patients with RA, receiving methotrexate as disease-modifying antirheumatic drug (DMARD), besides steroids, NSAIDs, and calcium supplements. The second group consisted of 60 patients receiving the anti-TNF drug as well as the medication the first group received. All patients were evaluated before and 1 y after the therapy initiation about their DXA. All data were gathered and analyzed using statistical methods.

**Results:** After gathering and evaluating all data, it resulted that for the first group, there was a slight worsening of DXA results after 1 y of conservative therapy (T-score L1-L4 average, from -2.4 to -2.6); while for the second group, the T-score L1-L4 changed from -2.3 to -1.8.

**Conclusion:** It was found that the use of anti-TNF drugs in patients with RA may contribute to improving DXA results and eventually in reducing the risk for osteoporosis.

## P112
### COST OF OSTEOPOROSIS-RELATED HIP FRACTURES IN A PRIVATE TERTIARY HOSPITAL

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**Objective:** Osteoporotic fractures, especially of the hip, lead to great burden both for the patient and economy. Due to the paucity of burden of illness studies of osteoporosis in the Asian region, particularly the Philippines, it is difficult to allocate healthcare resources appropriately for fracture prevention. The availability of information on the financial burden of osteoporosis-related fractures, particularly in the local region, will create awareness of the size of the problem as well as assist healthcare authorities to initiate appropriate programs and strategies. This study aimed to determine the cost of osteoporosis-related hip fractures in a private tertiary hospital.

**Methods:** Data from the medical records of patients diagnosed with osteoporosis-related hip fractures who were hospitalized from January 1, 2017 to December 31, 2019 were analyzed. The researcher recorded the patient's demographic data, type of hip fracture, type of treatment, duration of hospitalization, and medical costs. Descriptive statistics, t-test, chi-squared test, ANOVA with Tukey HSD test and regression analysis were employed to treat and analyze the different sets of data.

**Results:** Among the 150 patients, 44.6% were within the ≥80 years old age group and majority (76%) were females. The most common type of osteoporotic hip fracture involved the femoral neck (52.7%) and most of the patients underwent partial hip replacement (66%). Patients ≥80 age group, those sustaining an intertrochanteric fracture and those who were treated with internal fixation had a longer length of stay in the hospital. There was note of a parallel increase in the direct medical cost as the patients age group got older. It was found that femoral neck fracture had significantly higher implant costs while the other costs (hospitalization, surgery, laboratories, and medications) were observed to be comparable between the two types of fracture.

**Conclusion:** The overall mean cost of osteoporotic hip fracture was 5227.78 USD. The implant used on average accounted for approximately 27% of the total direct medical costs. It was noted that 26% and 23% of the total cost was attributed to the cost of surgery and hospitalization, respectively. Medication costs accounted for 11%, while laboratory costs comprised 13% of total costs.

## P113
### REARRANGING THE PLAYLIST - OPTIMIZING SEQUENTIAL AND COMBINED ANABOLIC & ANTIRESORPTIVE THERAPY FOR OSTEOPOROSIS MANAGEMENT: A CONSENSUS REPORT BY THE EGYPTIAN ACADEMY OF BONE HEALTH

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**Objective:** With the expansion of osteoporosis therapy options, clinical guidelines started to adopt new concepts such as short treatment courses and drug holidays. The introduction of the new concept of very high fracture risk has had its impact on the choices that treating doctors make when commencing, selecting to continue, or switching therapies. Therefore, one of the vital decisions which should be carefully considered is whether, when, and in what sequence anabolic/antiresorptive therapies should be employed. Aims: 1. to review and update the available therapeutic interventions approaches of osteoporosis patients at very high fracture risk, based on the best possible evidence; 2. to determine the manner in which these therapies can be implemented to standardize clinical practice for the prevention of osteoporotic fragility fracture.

**Methods:** Delphi approach was convened to establish consensus among bone health experts on best practice management approach for patients at very high risk of osteoporotic fragility fractures adopting a treat-to-target strategy. The level of evidence and the grade of recommendation were classified according to the model of the Center for Evidence Based Medicine in Oxford, and the grade of agreement was extracted using the Delphi technique. A Delphi questionnaire was developed and each statement was rated between 1-9 with 1 being 'complete disagreement' and 9 being 'complete agreement'.

**Results:** The expert panel composed of 24 experts employed a two-round Delphi consensus process. Seven statements were included entailing the sequential and combination therapy for management of osteoporosis in patients at very high fracture risk. Very high fracture risk was defined as BMD T-score <-2.5 in addition to multiple vertebral fractures or FRAX probability >30% MOF, >4.5% hip fracture. Level of evidence was 2a for sequential therapy and 2b for combined therapy (PTH and denosumab). Agreement with the recommendations (rank 7-9) ranged from 83.3-95.8%. After making some amendments, consensus was reached (i.e., ≥75% of respondents strongly agreed or agreed) on the wording of all 7 recommendations. The mean rate of agreement ranged between 8.38 ±1.06 and 8.71±0.69. An updated treatment algorithm was produced including recommended therapeutic options, duration of treatment and post-treatment management protocols.

**Conclusion:** Based on the available evidence and expert clinical experience, this work was able to stimulate a cohesive approach to the management of osteoporosis in patients at very high fracture risk to replace current variations in therapeutic options. It can serve as a useful tool that will contribute to the standardization of clinical practice for this pathology. Optimizing therapeutic approaches with sequential anabolic/antiresorptive as well as combined antiresorptive/anabolic therapies appear to provide the most substantial and clinically relevant skeletal benefits to this osteoporotic patients cohort.

## P114
## INFLUENCE OF PHARMACOLOGICAL OSTEOPOROSIS TREATMENT ON REFRACTURES FOLLOWING KYPHOPLASTY

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**Objective:** To examine the relationship between pharmacological osteoporosis treatment on the refracture rate in patients who have had a thoracic or lumbar level kyphoplasty. A kyphoplasty was a noninvasive vertebral augmentation surgery used to treat compression fractures. It was a known fact that a kyphoplasty could cause future compression fractures at the levels above and below the initial procedure. In addition, spinal compression fractures were considered to be osteoporotic fractures.

**Methods:** A single center observational cohort study with 192 patients who had kyphoplasty from 2015-2019 was conducted. The cohort was divided into two groups with a 1:1 ratio. The two groups were labeled Group I (pharmacological osteoporosis treatment) and Group II (no pharmacological osteoporosis treatment). Refracture was defined as having at least one future osteoporotic compression fracture requiring a kyphoplasty after the initial. Patients that had a subsequent fracture following the initial kyphoplasty procedure were placed into the "post kyphoplasty refracture" category, whereas those that did not have a fracture subsequent to the initial kyphoplasty were categorized as "no post kyphoplasty refracture". 44 patients self-reported the intent to start osteoporosis treatment with their primary care provider and were placed in an intended to treat group (ITT).

**Results:** A chi-square independence test was used to analyze the data. There was a significant reduction in the refracture rate ($\chi^2$=4.4045, p=0.036). In Group I, the ITT group were the only patients who were lost to follow up. 0 were lost to follow up in Group II.

**Conclusion:** The chi-square independence test suggested a strong dependent relationship between pharmacological osteoporosis treatment and the refracture rate following kyphoplasty and determined significance in data. This study gave physicians a treatment method to reduce the chance of patients developing future compression fractures. Thus, leading to far less future kyphoplasty procedures.

## P115
## POTENTIAL INTEREST OF VITAMIN D SUPPLEMENTATION TO PATIENTS WITH RESPIRATORY TRACT INFECTIONS (RTI)

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**Objective:** Assessment of the overall effect of vitamin D supplementation using relevant procedure to improve the prognosis of RTI either in cases of frequent infections or to prevent or minimise effects of acute RTI.

**Methods:** After review and analysis of multiple publications and several studies, this retrospective meta-analysis of data help to demonstrate that vitamin D supplementation is safe and can protect against acute RTI whatever the age of the patients. This communication reviews the roles of vitamin D in reducing the risk of RTI, knowledge about the evidence that vitamin D could reduce, particularly, risk of influenza infections by several mechanisms including cathelicidins and defencins that can lower viral replication rates and reducing concentrations of pro-inflammatory cytokines that contribute to produce the inflammation that injures the lining of the lungs, leading to pneumonia as well as increasing concentrations of anti-inflammatory cytokines.

**Results:** Vitamin D is considered to be important for a healthy immune system by inducing expression of antimicrobial peptides in immune cells and at epithelial surfaces [1]. Moreover vitamin D has anti-inflammatory effects on the adaptive immune system and can downregulate pro-inflammatory cytokines and increase immune regulatory T-cells [2,3]. Both innate and adaptive immune responses can very according to different polymorphisms found in many steps of the vitamin D pathway.

**Conclusion:** The vitamin D supplementation increases the probability to stay free of RTI. In many studies, the findings support the notion that vitamin D status should be monitored in adult patients with RTI and suggest that an adapted supplementation of vitamin D deficiency could

be a safe and cheap way to reduce RTI and improve health in this vulnerable patient population. To reduce the risk of infection, it is recommended that people at risk of RTI consider taking for adult patient about 2000 UI/d of vitamin $D_3$ to raise 25(OH)D concentration above 40-50 ng/ml.

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## P116
## POTENTIAL CONTRIBUTION OF VITAMIN D IN SARS-COV-2 VIRUS/COVID-19 DISEASE (SCVD)

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**Objective:** To provide a balanced scientific view on vitamin D and SCVD. It reports many information resulting from several and recent studies, providing from different sources.

**Methods:** It has been reported in many recent studies that vitamin D deficiencies have a higher risk of mortality from SCVD and it has been suggested that vitamin D supplementation can be effective in lowering the rate of SCVD intensive care unit admissions. In view of current interest in vitamin D as a potential factor in the COVID-19 pandemic, we have analysed, by retrospective review, the ways in which vitamin D reduces the risk of viral infections [1,2], and the potential contribution in COVID-19 disease. Vitamin D has many mechanisms by which it reduces the risk of microbial infection and death. The most commonly processes known are: physical barrier, cellular natural immunity and adaptive immunity [3]. Vitamin D helps maintain right, gap, and adherences junctions [4].

**Results:** Vitamin D enhances cellular innate immunity partly through the induction of antimicrobial peptides, including human cathelicidin [5,6] and defensins [7]. Vitamin D also enhances cellular immunity, in part by reducing the cytokine storm induced by the innate immune. This system generates pro-inflammatory and anti-inflammatory cytokines in response to viral and bacterial infections as observed in COVID-19 patients [8]. It is relevant to suppose that an adapted supplementation to patients, taking in account the turnover of vitamin D in the body, by reference to 25(OH)D serum concentration could be imagined as reference, taking everything into consideration.

**Conclusion:** We can confirm observational evidence of a link of vitamin D with mortality and morbidity of SCVD. Based on the concept of balance benefit risk, we propose to people at risk of SCVD and diagnosed patients, a supplementation of vitamin D for adult patient, close to 2000 UI/d of vitamin $D_3$ to raise 25(OH)D concentration about 50-60 ng/ml.

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## P117
## METFORMIN USE AND RISK OF TOTAL JOINT REPLACEMENT IN PATIENTS WITH DIABETESA POPULATION-BASED COHORT STUDY

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**Objective:** To examine the association of metformin prescription with risks of total knee and/or hip joint replacement among patients with type 2 diabetes.

**Methods:** A population-based cohort study used 2000-2013 Taiwan's national health insurance research database. We selected patients over 45 years old when they newly diagnosed with type 2 diabetes mellitus (DM). DM patients were classified into metformin and nonmetformin users based on if metformin was ever used after diagnosis. Prescription time-distribution matching (PTDM) was performed to select the age, sex, and year of DM diagnosis paired exposure and nonexposure candidates. Then, propensity score matching (PSM) was used to balance the age, sex, urbanization, insurance type, adapted diabetes complication index, medications for pain management, hyaluronic acid and physical rehabilitation between two groups. The risk of knee and/or hip joint replacement after metformin use were assessed using Cox proportional hazard regression. Dosage of metformin (0, $\leq$1.0 mg/d; >1 mg/d) at baseline and the landmark (12/24 months after first prescription) were performed to evaluate potential dose-response relationship. Sensitivity analysis was performed by using inverse probability of treatment weighting (IPTW) and completing risk models.

**Results:** A total of 40,694 participants (20,347 nonmetformin vs. 20,347 metformin) were included (mean [SD] age, 63 [11] y; 49.8% were women) after PTDM. Comparing with the nonmetformin users, patients who used metformin had a lower risk of total knee or hip joint replacement (adjusted HR (aHR) = 0.67, 95%CI=0.58-0.76 for any joint replacement; aHR=0.67, 95%CI=0.59-0.79 for total knee replacement; aHR=0.59, 95%CI=0.41-0.85 for total hip replacement) after adjustment for covariates. PSM analyses in participants (10,163 nonmetformin vs. 10,163 metformin) and sensitivity analyses using IPDW and completing risk models showed similar results. Significant dose-response relationships (all p for trend <0.05) were observed between metformin use at baseline or 12/24 landmark points and total knee/hip replacement.

**Conclusion:** Use of metformin in patients with type 2 diabetes was associated with a significantly reduced risk of total joint replacement due to osteoarthritis, suggesting a potentially therapeutic effect of metformin on osteoarthritis. Further randomized controlled clinical trials are warranted to confirm the findings.

## P118
## ATYPICAL FEMORAL FRACTURE, OSTEOPOROSIS AND BIPHOSPHONATES: WHAT IS THE RELATIONSHIP?

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**Objective:** To know the personal history importance of each patient when evaluating long bone fractures and posterior management.

**Methods:** We present the case about a 55 years old women who suffers accidental trauma at home that causes several pain and functional impotence so she decides to go to the hospital where she is diagnosed with a subtrochanteric femoral fracture.

**Results:** Analyzing the radiological characteristics of the fracture, we are surprised by the fact that it meets the criteria for an atypical fracture so when asking about personal history and previous treatments, the patient

tells us that she has been taking bisphosphonates for three years due to osteoporosis and the last month she refers a pain in his left hip that prevents her from walking normally.

**Conclusion:** Bisphosphonates are medications used for the osteoporosis treatment in order to reduce the risk of fracture in these patients, but should not be administered indefinitely because their effectiveness decreases beyond 5 years and the increased risk of serious adverse events, such as atypical femoral fractures.

## P119
### HIP DYSPLASIA, OSTEOPOROSIS AND CUT-THROUGH NAIL: NOW WHAT?

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**Objective:** Know the possible complications that can exist in elderly patients who suffer trochanteric fractures.

**Methods:** We present the case about a 88 years old patient who suffers 3 months ago a trochanteric femoral fracture after falling at home. The x-ray shows a typical pertrochanteric fracture, but really impresses us is the several same hip dysplasia that the patient suffers.

**Results:** As the objective of treatment in this patient was to nail the fracture, we proceed to do, using a standard gamma nail, with good postoperative results and in subsequent consultations. The patient was walking a month after the surgery with some independence at daily life. Three months later the patient comes to the consultation with hip pain and inability to walk, at the x-rays we can see one type of complication that does not occur frequently in this type of age patients, a cut-through nail, with a small difference, this patient had a several dysplasia at same hip that increased the difficulty in managing this complication.

**Conclusion:** In the cut-through exists a central position perforation at the hip joint without cephalic screw loosening. These type of complications can be explained by a biomechanical change in the fracture site when the patient begins loading and walking on the member intervened. Collapse of the femoral neck and shear forces in a comminuted area, around the lag screw can produce a collapse in the area of the fracture. Having osteoporosis is also an added risk factor in these patients to suffer this type of complication.

## P120
### DOUBLE OSTEOPOROTIC FRACTURE IN UPPER EXTREMITY, ARE WE DOING IT RIGHT?

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Osteoporosis is a systemic disease whose incidence is increasing in recent years. Therefore it, the incidence of osteoporotic fractures also increases. We present the case of a 63-year-old female patient, who suffered a subcapital fracture of the right humerus in 2019, treated conservatively with immobilization. After her recovery, a bone densitometry was performed, with which the patient was diagnosed with osteoporosis in the lumbar spine and grade II osteopenia in the femoral neck. For this reason, we decided to start, in October 2019, treatment with alendronic acid, calcium and vitamin D.

A year and a half later, the patient went to the emergency room due to a low energy fall on the public highway. She reported functional impotence in the right upper limb. X-rays are taken and the existence of a double fracture in the limb is observed: supra-intercondylar humerus fracture and distal radius fracture.
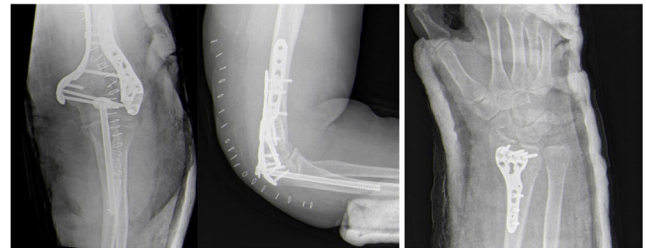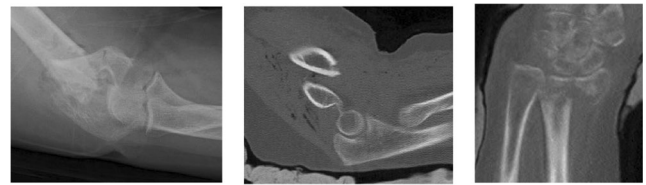


The patient needed surgery for both fractures, we performed osteosynthesis with 90° double plate in the elbow using a posterior approach with osteotomy of the olecranon and osteosynthesis with a preformed distal radius plate using a volar approach.

Osteoporosis is present in our daily work. This case shows us how a patient with correct treatment for osteoporosis suffers again a double osteoporotic fracture after a low-energy trauma. This makes us ask ourselves… are we really doing it right?

## P121
### SELF-DIRECTED AGEISM AND PHYSICAL PERFORMANCE AMONG OLDER ADULTS

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**Objective:** Age-related impairments in muscle performance have been proved to be influenced by various, including psychological, factors. Evidence shows that ageism negatively impacts the health of older adults: those with negative attitudes about ageing may live 7.5 years less than those with positive. This study aimed to explore possible links between physical performance and the prejudicial attitudes among older persons towards their own age group.

**Methods:** The survey consisting of 29 variables assessed sociodemographic parameters, physical fitness and attitudes toward ageing. Correlation, OLS regression and factor analysis were used.

**Results:** Based on the responses of 227 persons (age 60+/ ~73): education and rural environment reduce the tendency to think stereotypically. The negative elderly (self) picture increases with age. However, age-related perceptions were not correlated with BMI, the chair-test was the strongest predictor of the age-related attitudes (t=3.123, p=0.002). In a next step, we performed factor analysis on the 24-item scale about ageing perceptions. Four factors explained 50% of

the total variance, including the feeling of loneliness and exclusion, which proved to have a significant effect on muscle performance along with higher education, rural residence and age.

**Conclusion:** Seniors with negative stereotypes of ageing are characterized by significantly lower muscle performance. Investigation of the causal relationship between physical health and mental disposition is needed in order to verify if changing society's view of aging can delay age-related declines in muscle function.

## P122
### RISK FACTORS OF THE DEVELOPMENT OF OSTEOPOROSIS IN FEMALE WITH RHEUMATOID ARTHRITIS, NONTREATMENT BY GLUCOCORTICOIDS

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**Objective:** Tradition basic risk factors of osteoporosis (OP) is middle-age and glucocorticoids (GC), negative affect in quality of bone tissue and decrease BMD. Aim was to define role of rheumatoid arthritis (RA) in the development of OP in female with RA up to 60 years old, nontreatment with GC. **Methods:** The study included 52 RA females (according to ACR 1987 criteria), nontreatment of GC, in age between 20-60 years old (mean 50.2±7.4). An patient's file contained social and demographic data, anthropometric parameters, medical history, clinical and lab examination, traditional OP risk factors, joint status and comorbidities. Hand and distal feet X-ray was taken in each case. Van der Heijde modified Sharp method was used to score the erosions and joint space narrowing in hands and feet. Axial BMD was measured using DXA scan. DXA T-score was used in postmenopausal women and Z-score in menstruating women. After examination patient were divided in two groups with and without osteoporosis: 14 (26.9%) and 38 (73.1%), respectively. Both groups are similar by mean age and anthropometric characteristics, debut age and disease duration, stage of clinical lab activity and HAQ. **Results:** In first group vs. second, number of patients with 4 flares of RA during the last year were over (42.9% vs. 15.8%, p=0.04), difference was significant. Statistically significant intergroups differences was identified by quantitative assessment of X-ray by Sharp method (Sharp-Van der Heijde): the assessment of erosions in group 1 was 51(28.5-77), in group 2 was 6 (1.5-18), p<0.001, scoring of joint space narrowing 115.5(83-126) vs. 69(50-98), p<0.04 and the total Sharpe index 165(119.5-196.5) vs. 80(51-117), p<0.008, respectively. When assessing traditional risk factors, it was shown that in the postmenopausal period were 13 patients from group 1 (92.9%) and 21 (55.3%) patients from group 2 (OR=1.68, 95%CI 1.22-2.32, p=0.01). Periods of immobilization (more than two months) and low-energy fractures in the history were also more often detected in OP (respectively, 28.6 and 2.6%, OR=10.9, 95%CI 1.32–89.0, p=0.02; 50 and 18.4%, OR=2.71, 95%CI 1.13–6.52, p=0.03). Multifactorial analysis identified the following major OP risk factors: Sharp erosion score, fracture incident in medical history, menopause, smoking; the contribution of these variables in OP development was assessed (discriminant function coefficients: 0.0946; 3.6973; 3.5363; 2.6253, respectively). In according to revealed risk factors and their coefficients was created a ROC curve (AUC) model allows to predict the axial OP with high accuracy, equal to 92.9% (with the area under the ROC curve equal to 0.969, Fig.1).
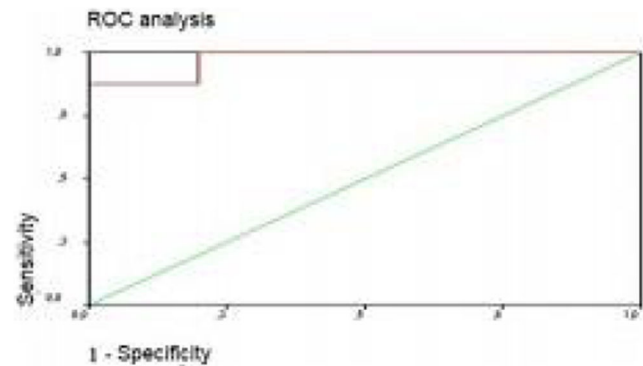


**Conclusion:** Development of OP in female with RA up to 60 years old, nontreatment of GC was conditioned to erosive X-ray changes in hand and distal feet (assessment by Sharp method), smoking, menopause and fact history of fracture.

## P123
### RAPAMYCIN IMPROVES BONE MASS IN HIGH TURNOVER OSTEOPOROSIS WITH IRON ACCUMULATION THROUGH POSITIVE EFFECTS ON OSTEOGENESIS AND ANGIOGENESIS

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**Objective:** Iron accumulation is an independent risk factors of type I osteoporosis, and mTOR plays an important role on the crosstalk between osteogenesis and angiogenesis. This study aimed to identify the role of mTOR in the high-turnover osteoporosis with iron accumulation, the underlying molecular mechanism, and whether rapamycin can target at mTOR treating type I osteoporosis with iron accumulation effectively.
**Methods:** We establish mouse models of iron accumulation and transgenic mouse models (Hepc$^{-/-}$) of high turnover type osteoporosis with iron accumulation to observe the variety of mTOR in these mice, and treat osteoblasts with FAC to watch mTOR in vitro. Then we injected rapamycin to mouse models of high turnover osteoporosis with iron accumulation, transfected the FAC treated osteoblasts with mTOR relative siRNA and cultured HUVECs with corresponding medium extracted from osteoblasts, to detect indexes of bone, osteogenesis and angiogenesis in bone and in vitro. Finally, relative biomarkers of cell signaling pathways were measured.
**Results:** We found the osteoblastic mTOR was activated both in mouse models of iron accumulation and high turnover osteoporosis with iron accumulation, and the deteriorative bone, osteogenesis and angiogenesis induced by iron accumulation were improved by suppressing mTOR with rapamycin in mice and siRNA transfection in vitro. The mTOR/STAT1/Cxcl9 pathway signals were stimulated by iron accumulation in osteoblasts.
**Conclusion:** Our study shows that iron accumulation impairs the bone regeneration of osteoporosis via osteoblastic mTOR/STAT1/Cxcl9 pathway, and rapamycin can target at mTOR improving osteogenesis and angiogenesis in bone of high turnover type osteoporosis with iron accumulation to increase bone mass.

## P124

### RESEARCH ON KEY MOLECULES OF OSTEOPOROSIS BASED ON PROTEOMICS OF BONE TISSUE IN POSTMENOPAUSAL WOMEN

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**Objective:** Using bone tissue proteomics analysis to find new mechanisms and new targets for the pathogenesis of postmenopausal osteoporosis, and to provide new strategies for the diagnosis and prevention of postmenopausal osteoporosis.

**Methods:** In this study, patients were screened according to the inclusion and exclusion criteria, and the femoral skull tissue samples were collected. A total of 96 femoral skull tissue samples were collected. A total of 83 samples were qualified for protein examination. The bone tissue samples were performed according to the BMD T value of the patient's hip. Grouping: normal group (T>-1.0, group A), osteopenia group (-2.5<T<-1.0, group B), osteoporosis group (T<-2.5, group C), all samples were protein Extracted, digested with trypsin, and labeled with TMT. After HPLC fractionation, liquid chromatography mass spectrometry was used to analyze the expression levels of different proteins in each bone tissue specimen; analysis of proteins with significant differential expression between each group of bone tissues (change fold ≥1.2, P value ≤0.05), perform bioinformatics analysis, and further screen the three groups of osteoporosis group, osteopenia group and normal group that show continuous upregulation or downregulation as possible key molecules of osteoporosis.

**Results:** This postmenopausal female bone tissue proteomics study identified 3743 proteins in human bone tissues, of which 3280 proteins contained quantitative information. Using 1.2 times as the differential expression change threshold and statistical test t-test p-value <0.05 as the significance threshold, then among the quantified proteins, the expression of 353 proteins in the B/A comparison group was upregulated, and 387 proteins The expression was downregulated; the expression of 343 proteins in the C/A comparison group was upregulated, and the expression of 288 proteins was downregulated; the expression of 224 proteins in the C/B comparison group was upregulated, and the expression of 310 proteins was downregulated; and for all differentially expressed proteins functional classification, functional enrichment and cluster analysis based on functional enrichment were carried out; through further screening of the proteins that showed continuous changes in the three groups, 18 downregulated proteins and 13 upregulated proteins were found, a total of 31 differences in the same direction and significant The proteins include COL1A1, COL1A2 and DMP1, which are known to play an important role in bone metabolism. Among the 31 differential proteins, 26 proteins have not been reported in bone metabolism related research.

**Conclusion:** This proteomics has identified a large number of proteins in the bone tissues of postmenopausal women, and found that there are significant differences in the proteins in bone tissues among people with normal, osteopenia and osteoporosis. Through screening, we have obtained 31 significantly different proteins. These proteins include not only the currently known protein molecules related to bone metabolism, but also many proteins with unknown functions and roles in the process of bone metabolism. These may be clues for new mechanisms and new targets for the pathogenesis of postmenopausal osteoporosis.
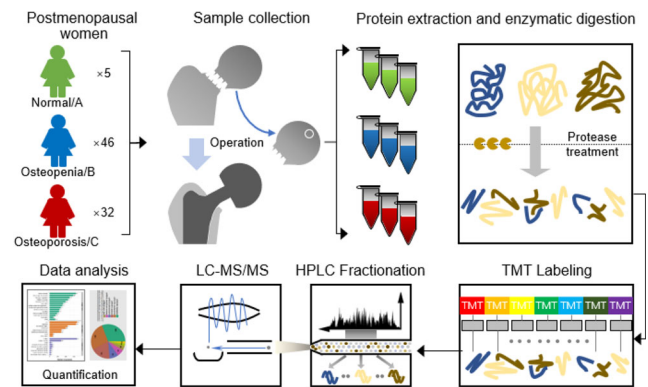


## P125

### MODERN POSSIBILITIES OF COMBINED THERAPY OF HYPERURICEMIA AND EXACERBATIONS OF ARTICULAR SYNDROME IN PATIENTS WITH GOUT

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**Objective:** Throughout the year 69% of patients with gout experienced repeated exacerbations during therapy aimed at reducing urate levels. Therefore, proper prevention of articular syndrome exacerbations in acute and chronic gout is very important. Prevention of arthritis exacerbations with low dose NSAIDs should be done in the first 3-6 months of urate-reducing therapy. This study aimed to assess the frequency of exacerbations and quality of life in patients with gout after a 12 weeks course of urate-reducing therapy with allopurinol in combination with the anti-inflammatory drug meloxicam for the prevention of gout exacerbations.

**Methods:** 143 patients with an established diagnosis of gout were examined at an outpatient appointment. Physical examination was performed in all patients with the calculation of anthropometric data indicators (height, body weight, BMI), blood pressure (BP) levels during visits. Clinical blood and urine tests, biochemical blood tests with determination of the level of uric acid, creatinine, C-reactive protein (CRP), instrumental diagnostics (electrocardiography). Information about concomitant diseases was entered, drug therapy was recorded on moment of the program. Allopurinol was administered orally, once a day. Every 3 weeks under the control of serum uric acid levels (sUA), the allopurinol dosage was increased by 50 mg, up to 300 mg/d. The total daily dose of meloxicam administered in different dosage forms was 7.5-15 mg. After 3, 6, 9 and 12 weeks, the clinical efficiency of treatment was assessed using the EuroQol-5D-5L questionnaire, physical examination, joint pain dynamics at rest, during movement and palpation, as well as the Likert scale and visual analog scale (VAS) in mm. Factors such as the presence of anxiety or depression, selfcare ability, normal daily activities of daily living were taken into account, as well as their rating of their level of satisfaction with the treatment on a scale of 1 to 5, where 1 is not an improvement but a deterioration and 5 is a very good result. Both the period of remission and the time before the onset of a recurrence of gouty arthritis were taken into account, as well as adverse events (AEs) were recorded.

**Results:** Against the background of treatment with meloxicam 7.5 mg/d, more than two-thirds of the patients did not experience a worsening of the joint syndrome with an increase in the dose of allopurinol to 300 mg/d. By the 12th week of follow-up, it was found that the characteristic features of gouty arthritis significantly began to differ in improving mobility, selfcare, habitual daily activities, reducing soreness, reducing anxiety and depression (p<0.05). Moreover, the initial ESR and sUA levels were significantly different from the follow-up endpoint (p< 0.05), indicating a positive effect on the inflammatory process. A 3-month course of combination therapy did not cause a significant increase in BP or change in serum creatinine clearance in the patients. From the gastrointestinal tract there were no adverse events. 90.9% of patients assessed the treatment efficiency as very good. AEs in the form of an allergic skin rash were observed in one patient. But there was no need to interrupt the treatment, as the rash completely disappeared without consequences after completing the course of treatment with allopurinol and meloxicam.

**Conclusion:** A 12-week combination therapy with allopurinol, a urate-reducing drug, and meloxicam, an anti-inflammatory drug, prevents exacerbation of joint syndrome and improves quality of life in patients with gout.

## P126
## EXAMINATION OF LEAN MASS CONTENT IN TYPE 2 DIABETES MELLITUS PATIENTS USING DIFFERENT HYPOGLYCEMIC DRUGS

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**Objective:** Diabetes mellitus can be one of the reasons for the loss of muscle mass. Since absolute muscle mass is strongly correlated with height or weight, relative muscle mass -appendicular muscle mass (AMM) indexes are used for sarcopenia diagnosis by DXA. The aim was to examine lean body mass in postmenopausal women with type 2 diabetes depending on prescribed hypoglycemic drugs.

**Methods:** A sample of 75 postmenopausal women with type 2 diabetes mellitus (53 women injected insulin and 22 women received oral antidiabetic drugs (metformin+sulfonylurea) were recruited to the research. Patients were matched for age (U=582.0; p=0.986), height (U=545.0; p=0.662), weight (U=453.5; p=0.133), and BMI (U=444.5; p=0.108). The age of the participants was 62.6 (59.6-66.4) y, BMI 32.7(29.3- 35.6) kg/m$^2$. Lean mass was measured using DXA. AMM, AMM in kg divided by height and BMI were calculated.

**Results:** We did not reveal the differences in the total amount of lean mass in grams (U=524.0; p=0.496), regional distributional of lean mass: trunk (U=538.0; p=0.604), android region (U=501.0; p=0.342), gynoid region (U=576.5; p=0.944) in patients with different types of hypoglycemic drugs. There were no significant differences in the AMM (U=504.5; p=0.364) and calculated indices of the quantitative state of the muscle component: AMM/height (U=479.0; p=0.228), AMM/BMI (U=484.0; p=0.251).

**Conclusion:** Our study did not find any significant differences in lean mass component in patients with type 2 diabetes mellitus received different hypoglycemic therapy.

## P127
## IMPACT OF CROSS HORMONAL THERAPY IN PATIENTS WITH GENDER DYSPHORIA: FINAL RESULTS

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**Objective:** Hormone therapy is the main medical strategy for patients facing gender transition. Cross hormone therapy, acts by suppressing gonadal hormones and secondary sex characteristics of the biological sex. The impact of long-term cross sex hormone therapy in the transgender population is still unknown. We present an analysis in the impact of hormone replacement therapy on BMD in patients with gender incongruity who attend a program with a multidisciplinary approach in Bogotá, Colombia. This study aimed to evaluate the impact of hormone affirmation therapy on BMD in transgender patients in a center with a multidisciplinary approach in Bogotá, Colombia.

**Methods:** A series of cases of patients with gender dysphoria of MTF (transgender woman) and FTM (transgender man) is reported. Before the start of hormone therapy, a bone densitometry was performed evaluating the lumbar spine (LS), total hip (TH) and femoral neck (FN) BMD. A year after the start of treatment a new BMD evaluation was carried out using bone densitometry. The impact of the hormone therapy on BMD was analyzed within the period of one year after its initiation by means of the difference in BMD in g/cm$^2$ and the change in the percentage in the MTF and FTM group.

**Results:** In the FTM group there was an increase in BMD of 2.2% in the lumbar spine and of 0.9% in the femoral neck. In the MTF group there was a gain of 17% in the femoral neck. All the patients had normal T- and Z-scores.

**Conclusion:** Cross hormone therapy in patients with gender dysphoria has a positive impact in BMD.

## P128
## SCREENING CALCANEAL BONE MINERAL DENSITY AMONG JORDANIAN WOMEN

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**Objective:** Osteoporosis is the most common systemic skeleton illness that is characterized by a reduction in bone density and increased risk of fracture. The diagnostic sensitivity of ultrasound measurement of the calcaneus in the prediction of hip fracture has been shown by recent large prospective studies to be similar to hip BMD measured with DXA and superior to spine BMD. For each standard deviation decrease in the measurement, the risk of fracture increases approximately two-fold. The aim of this study was to screen osteoporosis, osteopenia, and normal BMD between different age groups of Jordanian women in different parts of Jordan using a Hologic Sahara bone densitometer machine.

**Methods:** BMD of the calcaneal Jordanian Women screen had been executed by the National Woman's Health Care Centre in collaboration with the Jordanian Osteoporosis Society (JOPS) through woman's health awareness campaign from 2014-2016 using an easy and painless procedure; an osteoporosis screening measures the calcaneal T-score by placing the (Lt) foot in a Hologic Sahara bone densitometer machine for all ladies attended the campaign and were elder than 20 years.

**Results:** 776 women have been screened from different parts of Jordan, their age was (20-87) years. Using estimated BMD by heel ultrasound, few patients have T-scores below -2.5, whereas most women fall above this level especially postmenopausal women.

**Conclusion:** The discrepancies in the prevalence of osteoporosis are the result of several factors including differences in age-related bone loss, some medication, and secondary to other diseases.

## P129
## REHABILITATION PROGRAM IN OSTEOARTHRITIS PATIENTS DURING THE COVID-19 LOCKDOWN

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**Objective:** In 2020, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes coronavirus disease 2019 (COVID-19), changed the entire providing rehabilitation medical services for osteoarthritis patients. To minimize the rate of new infections and to preserve medical resources, most rehabilitation programs in Romania hospitals were postponed. The aim of this prospective randomized controlled trial is to compare the outcomes of telerehabilitation program and conventional treatment in patients with lower limb osteoarthritis (hip and knee) during the COVID-19 lockdown.

**Methods:** Our study included 53 patients (aged 54-72 y, 25 females, 28 males), with known hip or knee osteoarthritis, who had been postponed for inpatient rehabilitation program because of COVID-19. Between April and June 2020, patients were randomly divided into experimental group (26 patients underwent telerehabilitation program: conventional treatment, educational measures, home web-based exercise program for entire body, including respiratory and aerobic exercises) and control group (27 patients) received only conventional treatment (usual analgesic and nonsteroidal anti-inflammatory drugs and chondroprotector agents). We chose easy scales to assess the outcomes – WOMAC index for functional status and visual analogue scale for pain. All patients were evaluated by telephone interviews during baseline, in the fourth and eighth week.

**Results:** The pain in EG decreased compared with that in CG both at the fourth week ($p<0.003$) and at the eighth week ($p<0.05$). The self-reported WOMAC score in EG was significantly lower than that in the CG at the fourth week ($p<0.001$), but not at the final ($p>0.05$). Patients over 65 years of age mentioned that the person which helps them to access the web material was no longer available.

**Conclusion:** A decrease of physical activity in pandemic period is associated with an increase in pain and loss of lower limb joint function. Our results were in accordance with the demonstrated importance of home exercise programs to decrease symptoms and improve daily functioning during prolonged rest period. The best results were obtained in subjects under 65 years old, so age is a real obstacle for telerehabilitation in our patients.

## P130
### WEB-BASED EXERCISE PROGRAM IN THE OSTEOPOROTIC FIBROMYALGIA FEMALES DURING COVID-19 PANDEMIC

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**Objective:** The positive effects of an aerobic exercise in the management of fibromyalgia (FM) patients with osteoporosis was recognized. At present, the coronavirus disease 2019 (COVID-19) pandemic has significantly affected public health. As entire world, in our country hospital facilities, are less accessible than usual. To minimize the rate of new infections and to preserve medical resources, most rehabilitation services in our country were postponed.

**Methods:** A single blind randomized controlled trial was conducted to evaluate home-training program efficacy in the treatment of females that associated FM and postmenopausal osteoporosis. 42 licensed females (average age 52.3 y). diagnosed with FM by ACR criteria and postmenopausal osteoporosis (lumbar spine BMD T-score <-2.5 SD) were recruited from our rehabilitation clinic database. Patients were randomized into two groups: group 1 – 22 females (G1) underwent telerehabilitation program: conventional treatment, educational measures, home web-based exercise program for entire body, including respiratory, resistive, weight bearing and aerobic exercises; group 2 – 20 females control (G2), receiving only conventional treatment for osteoporosis and analgetic drugs. We chose relative easy scales to assess the outcomes

– visual analogue scale (VAS) for pain, Spitzer scale for quality of life and fibromyalgia impact questionnaire (FIQ). All patients were evaluated by telephone interviews during baseline and after 6 weeks.

**Results:** Obtained data presented statistical differences between the groups. The improvements were found after 6 weeks for FIQ (47.5% in G1 and 29.5% in G 2, respectively) ($p<0.05$) and improvement in G1 was significantly higher than G2 ($p<0.01$). VAS scores for pain reduced in all females; this reduction was significantly higher in G1. The Spitzer scale also showed significant improvements in G1 group.

**Conclusion:** Home-training program, based on aerobic exercises, can lead to long-term success in the management of females with FM and osteoporosis, especially for quality of life and clinical status. Early detection and implementation an aerobic training – resistive and weight-bearing exercises, may be indicated in all postmenopausal females with FM in special situation like present pandemic. Age is not a barrier to the adoption of telerehabilitation in our licensed patients.

## P131
### NEUROPATHIC PAIN IN PRIMARY KNEE OSTEOARTHRITIS: COMPLETE MANAGEMENT

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**Objective:** Primary knee osteoarthritis (PKOA), a complex joint disease causing pain and decreased function, is one of the leading causes of year lost to disability worldwide. The recent documented presence of a neuropathic component of pain in these patients has an important negative impact on quality of life. In our study we investigated if complete management (SpineDinamic daily, 1 tablet, 8 weeks and rehabilitation program – educational measures, aerobic and proprioceptive exercises, and magnetotherapy, three times a week) influence neuropathic pain and functional status and improve quality of life in PKOA.

**Methods:** We performed a prospective randomized controlled trial in outpatient medicine clinic. 54 PKOA patients (aged 51-72 y, 35 females, 19 males, diagnosed as grade II and III KOA in accordance with the Kellgren-Lawrence classification) were completely evaluated before rehabilitation program, to exclude the potential confounding comorbidities for neuropathic pain subphenotype, in accordance with the updated ESCEO stepwise algorithm, and were randomly divided into the experimental group (EG - underwent complete management) and control group (CG) received only rehabilitation program, without SpineDinamic therapy. Improvements in pain (painDETECT questionnaire), knee function (WOMAC questionnaire) and quality of life (Short Form-36 survey) were compared. These outcomes were measured at baseline and postrehabilitation. We used SPSS Statistics 22.0 for the data analysis.

**Results:** Parameters in both groups had an improving trend. The painDETECT and WOMAC pain scores decreased significantly in the EG compared to the CG ($p<0.001$ and $p=0,003$, respectively). The WOMAC physical function and SF-36 scores were significantly improved in EG. Between-group differences were statistically significant postrehabilitation ($p<0.05$).

**Conclusion:** Our results sustained the well known benefit of magnetotherapy and exercise program for clinical manifestations and functional status in PKOA. Combining SpineDinamic therapy with rehabilitation program might enhance both the altered pain perception and quality of life in PKOA patients. Pain level and quality of life in PKOA patients are deeply interconditioned and require both careful assessment and complete management.

## P132

### IDENTIFICATION OF COMMON DIFFERENTIAL GENES AND SEVERAL PROGNOSIS BIOMARKERS IN EWING SARCOMA USING BIOINFORMATIC ANALYSIS

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**Objective:** Ewing sarcoma (ES) is a highly aggressive tumor occurring mainly in adolescents and young adults. The purpose of our study was to identify candidate biomarkers of ES and uncover their potential molecular mechanisms. Genetically, some genes play an important role in the development of ES, however, the specific molecular mechanism and pathogenesis are still unclear. Our study aims to identify candidate biomarkers of ES using bioinformatic analysis.

**Methods:** The gene expression profiles of GSE45544 and GSE17674 were downloaded from Gene Expression Omnibus (GEO) database. Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes pathway (KEGG) were used to analyze the functions and pathway enrichment of the common differential genes based on Metascape online tool. Subsequently, protein-protein interaction (PPI) network was constructed, and hub genes of the differentially expressed genes (DEGs) were identified by Cytoscape software. Finally, the prognostic significance of each hub gene was performed by GEPIA.

**Results:** A total of 591 common DEGs were identified in ES, including 47 upregulated genes and 42 downregulated genes. GO analysis showed that these DEGs were mainly enriched in cell division, chromatin binding and response to antibiotic, while KEGG analysis revealed that all these DEGs were mainly enriched in the pathways associated with cancer, such as aldosterone-regulated sodium reabsorption and p53 signaling pathway. In addition, PPI network was visualized by the Cytoscape software, and 6 of hub genes include TOP2A, BUB1B, NUSAP1, NCAPG, CDK1 and ASPM showed worse disease-free survival in sarcoma patients.

**Conclusion:** TOP2A, BUB1B, NUSAP1, NCAPG, CDK1 and ASPM may be potential biomarkers for the prognosis of ES, and provide therapeutic targets for the development of drugs.

## P133

### BIOINFORMATIC ANALYSIS OF DIFFERENTIALLY EXPRESSED GENES IN PRIMARY OSTEOPOROSIS

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**Objective:** To investigate the differentially expressed genes (DEGs) related to the occurrence and development of osteoporosis (OP) as well as screen out potential drug targets.

**Methods:** The microarray data concern osteoporosis were obtained from GEO database and DEGs were identified by R statistical software. GO and KEGG enrichment analysis, protein-protein interaction (PPI) network analysis, and selection of hub genes were conducted.

**Results:** A total of 569 DEGs were screened out, 7 upregulated and 562 downregulated. At the same time, GO analysis of DEGs was mainly enriched in processes such as pre-mRNA intronic binding, nuclear body, histone modification, and mRNA 3'-end processing, while KEGG analysis mainly involved the ubiquitin mediated proteolysis signal pathway (hsa04120). By the calculation of the STRING database, we obtained the PPI network, which consists of 517 nodes and 363 edges, and the top 10 hub genes (TCEB1, CUL2, KBTBD6, KBTBD7, ASB8, KLHL42, ASB5, FBXO11, ANAPC10, CDC23) of this study were acquired by Cytoscape software.

**Conclusion:** The top 10 hub genes might help us understand the pathophysiology of OP, even provide therapeutic targets for the

development of drugs. Meanwhile, it might provide some new ideas for funding creative scientific hypotheses of OP.

## P134

### THE EFFECT OF IRON ACCUMULATION ON OSTEOBLAST ACTIVITY AND MINERALIZATION THROUGH SLC7A11

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**Objective:** Iron accumulation affects the activity of osteoblasts, which may be related to the production of ROS, but the detailed mechanism remains to be further elucidated. The cystine/glutamate antiporter system is embedded on the surface of the cell membrane and can transport cystine into the cell and glutamate to the outside of the cell to play an antioxidant role. SLC7A11 is an important subunit of this system. This study explored the effect of iron accumulation through SLC7A11 on the activity and mineralization of osteoblasts.

**Methods:** The osteoblast cell lines Saos-2 and MC3T3-E1 were used as the research objects and were divided into two groups, one group was the control group (Ctrl), and the other was the iron intervention group (FAC). The control group did not do any treatment, and the FAC group was cultured with osteoblast culture medium containing 200 μM ferric ammonium citrate (FAC). After the intervention, mRNA expression levels of osteoblast-specific genes (such as RUNX2, ALP, OCN, SP7, OSX) and SLC7A11 were detected by quantitative reverse transcription PCR (qRT-PCR), protein expression levels of osteoblast-specific genes (such as Runx2, ALP, OCN, SP7, OSX) and SLC7A11 were detected by western blotting, while using alkaline phosphatase (ALP) staining to detect osteoblast differentiation and alizarin red staining to detect the mineralization ability of osteoblasts.

**Results:** Compared with the control group, the osteogenic specific genes Runx2, ALP, OCN, SP7, OSX mRNA and protein expression in the FAC group were significantly decreased, and the RNA and protein expression of SLC7A11 were significantly decreased as well. The area of positive areas stained with ALP and alizarin red was significantly reduced compared with the control group.

**Conclusion:** Iron accumulation can significantly affect the activity and mineralization of osteoblasts, which may affect the function of osteoblasts by inhibiting the expression of SLC7A11.

## P135

### MECHANISM OF PILOSE ANTLER IN TREATMENT OF OSTEOPOROSIS BASED ON NETWORK PHARMACOLOGY

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**Objective:** To demonstrate the pharmacodynamic material basis and molecular mechanism of pilose antler (PA) in the prevention and treatment of osteoporosis (OP) by the method of network pharmacology.

**Methods:** First, the active components of PA were screened by BATMAN-TCM database, and the components targets were obtained from the SwissTargetPrediction online tool. Moreover, the relevant target genes of OP were obtained by searching the DisGeNET database. Second, a Venn diagram was drawn to obtain the PA-OP common targets, as well as the protein–protein interaction (PPI) network and drug-components-targets (D-C-T) network were constructed by Cytoscape software. Last, the GO functional annotation and KEGG pathway enrichment analysis of common targets were performed using the Metascape online tool.

**Results:** A total of 14 candidate components of PA and 320 targets were identified, as well as 1098 targets associated with OP were predicted.

Subsequently, 82 common targets were identified by generating a Venn diagram. The PPI network of 82 common targets indicated that the top 5 nodal targets, including PIK3CA, MAPK1, ESR1, AKT1 and SRC were strongly associated with other proteins. The D-C-T network suggested that the active components with high degree of connectivity include prostaglandin E1, 17-β-estradiol, α-estradiol and oestrone. Furthermore, the GO enrichment analysis revealed that the biological process categories were dominated by response to peptide, cellular response to lipid, regulation of MAPK cascade, and so on. Additionally, the KEGG pathway analysis indicated the estrogen signaling pathway, osteoclast differentiation, and HIF-1 signaling pathway might have critical effects on the development of OP.

**Conclusion:** The results provide certain scientific basis for the research on the mechanism of OP prevention and treatment by PA.

## P136
**IMPACT OF ARNTL KNOCKDOWN ON OSTEOBLAST ACTIVITY AND ITS MECHANISM**

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**Objective:** The circadian rhythm is an endogenous oscillating mechanism that regulates a variety of cellular processes, including iron metabolism, oxidative stress, and cell death. ARNTL is the core component of mammalian biological clock which regulates the expression of other biological clock controlling genes. This study preliminarily explores the effect of ARNTL gene on osteoblast activity and possible mechanism.

**Methods:** Human osteoblast cell line Saos-2 was divided randomly into three groups: control (Ctrl), negative control (NC) and ARNTL knockdown (ARNTL-/-). No treatment was done in the Ctrl group, the NC group was transfected with siRNA-NC, and the ARNTL-/- group was transfected with siRNA-ARNTL. After 24 h of transfection, knockdown efficiency of ARNTL was detected by quantitative reverse transcription PCR (qRT-PCR). Proliferation ability of osteoblasts was detected by Cell Counting Kit 8 (CCK8). Malondialdehyde (MDA) content was detected by lipid oxidation detection kit. The mRNA expression level of osteoblast-specific genes (such as Runx2, ALP, OCN, SP7, OSX) and ferroptosis related genes (PTGS2, GPX4) was detected by qRT-PCR, and the protein expression levels of osteoblast specific genes (such as Runx2, ALP, OCN, SP7, OSX) and ferroptosis related genes (PTGS2, GPX4) were detected by western blotting.

**Results:** Compared with the control group, there was no significant difference in the expression of ARNTL mRNA in the NC group. The expression of ARNTL mRNA in the ARNTL-/- group was significantly decreased. The CCK8 test results indicated that the proliferation ability of osteoblast in ARNTL-/- group was significantly weakened. The MDA level was significantly increased. The ferroptosis related PTGS2 mRNA and protein expression was increased, GPX4 and osteoblast specific genes (such as Runx2, ALP, OCN, SP7, OSX) mRNA and protein expression were decreased.

**Conclusion:** After the ARNTL gene of osteoblasts was successfully knocked down, the activity of osteoblasts was significantly reduced, and the ferroptosis markers changed significantly. The ARNTL gene may affect the function and activity of osteoblasts through the ferroptosis mechanism.

## P137
**EFFECTS OF ADHERENCE TO TREATMENT ON MINERAL BONE DENSITY GROWTH (3-YEAR RESEARCH STUDY)**

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**Objective:** To determine the dependence of the increase of BMD on patients' adherence to treatment during long-term therapy.

**Methods:** The viewed group: 102 women with postmenopausal osteoporosis (PMO) age 59±4.6 years old took alendronate for 2 or more years with no medication change. The viewed group therapy regimen: alendronate 70 mg/week taken with calcium 1000 mg/d and vitamin D 800 IU/d. Research methods: DXA (once a year), test for patient compliance evaluation (once every 3 months for 3 y).

**Results:** After 1 year of treatment an increase in lumbar spine BMD by +0.048 (+0.028; +0.074) was detected at +5.99 (+3.46; +9.11)% (p<0.001). With high adherence to treatment (MPR >80%), the increase was significant and reliable during the 1st, 2nd, and 3rd years of alendronate treatment (p<0.001), and with low adherence to treatment, the increase was significant, but not reliable during both the 1st (p=0.128) and the 2nd years of treatment (p=0.023). After 1 y of treatment the increase in BMD of the femoral neck with high adherence to treatment was not reliable +0.023 (+0.002; +0.046). Only provided that high adherence (MPR >80%) was maintained over 2 y of alendronate treatment, the increase in BMD of the femoral neck was both significant and reliable +0.032 (+0.012; +0.050) g/cm$^2$, which amounted to +4.34 (+1.47; +6.67)% (p<0.001).

**Conclusion:** Alendronate intake for 1 y with high adherence to treatment (MPR >80%) causes a significant increase in lumbar spine BMD. The increase in BMD of the femoral neck after 1 y of alendronate intake with high adherence is not reliable. With high adherence to treatment, the increase in BMD of the lumbar spine was significant and reliable during the 1st, 2nd, and 3rd years of treatment with alendronate intake. Only provided that high adherence to treatment is maintained for 2 y, the increase in BMD of the femoral neck while alendronate intake becomes significant and reliable.

## P138
**HOW LONG TO TAKE ALENDRONATE IN POSTMENOPAUSAL OSTEOPOROSIS? (5-YEAR RESEARCH STUDY)**

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**Objective:** To determine the necessary duration of alendronate intake to achieve a sustained increase in BMD in postmenopausal osteoporosis (PMO).

**Methods:** The viewed group: 102 women with PMO age 59±4.6 years old took alendronate for 2 or more years with no medication change. Exclusion criterion: other diseases causing osteoporosis (OP). The control group: 32 women without OP, comparable in age with the main group. The viewed group therapy regimen: alendronate 70 mg/week taken with calcium 1000 mg/d and vitamin D 800 IU/d. The control group patients (pt) took as much Ca and vitamin. D as the main group. Research methods: DXA (once a year), test for pt compliance evaluation (once every 3 months for 5 y).

**Results:** After 1 y of treatment an increase in lumbar spine BMD by +0.048 (+0.028;+0.074) was detected at +5.99 (+3.46; +9.11)% (p<0.001). The increase in BMD of the femoral neck is not reliable. After 3 y an increase in lumbar spine BMD by +0.072 g/cm$^2$ (+8.51%), p<0.001 was detected, the BMD increase in the 2nd and 3rd years together was lower than its increase in 1st year alone. 3 years of treatment caused an increase in femur BMD (p<0.01) for pt with PMO, the BMD increase in the 2nd and 3rd years together was lower than its increase in 1st year alone. The increase in BMD of the femoral neck in the 1st, 3rd and 5th years is uncertain because it does not exceed the densitometer error level (±0.012 g/cm$^2$). 5 y of treatment with no medication change cause an increase in lumbar spine BMD (p<0.001), the BMD increase in the 4th and 5th years together is not reliable.

**Conclusion:** 3-y alendronate treatment is proved to increase lumbar spine BMD and femoral BMD. There was no increase in BMD of the femoral neck while taking alendronate over 5 y. Further treatment (5 y with no medication change) does not lead to a further increase in the density of BMD in all studied regions but to a decrease in the number of spinal and distal fractures.

## P139

### CAN THE LIMITING OF KNEE ARTHROPLASTY TO IMPROVE THE PROGNOSIS IN PATIENTS WITH OSTEOARTHRITIS?

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**Objective:** The number of total knee arthroplasty (TKA) increase annually. In fact, the number of patients who are not satisfied with the results of arthroplasty also increase. The aim of this study was to analyze the functional outcomes and quality of life in patients with osteoarthritis (OA) who underwent TKA from 2008-2017.

**Methods:** We identified primary TKAs performed for noninflammatory arthritis in 1698 patients between 2008-2017. The outcomes of TKA assessed according to Oxford Knee Score (OKS) and the WHO Quality of life (WHOQOL). We received 1451 (85.4%) fully completed questionnaires.

**Results:** Among 1451 patients with OA only 1291(89.0%) patients had the excellent and good OKS results in 1 y after TKA. The same results after 2 y had 1240 (85.5%) of patients and only 1207 (83.2%) in 3 y after TKA and 78.3% patients in 4 y after TKA. Overall, 74.3% of patients have good and excellent results and were satisfied with their ability to perform normal daily living activities in 5 y after TKA. Conversely, the number of patients dissatisfied with the results of TKA according to OKS increases from 11% to 25.7% within 5 y. The results of WHOQOL were comparable to the results of OKS.

**Conclusion:** In the future we can have the situation, when the quantity of patients with excellent and good results according to OKS (0-39 points) will be comparable with patients with satisfied and dissatisfied results of TKA (40-60 points). The 71 (28.1% between 253) patients with satisfied and dissatisfied results had preoperative pain of low intensity and OA (Kellgren-Lawrence radiologic stage II-III) before TKA had no conservative treatment. Based on the receiving data we cannot exclude the fact that operation was early performed. More research is needed to explain this issue.

## P140

### VIEWS, BARRIERS, AND FACILITATORS OF PHARMACISTS REGARDING THE NEED FOR A FRACTURE LIAISON SERVICE IN A TERTIARY TEACHING HOSPITAL IN MALAYSIA

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**Objective:** To explore the views, barriers, and facilitators of pharmacists regarding the need for a Fracture Liaison Service (FLS) in the University Malaya Medical Centre (UMMC).

**Methods:** This qualitative study was conducted from February to April 2021 in the UMMC. Pharmacists working in the outpatient, inpatient and drug information centre were recruited via purposive sampling to ensure maximum variation. Provisional registered pharmacists were excluded. Semistructured in-depth interviews were conducted using a topic guide until thematic saturation was achieved. Data were transcribed verbatim and analysed using thematic analysis.

**Results:** Eight pharmacists with 2-16 y of working experience were recruited. Three themes emerged from our data: views regarding 1) secondary fracture prevention; 2) the implementation of FLS; and 3) role of the FLS coordinator. Pharmacists recognised the importance of secondary fracture prevention as fracture begets fracture. All pharmacists agreed that FLS should be implemented in the UMMC to improve secondary fracture prevention management to reduce refracture rates. However, most pharmacists have never heard of the term "FLS". They perceived that the functions of FLS were to ensure that patients received the care required for secondary fracture prevention by coordinating the care provided between departments and to ensure continuity of care. Patient education should be provided as part of the FLS. In order for FLS to be successful and sustainable, a dedicated coordinator should be appointed, and support from the relevant stakeholders including doctors, nurses, pharmacists, rehabilitation team, and policymakers is needed. Development of local guidelines can help to improve FLS awareness among stakeholders. Ideally, any healthcare professional can become a FLS coordinator; however, pharmacists have the advantage as a FLS coordinator in terms of knowledge in medications, but the shortage of manpower might be a barrier.

**Conclusion:** Most pharmacists have never heard of a FLS, but agreed that there was a need for FLS in the UMMC to improve the delivery of secondary fracture prevention. They believed that they were sufficiently qualified to be the FLS coordinator, but were concerned regarding the lack of manpower.

## P141

### THE RELATIONSHIP BETWEEN VITAMIN D DEFICIENCY AND OUTCOME OF COVID-19 PATIENTS

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**Objective:** Infection with the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) poses an enormous challenge to health care systems throughout the world. Without causal treatment, identification of modifiable prognostic factors may help to improve outcomes. The purpose of our study is to explore possible associations of vitamin D (VitD) status with disease severity and survival.

**Methods:** We studied 165 patients diagnosed with coronavirus disease 2019 (COVID-19) and treated at our center. VitD status at first presentation was assessed retrospectively using accredited laboratory methods. VitD deficiency was defined as serum total 25-hydroxyvitamin D level <12 ng/mL (<30 nM). Primary endpoint was severe course of disease (i.e., need for invasive mechanical ventilation and/or death, IMV/D).

**Results:** Within a median observation period of 66 d (range 2-92), 21 patients required IMV. A total of 28 patients had IMV/D, including 16 deaths. 84 (50.9%) patients required hospitalization (inpatient subgroup). A total of 45 (27.2%) patients were VitD deficient. When adjusted for age, gender, and comorbidities, VitD deficiency was associated with higher risk of IMV/D and death (HR 6.11, 95%CI 2.78-13.43, p<0.001 and HR 14.69, 95%CI 4.17-51.89, p<0.001, respectively). Similar correlations were observed in the inpatient subgroup.

**Conclusion:** Our study demonstrates an association between VitD deficiency and severity/mortality of COVID-19, highlighting the need for interventional studies on VitD supplementation in SARS-CoV-2 infected individuals.

## P142

### THE RELATIONSHIP BETWEEN POLYPHARMACY AND FALLS IN ELDERLY PATIENTS WITH HIP FRACTURE

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**Objective:** Polypharmacy and fall-risk increasing drugs (FRIDS) have been associated with injurious falls. FRIDS are classified into two groups: those which are associated with a high risk of falling (antipsychotics, anxiolytics, hypnotics and sedatives, antidepressants, and dopaminergic agents) and those considered as associated with a low and moderate risk of falling (opioids, vasodilators used in cardiac diseases, antihypertensives, diuretics, beta blocking agents, calcium channel blockers, agents acting on the renin-angiotensin system, $\alpha$-adrenoreceptor antagonists). The purpose of this study is to measure the prevalence of polypharmacy and use of FRIDS (by pharmacological group and by total number) at discharge in patients older than 65 y hospitalized due to a hip fracture in an Orthopaedic Dept. In addition, we aim to explore what patient's characteristics may be associated with polypharmacy and FRIDS prevalence.

**Methods:** This study describes the baseline findings of a 5-y retrospective cohort study (from January 2016 to December 2020). We included 478 patients older than 65 y discharged from an Orthopaedic Unit who were able to walk before surgery. Patient's baseline variables, total number of drugs, and FRIDS at hospital discharge were collected.

**Results:** The mean number of drugs and FRIDS prescribed at discharge was 11.2±3.0 and 2.8±1.5, respectively. Polypharmacy was prevalent in all patients except in four: 22.9% (5-9 drugs) and 75.3% (≥10 drugs). Only 13 patients had no FRIDS and 35.7% were on >3 FRIDS. The most prevalent FRIDS were agents acting on the renin angiotensin system (42.9%) and anxiolytics (38.7%). The number of FRIDS was higher in patients with extreme polypharmacy (3.3±1.4) than in those on 5-9 drugs (1.6±1.0, p<0.05). Independent people in performing instrumental activities had lower risk of extreme polypharmacy (≥10 drugs) or >3 FRIDS: OR 0.39 (95%CI 0.18-0.83) and OR 0.41 (95%CI 0.20-0.84), respectively. People living in a nursing home had higher risk of >3 FRIDS: OR 4.02 (95%CI 1.12-14.53).

**Conclusion:** Polypharmacy and FRIDS are prevalent in patients discharged from orthopaedic care after surgery for a hip fracture. Interventions on drug use at hospital discharge could have a potential impact on falls in this high risk population.

## P143

### EFFECT OF SURGERY ON CARDIAC STRUCTURE AND FUNCTION IN MILD PRIMARY HYPERPARATHYROIDISM

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**Objective:** The cardiovascular (CV) risk profile is worsened in primary hyperparathyroidism (PHPT), and CV mortality is related to serum calcium levels. It is unknown whether CV mortality is increased in the most common form of PHPT and whether the increased CV risk is reversible after surgery. The purpose of this study is to investigate the morbidity of parathyroidectomy compared with observation without operation in patients with mild primary hyperparathyroidism. Furthermore, the study researches for recording simultaneously reversibility of echocardiographic changes in mild primary hyperparathyroidism after surgery treatment.

**Methods:** From January 2012 to December 2019, 30 patients were involved, of which 15 were randomized to observation (1st subgroup) and 15 for parathyroidectomy (2nd subgroup).

The inclusion criteria were mild PHPT without the appearance of symptoms, corrected calcium levels for albumin between 2.60-2.85 mmol/l, age between 50-80 y, without taking other drugs that affect calcium metabolism. At baseline and after 2 y, a biochemist and echocardiographic control was conducted.

**Results:** In the 2-y follow-up, the corrected calcium levels and those of PTH were significantly lower in the 2nd subgroup. Instead, there seemed no significant differences in blood pressure, heart rate, BMI, inflammatory markers, cholesterol and other cardiovascular risk markers. The echocardiography did not show significant differences between subgroups in heart function and dimensions, except a marginal reduction in left ventricular mass and the mass ratio of the left ventricle in the 2nd subgroup, suggesting reversibility of left ventricular hypertrophy even in mild PHPT. Simultaneously, to the 2nd subgroup, a decrease of septum size was found. Unlike other studies, no correlation was observed between vitamin D and echocardiographic variables.

**Conclusion:** It is safe to observe without surgery patients with mild PHPT for a few years and suggest that longer follow-up may yield larger and clinically important differences.

## P144

### DEVELOPMENT, VALIDITY AND RELIABILITY OF A REFERRAL FORM FOR SARCOPENIA ASSESSMENT IN STANDARD CLINICAL PRACTICE

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**Objective:** Diagnosis of sarcopenia requires quantitative and qualitative measurement of muscle mass as well as assessment for underlying aetiology. Early detection of sarcopenia can prevent downstream adverse health outcomes. Since sarcopenia is asymptomatic, particularly in its early stage, the development of an effective screening tool is vital to identify those patients at risk and in the meantime can be used to refer this cohort, suspected to have sarcopenia, for body composition valuation. Currently, the gold standard in measurement is highly debatable. It is unlikely that a single test which examines only 1 parameter will be adopted as the standard tool to assess for sarcopenia. Furthermore, the tool should be cheap, easy to use and has high predictive value. Aims: 1. To develop a screening tool that can be used to identify older adults who are at risk of developing sarcopenia; 2. To assess its validity, reproducibility as well as comprehensibility as a referral form for body composition assessment using DXA scanning.

**Methods:** The screening form was based on the EWGSOP recommended definition for sarcopenia which is based on: low muscle strength, low muscle quantity or quality and low physical performance. The developed tool included a combination of SARC-F questionnaire, scores of grip strength and chair stand test as a measure of muscle strength, as well as 4-m walk gait speed test as a measure of physical performance. In addition, the screening tool included the mini-nutrition assessment short form (MNA-SF) for malnourishment and falls risk assessment (FRAS). As DXA is used as a measure of muscle quality, the validity of the model

was assessed by comparing the results of the scale to the results of the appendicular lean mass adjusted for BMI (ALM/BMI). 67 patients with suspected sarcopenia (52.2% females, 47.8% males) were assessed. 68 healthy subjects of matched sex and age were included as a control group. The comprehensibility and reproducibility of the model were also assessed.

**Results:** The developed model was a combination of questionnaires, anthropometric measures, and physical function tests. Using the ALM/BMI as standard reference, the combined model scores suggestive of sarcopenia, showed enhanced sensitivity (86.7%) with a resultant increase in screening performance compared to individual tools, such as SARC-F, with AUROC, 0.892; 95%CI, 0.86-0.92; P=0.018. The specificity and negative predictive value were, respectively, 98.9% and 97.6% in men and 95.8% and 96.8% in women. Reproducibility of the overall questionnaire and individual domains was excellent (Spearman-Brown index, 0.94-0.98). All the patients rated the form as quite comprehensible or extremely comprehensible. Comprehensibility percentage was 96.8%.

**Conclusion:** Results revealed clearly that while each tool may reliably exclude subjects without sarcopenia, they may not be effective in screening for the condition, particularly in asymptomatic older adults. The consistent association between the diagnosis of sarcopenia and clinically significant outcomes such as decline in physical performance, nutrition status and increased falls risk, endorses their combined efficacy as screening tools. The developed model was effective, reliable and well validated referral instrument with improved diagnostic accuracy. The advent of pharmacological treatment and evidence-based management such as exercise and nutrient supplementation have helped sarcopenia screening gain prominence.

## P145
### OSTEOPOROSIS TREATMENT FOLLOWING OSTEOPOROTIC FRACTURES: DATA FROM A SINGLE MEDICAL CENTER

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**Objective:** Most postosteoporotic fracture patients do not receive osteoporosis treatment, although it reduces risks for additional fractures. This retrospective, observational study reviewed osteoporosis evaluation and treatment following typical osteoporotic fractures.

**Methods:** We identified patients with hip, vertebral, humerus or radius fractures, examined in Meir Medical Center, January-December 2017. Exclusion criteria were: not a Clalit Health Services member, high energy or pathologic fracture, or 30-d postoperative mortality. Primary endpoint was osteoporosis drugs issued within 12 months of fracture. Secondary endpoints were bone density testing and mortality.

**Results:** Of 928 patients diagnosed, 346 (37%) were excluded. 582 (78.6±11.1 y of age, 75.8% women) were included: 321 (55.5%) hip, 84 (14.1%) humerus, 33 (5.6%) vertebra, 144 (24.7%) radius. Hip fracture patients were older, with more previous fractures. Osteoporosis drugs were issued to 26.5%; humerus fracture received the least (21.4%) and vertebral fracture, the most (30.3%), p=0.51. Treatment related to age, gender or previous fracture, was similar. Bone density testing was done in 23.2% of patients, with vertebra

(39.4%) and radius (34%) the most. One-year mortality after hip fracture was 12.1%, with humerus (3.6%), vertebral (3%) and radius (1.4%) (p=0.0). Logistic regression demonstrated that previous treatment (OR=7.4, 95%CI 3.6-15.2), bone density testing (OR=4.4, 95%CI 2.6-7.4) and endocrinology visit (OR=2.6, 95%CI=1.4-4.6) were the most significant discriminating factors associated with osteoporosis treatment.

**Conclusion:** Fewer than one-third of patients received pharmacotherapy within a year postfracture. Since pharmacotherapy reduces future fractures and mortality, we encourage medical staff, including orthopedic surgeons, rehabilitation team and general practitioners to increase awareness of their importance.

## P146
### URBAN-RURAL DIFFERENCES IN PATIENTS WITH OSTEOARTHRITIS

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**Objective:** Osteoarthritis, the most common form of arthritis, is a disabling chronic disease with significant clinical and economic implications [1–6]. The most important risk factors for osteoarthritis include age, sex, obesity, and trauma [6–10]. With aging and obesity trends, the incidence and prevalence of osteoarthritis is expected to rise in the world, increasing the demand for health resources. The pain caused by this pathology is the main complaint of most patients, prompting them to seek medical attention [11]. Although osteoarthritis is considered a non-inflammatory arthritis, where mechanical causes play a major role, inflammatory mechanisms may be present. Our goal is to analyze rural-urban differences, in patients with osteoarthritis.

**Methods:** The study included all consecutive patients diagnosed with osteoarthritis, hospitalized in the Rheumatology Service at QSUT Mother Teresa, in the period of January 2010 to December 2015, using diagnostic codes.

**Results:** We analyzed 589 cases, where 79% (n=464) were female and 20% (n=118) lived in rural areas. The average age of patients in rural areas is significantly younger than the average age of patients in urban areas (respectively 53.41±10.53 and 56.01±10.13 y, p=0.013). The most commonly affected joint in the rural population is the knee (52.3 vs. 39.4% in urban areas, p=0.044), followed by the hip (19.8 vs. 18.6%, p=0.238) and the least affected is the hand joint (18.7% vs. 33.3%, p=0.052). Overweight was found more in the rural population (41.7% urban vs. 31% rural, p=0.011).

**Conclusion:** Lifestyle is an important factor, which contributes to osteoarthritis. Putting in the movements of the joints of the hands significantly reduces the presence of pain.

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## P147

### SONOGRAPHIC PECULIARITIES OF HIP JOINT DEVELOPMENT OF CHILDREN OF THE FIRST YEAR OF LIFE

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**Objective:** To evaluate the hip morphology of children using the ultrasound according to Graf's technique. To investigate the development of the femoral head ossification centre and the hip joint acetabulum of children of the first year of life.

**Methods:** The study included 1549 children (600 boys and 949 girls) ranging from 5 days to 12 months of age and also 812 children (413 boys and 399 girls) aged from 10-15 days old. The children were scanned according to Graf's technique.

**Results:** We have received the following distribution on the types according to Graf: Ia, Ib 40.48%; IIa+ 8.39; IIa- 9.49%; IIb 34.7%; IIc 2.55%; D 2.87%; IIIa, IIIb 1.42%; IV 0.1%. In our research we were taking the alpha angle for the analysis. The alpha angle allows conclusions to be drawn about the potential for the ossification in the acetabular roof. The acetabular roof of hip joint in our investigation shows an enormous potential in the first 2 months of life, which is still present to 6 months period but reduces after 6 months and approaches a level by 10 months with very little movement thereafter. The significant difference of the alpha angle average values of the infant hip among newborn children born in different seasons was revealed. The alpha angle average value was distinctly bigger among the infants who were born in spring and summer months than among those who were born in winter and autumn. The statistical confidence of differences of the alpha angle average values between the newborn boys and girls who were born in the same season (p<0.05) was revealed. The femoral head ossification center in girls appears earlier than in boys (p<0.05).

**Conclusion:** The data received as the result of the statistical analysis indicate the statistical confidence of differences of the femoral head ossification centre and the hip joint acetabulum development between the boys and girls (p<0.05). The unusual observation that there is a seasonal element in the development of the hip joint was received.

## P148

### SARCOPENIA AND FALL-RELATED INJURY AMONG OLDER ADULTS IN FIVE LOW AND MIDDLE INCOME COUNTRIES

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**Objective:** Sarcopenia is a common condition in older people and increasing evidence suggests that it can be considered as a potential risk factor for falls and fractures. However, no studies on this topic from low and middle income countries (LMICs) are available. Thus, we assessed this association among older adults from five LMICs (China, India, Ghana, Mexico, and Russia).

**Methods:** Community-based, nationally representative, cross-sectional data of the Study on Global Aging and Adult Health were analyzed. Sarcopenia was defined as the presence of low skeletal muscle mass based on indirect population formula, and either slow gait or low hand grip strength. The presence of fall-related injury was ascertained through selfreported information. Multivariable logistic regression analysis and meta-analysis were conducted.

**Results:** The sample consisted of 13,101 individuals aged ≥65 y (mean (SD) age 72.6 (11.3) y; 45% males). The prevalence of fall-related injury was higher among those with sarcopenia than in those without this condition (e.g., Mexico 9.8% vs. 2.7%). Adjusted analyses showed that sarcopenia was associated with a 1.85 (95%CI=1.24-2.77) times higher odds for fall-related injury, with a low level of between-country heterogeneity.

**Conclusion:** Sarcopenia is associated with a significant higher odds of fall-related injury in LMICs. Future studies of longitudinal design may shed light on whether sarcopenia in LMICs may be considered as a risk factor for falls.

## P149

### OSTEOPOROSIS: PREVALENCE, AWARENESS AND PERTINENT RISK FACTORS IN A COHORT OF ELDERLY ASIAN POPULATION PRESENTING WITH LOW-ENERGY DISTAL RADIUS FRACTURES

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**Objective:** To evaluate the awareness of osteoporosis and related risk factors in elderly Asian patients who present with distal radius fractures. The distal radius fracture is one of the most frequent fractures in the elderly cohort, owing to osteoporosis, and may be a harbinger for further fractures, however, data is scarce regarding awareness of this condition among these patients.

**Methods:** This cross-sectional study was conducted on patients aged ≥45 that presented in the emergency department with low-energy distal radial fractures in Karachi from January-December 2018. Data were collected via a selfdesigned questionnaire, assessing the demographic information, knowledge about osteoporosis and its risk factors. The data were analyzed using SPSS 20 for statistical significance.

**Results:** From a total of 550 patients with a mean age of 70.5±32.82 y, there were 442(80.36%) females and 108(19.63%) males. On educational consideration, 243(44.18%) patients could not read or write and only 110(20%) of the patients received secondary school education. Only 123(22.36%) were well informed about osteoporosis, the predominant source of information being their physician. There were 427(77.63%) patients who were unaware of osteoporosis, 16% of which were smokers, 26% indicated they exercised at least 30 min daily, and 2% reported drinking alcohol occasionally. On dietary supplements, 24.27% of patients reported calcium and 17.81% reported vitamin D supplement consumption on regular basis.

**Conclusion:** We found a positive correlation between a patient's education status and osteoporosis awareness. We believe that the role of the physician could be crucial in preventing further fractures in such patients via physician lead educational campaigns to target modifiable risk factors.

## P150

### 25-HYDROXYVITAMIN D CONCENTRATION, PTH, AND PREVALENT VERTEBRAL FRACTURE IN JAPANESE HIP FRACTURE PATIENTS

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**Objective:** To evaluate the level of 25-hydroxyvitamin D (25(OH)D) in Japanese hip fracture patients and to evaluate the relationships between concentration of 25(OH)D and PTH, the number of moderate or severe prevalent vertebral fractures.

**Methods:** The study subjects were 310 patients (62 men, 248 women) who sustained hip fracture due to a fall from a standing position, or due to events of lower energy trauma, between April 2017 and May 2020. The average

age at the time of injury was 84.8 y (67-98 years). 25(OH)D and intact PTH (iPTH) concentrations in serum were evaluated. A 25(OH)D concentration of ≥30 ng/mL, 20-30 ng/mL, and <20 ng/mL were considered sufficiency, insufficiency, and deficiency, respectively. Prevalent vertebral fractures were determined using plain radiographs of the thoracic or lumbar spine. The number of vertebral fractures of semiquantitative grade (SQ grade) 2,3 were counted. The relationships between 25(OH)D concentration and the number of vertebral fractures, iPTH were examined using Spearman's rank correlation coefficient.

**Results:** The mean 25(OH)D concentration was 11.3 ng/mL (4-26.1 ng/mL). None of the subjects had adequate vitamin D levels. The mean iPTH value in subjects was 48.9 pg/mL (9-429 pg/mL). The mean number of prevalent vertebral fractures was 1.5 (0-11). There was a weak significant correlation between 25(OH)D concentration and number of prevalent vertebral fractures of SQ grade 2,3 (p=0.003, r=-0.168). There was a weak significant correlation between 25(OH)D and iPTH concentrations (p<0.001, r=-0.236).

**Conclusion:** Vitamin D deficiency was much severe in hip fracture patients. Moderate or severe grade of prevalent vertebral fracture might be related to vitamin D deficiency. Despite of vitamin D deficiency, iPTH was within normal range in many subjects. This might be due to low active daily living level prior to fracture.

## P151
### INFLAMMATORY MARKERS ARE ASSOCIATED WITH QUALITY OF LIFE, PHYSICAL ACTIVITY & GAIT SPEED BUT NOT SARCOPENIA IN AGED MEN (40-79 Y)

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**Objective:** One of the presumed driving mechanisms behind sarcopenia is the age-related chronic low-grade inflammation (inflammaging). However, findings regarding inflammaging in sarcopenic older adults are often conflicting. This study aimed to determine associations between inflammatory markers, prevalent as well as incident sarcopenia, sarcopenia-defining parameters, quality of life (QoL) and physical activity in middle-aged and older European men.

**Methods:** Men aged 40-79 y (mean 59.66±11.00) were recruited from population registers in eight European centres for participation in the European Male Aging study (EMAS). Subjects were assessed at baseline (2003-2005) and again after a median follow-up of 4.29 y. In 2577 participants, associations between baseline inflammatory markers (hs-CRP, white blood cell count (WBC), albumin) and baseline physical activity PASE) and QoL (SF-36) were analysed. In the Leuven and Manchester cohort (n=447), data were available on muscle mass (whole body DXA) and strength at baseline. In this subgroup, cross-sectional associations between baseline inflammatory markers and sarcopenia-defining parameters (hand grip strength, chair stand test, appendicular lean mass, gait speed) and prevalent sarcopenia were examined. In a further subgroup (n=277), associations with knee extensor strength were explored. Predictive value of baseline inflammation on functional decline, physical activity, QoL and incident sarcopenia was also examined. Linear and logistic regression were used, adjusted for age, BMI, centre and smoking.

**Results:** At baseline, hs-CRP and WBC were negatively associated with PASE score (hs-CRP: β=-7.920, p<0.001; WBC: β=-4.552, p<0.001) and the physical component score of SF-36 (hs-CRP: β=-1.025, p<0.001; WBC: β=-0.364, p<0.001). Baseline WBC levels were negatively associated with gait speed (β=-0.013, p=0.025), quadriceps isometric 90° (β=-5.983; p=0.035) and isokinetic 60°/s peak torque/body weight (β=-5.532, p=0.027). Prevalence of sarcopenia at baseline was 18.1% (n=81). Of those without sarcopenia at baseline, 64 (18.6%) satisfied criteria for sarcopenia at follow-up. There were no significant associations between baseline inflammatory markers and either prevalent or incident sarcopenia, or change in sarcopenia-defining parameters.

**Conclusion:** In middle aged and older men, inflammatory markers (hs-CRP and WBC) were associated with measures of QoL, physical activity and gait speed, but not with other sarcopenia-defining parameters. None of the inflammatory markers in this study could predict functional decline, decline in physical activity, decline in QoL or incident sarcopenia.

## P152
### PROGNOSTIC MARKERS OF SURGICAL SITE INFECTION FOR PATIENTS BEFORE TOTAL HIP ARTHROPLASTY

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**Objective:** Surgical site infection (SSI) is one of the most serious complications after arthroplasty. The aim of this study was to develop blood laboratory markers for early postoperative complications prognosis.

**Methods:** This prospective study comprised 42 patients who underwent primary total hip arthroplasty (THA) and 28 donors were in control group. Mean age in group with THA was 59.8±21 y (range 34-76), 50% were female, in control group 54.3±22 y (range 31-72 y), 50% were female. Blood samples were collected before THA. Patients after THA were divided into 2 groups depending on postoperative complications: 31patients without SSI (group 1) and 11 patients with SSI (group 2). Blood samples were analyzed, using an automatic blood cell counter (DxH800; Beckman Coulter, USA) and flow cytometry (FC 500; Beckman Coulter) by using Cytodiff reagent and analysis software (Beckman Coulter).

**Results:** Patients in the group 2 had significantly lower baseline level of B lymphocytes compared with patients without infectious complications (group 1).

Table 1. Subpopulation composition of leukocytes in the blood of patients before surgery, depending on the development of infectious complications

| Subpopulations of leukocytes Me ($C_{25}$-$C_{75}$), ×$10^9$/L | Group 1 (n=31) | Group 2 (n=11) |
|---|---|---|
| Total white blood cell count | 6.4 [5.4 - 7.6] | 6.7 [4.8 - 7.7] |
| B lymphocytes (CD3-CD19+) | 0.22 [0.16 - 0.31] | 0.16* [0.10 - 0.22] |
| CD16 negative T lymphocytes & NK cells | 1.51 [1.20 - 1.82] | 1.60 [1.38 - 2.05] |
| CD16 positive T lymphocytes & NK cells | 0.27 [0.21 - 0.35] | 0.24 [0.14 - 0.44] |
| Total T lymphocyte & NK cell count | 1.85 [1.51 - 2.27] | 1.73 [1.53 - 2.48] |
| Total lymphocyte count | 2.07 [1.75 - 2.48] | 1.96 [1.62 - 2.65] |
| CD16- negative monocytes | 0.47 [0.33 - 0.60] | 0.49 [0.41 - 0.59] |
| | 0.04 | 0.03 |

| | | |
|---|---|---|
| CD16- positive monocytes (pro-inflammatory) | [0.02 - 0.05] | [0.01 - 0.06] |
| Total monocytes count | 0.52 [0.36 - 0.66] | 0.52 [0.43 - 0.67] |
| CD16 negative immature granulocytes (neutrophils) | 0.01 [0.00 - 0.03] | 0.02 [0.00 - 0.03] |
| Total eosinophil count | 0.17 [0.10 - 0.28] | 0.13 [0.08 - 0.24] |
| CD16 positive mature granulocytes (neutrophils) | 3.51 [2.36 - 4.30] | 3.45 [2.58 - 4.34] |
| Total granulocyte (neutrophil) count | 3.52 [2.47 - 4.31] | 3.47 [2.61 - 4.40] |
| Total basophil count | 0.06 [0.04 - 0.09] | 0.06 [0.06 - 0.08] |

Note: * - significant differences, $p < 0.05$

In the group of patients without infectious complications was significant direct relationship ($r_s = 0.45$; $p = 0.02$) between the number of B lymphocytes and standard deviation of monocyte volume (SD-V-Mo). This result indicates, that a large number of functionally active monocytes perform the processes of phagocytosis and antigen presentation. In the group of patients with the development of infectious complications was an inverse relationship. ($r_s = -0.68$; $p = 0.02$). We have detect that the SD-V-Mo index in patients of the 2nd group was significantly ($p < 0.05$) lower (19.08) compared with the 1st group (19.71).

**Conclusion:** The blood level of B lymphocytes (CD3-CD19+) and the SD-V-Mo can be prognostic markers of an SSI for patients before THA.

## P153

## COMPARING PRIMITIVE (I) AND SECONDARY (II) MALE OSTEOPOROSIS (MOP)

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**Objective:** Clinical, BMD and biological criteria in MOP I/II
**Methods:** 95 men, 50% MOP I/II, average 64 yo. Size, weight, BMD and biology measurements.
**Results:** 9/10 of MOP II with single etiology: 33% iatrogenic (1/2 corticoids) 26% endocrine, 9% hypogonadism, 30% other. Discovery: vertebrae compression (VC) I>II (57/45%),
medical history: VC 71/59%, other fractures 20% I=II, BMD 10%, size loss, rare back pain. Risk factors: alcohol, tobacco, coffee, MOP I=II. Sedentary lifestyle predominates in MOP II (43/31). 100% MOP I had BMD/80% MOP II. Results before/after treatment (average time 6 y): MOP I in vertebral -2.8/-2.1(significant), at femoral neck -2/-1.7, MOP II vertebral -2.6/-1.9 (significant), at femoral neck -2.1/-1.8. FRAX: I 5.9%/ II 7.9%. Size loss differs significantly - 5.6 cm (I), -3 cm (II). Weight: MOP I=MOP II. Biologically: vitamin D is subnormal (I=II), average serum CTX is 0.48. Daily calcium intake is around 500 mg. Treatment: MOP I and II: Ca and vitamin D (88/76%), oral bisphosphonates (68%), teriparatide (25%), denosumab 0% (not prescribed in MOP in France). Secondary etiologies are treated for 41%, surgically: 20%. The risk of falls: 27/39%(I/II), 50% >70 yo. Fall causes: neurological and locomotor (20% each), unipodal balance is good 2/3. Rheumatologist (Rh) has hygiene-dietary approach, sensitive to the risks of falls but does not prevent them enough, in this case he recommends the cane (1/2). He is attentive to the management, compliance, visual correction. He must improve the monitoring: appointments and biological controls are prescribed only once /2, BMD once /3. However, MOP II is better followed up even though the Rh does not refer much to the endocrinologist (37%). Tolerance to treatments is

excellent (96%) with rare side effects (7%) for MOP I and II. The clinical and biological results of treatment are very good in the framework of the guidelines.
**Conclusion:** This study of the MOP, rich in information about Rh practices, highlights several differences between MOP I and II but 2 significant items: loss of size, lumbar density before/after treatment.

## P154

## FRAGILITY OF RESULTS IN OSTEOPOROSIS RANDOMIZED CONTROLLED TRIALS SUPPORTING THE TREATMENT GUIDELINES

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**Objective:** Evidence-based guideline recommendations that are mainly based on results of clinical trials are important to clinical decision-making. The 'fragility index' (FI) has been proposed as a novel measure of the robustness of trial findings. The purpose of our study was to analyze the fragility of the randomized controlled trial (RCT) referenced in the guidelines for the treatment of osteoporosis.
**Methods:** We included the clinical trials if they investigated primary osteoporosis, used a parallel two-group design with a 1:1 randomization, and reported fracture outcome as the primary endpoint. The FI for each outcome was calculated. The FI was defined as the minimum number of events in the experimental group that need to change from a nonevent to an event in order to render a significant result non-significant (or vice versa), which was calculated in a two-by-two contingency table based on the data that the trial authors used in original analyses.
**Results:** Of the 372 RCTs identified from the guidelines, 42 were eligible for analyses. The median FI was 10 (25th-75th percentile [Q1-Q3]: 4-18). Of the 23 neutral trials, the median FI was 6 (Q1-Q3: 4-16), while the remaining significant trials had a median FI of 11 (Q1-Q3: 4-40). There were 17 (40.5%) trials where the number of patients lost to follow-up was greater than the FI. The FI was significantly associated with sample size ($r = 0.459$, $p = 0.002$), journal impact factor ($r = 0.426$, $p = 0.0056$), and the percent of patients lost to follow-up ($r = 0.433$, $p = 0.015$).
**Conclusion:** We found that the robustness of results from include trials varied, and results from some RCTs depend on a small number of events. The FI may provide additional, intuitive metrics to help interpret the robustness of trial results.

## P155

## RELATIVE EFFICACY AND SAFETY OF BIOLOGIC TREATMENTS FOR OSTEOARTHRITIS: A CONVENTIONAL AND NETWORK META-ANALYSIS

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**Objective:** To examine the efficacy and safety of novel biologic interventions, including TNFα inhibitors, IL-1/IL-6/IL-17 inhibitors and others, for the treatment of osteoarthritis (OA).
**Methods:** Five databases were searched up to Feb 20, 2021. Randomized controlled trials (RCTs) and prospective studies comparing biologics with placebo or each other in patients with OA were included. The primary outcomes were the mean changes from baseline in pain and physical function score. Secondary outcomes were adverse events (AEs) and mean

change in stiffness score. Bayesian network and conventional meta-analyses were performed.

**Results:** 15 studies were analyzed, including 13 RCTs and 2 pilot studies. In the network meta-analysis, infliximab achieved a greater pain relief compared with hyaluronic acid (HA) [standardized mean differences(SMD) -22.95; -34.21 to -10.43], adalimumab (SMD -21.71; -32.65 to -11.00), anakinra (SMD -24.63; -38.79 to -10.05), canakinumab (SMD -32.83; -44.45 to -20.68), etanercept (SMD -18.40; -29.97 to -5.73), lutikizumab (SMD -25.11; -36.47 to -14.78), naproxen (SMD -30.16; -41.78 to -17.38), tocilizumab (SMD -24.02; -35.63 to -11.86) and placebo (SMD -25.88; -34.87 to -16.60). Probability ranking indicated that infliximab had the highest (98%) probability to be the best drug for pain reduction, while canakinumab (79%) was the worst one. In the conventional meta-analysis compared to placebo, tocilizumab was superior in pain (SMD -0.60; -1.05 to -0.15) and function (SMD -1.48; -2.00 to -0.97), while infliximab (SMD -2.04; -2.56 to -1.52) and etanercept (SMD -0.47; -0.89 to -0.05) were more effective only in pain outcome. No more significant differences were observed between biologics and placebo.

**Conclusion:** Infliximab was the most effective biologic for pain relief in patients with OA and did not cause more AEs compared with placebo. The efficacy and safety of other novel biologics was uncertain and more RCTs are warranted.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HA | -1.29 (-7.19, 6.82) | 1.53 (-11.33, 15.78) | 9.86 (-0.86, 21.70) | -4.34 (-12.06, 3.83) | -22.95 (-34.21, -10.43) | 2.10 (-6.40, 13.15) | 7.07 (-3.31, 18.93) | 2.82 (-4.28, 11.63) | 0.94 (-9.31, 12.69) |
| 1.29 (-6.82, 7.19) | adalimumab | 2.61 (-10.00, 15.01) | 11.11 (1.26, 20.16) | -3.20 (-12.21, 4.66) | -21.71 (-32.65, -11.00) | 3.36 (-4.59, 11.75) | 8.32 (-2.04, 17.30) | 4.05 (-1.85, 9.67) | 2.13 (-7.16, 11.53) |
| -1.53 (-15.78, 11.33) | -2.61 (-15.01, 10.00) | anakinra | 8.42 (-5.25, 21.59) | -6.23 (-20.18, 7.22) | -24.63 (-38.79, -10.05) | 0.57 (-12.07, 13.76) | 5.61 (-7.82, 18.79) | 1.37 (-10.19, 12.35) | -0.55 (-13.71, 12.67) |
| -9.86 (-21.70, 0.86) | -11.11 (-20.16, -1.26) | -8.42 (-21.59, 5.25) | canakinumab | -14.40 (-26.10, -3.24) | -32.83 (-44.45, -20.68) | -7.88 (-16.56, 2.73) | -2.76 (-10.55, 4.47) | -7.04 (-14.91, 0.88) | -8.92 (-19.54, 2.60) |
| 4.34 (-3.83, 12.06) | 3.20 (-4.56, 12.21) | 6.23 (-7.22, 20.18) | 14.40 (3.24, 26.10) | etanercept | -18.40 (-29.97, -5.73) | 6.78 (-2.66, 17.44) | 11.71 (0.52, 23.06) | 7.49 (-0.57, 15.93) | 5.59 (-5.45, 17.28) |
| 22.95 (10.43, 34.21) | 21.71 (11.00, 32.65) | 24.63 (10.05, 38.79) | 32.83 (20.68, 44.45) | 18.40 (5.73, 29.97) | infliximab | 25.11 (14.78, 36.47) | 30.16 (18.79, 41.78) | 25.88 (16.60, 34.87) | 24.02 (11.86, 35.63) |
| -2.10 (-13.15, 6.40) | -3.36 (-11.75, 4.59) | -0.57 (-13.76, 12.07) | 7.88 (-2.73, 16.56) | -6.78 (-17.44, 2.66) | -25.11 (-36.47, -14.78) | lutikizumab | 5.13 (-6.00, 13.83) | 0.79 (-5.86, 6.12) | -1.05 (-11.31, 8.10) |
| -7.07 (-18.93, 3.31) | -8.32 (-17.30, 2.04) | -5.61 (-18.79, 7.82) | 2.76 (-4.47, 10.55) | -11.71 (-23.06, -0.52) | -30.16 (-41.78, -17.38) | -5.13 (-13.83, 6.00) | naproxen | -4.34 (-11.64, 3.87) | -6.17 (-16.78, 5.46) |
| -2.82 (-11.63, 4.28) | -4.05 (-9.67, 1.85) | -1.37 (-12.35, 10.19) | 7.04 (-0.88, 14.91) | -7.49 (-15.93, 0.57) | -25.88 (-34.87, -16.60) | -0.79 (-6.12, 5.86) | 4.34 (-3.87, 11.64) | placebo | -1.86 (-9.55, 5.93) |
| -0.94 (-12.69, 9.31) | -2.13 (-11.53, 7.16) | 0.55 (-12.67, 13.71) | 8.92 (-2.60, 19.54) | -5.59 (-17.28, 5.45) | -24.02 (-35.63, -11.86) | 1.05 (-8.10, 11.31) | 6.17 (-5.46, 16.78) | 1.86 (-5.93, 9.55) | tocilizumab |

Result of network meta-analysis for pain. The light grey grid represents statistical significant.

## P156
### RETROSPECTIVE ANALYSIS OF THE EFFECTS OF NONCOMPLIANCE WITH DENOSUMAB ON CHANGES IN BONE MINERAL DENSITY DURING THE COVID-19 PANDEMIC

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**Objective:** Although denosumab is a safe and effective treatment for osteoporosis in various clinical trials, few studies have investigated its efficacy in specific clinical situations. The effect of noncompliance with the standard six-month dosing regimen for denosumab on BMD was assessed in a retrospective study of patients prescribed denosumab during the COVID-19 pandemic.

**Methods:** Between February 2019 and September 2020, 638 patient records were reviewed, with 236 patients meeting the eligibility criteria. Patients were divided into three groups: those who received denosumab injections between 5-7 months after their initial subcutaneous injection, those who received denosumab injections between 7-9 months after their initial subcutaneous injection, and those who received denosumab injections >9 months after their initial subcutaneous injection. A multivariate regression study was conducted to compare the BMD shift (at least one year apart) before and after two denosumab injections

between the three prespecified groups in both the lumbar spine (LS) and the femoral neck (FN).

**Results:** The difference between LS BMD indicates that there is a statistical difference between subjects who received denosumab injections between 5-7 months (near-standard dosing interval) and >9 months (p<0,05), but not in FN BMD, and no clinically significant association was identified.

**Conclusion:** The results of this study show that in special clinical situations, such as the COVID-19 pandemic, clinicians may have some flexibility to prescribe denosumab, but the interval between injections should not exceed 9 months.

## P157
### A LOOK AT LOW T3 SYNDROME IN RHEUMATOID ARTHRITIS

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Syndrome of low T3 level (low T3), arises as a general response of the body as a compensatory reaction in severe disease, and reflects adaptive metabolic reactions and energy savings in a painful situation. Euthyroidism with a low level of T3 indicates an energy deficiency in the tissues. Apparently, under conditions of euthyroidism with a low level of T3, oxygen assimilation by tissues almost does not occur, energy is wasted, and therefore, the body in this situation is in a state of constant energy hunger. The analysis of biochemical tests shows that under these conditions there are colossal losses of structural material - proteins, to a much lesser extent - carbohydrates and fats, but the assimilation of oxygen by "starving" tissues and organs does not occur. At the same time, the result of prolonged hypoxia and energy deficiency is increased body weight loss, amyotrophic syndrome, the development of amyloidosis, myocardial dystrophy, fibrosing alveolitis, vasculitis, etc.

The mechanisms of development of the established changes in the function of the thyroid gland are not clear. Despite a decrease in T3 and an increase in T4, the clinical picture of diseases in the examined persons with rheumatoid arthritis (RA) did not always correspond to the classical picture of hypo- or hyperthyroidism, although there were complaints characteristic of these states.

It is possible that in RA there is a secondary thyroid disorder associated with the function of the pituitary gland and hypothalamus.

In addition, the shift in the ratio of free T3 and free T4 levels in RA may be associated with the development of changes in the metabolism of thyroid hormones in peripheral tissues, a decrease in the sensitivity of receptors to them in cells and target tissues, as well as a decrease in the activity of T4 deiodases.

Possibly, at the first stage of RA development, an increase in the level of T3 in the blood occurs due to the adaptive-compensatory response of the whole organism and the thyroid gland to the increased need for thyroglobulin to support metabolic processes in tissues under conditions of illness. This is provided by an increase in the conversion of T4 to T3, as well as an increase in the synthesis of T3 in the thyroid gland. In unfavorable conditions, more triiodothyronine is required to maintain constancy in the intracellular and pericellular environment, which directly controls energy metabolism in tissues. Prolonged increased consumption of T3 leads to its functional insufficiency and indirectly contributes to the formation of combined pathology of RA and ATP. As a result, patients with RA and ATP often have "ineffective" goiter transformation, accompanied by a hypothyroid state relative to triiodothyronine, and a hyperthyroid state relative to thyroxine against the background of normal TSH synthesis.

Excessive concentration of thyroid hormones contributes to an increase in inflammatory reactions. It has been proven that the more vividly the infection manifests, leading to the development of RA, the more often the thyroid function increases. Infection, even in an inactive state,

enhances thyroid activity in 50% of patients. It is assumed that the infection causes irritation of the thyroid parenchyma, pituitary gland, hypothalamic region. On the other hand, a violation of the normal activity of the thyroid gland affects the course of the infectious process. This is manifested in various metabolic disorders, changes in calorigenesis and oxygen consumption by tissues, the activity of the central nervous system and other organs, as well as in the inhibition of lymphocytopoiesis, a decrease in the reactivity of the body and an increase in the adverse effect of infection on the course of the rheumatoid process.

With the involvement of the thyroid gland during RA, the pathological process intensifies, its course worsens, and the tactics of treating these patients also change. An excess of thyroid hormones leads to a disruption in the formation of a general adaptation syndrome, patients become torpid to any therapy. The condition improves with a gradual decrease in the functional activity of the thyroid gland against the background of the appointment of treatment. On the other hand, this can be explained by the fact that, in addition to autoimmune mechanisms in thyroid damage, an important role is played by the direct influence of "pro-inflammatory" cytokines: interleukin-1, 6, tumor necrosis factor, which can enhance immune responses, interact with thyrotropin receptors and additionally stimulate the production of thyroid hormones. The thyroid gland expresses interleukins when exposed to circulating immune complexes (which are formed in excess in RA), and cytokines, in turn, stimulate fibroblast proliferation, excessive production of collagen and glycosaminoglycans, leading to a narrowing of the joint space, the formation of bone outgrowths and a decrease in functional activity joint. It is known that the production of cytokines, in particular IL-6, is increased in RA. An increase in the level of cytokines such as $\alpha$-interferon, $\gamma$-interferon, IL-1, IL-2, TNF and granulocyte colony-stimulating factor may be accompanied by the development of hypothyroidism or thyrotoxicosis. These changes are often of a transient nature and disappear several months after the normalization of their number. The process of formation of reversive T3 is considered as a way of removing an excess amount of thyroxine from metabolism. The reversiveT3 content rises sharply in conditions when it is necessary to conserve energy, to protect the body from overheating during fasting, an increase in body temperature, systemic or severe diseases, as well as in old and senile age.

## P158
## PANDEMIC, LOCKDOWN AND RHEUMATOLOGIC PRACTICE

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**Objective:** During this exceptional and particular period of confinement, we have observed and analyzed the rheumatologists' (Rh) feelings, reactions, and attitudes that may have emerged.

**Methods:** During the first lockdown in France, during spring 2020, 13 questions, 9 appendices, ranking of the most frequently cited reactions were asked to 38 private practice Rh from the Ile-de-France region, average age 63 yo, 58% male (M).

**Results:** Fear of being contaminated and of transmitting M 91/F 69%, concern about an unknown pandemic M 86/F 69%, anger M 71/F 84% were the main feelings expressed. Anger at the indifference to the exposure of doctors in the city 84%, the unpreparedness of the authorities M 95/F 62%, the mortality in EHPAD (nursing homes) 81%, the media cacophony 79%, the hidden reality 71%. On a personal level, according to 61%, the Rh is not anxious about the world after, has no psychological repercussions (sleep, melancholy, family relations, frustration) 58% and his degree of commitment was guilt-free 55%. Professionally: perplexity in the face of the contradictions of experts and scientific journals 79%, wide acceptance of constraints in the practice (10 h/d mask wearing, 92%, spaced reception of patients 95%, education of barrier gestures and social

distancing 97%), adaptation of the medical practice (teleconsultation, telephone consultation) 78%, fear of abandoning treatment or diagnostic delay M 82/F 62%, financial arrangements necessary M 86/F 53%. For M: worries about the pandemic, anger and uncertainty about what will happen next predominate in this order. For F, anger (untruths and lack of means) is the main feeling. Anger, fear and uncertainty are the most frequently cited feelings for both male and female.

**Conclusion:** The Rh at the end of the period of confinement during spring of 2020, is worried M>F and anger especially in front of the sanitary unpreparedness M>F. On a personal level the private life has been little affected F>M and he has been able to adapt professionally. Nevertheless, the deconfinement has not been a banal return to normal 63% M=F.

## P159
## BENEFITS OF PHYSICAL ACTIVITY IN CHRONIC RHEUMATOID DISEASE (CRD)

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**Objective**: CREER group of rheumatologists (Rh) has studied a CRD population practicing a physical activity (motivations, expectations, nature and rhythm) excluding household ones despite their quantifiable energy value (MET). This study aimed to determine the place of physical activity in the management of CRD.

**Methods:** 207 patients, 53 yo average, 56% (50-70 yo), 60% women (W), rheumatoid arthritis (RA): 57%) or ankylosing spondylitis (AS): 40%, low or moderate activity (66%). Years of evolution: 10 RA/11.5 AS, corticosteroids 34/5%, NSAIDs 15/52%, conventional DMARDS 84/30%, biotherapies 21/43%. Comorbidities: 55 RA/ 44% AS, high blood pressure 20%, overweight 21%, tobacco 13.5%, other 19%.

**Results:** 7/10 patients are encouraged to engage in physical activity, regardless of gender, age, RA or AS. Are suggested: walking 53%, swimming/aquagym 40%, gym 19%. The practice is regular for 60% W>M, RA=AS, more for 70% if <40 yo and >60 yo. Really practiced activity: walking 46%, aquatic activities 37%, cycling 29%, home sports 19%. Once/week minimum is followed for cycling and swimming, insufficiently for walking, largely for sport at home. 50% have been practicing for 3 y. 60% adapt the rhythm to the CRD activity. Motivations: maintain one's health, destress. Sport recommendations: Rh 80%/ general physician 45%. 50% patients ignore if this will improve or worsen the CRD. Hence the need for information by the Rh of the benefits of physical activity. If 60% of patients modify their activity because of CRD, many do not participate in sport because no time, no need, no desire RA=AS.

**Conclusion:** The main activity practiced and advocated is walking. The patients go beyond, by mobilizing for cycling, swimming and gym. But the reluctance persists and we must, through therapeutic education, convince of the benefits of the activity on CRD and its comorbidities, unknown to 50% of patients. To map lesions, judge the ability and desires are necessary to set goals for duration and frequency of activity. Using connected tools improves compliance. Finally, walking which does not require neither schedule nor equipment (otherwise a cane) should become a firstline prescription.

## P160
## ANALYSIS OF TREATMENT RESULTS FOR LATERAL CLAVICLE FRACTURES AND FRACTURE DISLOCATIONS

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**Objective:** Description of a new method of surgical treatment of fracture dislocations and fractures of the acromial end of the clavicle using a clavicle hook plate in the department of concomitant injuries of adults of the Samarkand branch of RSSPMCTO in period from 2015-2020.
**Methods:** When analyzing 150 cases of medical histories for a clavicle fracture, 45 fracture dislocations and fractures of the acromial end of the clavicle were identified; there were 42 injured men, 3 women. According to the types of injury, the largest number falls on household - 12%, road traffic accidents - 11%, sports - 3%, street - 2%, others - 3%. Under general anesthesia, the acromion and the fracture site of the acromial end of the clavicle are exposed in layers for 5-6 cm. The hook is placed under the acromion, the plate is reinforced with three or four screws on the acromial end of the clavicle. The wound is sutured in layers. Immobilization with a "scarf bandage" until removing the stitches for 7-10 d. Development of the hand, wrist joint from the first days in the elbow joint from 3-5 d.
**Results:** According to the described method, 45 operations were performed. Development of the hand, wrist joint from the first days; in the elbow joint from 3-5 d. Movement in the shoulder joint after 2 weeks from the day of surgery. According to the described method, 45 operations were performed. Early functional development of the joints, shortening the treatment time in the postoperative period, and shortening the time of inpatient and outpatient treatment made it possible to reduce the period of temporary disability.
**Conclusion:** The proposed method of surgery with the use of a clavicular hook plate is currently the most optimal in comparison with other methods of surgery. The technique of performing operation is not complicated, it is carried out with minimal traumatization of soft tissues and does not require special external immobilization of the limb.

## P161
### MALE SECONDARY OSTEOPOROSIS: MULTILEVEL ASPECTS

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**Objective:** Multiple causes of male osteoporosis are described like glucocorticoid exposure, hypogonadism, uncontrolled long term hyperthyroidism, primary hyperparathyroidism, severe hypovitaminosis D, different active endocrine tumours of pituitary and adrenal glands, etc. (1-5). After the administration of glucocorticoids, rapid bone loss occurs, and fracture risk increases within a few months in a dose-dependent manner. We aim to introduce a male with prior ankylosing spondylitis can be associated with bone loss and increased risk of fractures.
**Case report:** A 63-year old, nonsmoking male is admitted for evaluation of osteoporosis. His medical history includes: HLA-B27-positive ankylosing spondylitis (AS). He is also known with left thyroidectomy and isthmectomy for toxic adenoma that was performed 38 y prior to current admission, without consecutive levothyroxine treatment and an additional right thyroid node, which was detected 14 y ago. At the age of 22 y, the patient was offered glucocorticoid treatment for 2 y. The medical background also includes: aortic and mitral regurgitation, extrasystolic supraventricular arrhythmia, grade III arterial hypertension, currently controlled with specific oral medication. Furthermore, he is suffering from kidney microlithiasis and vitamin D deficiency which was treated with vitamin D supplements. On admission, he accused persistent back pain without evidence of a radiological thoracic-lumbar fracture. The panel of evaluation revealed: total calcium=9.83 mg/dL (8.4-10.3), phosphorus=2.33 mg/dL (2.5-4.5), alkaline phosphatase=100 U/L(38-129), CrossLaps=0.130 ng/mL (0.104-0.504), osteocalcin=17.82 ng/ml (14-46), P1NP=21.07 ng/mL (normal: 15=58), PTH=55.87 pg/mL (15-65), 25-hydroxyvitaminD=42.3 ng/ml (30-100), TSH=0.59 μUI/mL (normal: 0.34-5.6), freeT4=0.87 ng/dL (normal: 0.61-1.12), calcitonin=3.53 pg/mL(normal: 1-11.8), without hypogonadism. L2-4 lumbar BMD-DXA=0.667 g/cm², T-score=-3 SD, Z-score=-1.7 SD. 1 y after weekly alendronic acid 5600 UI and vitaminD3 supplements, DXA showed BMD=0.681 g/cm², T-score=-3 SD, Z-score=-1.7 SD.
**Conclusion:** Prior glucocorticoid exposure in addition to AS are contributor to male bone loss. However, stationary BMD after oral bisphosphonates is suggestive for a good response to therapy.
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## P162
### MIR-671 ABUNDANT IN SMALL EXTRACELLULAR VESICLES DERIVED FROM RHIZOMA DRYNARIAE-PRECONDITIONED BONE MESENCHYMAL STEM CELLS REGULATING OSTEOGENESIS BY TARGETING TAK1 MEDIATING WNT SIGNALING

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The antiosteoporosis and bone protection effects of Rhizoma drynariae (RD) are well known. Small extracellular vesicles (sEVs) derived from mesenchymal stem cells have been demonstrated to possess potent regeneration. Whether the antiosteoporosis and bone protection effects of RD are correlated to the exosomes secretion and delivery is still not fully understood. In this study, we evaluated the osteogenesis effects of sEVs derived from RD-preconditioned bone mesenchymal stem cells (RD-sEV) on osteoblasts. The underlying mechanism of RD-sEV-induced osteogenesis was explored by RNA sequencing and verified by transfection with the corresponding mimic and inhibitor. RD-sEV stimulates proliferation and osteogenic differentiation of osteoblasts. Sequencing identified a unique enrichment of a set of miRNAs in RD-sEV. Overexpression or inhibition in vitro demonstrated that the osteogenesis-inducing potential was primarily attributed to miR-671, one of the most dramatically downregulated miRNAs in the RD-sEV fraction. Dual-luciferase reporter assays showed that miR-671 attenuated osteogenesis through direct suppression of TAK1 by targeting its 3' untranslated region. Rescue experiments indicated that miR-671 mimic could reverse the decrease of beta-catenin which aroused by Dkk-1, a classic Wnt signaling inhibitor. These data report the potential of RD-sEV to stimulate osteogenic differentiation achieved by delivering sEV-miR-671 to target TAK1 for further regulating the Wnt signaling.

## P163
### MONITORING OF LUMBAR SPINE KINEMATICS AFTER MICRODISCECTOMY WITH THE USE OF WEARABLE SENSORS: A PATH TO RECOGNIZE POSSIBLE RECURRENCE KINEMATIC FACTORS

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**Objective:** The literature reports 5-15% recurrence rate of lumbar spine microdiscectomies (LSMs). Lumbar spine flexion (LSF) is mentioned as the most harmful load to the intervertebral disc that could lead to recurrence during the 6 postoperative weeks. Patients with sagittal plane ROMs more than 10° during that period had a recurrence rate of 26.5%, whereas those with <10° had a rate of 4.1%. The purpose of this study is to quantify LSFs, following LSM, by quantifying (monitoring during daily activities) the frequency of more than 10° LSF ROM, at the period of 6 weeks postoperatively.

**Methods:** ROMs were recorded during 33 subjects' daily activities for 24 h twice per week. MetaMotionR+, Inertial Measurement Unit (IMU), was used for the measurement of lumbar spine kinematics.

**Results:** The mean number of >10° of LSFs per hour were: 40.1/h during the 1st postoperative week (P.W.) (29% normal subjects-N.S.), 2nd P.W. 61.2/h (44% N.S.), 3rd P.W. 72.9/h (52.7% N.S.), 4th P.W. 61.1/h (61.1% N.S.), 5th P.W. (69.7% N.S.) and 6th P.W. 106.25 (76.9% N.S.).

**Conclusion:** LSFs constitute important risk factors for rLDH. This is the first time, to our knowledge, recording lumbar spine kinematics during daily activities for 24 h/d following microdiscectomy. Although patients' data report less sagittal plane movements than normal, further in vitro studies should be done by using our results of the patients' kinematic, to identify if such a kinematic pattern could cause reherniation of microdiscectomied lumbar discs. Furthermore IMUs could be additionally used as a precaution measure, to alert patients by vibration, whenever they exceed acceptable rates of LSFs.

## P164

### EQUITY OF HEALTHCARE EXPENDITURE IN HIP FRACTURE PATIENTS ACROSS SOCIOECONOMIC GROUPS: A BENEFIT INCIDENCE ANALYSIS USING AUSICUROS DATA

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**Objective:** Data suggest a higher incidence of hip fracture among those of lower socioeconomic position (SEP) compared to those of higher SEP. With a universal healthcare system in Australia, we examined health service expenditure for hip fracture patients across income and education groups using healthcare utilisation data collected by the Australian arm of the International Costs and Utilities Related to Osteoporotic fractures Study (AusICUROS) study.

**Methods:** Healthcare utilisation data 4 months post-fracture were extracted for participants aged ≥50 y with hip fracture (n=174, 76% women). Selfreported income and highest level of education were categorised as low, medium, or high. Using Benefits Incidence Analysis, total healthcare expenditure (public and private) was calculated from 2020 Medicare Benefits Schedule, and mean hip fracture related admissions were ascertained from the 2018 National Hospital Cost Data Collection. Concentration Indexes (CI) were developed to indicate the degree of socioeconomic inequality in healthcare expenditure. Their magnitude indicates the strength of the relationship and degree of variability. We also compared distributions of expenditure across SEP groups with expected need inferred from hip fracture incidence.

**Results:** The CI suggested health expenditure across socioeconomic groups was equitable, although we observed a nonsignificant trend toward greater healthcare expenditure in the lowest income and education groups (CI=-0.0455, p=0.20, and -0.0506, p=0.09, respectively).

**Conclusion:** Overall healthcare expenditure for individuals with incident hip fracture was found to be equitable across socioeconomic groups, slightly favouring the most disadvantaged groups. The results appear as a positive reflection of Australia's universal health system.

## P165

### DEVELOPMENT AND INTERNAL VALIDATION OF MACHINE LEARNING APPROACH FOR PREDICTING 1-YEAR MORTALITY AFTER FRAGILITY HIP FRACTURE

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**Objective:** This study aimed to (1) develop and internally validate the mortality prediction models for 1-y mortality after hip fracture using the machine learning approach; and (2) incorporate the algorithm with the best prediction performance into a freely accessible mobile application.

**Methods:** This retrospective study was conducted using database from our fracture liaison service registry. 492 patients diagnosed with fragility hip fracture were included. The database was randomly split into two sets: 344 cases (70%) for training and 148 (30%) for testing. A machine learning technique was utilized to develop the Artificial Neural Network (ANN) and logistic regression (LR) models, and internally validated by evaluating their accuracies and the area under the receiver operating characteristic curves (AUC). A mobile application to predict 1-y mortality after hip fracture was then developed using the best performing algorithm (Figure 1).

**Results:** The ANN model was the best performing algorithm with the highest accuracy of 96.80% and 95.95% in the training and testing datasets, respectively. The AUC of the ANN model for both datasets were 0.993 [95%CI: 0.986, 0.998] and 0.949 [95%CI: 0.892, 0.993], higher than the 0.986 [95%CI: 0.976, 0.994] and 0.939 [95%CI: 0.881, 0.985] of the logistic regression model. The best algorithm was subsequently incorporated into a mobile application: (Figure 2)



**Conclusion:** Our machine learning approach provided excellent capability for predicting 1-y mortality after hip fracture and had developed into a mobile application for any users. External validation of this tool is needed to ensure the clinical utility in hip fracture care among different centers.

## P166
### THE RESULTS OF MEDICATION CORRECTION OF CLINICAL AND ORTHOPEDIC MANIFESTATIONS IN PATIENTS WITH VARIOUS FORMS OF FIBROUS DYSPLASIA

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**Objective:** To improve medication correction of disorders of the structural state and metabolism of bone tissue in patients with fibrous dysplasia (FD).
**Methods:** There were 16 patients with FD who were receiving medication treatment. Age of patients was from 6-28 y. All patients underwent basic antiosteoporotic therapy, of which 10 were treated with pamidronic acid. Serum Ca and Vit D3 levels were screened before and during treatment. The structural state of bone tissue was studied according to the Z- and T-criteria, bone metabolism - the study of bone markers: total P1NP, β-CTx, osteocalcin.
**Results:** Based on paraclinical studies in patients with FD, depending on the clinical manifestations, form of the disease, age, indications for medication treatment with the use of pamidronic acid have been developed. Basic treatment and basic treatment in combination with pamidronic acid were used. Pamidronic acid medications were used at a dose of 0.5-1.0 mg/kg/d for one – three infusions, the interval between cycles was 3-4 months. Schemes, doses, combinations of pamidronic acid

with other antiosteoporotic drugs depending on changes in the condition and metabolism of bone tissue in FD were determined. Indications for basic therapy were: β-CTx up to 0.500 ng/ml and Z-test up to -1.0 SD. Basic therapy included: preparations of Ca "Osteogenon" 1-2 capsules 2 times a day and vitamin D3 in a dose of up to 2000 IU. Indications for basic therapy in combination with the use of pamidronic acid at a dose of 0.5-1.0 mg/kg/d were severe pain, a significant area of long bone lesions, changes in β-CTx from 1.5 ng/ml and above, Z-test from - 1.5 SD and below. The effectiveness of therapy was assessed by changes in the level of β-CTx in the serum and the Z-test of the lumbar vertebrae. The effectiveness of the used treatment did not depend on the dose of pamidronic acid and the form of FD. The relation between changes in the marker of osteoresorption and its reduction depending on the initial values (Wilcoxon's test p=0.0045).
**Conclusion:** The results of medication treatment in patients with FD indicate its significant effectiveness (Wilcoxon test p=0.0045): reduction and elimination of pain, improvement of the structural condition and metabolism of bone tissue.

## P167
### HYPOVITAMINOSIS D ON AN ADULT FEMALE: FROM AUTOIMMUNE CONDITIONS TO PANDEMIC DAYS

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**Objective:** COVID-19 pandemic was associated with increased risk of hypovitaminosis D due to lockdown regulations and limited outdoor activities, while young adult patients with autoimmune conditions may associated decreased values of 25-hydroxyvitamin D due to copresence of celiac disease, glucocorticoid exposure, malabsorption, overtreatment of autoimmune hypothyroidism, etc. (1-5). We aim to introduce a female case known with autoimmune conditions who was admitted for vitamin D deficiency related symptoms during pandemic.
**Case report:** A 41-year-old, nonsmoker female is admitted for nonspecific muscle cramps, and joints pain, asthenia which is persistent for the last several months in addition to chronic low back pain (which required chronic use of nonsteroid anti-inflammatory medication). Her personal medical background reveals a diagnosis of HLA-B27-positive ankylosing spondylitis that was established seven years before current admission. She is also known with autoimmune thyroiditis with negative antibodies, a diagnostic that was based on suggestive ultrasound features with highly hypoechoic pattern of relative small thyroid gland (and normal thyroid function). She is also confirmed with thrombophilia. She has a negative personal history of confirmed COVID-19 infection and she followed the lockdown restrictions for several weeks. The family medical history is irrelevant. On admission, clinical examination of the thyroid is within normal limits on a menstruated normal weighted female. Biochemistry data points out normal total calcium of 9.45 mg/dL (normal: 8.4-10.3 mg/dL). Endocrine panel shows TSH=1.28 μUI/mL (normal: 0.5-4.5 μUI/mL), free levothyroxine=11.65 pmol/L (normal: 9-19 pmol/L), anti-thyroperoxidase antibodies=10.88 UI/mL (normal: 0-35), anti-thyroglobulin antibodies=10 UI/mL (normal: 0-115 UI/mL). 25-hydroxyvitamin D=10 ng/mL (normal >30 ng/mL) with increased PTH levels and negative antibodies for celiac disease. Supplementation with daily 2000 UI of vitamin D for 12 weeks followed by daily 1000 UI was recommended.
**Conclusion:** The association thrombophilia-hypovitaminosis D has been reported in some patients, but it is rather incidental. Chronic use of anti-inflammatory medication may cause malabsorption, and also the potential of a second autoimmune disease at intestinal level may cause this deficiency, but the current pandemic reality has become a new cause of it.

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## P168

### BONE INVOLVMENT ON A YOUNG MALE WITH MEDULLARY THYROID CARCINOMA

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**Objective:** Medullary thyroid cancer (MTC), neuroendocrine tumor with bone spreading potential, may be already metastasized at the time of diagnosis (for instance, affecting liver, lung, brain and) (1-5). Most common skeleton sites are the spine and pelvis, followed by the ribs, then the extremities, and skull (1-5). Also, MTC may associate primary hyperparathyroidism (MEN2A syndrome) and common vitamin D deficiency (1-5). We aim to introduce a male with MTC and severe outcome, in addition to bone involvement.

**Case report:** A 31-year-old, nonsmoking male is admitted as an emergency for a large right mediastinal mass of 11.4/8.3/14.3 cm, causing severe haemoptysis. Biopsy showed MTC, so he was referred for endocrine assays. Paraclinical investigations: serum calcitonin=6245 pg/mL (normal: 8.3-14.3 pg/mL), chromogranin A=189.5 ng/mL (normal: 20-125 ng/mL); neuron specific enolase=12.93 ng/mL (normal: 0-12 ng/mL), total serum calcium=9.1 mg/dL (normal: 8.4-10.2 mg/dL), PTH=44.12 pg/mL (normal: 15-65 pg/mL), 25-hydroxyvitaminD=25.98 ng/mL (normal: 30-100 ng/mL), normal metanephrines/normetanephrines. Cervical ultrasound: no specific nodule at thyroid, but multiple supraclavicular and lateral cervical lymph nodes (blocklike), of maximum 5.78/2.13 cm. Computed tomography (CT) showed: thyroid nodule of 0.9/0.6 cm, lung metastases with secondary incomplete atelectasis, hepatosplenomegaly, numerous supraclavicular, intercostal and phrenic lymph nodes, in association with mediastinal mass. A severe cholestasis initially contraindicated chemotherapy thus external radiotherapy for the lung and mediastinal masses was started followed by chemotherapy (doxorubicin-cyclophosphamide-vincristine). 8 months calcitonin increased to 11791 pg/mL while total serum calcium decreased to 8.6 mg. Lumbar BMD-DXA=1.342 g/cm$^2$, Z-score=1.1 SD, CT revealed more metastases (including at liver of 2.8/2.7 cm) and an osteolytic lesion on left iliac bone of 6.2/4.5 cm, confirmed at. Tc$^{99m}$ bone scintigraphy as high uptake, also at right humerus, scapula, 1/3 distal left femur. Zolendronic acid (4 mg/28 d) was added.

**Conclusion:** Bone metastases might be expected even in young patients with uncontrolled MTC.

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## P169

### POLYMORPHISM OF ANDROGEN RECEPTOR GENE AND SKELETON FORMATION IN TRANSGENDER INDIVIDUALS

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**Objective:** The androgen receptor (AR) gene MIGHR is known to be associated with transsexualism. Bone tissue is one of the target organs for androgens. Trochanteric index (TI) (ratio of height to the leg length) may indicate the organism androgenization level during puberty. It is interesting to identify the peculiarities of this process in the transperson population. Our aim was to identify the connection between androgen receptor (AR) gene CAG polymorphism and skeletal formation type in transgender persons.

**Methods:** The study involved 262 patients above 18 y with the diagnosis of transsexualism (121 MtF, 141 FtM). Mental and sexual status; TI; and genetic analysis (AR gene polymorphism) was estimated.

**Results:** The average TI in the MtF group accounts for 1.93±0.03, which represents hypoevolutive type of skeletal development. For FtM group TI was 2.01±0.04, that matches frontier between normal evolutive and hyperevolutionary types. Differences in TI values in the MtF and FtM were significant (p=0.000). The MtF and FtM groups showed significant differences in the number of CAG repeats (p=0.000). A strong negative correlation was found between the TI value and number of CAG repeats in both groups (R=-0.24; p=0.000).

**Conclusion:** TI is associated with polymorphism of AR. FtM population is characterized by a less number of CAG repeats in the AR gene compared to MtF, a higher TI, and a tendency toward a hyperevolutionary type of the formation of the skeleton. The MtF population otherwise is characterized by a hypoevolutive type of the formation of the skeleton.

## P170

### EFFECT OF VITAMIN D SUPPLEMENTATION ON RISK OF BREAST CANCER: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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**Objective:** Vitamin D supplementations are widely used to prevent osteoporosis, especially in menopausal women. However, the association between vitamin D and the risk of breast cancer should be taken into consideration. Laboratory findings indicated that vitamin D might have potent protective effect on breast cancer, but epidemiology studies reported conflicting results. The aim of the study was to conduct a systematic review and meta-analysis to clarify the efficacy and safety of vitamin D supplementation on risk of breast cancer.

**Methods:** MEDLINE, EMBASE, The Cochrane Central Register of Controlled Trials, ClinicalTrials.gov and abstracts of three major conferences were searched (up to December 8, 2020). Parallel randomized controlled trials (RCTs) examining the efficacy of vitamin D supplementation on risk of breast cancer or change of mammography compared with placebo in females were included. Data were meta-analyzed using a random-effects model. Bayesian meta-analysis was conducted to synthesize the results using data from observational studies as priors.

**Results:** Seven RCTs were identified for effect of vitamin D on risk of breast cancer, with 19,137 females included for meta-analysis. No statistically significant effect of vitamin D on risk of breast cancer was

found in classical random-effect meta-analysis (risk ratio=1.04, 95% CI: 0.84 to 1.28, p=0.71). When Bayesian meta-analyses were conducted, results remained nonsignificant. There was no statistically significant effect of vitamin D on mammography density observed: mean difference=0.46, 95% CI: -2.06 to 2.98, p=0.72.

**Conclusion:** There is insufficient evidence to support the harmness or efficacy of vitamin D supplementation in breast cancer risk. The efficacy of using vitamin D on risk of breast cancer from previous observational studies may be overestimated.

**Acknowledgement:** Registration: PROSPERO (identifier: CRD42019138718).

## P171
## MUSCULOSKELETAL DISORDERS AND PERCEIVED WORK DEMANDS AMONG FEMALE NURSES AT A TERTIARY CARE HOSPITAL IN INDIA

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**Objective:** Musculoskeletal disorders (MSD) are common among nurses and can affect patient outcomes. Our aim was to measure prevalence of MSD and their association with perceived work demands and sociodemographic variables among female nurses at a tertiary care hospital in South India.

**Methods:** A cross-sectional study was conducted starting June 2018 to May 2019 through interviewer administered questionnaires which comprised three parts: sociodemographic data, modified Nordic questionnaire, and perceived physical and psychological work demands.

**Results:** 296 nurses with a mean age of 30.4 y participated. Prevalence of any MSD in the last seven days was 60.5% with low back pain being the most common and elbow pain the least common. Occurrence of any MSD was associated with age, number of children, working hours at home, BMI, and total work experience. High perceived physical demands score was associated with lower back (OR: 3.06) and knee pain (OR: 7.73).

**Conclusion:** Prevalence of MSD was high and occurrence of lower back and knee MSD was associated with perceived physical demands. This information should be used as a benchmark and guiding tool for designing work place interventions to improve working conditions and health of nurses.

## P172
## A RISK ASSESSMENT STUDY ON WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG DENTISTS IN MANGALORE, INDIA

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**Objective:** Work-related musculoskeletal disorders (WMSDs) are responsible for morbidity in many working populations, which are of multifactorial in origin and of global concern due to industrialization. Dentists as one of the healthcare professionals who are prone to develop these WMSDs. The study aims to determine the prevalence of WMSDs among dentists in Mangalore region and explores the various risk factors for the development of MSDs and WMSDs.

**Methods:** This proposed study is a cross-sectional study conducted among dentists of two randomly selected dental colleges of Mangalore, India. A structured questionnaire was used to collect the demographic information, occupational history, risk factors, and ergonomic awareness with job task details. Prevalidated standardized tools such as quick exposure check list, rapid entire body assessment score sheet, and

Nordic Musculoskeletal Questionnaire were also used. Data were entered in MS-Excel and analyzed through SPSS version 22.

**Results:** More than 92% of the participants reported pain and discomfort in at least one part of their body. The major affected body part is neck, followed by the lower back and wrist. More than half of the orthodontists and oral surgeons reported that their MSDs are work-related origin. Pearson's correlation test indicated that there is a positive correlation between the current exposure and risk (r=0.613). Multivariate regression analysis found that younger participants, male (OR=4.1), involved physical activity (OR=1.04), dentists not taught about ergonomics in their dental school (OR=1.69) or never attended any workshops (OR=1.38), who reported task involving sustained muscle contraction (OR=1.12) or task with repetitive movements (OR=1.11) are the major risk factors for the development of MSDs among the dentists.

**Conclusion:** This risk assessment study found that there is a high prevalence of MSDs and WMSDs among dentists. Ergonomic awareness and health promotion need to be integrated with the professional practice for dentists.

## P173
## LOW-ENERGY FRACTURE PREDICTION IN PATIENTS PRESCRIBED ANTIEPILEPTIC DRUGS: A SWEDISH CASE-CONTROL STUDY ASSESSING THE VALUE OF BMD AND TBS

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**Objective:** Antiepileptic drugs (AED) are known to increase the risk of low energy fractures by causing secondary osteoporosis. In this study, we determined the value of BMD and trabecular bone score (TBS) as predictors for low energy fractures in patients prescribed AED.

**Methods:** This case-control study included 517 low energy fractures, i.e., a combination of ICD-10 codes according to the Swedish National Board of Health and Welfare's definition of osteoporosis- related fractures and ICD-10 codes for low energy trauma, in 1385 subjects who had all participated in a TBS convertible DXA examination between July 2011 and November 2018 in Kalmar county, southeast Sweden. The AED users were stratified according to cytochrome P-450 enzyme inducing ability and compared to controls. The dataset was a combination of previously collected data from the electronic health register (EHR) and new BMD and TBS data from a DXA database. Univariate and multivariate logistic regressions were applied.

**Results:** In this study BMD-spine did not predict low energy fractures; however, both BMD-hip (aOR: 0.35, 95%CI: 0.24-0.50) and TBS (aOR: 0.65, 95%CI: 0.46-0.92) were inversely related to fractures. Patients prescribed enzyme inducing AED had an increased fracture odds (aOR: 2.15, 95%CI: 1.24-3.72). There was no difference for fracture outcome between subjects with noninducing drugs and controls (p-value 0.476). In this study 67.5% of the TBS convertible DXAs were performed within a year of the low-energy fracture. Of the included patients, 82% were women.

**Conclusion:** While BMD-spine was not associated with low energy fractures, both BMD-hip and TBS predicted low energy fractures independently in patients prescribed AED. This is the first study demonstrating the value of TBS in patients prescribed AED. In clinical practice, BMD-hip and TBS could be combined to improve the assessment of bone health in this growing patient group. The value of the combination of the two measures should be assessed in a future prospective randomized study.

## P174

### ASSESSMENT OF CARDIOVASCULAR RISK IN PATIENTS WITH CALCIUM PYROPHOSPHATE CRYSTAL DEPOSITION DISEASE AND OSTEOARTHRITIS

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**Objective:** Factors affecting cardiovascular risk (CVR) in patients with calcium pyrophosphate crystal deposition disease (CPPD) have not been studied. Our aim was to do a comparison of CVR on the SCORE scale and the incidence of individual risk factors for cardiovascular diseases (CVD) in patients with CPPD and osteoarthritis (OA).

**Methods:** A single-stage, single-center study. The compared groups - patients with CPPD (n=246) and OA of the knee joints (n=53), from 18-80 years old. The frequency of individual CVR factors was compared with the results of stratification on the SCORE scale.

**Results:** The frequency of individual risk factors of CVD in CPPD and OA did not differ significantly, with the exception of arterial hypertension, which was detected in 123 (50%) patients with CPPD, and in 9 (17%) patients with OA, p=0.01. However, the presence of ≥3 of the listed risk factors (smoking, BMI >30 kg/m$^2$, hypertension, ischemic heart disease, type 2 diabetes mellitus, chronic heart failure, myocardial infarction, serum cholesterol >5.0 mmol/L, uric acid >360 μmol/L, C-reactive protein (CRP) >5 mg/L, glomerular filtration rate <60 ml/min) was determined in 123 (50%) patients with CPPD, and in 11 (21%) patients with OA (p=0.0002). The CVR on the SCORE scale was stratified as high or very high in 63% of patients with CPPD and in 38% of patients with OA (p=0.006). The median SCORE index in CPPD (10 [1.7; 10]) was significantly higher than in OA (3.5 [1.3; 8.6]), p=0.004. The median serum CRP level was also significantly higher in CPPD (p<0.001), as well as the number of patients with CRP ≥5 mg/l (p<0.001).

**Conclusion:** With a comparable frequency of detection of individual RFs in patients with CPPD and OA, patients with CPPD have a higher CVR, when stratified on the SCORE scale, as well as a higher CRP level.

## P175

### RELIABILITY OF RADIOLOGICAL INDICES IN COMPARISON WITH DXA IN DIAGNOSIS OF OSTEOPOROSIS

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**Objective:** Osteoporosis projects a dominant issue related to health in the community in developing country like ours, India and is often unrecognised or undiagnosed. Early diagnosis and treatment of osteoporosis is of utmost importance. This study evaluates the accuracy of Radiological Indices in comparison to gold standard DXA scan for diagnosis of osteoporosis, so that diagnosis of osteoporosis can be done using simple radiographs which would be cost effective and less exposure to radiation.

**Methods:** The is study is a one year hospital based comparative study which included a total of 80 patients who presented to OPD / IPD of Dept. of Orthopaedics and met the inclusion criteria were enrolled in the study. Patients were subjected to DXA scan and a plain radiograph of either of the hip joint with full length femur in AP and lateral views. Subsequently, the Singh's Index, cortical thickness index (CTI) AP and lateral, calcar to canal ratio (CCR) were measured and compared with the standard DXA scan. Spearman's rank coefficient was used to find correlation between radiological indices and DXA scan, kappa statistics for level of agreement, sensitivity and specificity for radiological indices was calculated.

**Results:** The data analysed showed significant correlation (Spearman coefficient) between radiological indices and DXA scan. CTI antero-posterior view and lateral view with cutoff 0.43(r=0.8172, p<0.0001 and r=0.8243, p<0.0001 respectively), CCR with cutoff 0.50 (r=0.8188, p<0.0001). Similarly for Singh's index (r=0.6002, p<0.0001).

**Conclusion:** Radiological indices are reliable in the diagnosis of osteoporosis and have a good correlation with T-scores deduced by DXA scan.

## P176

### PROFILE OF PATIENTS ENROLLED IN A FRACTURE LIASON SERVICE IN A PRIVATE TERTIARY HOSPITAL IN CEBU

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**Objective:** It is estimated that the number of osteoporotic hip fractures among Filipinos will reach 65,000 by 2020 and 175,000 by 2050. In an attempt to improve the identification, diagnosis and treatment of osteoporosis in the province of Cebu, the Fracture Liaison Service (FLS) was started. This study aims to evaluate the implementation of this program for targeting these high-risk groups and improving secondary fracture prevention. Our aim was to describe the profile and outcome of patients enrolled in the FLS program in a private, tertiary hospital in Cebu City.

**Methods:** All patients enrolled in the FLS of Chong Hua Hospital from September 2018 to May 2019 were included in this study. A total of 103 patients, above 50 y of age were interviewed and followed up. Utilizing the Fracture Liaison Assessment Form, the following data were collected: demographics, comorbidities, presence of fragility fracture or osteopenia, compliance to DXA scan, treatment compliance, refracture rate and incidence of falls. Descriptive statistics using frequency count and percentages were used.

**Results:** Majority of patients were within the 70-79 years old age group (33%) and majority were females (73%). Among the 103 enrollees, 32% had osteopenia while 68% had a fragility fracture involving the hip in 27.18%. While under the FLS care, 90.9% of patients were compliant with prescribed medications (calcium, antiosteoporotic drugs) and 98.86% were adherent to fall prevention exercises. No incidence of secondary fractures or falls after discharge.

**Conclusion:** The FLS care has enhanced the identification, assessment and initiation of treatment in patients at high risk for osteoporotic fracture. This approach has improved the pharmacologic compliance of patients and has helped prevent secondary fractures and falls in all patients enrolled in the program.

## P177

### ASSOCIATION BETWEEN TYPE 2 DIABETES AND RISK OF OSTEOPOROSIS: A NATIONWIDE COHORT STUDY

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**Objective:** Though previous studies have investigated the relationship between fracture risk and type 2 diabetes (T2D), cohort studies estimating composite osteoporosis risk have been lacking. The retrospective, nationwide, cohort study sought to determine the risk of osteoporosis in a Taiwanese cohort of patients with T2D.

**Methods:** This included patients diagnosed with T2D between 2002-2015 identified through the 2002 Taiwan survey of hypertension, hyperglycemia, and hyperlipidemia. A total of 1690 men and 1641 women aged 40 years old and older linked to the National Health

Insurance Research Database (NHIRD) were followed up until the end of 2015 to determine incidences of osteoporosis through ICD9-CM codes for osteoporosis or osteoporotic fractures or use of antiosteoporotic agents according to anatomical therapeutic chemical codes retrieved from the NHIRD. The person-year approach and Kaplan-Meier analysis were then used to estimate incidences and cumulative event rates, while Cox proportional hazard models were used to calculate adjusted hazard ratios (HR) for osteoporosis events.

**Results:** A total of 792 new osteoporosis events were documented over a median follow-up of 13.6 y. Compared to participants without T2D, those with T2D had higher osteoporosis risk [adjusted HR: 1.37, 95%CI: 1.11-1.69]. Subgroup analyses revealed that age had a marginally significant effect, indicating that T2D had more pronounced effect on osteoporosis risk in younger populations (<65 years old). No difference was found between patients stratified by gender.

**Conclusion:** T2D was significantly associated with increased risk for osteoporosis, especially in younger participants.

## P178
### REFERENCE VALUES FOR VITAMIN D FROM DOCTOR'S PERSPECTIVE

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**Objective:** The connection between vitamin D deficiency and osteoporosis is well established. Vitamin D hypovitaminosis also might predispose to inflammatory states and autoimmune diseases. On the opposite, vitamin D toxicity can cause symptoms such as nausea, vomiting, constipation, pancreatitis, acute kidney injury, weight loss, dehydration, altered mental status and lead to the development of life-threatening conditions. Subsequently the precision of a vitamin D reference range is of paramount importance in patient's health outcomes. Total 25-hydroxyvitamin D is considered as the most representative metabolite of vitamin D status. However, the reference values of 25-hydroxyvitamin D has not yet been fully elucidated and much debated during the past decades. The aim of our survey was to assess the level of awareness on upper and lower limits of the reference range for 25-hydroxyvitamin D among practicing doctors.

**Methods:** We conducted the national survey on reference values for vitamin D status among physicians specialized in various fields. Endocrinologists accounted for 80% of them.

**Results:** In our survey, we found that out of 704 physicians 77 (10.9%) and 45 (6.4%) considered 25 nmol/L and 50 nmol/L as the lower limits of the reference interval, respectively. On the other hand, 111 (15.8%), 115 (16.3%) and 36 (5.1%) physicians considered 375 nmol/L, 150 nmol/l and 75 nmol/L as the upper limits of the reference interval, respectively.

**Conclusion:** Currently, the question of the optimal concentrations of 25(OH)D in the blood serum stays open. Raising awareness among health care providers in this area, as well as on the characteristics of calcium-phosphorus metabolism, will help maintain adequate vitamin D levels and avoid excessive supplementation. At the present, clinicians prescribing vitamin D, in order to avoid undesirable consequences for the patient's health, should exercise caution.

## P179
### CURRENT THERAPIES IN OSTEOPOROSIS: NEW PERSPECTIVES OR IS IT ENOUGH?

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**Objective:** the discovery of biological therapies was a big step forward in the management of patients with osteoporosis and rheumatic diseases. Although the therapeutic offer seems sufficient, in the clinic, we continue to meet patients in whom apparently we still need new progresses.

**Methods:** We present the case of a 68-year-old man known with surgically treated mixed pulmonary adenocarcinoma, ankylosing spondylitis and osteoporosis of complex etiology, who presented to the Internal Medicine and Rheumatology Clinic Dr. I. Cantacuzino in December 2020 for intense pain in the lumbar spine, with insidious onset and aggravated in the last few days. From the patient's history we notice the left lower lobectomy for pulmonary adenocarcinoma (April 2013), recently diagnosed with ankylosing spondylitis (March 2019 when it was first seen in our clinic), osteoporosis-DXA examination (March 2019, score T -3.1. FRAX score 22% for major osteoporotic fracture, 15% for hip fracture), type 2 diabetes and high blood pressure. He received treatment with multiple NSAIDs (currently diclofenac 150 mg, and given the risks associated with osteoporosis, he received treatment with alendronate 70 mg/week, calcium 1 g, and vitamin D 2000 IU). At the objective examination we find typical changes of ankylosing spondylitis axial form with kyphotic thorax, significant pain in the percussion of the thoracic spinous processes, in a fixed point, T10-T12 area, with marked limitation of joint mobility. Biological investigations and composite scores for measuring ankylosing spondylitis activity reveal a disease with intense activity (BASDAI score 8.7, ASDAS-CRP 3.9). Current DXA exam T-score -3.3. Imaging, multiple thoracic vertebral fractures are identified (T9-T12).

**Results:** At this time, the patient needs to escalate the therapy for the autoimmune rheumatic disease and rethink the therapeutic regimen for the treatment of osteoporosis.

**Conclusion:** In such a patient, given the history of malignancy, the severe course of ankylosing spondylitis requiring biological treatment and complications on a rigid spine, with complex, progressive osteoporosis, despite oral bisphosphonate treatment, is there an ideal solution? Do we need to change the route of administration (intravenous bisphosphonates) or associate biological treatment (anti-TNF and anti-RANKL) under strict supervision?

## P180
### IMPACT OF HOMOCYSTEINE LEVELS ON BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH ANKYLOSING SPONDYLITIS WITH ANTI-TNFα THERAPY

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**Objective:** Osteoporosis is common complication in women with ankylosing spondylitis (AS), after menopause, even in early stages of the disease. Homocysteine (HCY) levels interferes with collagen crosslinking in bones and may affect BMD. The aim of our study was to follow the influence of HCY levels and 25-OH-vitamin D levels on BMD, in AS patients treated with anti-TNFα agents and antiosteoporotic treatment.

**Methods:** We recruited 55 postmenopausal women with AS between the age group of 47-75 y. All patients were in treatment with anti-TNFα agents (adalimumab, infliximab, etanercept). We measured BMD at baseline and then at 12 months. BMD was determined by DXA scan. Based on the WHO criteria, patients were included into 2 groups as follows: patients with osteopenia and patients with osteoporosis. We followed activity disease by BASDAI score and laboratory parameters: HCY, 25-OH-D3, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), BASDAI score and serum calcium. The patients received specific antiosteoporotic treatment (bisphosphonates, vitamin D supplementation and calcium supplementation).

**Results:** Among 57 postmenopausal women at baseline 61.40% (35) had osteoporosis (mean age 56.2±6.9 y) and 38.59% (22) had osteopenia (mean age 54.56±6.5 y). We found high levels of HCY in 68,4% (39) of the patients while the rest of them had normal levels. After 12 months of antiosteoporotic treatment in the group of patients with osteoporosis and high HCY level, BMD increased less compared to patients with osteoporosis and normal HCY level. Regarding patients with osteopenia, there was no significant difference in BMD between patients with elevated, respectively normal levels of HCY. Hyperhomocysteinemia was positively correlated with low levels of 25-OH-vitamin D (p=0.001), serum calcium (p<0.005) but also with increased disease activity (increased ESR, CRP and BASDAI score). There were no differences between HCY levels and BMD depending on the type of anti-TNFα agent.

**Conclusion:** Hyperhomocysteinemia and low levels of vitamin D were correlated with low BMD. Patients with AS in postmenopausal with elevated HCY levels had a poorer response to antiosteoporotic treatment.

## P181
### CLINICAL REMISSION IN RHEUMATOID ARTHRITIS PATIENTS TREATED WITH TOFACITINIB IS ASSOCIATED WITH LOW BASELINE EXPRESSION OF PYRUVATE KINASE AND SUCCINATE DEHYDROGENASE GENES IN THE PERIPHERAL BLOOD

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**Objective:** To investigate the importance of baseline expression of genes involved in energy generation in RA patients, which could serve prognostic biomarkers for treatment response to tofacitinib (TFCN).

**Methods:** Peripheral blood of 28 RA patients aged 52.2±15.6 years old, average disease duration 3.5 y (range 0.6-19) treated with TFCN (5-10 mg twice a day) during three months and 26 healthy age-matched control subjects were examined. Clinical response was assessed by disease activity score (DAS28-ESR), serum levels of ACPA antibodies, rheumatoid factor

(RF), C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR). Clinical remission

was assessed according to ACR criteria and DAS28 (DAS28 <2.6). Protein concentrations

were measured using ELISA. Total RNA was isolated from whole blood and used in gene expression studies performed with quantitative real-time RT-PCR.

**Results:** All of the patients were Steinbrocker's radiographic stage II-III at baseline. The majority of patients demonstrated erosive arthritis (23 out of 28), they were ACPA- (25 out of 28) and RF- (24 out of 28) positive. TFCN treatment significantly decreased the disease activity according to DAS28. At the end of the study majority of patients demonstrated moderate disease activity (3.2< DAS28 <5.1), four patients retained high disease activity while 7 attained remission (DAS28 <2.6). This was accompanied by significant decrease in CRP and the number of swollen and tender joints. Gene and protein expression analyses revealed that RA patients, which attained clinical remission following TFCN treatment demonstrated significantly lower baseline expression of genes associated with glycolysis (pyruvate kinase) and oxidative phosphorylation (succinate dehydrogenase) compared to other examined RA patients. Moreover, these gene expressions increased in the course of follow-up in RA patients who attained clinical remission.

**Conclusion:** Clinical remission attainment in RA patients treated with tofacitinib was associated with lower baseline expression of genes involved in energy generation pathways (pyruvate kinase and succinate dehydrogenase) compared to other examined subjects.

## P182
### ASSESSMENT OF MUSCULOSKELETAL DISORDERS IN PROFESSIONAL SONOGRAPHERS

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**Objective:** The musculoskeletal disorders, ultrasound origin, are defined as the clinical manifestations that are either caused by or aggravated by ultrasound exams at the workplace in professional sonographers. They are an occupational health problem for physicians and have a reported incidence of 90%. These conditions have a health and an emotional impact on the worker. Due to the multiplicity of disciplines that currently carry out ultrasound examinations, the purpose of this study is to assess the different musculoskeletal disorders in relation with ultrasound, their impact and monitoring, through the experience of ultrasonographers.

**Methods:** This is a survey comprising questions to single or multiple choices, addressed to different categories of physicians performing ultrasound. The first part is about the practitioner's information and experiences. The second one regarding the number of ultrasounds performed per week, the ergonomics at workplace, the different musculoskeletal manifestations attributed to the ultrasound examination, their impact on professional and family life and finally their management and monitoring.

**Results:** For two weeks, 151 physicians accepted to answer to the questionnaires. The mean age was 44 years old. The sex-ratio F/H is 2,3. These are 60 rheumatologists, 52 radiologists, 19 general practitioners, 12 gastroenterologist and 8 other specialties (gynecology, nephrology, cardiology, internal medicine). The exercise duration was >10 y in 43.7%. 42.3% of physicians do the ultrasound for >5 y and 67.3% more than three times a week. Every week, 40% do between 20-50 ultrasound exams. 28% of participants do physical activities with charging port. Concerning the general posture, the majority do the sonographers are while sitting and standing and 18.5% are constantly seated. 45.2% monitor their posture from time to time, 38% have a repetitive load at work. 54,3% do not have a touch screen ultrasound and 44.4% have a seat of work without backrest. 90.7% of partitioners have already suffered of musculoskeletal disorders after performing ultrasound and not explained by another cause. The most frequent localizations are shoulders, cervical spine, wrists, elbows and hands. The table summarizes the different musculoskeletal manifestations, their impact and their management.

**Conclusion:** 80-90% of sonographers will experience pain whilst scanning at some stage during their career (1,2). Musculoskeletal disorders are a significant concern for sonographers with detrimental effects on the individual, patients and the employer. The causes for these injuries are multifactorial; especially individual; gender, state of health postures, biomechanics, organizational, material and psychosocial. This is correlated with the exponential solicitation of sonographers but also with the high number of patients. Our study joined the results of the literature about the high frequency of musculoskeletal disorders in partitioner's sonographers and about the risk factors of these disorders. There is a variety of solutions for mitigating injury risk. Sonographer work postures, work schedules, task rotation, administrative support, and ergonomic workplace equipment all enter into the formula for reducing the incidence of these disorders.

**References:**

1. Jakes C. J Diagnostic Med Sonography 2001;17:74.
2. Mason B, et al. Sound Effects News 2014;3:26.

Table: Summary of the different musculoskeletal manifestations, their impact and their management by the participants.

| | Number (%) |
|---|---|
| Clinical disorders (pain, stiffness, numbness, uncomforted), after ultrasound not explain by another causes: | |
| - From time to time | 93 (61.6) |

| | |
|---|---|
| - Often | 40 (26.2) |
| - Never | 14 (2.3) |
| - Just after the ultrasound exam | 4 (2.6) |
| Localizations of the musculoskeletal disorders: | |
| - Shoulders | 104 (75.9) |
| - Cervical spine | 55 (40.1) |
| - Wrist | 50 (36.5) |
| - Elbows | 23(16.8) |
| - Hands | 22(16.1) |
| - Others | 13 (9.5) |
| Partitioners who attribute the disorders to the nature of the ultrasound requested: the time of the examination, the position it demands. | 34 (60.7) 19 (33.9) 3 (5.4) |
| - Those who answered that the problems occur whatever the type of ultrasound requested | |
| -Other answers | |
| MS disorders affect the family life: | |
| - Low level | 109 (72.2) |
| - Moderate | 35 (23.2) |
| - High | 7(4.6) |
| MS disorders affect the quality or performance of your work | |
| - Low level | 116 (76.8) |
| - Moderate | 31 (20.5) |
| - High | 4 (2.6) |
| Use of medication or consultations in the past 12 months because of the MS disorders: | |
| - Automedication | 69 (45.7) |
| - Specialist consult | 47 (47.5) |
| - Never | 56 (37.1) |
| Use of symptomatic treatments in the last 12 months | 98   64.9) |
| -Physiotherapy plus medical treatment | 35 (32.7) |
| -Immobilization of the member affected | 20 (18.7) |
| Evolution | |
| - Good | 63 (53.4) |
| - Partial, with MS manifestations after ultrasound | 42 (35.6) |
| - MS signs still persist | 13 (11%) |

MS: musculoskeletal.

## P183

## OSTEOPOROSIS RISK FACTORS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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**Objective:** Osteoporosis is one of the major complications of inflammatory bowel disease (IBD). It is essential to identify risk factors for osteoporosis whether general or specific to the intestinal disease. The objective of this study is to determine the prevalence and the risk factors of osteoporosis in patients with IBD.

**Methods:** One-year retrospective study conducted in patients followed in gastroenterology departments and admitted in rheumatology for bone status assessment. Inclusion criteria are patients aged over 20 y followed for IBD. Exclusion criteria are patients with musculoskeletal or other general disease that could have an impact on bone density. We have compared the demographic characteristics of both groups: osteoporotic (group 1) and not osteoporotic (Group 2). We then assessed the risk factors of bone loss.

**Results:** 46 patients have been included. It was about 27 men and 19 women. The average age was 38 y (20-67). The type of IBD was Crohn's disease in 71% cases and 29% followed for ulcerative colitis (UC). The median disease duration was 7 y. 13 patients have osteoporosis in at least 1 site among the lumbar spine, femoral neck and total hip (Group 1) and 33 patients were not osteoporotic. The osteoporosis risk factors were menopause in 37%, corticosteroid in 60%, smoking in 19.5%, the insufficient intake calcium was noted in 69.5% and insufficient physical activity in 8.7%. The table blow determines the characteristic demographic of both groups and the risk factors of bone loss. The two significant risk factors were age and Crohn's disease.

**Conclusion:** Osteoporosis commonly affects patients with IBD and many risk factors have been identified in literature. Based on the guidelines, patients at risk should have an assessment of BMD, in order to prevent or treat osteoporosis in early stage. In our study, factors significantly associated with osteoporosis were age and the type of IBD with a greater frequency of osteoporosis in Crohn's disease. Unlike gender, low BMI, and malabsorption that do not seem to matter as in literature in our study, probably because of the limited number of patients. Routine screening for osteoporosis and its risk factors should be systematic in patients with IBD.

**Reference:** Ostlander AE, et al. Gastroenterology 2011;140:116

Table: Characteristic demographic of the population and assessment of bone loss risk factors.

| | Group I (osteoporotic) n=13 | Group II (without osteoporosis) n=33 | P |
|---|---|---|---|
| Average age | 45.76±12.88 | 35.36±9.94 | 0.01 |
| Sex | | | |
| F | 7 | 12 | 0.27 |
| M | 6 | 21 | |
| Disease duration | 8.84±6.29 | 5.51±5.79 | 0.11 |
| Surgery | | | |
| Yes | 8 | 13 | 0.17 |
| No | 5 | 20 | |
| BM | 22.9±3.64 | 21.54±4.78 | 0.30 |
| History of corticosteroid therapy | | | |
| Yes | 9 | 19 | 0.46 |
| No | 4 | 14 | |
| Disease type | | | |
| Crohn's | 12 | 21 | 0.051 |
| RCH | 1 | 12 | |
| Vitamin D value | | | |
| <30 | 13 | 29 | |
| ≥30 | 0 | 3 | |
| Calcium value (average) | 93.95±6.70 | 116.82±130.91 | 0.33 |
| Past smoking | | | |
| Yes | 2 | 6 | 0.82 |
| No | 11 | 27 | |
| Adequate physical activity | | | |
| Yes | 11 | 32 | 0.12 |
| No | 2 | 1 | |

| Calcium intake | | | |
|---|---|---|---|
| Yes | 5 | 10 | 0.59 |
| No | 8 | 23 | |

| A&E | 0.48 (1.10) | 0.35 (0.90) |
|---|---|---|

Mean and costs±SD per patient in the year post-index.

All p<0.05 between cohorts.

[a]Opioid, nonopioid and adjuvant analgesics.

mod/sev, moderate to severe.

## P184

### HEALTHCARE RESOURCE UTILISATION AND COSTS AMONG PATIENTS WITH MODERATE TO SEVERE OSTEOARTHRITIS PAIN: A NONINTERVENTIONAL RETROSPECTIVE COHORT STUDY IN SALFORD, UK

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**Objective:** Compare healthcare resource utilisation (HCRU) and costs between patients with moderate to severe osteoarthritis (OA) pain and those without OA using the Salford Integrated Record (2010-2017).

**Methods:** For each patient, HCRU (GP, inpatient, outpatient, and A&E visits) and total direct costs (HCRU and prescribed analgesic drugs per UK standardised tariffs) were calculated and compared with propensity matched controls for the year post-index (cost by 2-part model; HCRU by t-test).

**Results:** 3123 patients with moderate to severe OA pain (1922 severe) were indexed alongside 3123 controls without OA (60.2/60.9% female; mean age 63.8/63.4 y, median CCI: 3/3, respectively). Total direct costs (£2519 vs. £1379) and all categories of HCRU, except GP home visits, were significantly higher in the year post-index among patients with moderate to severe OA pain than in controls (Table). Highest mean costs in both cohorts were for inpatient admissions (£1517 vs. £770) and outpatient visits (£674 vs. £407). Total mean analgesia costs were ~3-fold higher (£110 vs. £39) and covered a broader range of drug classes in patients with moderate to severe OA pain than in controls. Paracetamol (40% had ≥1 prescription) and strong opioids (34%) were the most prescribed analgesics to patients with moderate to severe OA pain.

**Conclusion:** Patients with moderate to severe OA pain have considerably higher HCRU and incur almost double the annual direct costs of patients without OA.

Table. Annual healthcare resource use and costs

| | Mod/sev OA pain | Matched controls |
|---|---|---|
| n | 3123 | 3123 |
| Total annual direct cost comprising | £2519 (3511) | £1379 (3787) |
| GP | £149 (214) | £107 (201) |
| Inpatient | £1517 (2809) | £770 (2717) |
| Outpatient | £674 (1213) | £407 (1726) |
| A&E | £70 (167) | £55 (149) |
| Analgesic drugs[a] | £110 (260) | £39 (190) |
| Annual healthcare resource utilisation | | |
| GP | | |
| visit | 3.61 (4.13) | 2.04 (2.85) |
| phone call | 1.52 (3.04) | 1.08 (2.22) |
| home visit | 0.20 (1.24) | 0.29 (1.40) |
| Inpatient | 0.74 (1.30) | 0.57 (4.40) |
| Outpatient | 11.19 (14.17) | 5.85 (18.68) |

## P185

### CAPTURE THE FRACTURE: EXPERIENCE OF OUR FLS IN ARGENTINA

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We present the data and achievements of our pioneer Fracture Liaison Service (FLS) in Argentina, after 4 y of the Capture the Fracture program, within the Sanatorio Las Lomas private hospital. The aim is to evaluate our FLS consolidation after its implementation, taking in account the obstacles we faced and the experiences we obtained.

Our secondary prevention program was launched during 2017, developed and attended by the Endocrinology and Metabolism Dept.'s medical staff. Immediately the Orthopedic Dept. joined us. We identified and gathered fractured patients in emergency, ambulatory and hospitalized rooms. During the first visit we included physical exam, personal and familiar medical history, BMD evaluation by DXA scan with TBS and FRAX algorithm and mineral metabolism laboratory testing. From 521 included patients, the fracture index was: 30.4% radius, 17.1% femoral, 16% vertebral, 11.6% tibial, 4% humerus and 11% other sites. Comparing April 2021 vs. April 2020, despite SARS-Cov-2 pandemic, we achieved an increase in patients recruitment (46.64%), doubling the number. We attribute this to our increased efforts by contacting fractured patients by telephone, offering medical assistance. The refracture index was 20%, with 25% of these patients suffering a third fracture. The centinel fracture and the most predictive of a second episode was the radius fracture.

In the next chart we present the numbers achieved in our private hospital FLS.

| Included FLS patients | Number (n=521) | Percentage (%) |
|---|---|---|
| Women | 327 | 93.16 |
| Age, media (DE) | 72.6 | |
| Primary fracture site | 351 | |
| Radius | 107 | 30.4 |
| Hip | 60 | 17.1 |
| Vertebra | 56 | 16 |
| Tibia | 41 | 11.6 |
| Humerous | 13 | 4 |
| others | 40 | 11 |
| Risk fracture factors | | |
| Previus fragility fracture | 69 | 20 |
| Family history of hip fracture | 12 | 17.4 |
| Active smoking habit | 13 | 18.8 |
| Corticosteroids ·•32• | 26 | 37 |
| Diabetes | 20 | 28 |
| FRAX, media (DE) | | |
| Mayor | 116 | 13,7 |
| Hip | 116 | 5,2 |

## P186

### WHICH IS THE BEST ANTIRESORPTIVE TREATMENT AFTER FINISHING TERIPARATIDE? BEST POST-TERIPARATIDE TREATMENT

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Anabolic drugs are the treatment of choice for osteoporotic patients with very high risk of fractures. Postanabolic treatment an antiresorptive drug maintains the BMD gained. The recommendations regarding the ideal antiresorptive drug are not precise. The aim of this paper is to compare the usefulness of zoledronate and denosumab in a group of 28 women with very high risk of fractures. All of them completed at least one year of treatment with teriparatide and latter 14 received zolendronate and 14 denosumab for another year. We retrospectively review their biochemical and densitometric changes. Both treatment groups experienced a reduction in bone turnover markers of the same magnitude at the end of the second year. In Lumbar Spine BMD increase of 3.96±8.56% median (Me) 2.54 p 0.21 in zolendronate group and 3.55±5.36% (Me 5.14) p 0.07 in denosumab group. Femoral neck BMD changed -0.09±6.50% (Me 0.29) p 0.85 in zolendronate group, and -3.41±5.08% (Me 5.35) p 0.59 in denosumab group, with no difference between both groups. In total hip BMD an increase of 0.55±4.20% (Me 0.43) p 0.70 in zolendronate group, and 4.53±5.13% (Me 0.64) P 0.04 with denosumab. We conclude that both antiresorptive treatments have a similar effect in biochemical markers after one year of treatment. BMD increase significantly in total hip and changed with a trend in lumbar spine with denosumab, but without differences between both groups of treatment.

Table. Baseline characteristics and densitometric results of the subgroups. The results are expressed as media±SD; when the standard deviation is very large, they are also expressed as median (Me). Baseline BMD is BMD prior to teriparatide therapy and post- antiresorptive. BMD is BMD after teriparatide and one year with zoledronate or denosumab. * Median of changes between BMD post-teriparatide and post- antiresorptive

Table.

|  | Zoledronate | Denosumab | P |
|---|---|---|---|
| N | 14 | 14 | NS |
| Age (y) | 66.7±13 | 64.7±8.3 | 0.64 |
| BMI (kg/m$^2$) | 23±3.1 | 25±4.3 | 0.21 |
| Calcium intake (mg/d) | 893.5±448 | 725±419 | 0.33 |
| Previous bisphosphonates | 8/14 (57%) | 9/14 (64%) | 0.64 |
| Months of previous bisphosphonates | 58.67 ±70.62 | 71.77±55 | 0.66 |
| Teriparatide (months) | 20.28±4.76 | 18±5 | 0.22 |
| Baseline BMD LS (g/cm$^2$) | 0.831±0.07 | 0.875±0.08 | 0.01 |
| Baseline BMD FN (g/cm$^2$) | 0.706±0.04 | 0.702±0.14 | 0.94 |
| Baseline BMD TH (g/cm$^2$) | 0.644±0.09 | 0.637±0.04 | 0.89 |
| Postantiresorptive BMD LS | 0.952 ±0.125 p 0.21 * 2.54% * | 0.838±0.05 p 0.07* 5.14%* | p 0.88 |
| Postantiresorptive BMD FN | 0.724±0.06 p 0.85* 0.29% * | 0.712±0.11 p 0.59* 5.35% * | 0.37 |
| Postantiresorptive TH | 0.678±0.07 p 0.70* 0.43%* | 0.700±0.05 p 0.04* 4.64% * | 0.11 |
| Vertebral fractures | 9/14 | 7/14 | 0.70 |
| Hip fractures | 4/14 | 1/14 | 0.32 |
| Other fractures | 6/14 | 4/14 | 0.69 |
| CTX (ug/ml) | 424±234 | 511±158 | 0.20 |
| Osteocalcin (ng/ml) | 26.42±17 | 27.26±11 | 0.60 |
| Vit D (ng/ml) | 30.81±9.9 | 33.51±20 | 0.70 |
| PTH (pg/ml) | 45.02±13.6 | 47.45±19.8 | 0.18 |

## P187

### ONE-YEAR LEVEL OF SUSTAINED LOW ACTIVITY OF RHEUMATOID ARTHRITIS AND OVERWEIGHT/OBESITY: DATA FROM REAL CLINICAL PRACTICE

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**Objective:** To determine the level of one-year low activity as a result of treatment with biological drugs and the impact of overweight/obesity.
**Methods:** A retrospective study of an administrative data of RA patients (according to the ACR 1987). The analysis period covers one year of long-term biological therapy. The patients went through a rheumatology office, St. Marina University Hospital, Varna, Bulgaria in the period June 2017 to September 2018. Sociodemographic indicators, BMI (kg/m$^2$), RA activity (according to SDAI) were analysed. A sustained low activity (LDA) was accepted at SDAI values below 11 for each of the three consecutive visits (at 6 months). Statistical processing was performed with descriptive statistics, chi-square, independent t-test, logistic regression. Significance level of p<0.05 is used.
**Results:** 190 patients were included, mostly women (85.8%) with a mean age of 58.7 (±11.3) with long-standing RA (12.1 y ±9.2) during treatment with biologics (3.7 y ±2.1). The mean BMI was 26.8 kg/m$^2$ (±5.2). No gender difference was found in BMI. 55.3% of patients were overweight (p>0.05), 23.2% were obese (p<0.001). Patients received TNFi or IL6i (55.4% and 44.6%, p>0.05). One-year LDA was found in 32.6% of patients (p<0.001). Regardless of the type of biologic therapy, patients with a BMI <30 kg/m$^2$ were two and a half times more likely to be in a sustained LDA than in obese patients (OR 2.64, 95%CI 1.14-6.09). In TNFi treatment, a BMI <30 kg/m$^2$ was associated with an almost 4-fold higher chance of the patient being in the LDA than in obese patients (OR 3.9 95%CI 1.24-12.52). In IL6i treatment, obesity is not defined as a factor that is associated with a lower chance of the patient being in a 1-y LDA.
**Conclusion:** One year of low RA activity is rarely achieved in real clinical conditions. Being overweight/obese makes this goal even more difficult. In these patients, treatment with IL6i appears to be the better choice.

## P188

### PERSISTENCE WITH OSTEOPOROSIS TREATMENT IN PATIENTS FROM THE LILLE UNIVERSITY HOSPITAL FRACTURE LIAISON SERVICE

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**Objective:** A Fracture Liaison Service (FLS) was set up at Lille University Hospital in 2016. The purpose of this study was to assess persistence with osteoporosis treatment in patients from the FLS over a period of 1 year, and to determine predictors of discontinuation.
**Methods:** The study population comprised adults of both genders, aged 50 or over, admitted to Lille University Hospital between January 2016 and January 2019 for a low-trauma fracture and managed in our FLS. Outcomes included (1) persistence rate at 1 year after treatment initiation, (2) persistence rate at 2 years after treatment initiation, (3) persistence rate at 1 and 2 years after treatment initiation according to type of treatment, (4) predictors of non-persistence, and (5) reasons for discontinuing treatment over 1 year after initiation. Persistence was determined using the Kaplan-Meier method.
**Results:** In all, 1224 patients (≥50 years old) with a recent history of low-trauma fracture (≤12 months) were identified. Of these, 380 patients

– 79.2% female; mean (SD) age 76 (11) years – were seen at the FLS. In those 380 patients, 410 fractures were found and 360 of them (87.8%) were major fractures, breaking down as follows: vertebra (44%), hip (19%), proximal humerus (10%), and pelvis (8%). Osteoporosis treatment was prescribed for 367 (96.6%) patients and 275 of them began the prescribed treatment. The following anti-osteoporosis drugs were prescribed: zoledronic acid (n=150, 54.5%), teriparatide (n=63, 22.9%), and denosumab (n=39, 14.2%). Oral bisphosphonates were prescribed for a few patients (n=23, 8.4%). Persistence with osteoporosis medication (any class) was estimated at 84.1% (95%CI: 79.1% to 88.1%) at 12-month follow-up, and dropped to 70.3% (95%CI: 63.7% to 75.9%) at 24 months. When drug-specific analyses were performed using the Kaplan*Meier method, persistence rates at 12 and 24 months were found to be higher with denosumab than with any other treatment. Independent predictors of nonpersistence at 12 months were 'follow-up performed by a general practitioner (GP)' – odds ratio (OR) for GP vs. FLS=3.68; 95%CI, 1.52 to 8.90, p=0.004 – and 'treatment with zoledronic acid' – OR for zoledronic acid vs. denosumab=3.39; 95%CI, 1.21 to 9.50, p=0.019; OR for zoledronic acid vs. teriparatide=8.86; 95%CI, 1.15 to 68.10, p=0.035.

**Conclusion:** This study provides evidence of the success of our FLS in terms of long-term persistence with osteoporosis treatments. However, osteoporosis treatment initiation still needs to be improved.

## P189
## AN APPROPRIATE INTERVENTION THRESHOLD BY FRAX® TOOL FOR PHARMACOLOGICAL TREATMENT OF OSTEOPOROSIS IN THAILAND

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**Objective:** Osteoporosis is a common medical condition amongst the elderly population. The consequences of osteoporotic fractures are associated with high morbidity and mortality rates, as well as an economic burden. Presently, Fracture Risk Assessment Tool (FRAX) has been recommended and incorporated into over 100 osteoporotic guidelines worldwide. However, the appropriate intervention threshold for osteoporosis treatment in Thailand is still unknown. The aim of this study was to identify an appropriate cut point of Thai 10-y probability of major osteoporotic fracture (MOF) intervention thresholds in Thai population.

**Methods:** In this cross-sectional study, we analyzed data collected by filling questionnaires for online FRAX tool evaluation of 1311 Thai population aged 50-90 years old seen at Police General Hospital and Siriraj Hospital, from January 2018 to January 2020. The determined results from the FRAX tool were analyzed through receiver operating characteristic (ROC) curve to identify the cut-point of the new intervention threshold.

**Results:** Based on the ROC curve, the appropriate intervention threshold for FRAX 10-y probability of major osteoporotic fracture with maximum area under the curve of 0.54 at 95%CI was 10% with the sensitivity and the specificity of 55% and 54.5%, respectively.

**Conclusion:** This study interpreted an appropriate cut point of Thai MOF intervention thresholds for osteoporosis treatment, and the value of 10% was found to be similar to other Asian countries (Hong Kong, Japan, and Sri Lanka) and can guide a therapeutic decision in Thailand.

## P190
## SUPPLEMENTAL VIDEO PODCASTS IN OSTEOPOROSIS FOR ORTHOPAEDIC RESIDENT PHYSICIANS DURING COVID-19 PANDEMIC IN THAILAND

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**Objective:** COVID-19 pandemic has posed challenges to medical education. Video podcasts are offered to students to compensate loss of lecture hours. Efficacy of video podcasts, however, are still controversial.

**Methods:** We developed 22 video podcasts covering major topics in osteoporosis and metabolic bone diseases. Of 37 orthopaedic residents at Police General Hospital recruited, 18 watched the videos. Participants completed pre-exposure 60 multiple choice questions and a self-assessment questionnaire. They were given one month to study, after which the postexposure test, self-assessment form and preference survey were completed.

**Results:** With numerically lower pretest scores (47.59±9.77% in video group, 53.95±9.77% in traditional group, p=0.056), students in the video group significantly outperformed the traditional group in the post-test (89.81%±3.83% in video group, 76.93%±10.92% in traditional group, p<0.001). Juniors watching videos also scored higher than seniors. Gain of confidence and perceived ability was greater with the videos. However, students still preferred live lectures over an entire course of videos.

**Conclusion:** This study showed better improvement in performance and confidence using supplemental video podcasts. Juniors tended to improve more watching videos. We suggest providing video podcasts during early years as a supplement during the pandemic and as a new normal residency training.

## P191
## COMPARISON OF BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN BETWEEN FRACTURE DISTAL END RADIUS CASES AND WITHOUT FRACTURES: PROSPECTIVE STUDY IN POLICE GENERAL HOSPITAL

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**Objective:** Distal radius fracture is universally accepted as one of major osteoporotic fractures. Few patients suffering of this type of fracture, however, has undergone proper assessment for future fracture risk, leading to underdiagnosis of osteoporosis and undertreatment after this type of fragility fracture. This study aimed to compare age- and site-related BMD in Thai menopausal women with distal end radius fracture with those without fracture, and to investigate the role of vertebral fracture assessment (VFA) in diagnosing osteoporosis after distal radius fracture.

**Methods:** We performed a prospective study, in 50 postmenopausal women with distal radius fracture, and 111 controls. BMD of the femoral neck (FN BMD), total hip (TH BMD), lumbar spine (LS BMD), and VFA were obtained from DXA scans performed within 2 weeks of injury. The site-specific BMDs were compared between the two groups using independent T-test.

**Results:** The mean BMD was significantly lower at all sites in the fracture group (FN BMD 0.5899±0.075 vs. 0.6714±0.090, p-value=0.0074; TH BMD 0.7415±0.103 vs. 0.8276±0.116, p-value=0.0093; LS BMD 0.7988±0.107 vs. 0.8899±0.111, p-value=0.0094 in fracture vs. non-fracture group, respectively). According to the WHO criteria, 23(46%) of the fracture group were defined as having osteoporosis, 25(50%) having osteopenia, 2(4%) having normal BMD, whereas 18(16%) of the nonfracture group had osteoporosis, 60(54%) had osteopenia, and 33(30%) had normal BMD. VFA increased the yield for diagnosis of osteoporosis with a number needed to treat of 10.

**Conclusion:** Postmenopausal women with distal radius fracture had lower BMD at all sites compared to those without fracture. These results suggest that every postmenopausal woman aged 50 and over with distal radius fracture from a low energy trauma should be investigated for osteoporosis. VFA aided in diagnosing osteoporosis, as it detected unknown vertebral fractures in approximately one-tenth of patients. Hence, BMD plus VFA may become a new standard of diagnosing osteoporosis.

## P192

### SECONDARY HYPERPARATHYROIDISM WITH SEVERE OSTEOPOROSIS AFTER BILIO-PANCREATIC DIVERSION: CLINICAL CASE REPORT

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**Objectives:** Obesity is an important public health scourge worldwide, which lately reached epidemic proportion. Bariatric surgery is the most effective way to cut and maintain weight among patients with morbid obesity. One of the methods is biliopancreatic diversion (BPD) which has the most frequent complications associated with macro- and micronutrient malabsorption.

**Methods:** We present a case of a 50-year-old female patient with secondary osteoporosis developed into severe osteoporosis after a BPD treatment performed 6 years previously. In the postoperative period, the necessary replacement therapy with calcium, vitamin D and other micro- and macronutrients had been taken irregularly; no long-term laboratory monitoring was provided due to the lack of appropriate recommendations. On admission, she was not able to move because of severe pain and edematous syndromes, her height decreased by 10-12 cm. The DXA confirmed severe osteoporosis (T-score of radius total -5.6 SD, L1-L4 -3.4 SD and total hip -4.2 SD). The X-ray demonstrated multiple consolidated fractures of ribs. The laboratory data indicated severe hypoproteinemia (total protein 38 g/L), hypocalcemia (ionized calcium 0.99 mmol/l), 25(OH) vitamin D deficiency (5.6 nmol/l) and an increased rate of PTH (562,6 pg/ml). Ultrasound revealed signs of hyperplasia of the right upper parathyroid gland (1.0 x 0.8 x 0.4 cm).

**Results:** Our treatment started with enhanced infusion therapy of albumin and diuretics with the response of positive diuresis and a loss of excess fluid. Next, the therapy aimed to replenish the deficiency of calcium (calcium carbonate 2 g), vitamins A, D (cholecalciferol 800 IU and alfacalcidol 2 µg), E, B, iron, folic acid, digestive enzymes and protein. Long-term bisphosphonate therapy is prescribed after normalization of calcium-phosphorus metabolism. Upon reexamination after the relief of the malabsorptive syndrome and an improvement of general somatic state. During 2 years of follow-up, the patient moved independently, did not presented new fractures; an increase of BMD was observed (T-score of radius total -5.1 SD, L1-L4 -2.3 SD and total hip -2.4 SD), the laboratory test showed normalization of biochemical parameters.

**Conclusion:** The lack of compulsory lifelong replacement therapy and a follow-up management leads to side effects, including severe osteoporosis due to malabsorption related vitamin D deficiency. Keeping all risk factors for osteoporotic fractures under control is necessary to prevent a decrease of life quality in the extreme case of patient's disability.

## P193

### SARCOPENIA AND LONG-TERM OUTCOMES IN YOUNG ADULTS WITH JUVENILE IDIOPATHIC ARTHRITIS

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**Objective:** Association of sarcopenia and long-term outcomes in young adults with juvenile idiopathic arthritis (JIA) are not well studied. The study indicates the association between articular (JADI-A) and extraarticular (JADI-E) damages and the low lean mass in young adults with JIA.

**Methods:** We studied 26 young adults with JIA, diagnosed according to the ILAR classification, with a disease duration of >3 y, a mean age of 22.3 ±8.15 y. The mean age at the disease onset was 9.04±4.9 y. We diagnosed sarcopenia as a decrease muscle mass on DXA. We distributed patients into

two groups according to the skeletal muscle index (SMI) calculation - the sum of muscle masses of the arms and legs/height$^2$; the cutoff points considered by SMI <7 kg/m$^2$ for males, <6 kg/m$^2$ for females. We used the integral index of articular (JADI-A) and extraarticular (JADI-E) damages to assess the long-term outcomes of JIA [1].

**Results:** All patients were divided into 2 groups according to lean mass. The I group included 16 patients with sarcopenia (SMI–5.22±0.72 kg/m$^2$), II group - 10 patients without sarcopenia (SMI–8.05±0.94 kg/m$^2$). Although patients of both groups did not differ by age, duration and age of disease onset, in I group were detected lower height and weight than in the II group (height 1.6±0.07 m vs. 1.7±0.09 m; p=0.01; weight 55.06 ±8.3 kg, 70.0±10.8 kg; p=0.001, respectively).The JADI-A was higher in the I group: 6.06±7.9 vs. 0.3±0.5; p=0.04; JADI-E was higher in group I, either: 1.62±1.6 vs. 0.22±0.4; p=0.02. The JADI-A score correlated with SMI (Spearman's r [rS=-0.61]); the JADI-E score correlated with SMI [rS=-0.49], either (p<0.05).

**Conclusion:** Sarcopenia was detected in young adults with JIA. The presence of articular and extraarticular outcomes in young adults with JIA is associated with sarcopenia.

**Reference:** 1. Viola S, et al. Arthritis Rheum 2005;52:2092

## P194

### CHARACTERIZATION OF PATIENTS WITH FRAGILITY FRACTURE IN A CENTER OF SOUTHERN COLOMBIA

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**Objective:** Fragility fractures associated with osteoporosis are a frequent clinical condition, with a predilection for postmenopausal women, however it can affect people of all ages. Its early detection and treatment is associated with an improvement in the quality of life, as a result of a reduction in the incidence of new fractures and prevention of the disability.

**Methods:** Prospective, cross-sectional, analytical, observational, quantitative study in adult hospitalized patients with a diagnosis of fragility fracture referred to the endocrinology service at the Hernando Moncaleano Perdomo University Hospital, who underwent FRAX score classification and biochemical profile to identify secondary causes of osteoporosis.

**Results:** Of the 31 patients included in the study, the median age of the population was 74±13.5 years, of which only 16.3% had a previous diagnosis of osteoporosis even though 29% had a fracture event due to previous fragility. A 12.9% in hospital mortality was documented and an average hospital stay of 17 days with 12.17 million Colombian pesos cost. Hip fracture was the most frequent location with 62% of the cases. Nonoptimal levels of vitamin D were found in 80.6%; hypoalbuminemia, anemia, and increased BMI were associated with higher mortality during hospital stay with a statistically significant p<0.05. Thus creating the first database of fragility fractures in Huila and the first approach to Fracture Liaison Service.

**Conclusion:** In patients with fragility fractures, it is vital to perform a complete biochemical profile in search of secondaryism; as well as the beginning of active therapy in order to avoid new major fracture events that condition a negative impact on the quality of life of the patient and their family. Comprehensive assessment by a Fracture Liaison Service makes it easier to approach and manage these patients.

## P195

### LABORATORY METHOD FOR DETERMINING THE MALPOSITION OF THE RODS OF TRANSPEDICULAR APPARATUS OF THE SPINE IN THE INTRAOPERATIVE PERIOD

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**Objective:** The use of transpedicular fixation in the treatment of spinal injuries greatly contributes to the patient's recovery. Despite significant advances in the use of instrumental correction, up to 15% of patients face manifestations of neurological symptoms as a result of surgical treatment, and up to 14% of patients have malposition of threaded transpedicular rods and screws. The aim of the study was to determine laboratory criteria for assessing the incorrect position of the rods in the intraoperative period during transpedicular fixation of spine.

**Methods:** The studies were carried out in a group of 110 patients with fractures of the lumbar spine (localization: level L1). The indications for surgical treatment were: wedge-shaped deformity of the vertebra more than 1/3, local kyphotic deformity of the spine, the presence of vertebro-medullary conflict of the 2nd degree. Malposition of threaded rods was found in 10% of cases. In ½ cases (that is, in 5%), the complication was detected no later than 10 days after the operation. The complication was accompanied by the standing of the structural elements into the lumen of the spinal canal. All patients underwent clinical and X-ray examination, computed tomography. A small volume of cerebrospinal fluid (CSF) was taken from all patients in the intraoperative period, after installing the rods, to determine general clinical parameters (cytosis, leukogram, etc.), biochemical parameters (total protein, chlorides, etc.), immunological parameters (acute phase proteins, interleukins).

**Results:** It was found that among all the studied laboratory parameters, the concentration of the acute phase protein, haptoglobin, was the most important. At a level of haptoglobin in the cerebrospinal fluid of 0.1 g/l and higher, the malposition of the rods was detected, at a concentration of less than 0.1 g/l, there was no malposition. The method allows obtaining reliable information about the presence of complications of surgical treatment at the stage when it is possible to correct the position of metal structures, that is, it aims to prevent the formation of a possible complication.

**Conclusion:** The resulting research laboratory test is accurate; it allows you to properly differentiate between not less than 82% of cases.

## P196

### LABORATORY CRITERION FOR DETERMINING THE MALPOSITION OF RODS IN PATIENTS WITH TRANSPEDICULAR FIXATION OF THE SPINE IN OSTEOPOROSIS

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**Objective:** It is known that the presence of vertebral osteoporosis complicates the treatment of patients with spinal injuries, in particular, when using the method of transpedicular fixation. Changes in the structure of bone tissue often lead to malposition of threaded transpedicular rods, which can appear both in the early postoperative period and in the long term after the start of treatment. The aim of this work was to develop a laboratory criterion for assessing the risk of incorrect position of the rods in patients with transpedicular fixation of the spine in osteoporosis.

**Methods:** Studies were carried out in a group of 110 patients with a fracture of the lumbar spine. Malposition of threaded rods was detected in 5% of cases. In patients with suspected malposition, 0.5 ml of cerebrospinal fluid (CSF) was taken to determine the concentration of ceruloplasmin. The study was performed on a Ciba Corning Express Plus biochemical analyzer (Diagnostics, Germany).

**Results:** It was found that the concentration of ceruloplasmin determined in the cerebrospinal fluid obtained at the time of the operation, as well as in the postoperative period, may reflect the risk of malposition of threaded transpedicular rods in osteoporosis of the vertebrae. Obtaining CSF in a patient with undiagnosed vertebral osteoporosis with suspected malposition transpedicular rod at any stage of postoperative follow-up,

as well as in a patient with a known diagnosis of "vertebral osteoporosis" at any stage of postoperative follow-up or at least 2-3 months after applying an external fixation device during a control examination with the determination of ceruloplasmin concentration in the CSF, allows us to conclude that there is a high risk of having a malposition at a protein level of <0.2 g/l, and at a concentration of 0.2 g/l and above – about the absence of a malposition. The duration of ceruloplasmin determination on an automatic biochemical analyzer is 10 min, thus, the determination method is simple to perform and allows you to quickly obtain the necessary information about the complication.

**Conclusion:** The developed method for determining the risk of developing an incorrect position of the rods in patients with transpedicular fixation of the spine in osteoporosis makes it possible to determine with high accuracy the presence of a complication of surgical treatment.

## P197

### EXAMINATION OF THE HEMOSINOVIAL FLUID TO DETERMINE HOW LONG AGO THE INJURY THAT CAUSED POST-TRAUMATIC HEMARTHROSIS WAS RECEIVED

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**Objective:** The nature of the course of post-traumatic hemarthrosis, the risk of complications and the outcome of treatment depend on how long ago the injury that caused the pathological process occurred. Obviously, you can find out about when the injury occurred from the patient. There are situations in which it is not possible to find out the information (the patient does not remember or was not conscious). Meanwhile, information about how long ago the injury occurred is important, it is taken into account when making a diagnosis and influences the choice of an adequate method of treatment. This study aimed to develop a laboratory criterion to determine how long ago the injury that caused the hemarthrosis occurred.

Methods: We examined 25 patients with a diagnosis of post-traumatic hemarthrosis of the knee joint. The diagnosis was made on the basis of a combination of clinical, instrumental and laboratory research methods. All patients underwent knee puncture to reduce fluid pressure and relieve pain. The resulting biological fluid was examined by general clinical, biochemical, and immunological methods. The research results were processed statistically using the Statistica v.10.0.228.2 software (Stat Soft, USA).

**Results:** Despite the ambiguous changes associated with the response to inflammation, the most specific marker of erythrocyte hemolysis is the haptoglobin protein. It serves to bind free hemoglobin formed during the destruction of red blood cells in the bloodstream. In patients with post-traumatic hemarthrosis caused by trauma 1-3 days before going to the doctor ("fresh" hemarthrosis), the concentration of haptoglobin in the aspirate was 1.66 g/l or more, if the patient had post-traumatic hemarthrosis as a result of trauma, received 4 or more days before going to the clinic ("stale" hemarthrosis), the concentration of haptoglobin in the aspirate was <1.66 g/l.

**Conclusion:** Determination of the time from the moment of injury that caused post-traumatic hemarthrosis can be carried out using a laboratory indicator, assessed in the hemosynovial fluid from the damaged joint.

## P198

### ASSOCIATION BETWEEN EXPOSURE TO FINE PARTICULATE MATTER AND OSTEOPOROSIS: A POPULATION-BASED COHORT STUDY

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**Objective:** Environmental air pollution has been associated with disruption of bone health at a molecular level. Particulate matter (PM) exposure can simultaneously stimulate bone resorption and halt bone formation. The primary aim of the present study is to describe the association between long-term exposure to PM and osteoporosis in a large cohort of women at high risk of fracture.

**Methods:** Clinical, demographic and densitometric data were extracted from the DeFRAcalc79 dataset, which gathers data on women at risk for osteoporosis. Data on the monitoring of PM10 and PM2.5 concentrations were retrieved from the Italian institute of environment protection and research (Instituto Superiore per la Protezione e la Ricerca Ambientale, ISPRA). Generalized linear models with robust estimators were employed to determine the relationship between BMD and PM long-term exposure.

**Results:** 59,950 women from 110 Italian provinces were included in the study. PM 2,5 exposure was negatively associated with T-score levels at the femoral neck ($\beta$ -0.005, 95%CI 0.007 to -0.003) and lumbar spine ($\beta$ -0.003, 95%CI -0.006 to -0.001). Chronic exposure to PM2.5 above 25 $\mu g/m^3$ was associated with a 16% higher risk of having osteoporotic T-score at any site (aOR 1.161, 95%CI 1.105 to 1.220), exposure to PM10 above 30 $\mu g/m^3$ was associated with a 15% higher risk of having osteoporotic T-score at any site (aOR 1.148, 95%CI 1.098 to 1.200) (Figure).

**Conclusion:** Long-term exposure to air pollution was associated with a higher risk of osteoporosis. Femoral neck site seemed to be more susceptible to the detrimental effect of PM exposure than lumbar spine site.
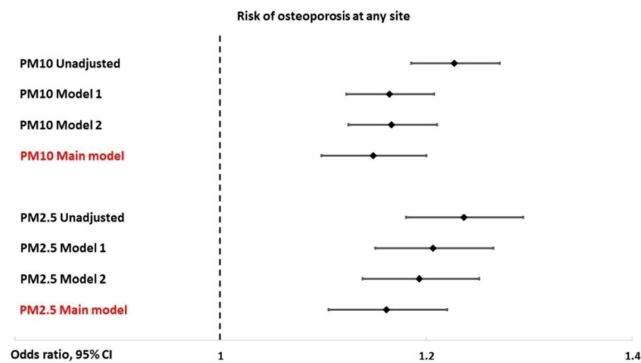


Figure. Risk of osteoporosis at any site in patients chronically exposed to particulate matter (PM) 10 >30 $\mu g/m^3$ and PM2.5 >25 $\mu g/m^3$. Model 3 (main model) adjusted for age, BMI, presence of prevalent fragility fractures, family history of osteoporosis, menopause, glucocorticoid treatment, comorbidities and macro-area of residency (categorized as: northern Italy, central Italy and southern Italy).

**P199**

**THE USE OF ORAL AMINO-BISPHOSPHONATES AND THE RISK OF COVID-19**

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**Objective:** The determinants of the susceptibility to SARS-CoV-2 infection and severe coronavirus disease 19 (COVID-19) manifestations are yet not fully understood. Amino-bisphosphonates (N-BPs) have anti-inflammatory properties and have been shown to reduce the incidence of lower respiratory infections, cardiovascular events and cancer. We conducted a population-based retrospective observational case-control study with the primary objective of determining if oral N-BPs treatment can play a role in the susceptibility to the development of severe COVID-19.

**Methods:** Administrative ICD-9-CM and ATC data, representative of Italian population (9% sample of the overall population), were analyzed. Oral N-BPs (mainly alendronate and risedronate) were included in the analysis. Patients treated with bisphosphonates (cases) were randomly matched (1:1 ratio) for age, sex and for other clinically relevant variables (presence of treatments other than bisphosphonates and hospitalizations) with all the health assisted population without this treatment (controls).

**Results:** Incidence of COVID-19 hospitalization was 12.32 [95%CI 9.61-15.04] and 11.55 [95%CI 8.91-14.20], of ICU utilization due to COVID-19 was 1.25 [95%CI 0.38-2.11] and 1.42 [95%CI 0.49-2.36] and of all-cause death was 4.06 [95%CI 2.50-5.61] and 3.96 [95%CI 2.41-5.51] for oral N-BPs users and non-users, respectively (Figure 1). Sensitivity analyses that excluded patients with prevalent vertebral or hip fragility fractures and without concomitant glucocorticoid treatment yielded similar results (Figures 2, 3).

**Conclusion:** We found that the incidence of COVID-19 hospitalization, intensive care unit (ICU) utilization and COVID-19 potentially related mortality were similar in N-BPs treated and nontreated subjects. Similar results were found in N-BPs vs. other antiosteoporotic drugs. We provided real-life data on the safety of oral N-BPs in terms of severe COVID-19 risk on a population-based cohort. Our results strongly support national and international guidelines that advocate against the discontinuation of oral bisphosphonates only for the fear of COVID-19.
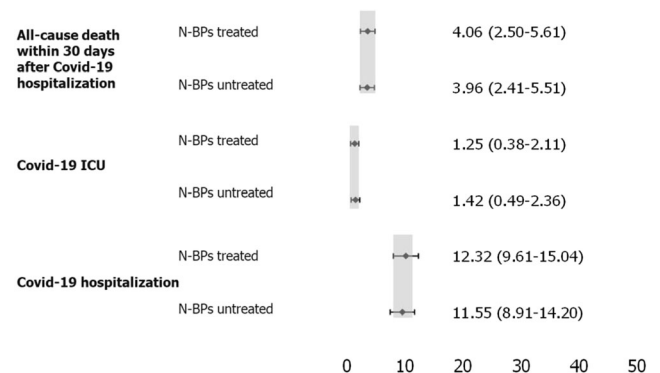


Figure 1. Incidence and 95%CI of COVID-19 related events in N-BPs treated and untreated subjects.
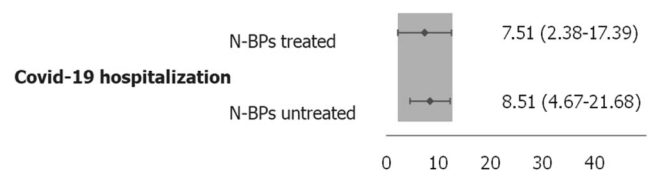


Figure 2. Incidence and 95%CI of COVID-19 related events in N-BPs treated and untreated subjects with antiosteoporotic drugs and without corticosteroids.
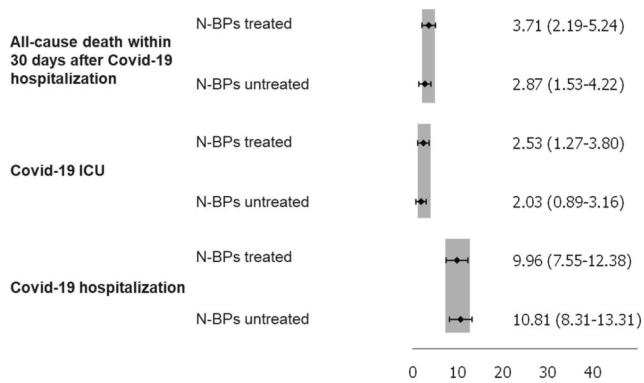
Figure 3. Incidence and 95%CI of COVID-19 related events in N-BPs treated and untreated without previous vertebral or hip fragility fractures.
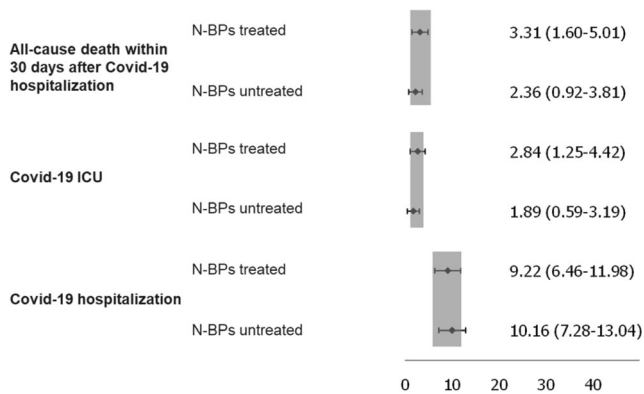


Figure 4. Incidence of COVID-19 related events in bisphosphonates treated and untreated patients without previous vertebral or hip fracture without corticosteroid prescriptions.

## P200
### PROBLEMS OF CLINICAL DIAGNOSIS OF DEVELOPMENTAL DYSPLASIA OF THE HIP IN INFANTS

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**Objective:** To determine the reliability and feasibility of using the system of selective ultrasound screening of children in groups at risk of DDH.
**Methods:** The hip joints were examined in 1549 children (600 boys and 949 girls) ranging from 5 days to 12 months of age. All children were divided into two groups, identified by clinical signs and risk factors DDH. The children underwent ultrasound examination of the hip joints according to R. Graf. Based on this final diagnosis, sensitivity, specificity, positive and negative predictive values of risk factors and physical examination findings were calculated.
**Results:** The sensitivity, specificity, positive predictive value and negative predictive values of having a risk factor for DDH in history were 63%, 76%, 48%, 86%, and having abnormal hip examination findings were 37%, 91%, 58% and 81%, respectively.
**Conclusion:** The expediency of the system of general ultrasound screening of the infants hip has been substantiated, given that when using the system of selective screening of risk groups, 12% (every eighth child) of DDH in children remains undiagnosed.

## P201
### LOW BIOAVAILABLE IGF-1 IS ASSOCIATED WITH SARCOPENIA IN POSTMENOPAUSAL WOMEN WITH RHEUMATOID ARTHRITIS

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**Objective:** To measure serum levels of bioavailable IGF-1 in postmenopausal women with rheumatoid arthritis (RA) and to examine their association with sarcopenia.
**Methods:** The study group consisted of 69 postmenopausal women with RA and 28 postmenopausal women as controls. Serum levels of bioavailable IGF-1 was determined using an electrochemiluminescent assay. Sarcopenia was defined according to EWGSOP recommendations as low muscle mass (expressed as appendicular skeletal muscle mass index [ASMI] calculated by DXA) and low muscle strength (hand grip) or low physical performance (short physical performance battery [SPPB]).
**Results:** Mean IGF-1 levels were significantly lower in the RA group as compared with controls (102.3±42.2 μg/L vs. 121.3±34.9 μg/L, p=0.038). In addition, the prevalence of sarcopenia was significantly higher in patients with RA (42% vs. 0%, p=0.001). Moreover, RA patients with sarcopenia had lower IGF-1 levels compared to those without sarcopenia (90.15±37.2 μg/L vs. 111.08±43.8 μg/L, p=0.036).
**Conclusion:** Postmenopausal women with RA have lower levels of bioavailable serum IGF-1 and higher prevalence of sarcopenia as compared with controls. Lower levels of IGF-1 are associated with the presence of sarcopenia in postmenopausal women with RA. Thus, low levels of bioavailable serum IGF-1 may serve as a predictive factor of developing sarcopenia in postmenopausal women with RA.

## P202
### HIGH BONE TURNOVER IS ASSOCIATED WITH DISEASE ACTIVITY IN POSTMENOPAUSAL WOMEN WITH RHEUMATOID ARTHRITIS AND IS NOT ASSOCIATED WITH DISEASE CHRONICITY OR SARCOPENIA

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**Objective:** To measure serum levels of bone turnover markers in postmenopausal women with rheumatoid arthritis (RA) and to examine their association with disease activity, disease chronicity and sarcopenia.
**Methods:** The study group consisted of 69 postmenopausal women with RA and 28 postmenopausal women as controls. Serum levels of bone alkaline phosphatase (BALP), serum crosslinked C-telopeptide of type I collagen (CTX), osteocalcin (OCN), PTH, and 25-hydroxycalciferol

(25-OH-D3) were determined. The ratio CTX/OCN was calculated as indicative of bone turnover levels. RA disease activity was calculated using the DAS28 (ESR) score and RA chronicity was calculated using the HAQ score. Sarcopenia was defined according to the EWGSOP recommendations.

**Results:** The mean values for bone formation markers OCN and BALP were significantly lower in the RA group (OCN: 16.6±9.3 ng/ml vs. 20.3 ±6.7 ng/ml, p=0.05 and BALP: 11.9±4.8 IU/dl vs. 19.5±6.18 IU/dl, p=0.001). The mean values for bone resorption markers CTX and PTH were increased in the RA group (CTX: 0.273±0.176 ng/ml vs. 0.243 ±0.114 ng/ml, p=0.402 and PTH: 53.29±22.4 pg/ml vs. 38.8±15.8 pg/ ml, p=0.004). The mean value of 25 OH cholecalciferol did not differ between the two groups (29.6±10.1 vs. 25.3±11.4, p=0.071). The ratio CTX/OCN, indicative of high bone turnover levels, was significantly increased in RA patients (0.182±0.009 vs. 0.013±0.007, p=0.007). The high bone turnover in the RA group was independent of disease chronicity (p=0.173) or sarcopenia (p=0.645) and was positively associated with disease activity (p=0.05). Higher disease activity was associated with increased bone turnover (Spearman value: 0.233).

**Conclusion:** Increased bone resorption accompanied with decreased bone formation is associated with high bone turnover in post-menopausal women with RA. Increased disease activity results to high bone turnover and the latter is not associated with disease chronicity or sarcopenia.

## P203
### CHARACTERISATION OF GROWTH PLATE DYNAMICS IN SURGICAL AND NONINVASIVE LOADED MURINE MODELS OF OSTEOARTHRITIS

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**Objective:** Our recent work in the MRC National Survey of Health and Development (NSHD) found that increased height in childhood was associated, albeit modestly, with lower odds of knee OA at age 53 years. We build upon this work to examine growth plate dynamics in surgical and noninvasive loaded mouse models of osteoarthritis (OA).

**Methods:** Eight 8-week-old C57BL/6 male mice underwent destabilisation of medial meniscus (DMM) surgery to induce OA-like changes in right knee joints. Contralateral left knee joints had no intervention (controls). In 16-week-old C57BL/6 male mice (n=6), OA was induced using non-invasive mechanical loading of right knee joints with peak force of 11 N. Nonloaded left knee joints were internal controls. Chondrocyte transiency in articular cartilage (AC) and growth plate (GP) of tibiae was examined by histology and immunohistochemistry. Tibial subchondral bone (SCB) parameters were measured using μCT and correlated to 3D GP bridging analysis.

**Results:** Higher expression of chondrocyte hypertrophy markers; Col10a1 and MMP13 were observed in tibial AC chondrocytes of DMM and loaded knees. In tibial GP, Col10a1 and MMP13 expressions were widely dispersed in significantly enlarged zones of proliferative and hypertrophic chondrocytes in DMM (p=0.002 and p<0.0001, respectively) and loaded (both p<0.0001) tibiae of mice compared to their controls. 3D quantification revealed enriched GP bridging and higher bridge densities in medial compared to lateral tibiae of DMM and loaded knee joints of the mice. GP dynamics were associated with higher SCB volume fraction in medial compared to lateral tibiae of DMM and loaded knee joints (DMM SCB BV/TV: 36.7±4.5% vs. 29.4±3.1%, p=0.03; loaded: 47.1±1.6% vs. 40.1±1.7%, p=0.02 respectively) and epiphyseal trabecular BV/TV in medial tibiae of loaded knee joints (73.4±2.8% vs. 60.7±1.8%, p=0.005).

**Conclusion:** The results confirm associations between aberrant chondrocyte hypertrophy marker expression and OA pathology in surgical and loaded murine models of OA. Herein, we reveal for the first time spatial variation of growth plate bridging in surgical and loaded osteoarthritis models and how these may contribute to anatomical variation in vulnerability of osteoarthritis development.

**Disclosure:** The research leading to these results has received technical support from 3Dmagination Ltd, Didcot, UK.

## P204
### OSTEOPOROSIS CLINICAL RISK FACTORS THAT JUSTIFIED THE PRESCRIPTION OF BONE DENSITOMETRY (DXA): ABOUT 444 PATIENTS

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**Objective:** Osteoporosis is a disease that affects BMD and bone microarchitecture at the origin of an increased risk of fracture. The reduction in bone density assessed DXA and fall history represent the first two risk factors of nonvertebral fracture after menopause. There is a several risk factors of densitometric osteoporosis. The study aim was evaluation of clinical risk factors that justified the realization of BMD by DXA about 444 cases.

**Methods:** Transversal and descriptive monocentric cohort study conducted for 24 months in 444 patients referred by physicians regularly use prescription of BMD by DXA. The realization of this exploration by the same DXA-Hologic in the rheumatology department at the University Hospital Ibn Rochd was the criterion for entry into the study. All patients were interviewed on the same day on the risk factors for osteoporosis and fractures justifying the prescription of a BMD.

**Results:** Data included 410 women and 34 men. Most women were postmenopausal (90.2%). The average age was 59.3 y (σ=12.6), 34% were ≥65 y. The mean BMI was at 27.6. 18.3% of patients had at least a history of falls in the previous 12 months and 22.5% a history of fracture after a low-energy trauma. 42.6% were osteoporotic and 36.7% had osteopenia in at least one of these sites: lumbar spine, femoral neck, total hip. Early menopause, taking corticosteroids in the long term, rheumatoid arthritis and diabetes were the main risk factors that justified the prescription of DXA for the evaluation of bone densitometry (Table). Prescribers of this exploration were mainly rheumatologists (N=256, 57.1%), 41 endocrinologists (9.2%).

**Conclusion:** Our results confirm those of the literature regarding the risk factors that justified the prescription of BMD by DXA. These factors occurs diagnosis of osteoporosis in our study in 42.6% of patients.

Table. Patients characteristics and risk factors justified DXA

| Patients characteristics and osteoporosis risk factors | Patients number=444 n (%) |
|---|---|
| Women | 410 (92.3') |
| Menopausic women | 370 (90.2) |
| Mean age (σ) | 59.3 (12.6) |
| < 65 y | 293 (66.0) |
| ≥ 65 y | 151 (34.0) |
| BMI (kg/m$^2$) | |
| mean (σ) | 27.6 (5.1) |
| skinny (<19) | 9 (2.0) |
| normal (19-25) | 135 (30.4) |
| overweight (≥25) | 300 (67.6) |
| Osteoporosis risk factors | |
| Early menopause | 77 (18.8) |

| | |
|---|---|
| Rheumatoid arthritis | 54 (12.2) |
| Diabetes | 62 (14.0) |
| Hyperthyroidism | 46 (10.4) |
| Long term corticosteroid | 76 (17.1) |
| Past history of smoking | 12 (2.7) |
| Alcohol intake | 11 (2.5) |

## P205

### BONE STATUS AND TRANSVERSE MYELITIS

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**Objective:** Bone loss might be expected in patients with spinal cord dysfunction including those patients associating transverse myelitis (TM) (1-5). Skeletal fragility may be related to immobilization, vitamin D deficiency, etc. (1-5). We aim to introduce a female with anomalies of bone status associating TM.

**Case report:** A 54-year old, nonsmoking female is admitted for 5-y history of thoracic TM with motor deficit of paralytic intensity on both lower limbs. She is also known with untreated postmenopausal osteoporosis. The medical history also includes neurogenic bladder, ponytail syndrome, micronodular endemic goiter with euthyroidism and vitamin D deficiency with persistent supplementation. On admission, total serum calcium=9.5 mg/dL (normal: 8.4-10.2 mg/dL), bone turnover markers: alkaline phosphatase=75 U/L (normal: 40-150U/L), CrossLaps=0.379 ng/mL (normal: 0.33-0.782 ng/mL), osteocalcin=20.30 ng/mL (normal: 15-46 ng/mL), P1NP=67.6 ng/mL (normal: 15-46 ng/mL), normal PTH=31.55 pg/mL (normal: 15-65 pg/mL), low 25OHD=15.8 ng/mL (normal >30 ng/mL). The central DXA showed lumbar BMD=0.905 g/cm$^2$, T-score=-2.3 SD, Z-score=-1.1 SD, hip BMD=0.483 g/cm$^2$, T-score=-4.2 SD, Z-score=-3.1 SD. Profile screening X-Ray of thoracic-lumbar spine showed no vertebral fractures. Treatment with zolendronic acid 5 mg/y plus vitamin D 2000 UI/d was initiated. One year later, 25OHD increased to 24.3 ng/mL, while DXA assays showed an improvement of parameters as following: lumbar BMD=0.925 g/cm$^2$, T-score=-2.1 SD, Z-score=-0.9 SD, hip BMD=0.546 g/cm$^2$, T-score=-3.7 SD, Z-score=-2.7 SD.

**Conclusion:** In patients with TM, bone status mat be damaged due to multiple mechanisms and antiosteoporotic drugs in addition to vitamin D supplements might help the prevention of fracture and sarcopenia in order to pay attention to quality of life.

**References:**
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2. Albulescu DM, et al. Revista de Chimie 2018;69:2438.
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## P206

### SECONDARY DETERMINATIONS AT BONE LEVEL AS FIRST MANIFESTATION OF BREAST CANCER

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**Objective:** Breast cancer is the most frequent diagnosed carcinoma in women (1-5). Skeleton is among the most common sites of secondary spreading, as well as lung, liver, brain, and lymph nodes (1-5). Prompt recognition of metastases involves a prompt therapy with prolonged survival time and increase quality of life (1-5). We aim to introduce a female case associating bone metastasis as first manifestation of mammary carcinoma.

**Case report:** A 44-year-old female known with total hysterectomy and bilateral adnexectomy for a benign uterine tumour at age of 40 y is admitted for generalized bone pain, especially at lower left limb, left shoulder and generalized muscular pain, fatigue. Biochemistry panel of phoshor-calcium metabolism was normal, as well as BMD at DXA. Technetium $^{99m}$ whole body bone scintigraphy showed abnormal uptake at skull (frontal and parietal bones), vertebral spine, femur, humerus. Tumoral markers CA$_{125}$ and CA$_{15-3}$ were mildly elevated, as well as bone turnover markers. Computed tomography scan showed a large lump at the level of left breast and multiple other smaller lesions in both mammary regions, characteristic for a multicentric and multifocal carcinoma, with mediastinal lymph nodes enlargement in addition to secondary bone spreading at the level of cervical and thoracic vertebras, femur, lumbar region and both clavicles. Zolendronic acid was initiated in association with multilevel oncologic therapy.

**Conclusion:** Bone metastases on females without a history of a carcinoma might represent the first sign of the disease and adequate recognition may improve the outcome.

**References:**
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## P207

### SKELETON METASTASES AS FIRST SIGN OF AGGRESSIVE PAPILLARY THYROID CARCINOMA

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**Objective:** Papillary thyroid carcinoma (PTC), a common endocrine neoplasia has a slow evolution, mostly associating a favourable prognosis (1-5).Thyroidectomy is the first line therapy; postoperative hypocalcemia requires calcium and vitamin D (1-5). PTC first invades cervical lymph nodes (1-5). Distant spreading(lung, bones) in the absence of obvious thyroid disease is very uncommon(occult evolution).

**Case report:** This is a 55-year-old male admitted for lumbar pain emerging to lower limbs, poorly responsive to analgesics. Clinical evaluation was irrelevant. MRI revealed a tumour at S1 sacral vertebra of 46/36/27 mm, with compression of the spinal nerve and local oedema. S1-L5 laminectomy was performed; postoperative pathologic and immunochemistry exam pointed PTC metastases. Further, computed tomography was done and a few thyroid nodules were identified, the largest of 16 mm with microcalcifications, and cervical lymph nodes of maximum 19/18 mm. Total thyroidectomy with central lymphadenectomy was done with post-operative PTC confirmation. Within less than a year, while under monthly zolendronic acid, the patient also received radioiodine therapy (450 mCi), with progressive evolution of the disease, reaching a peak of blood thyroglobulin level of 12586 ng/mL. Whole body iodine 131 scintigraphy showed spreading to both lungs, left shoulder, sacrum, and vertebral spine. He further started a therapy with thyrosine kinase inhibitor.

**Conclusion:** It is very unlikely that PTC's first sign to be bone metastasis. It is important to identify the condition, for a proper diagnosis and therapy to improve the outcome. This case was an exceptional form of aggressive PTC poorly responsive to traditional treatment.

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## P208
### HYPERCALCEMIA AS FIRST MANIFESTATION OF LUNG CANCER

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**Objective:** Hypercalcemia associating lung and mediastinal carcinomas represents a marker of poor prognostic marker (1-5). Low PTH is suggestive for paraneoplasic syndrome (1-5).

**Case report:** This is a 54-year-old, nonsmoking male, known with arterial hypertension, type 2 diabetes mellitus, and high levels of total serum calcium (TSC)=13.4 mg/dL (normal:8.5-10.2 mg/dL) without any investigations and therapy. He was admitted for constipation, nausea and abdominal pain in relationship to high TSC. Thyroid function was normal, TSC was persistently high=13.2 mg/dL (normal: 8.5-10.2 mg/dL), suppressed PTH=6.7 pg/mL (normal: 15-64pg/mL), 25OHD=22.7 ng/mL (normal >30 ng/mL), increased CrossLaps=1.35 ng/mL (normal: 0.104-0.504 ng/mL) and osteocalcin=82 ng/mL (normal:14-46 ng/mL). Lumbar BMD-DXA=0.892 g/cm$^2$, T-score=-2.7 SD, Z-score=-1.9 SD. Computed tomography: inhomogeneous mediastinal and lung tumor enclosing the left primitive bronchus, left inferior pulmonary vein of 42/65/55 mm, left pulmonary atelectasis and cloned fluid accumulation in the right pleural cavity; mediastinal lymphadenopathy of 7/12 mm. High tumor markers: CA125=47.8 U/mL (normal <35), CA15-3=25.4 U/mL(normal <25 U/mL). Whole body bone scintigraphy (99mTc-HDP) revealed increased tracer uptake at bilateral hip, mostly at femoral head and humeral proximal epiphyses. The patient was offered pamidronate 15 mg/mL by intravenous infusion, and after 2 weeks biochemistry showed normal values of TSC=9.9 mg/dL (normal: 8.4-10.2 mg/dL) and PTH=7.3 pg/mL (normal: 15-65 pg/mL). However, muscle weakness, fatigue, nausea persistent, and after initial biochemical control of hypercalcemia, high TSC relapsed. In the meantime, the patient was referred for further oncological investigations and therapy which he delayed. He died within a few months.

**Conclusion:** Malignancy related hypercalcemia represents an independent factor of poor prognostic. Some cases present the high TSC levels in the absence of specific diagnostic of originating neoplasia. Specialists from different areas of medicine should pay attention to high levels of calcium unrelated to drugs or dehydration. Low PTH levels in addition to high calcium are very suggestive for cancer associated hypercalcemia.

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2. Bechir ES, et al. Revista de Chimie 2019;70:3515.
3. Paduraru DN, et al. Chirurgia (Bucur) 2019;114:564.
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5. Popescu M, et al. Revista de Chimie 2018;69:2089.

## P209
### VERY LOW BONE MASS AND ANKYLOSING SPONDYLITIS

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**Objective:** Several rheumatic diseases, for instance ankylosing spondylitis (AS), are characterized by extremely low bone mass, including in males or young adults (1-5). In patients with very low T-score, high risk of vertebral fractures, lack of response to antiresorptive therapy, or gastric morbidities, anabolic drugs like teriparatide are an option in countries with available protocol (1-5).

**Case report:** A 66-year-old, smoking male is admitted for bone assessment. His personal history includes: 2 years ago he suffered a left hip fracture and, despite the diagnosis of severe osteoporosis, he was not compliant to specific therapy. He is known for HLA-B27-positive AS since the age of 35 y. The medical history includes: congenital dysphonia, polyneuropathy, atrial fibrillation, chronic heart failure, right fascicular block; also, chronic gastroduodenitis, megacolon, gallstones, microlithiasis. On admission, biochemistry profile showed: total serum calcium=9.8 mg/dL (normal: 8.5-10.2 mg/dL), phosphorus=3.2 mg/dL (normal: 2.5-4.5 mg/dL), bone turnover markers: alkaline phosphatase=85 U/L (normal: 38-129 U/L), high CrossLaps=0.892 ng/mL (normal: 0.104-0.504 ng/mL), osteocalcin=20.60 ng/mL (normal: 14-46 ng/mL), and increased P1NP=88.25 ng/mL (normal: 15-46 pg/mL), and bone hormones as following: PTH=31.96 pg/mL (normal: 15-65 pg/mL), 25OHD=20.4 ng/mL (normal >30 ng/mL). Central DXA showed lumbar L2-4 BMD=0.905 g/cm$^2$, T-score=-6.6 SD, Z-score=-5.5 SD, hip BMD=0.581 g/cm$^2$, T-score=-3.6 SD, Z-score=-2.7 SD, 1/3 distal radius BMD=0.580 g/cm$^2$, T-score=-2.8 SD, Z-score=-2.2 SD. Screening spine X-ray revealed kyphosis-maximum point: T8 vertebra, mild (T5,T10,T11), moderate (T6) and severe (T7,T8,T9,T12) vertebral fractures. Treatment with zolendronic acid 5 mg/y plus vitamin D 2000 UI/d was initiated. One year later, 25OHD was 23.50 ng/mL; improvement of DXA profile: L2-4 BMD=0.554 g/cm$^2$, T-score=-5.6 SD, Z-score=-4.9 SD, hip BMD=0.624 g/cm$^2$, T-score=-3.4SD, Z-score=-2.2 SD, 1/3radius BMD=0.592 g/cm$^2$, T-score=-2.7 SD. Z-score=-2 SD. Further therapy with zolendronic acid and vitamin D supplements were recommended.

**Conclusion:** AS-related qualitative and quantitative impact on bone requires lifelong follow-up, as well as therapy.

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## P210
### FROM HYPERCALCEMIA TO... OVARIAN CANCER

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**Objective:** Ovarian tumors represent a vast, challenging, multidisciplinary field, with a particular poor outcome for ovarian cancer (OC) (1-5). Malignancy-related hypercalcemia is a marker of severe prognostic (1-5). We aim to introduce a case detected with OC starting from hypercalcemia-related syndrome.

**Case report:** A 75-year-old female, known with arterial hypertension, type 2 diabetes mellitus, is admitted for fatigue, nausea, lower abdominal distension, 9-kg weight loss/last year. Clinical exam: pelvic mass and ascites. Blood assays: total serum calcium=11.1 mg/dL (normal:8.5-10 mg/dL) (she denies vitamin D/A/calcium supplements); normal TSH; PTH=84.9 pg/mL (normal: 15-65 pg/mL); 25OHD=10 ng/mL (normal >30 ng/mL); normal bone turnover markers. Osteoporosis confirmed by: $L_{2-4}$BMD-DXA=0.839 g/cm$^2$, T-score=-3 SD, Z-score=-1.1 SD. Computer tomography: left ovarian tumor(14/10.5 cm), peritoneal carcinomatosis, hepatic and pulmonary metastases, subchondral cysts in left acetabulum(1.7/1.3 cm), and areas of osteocondensation of L2 (0.4 cm), left iliac bone (0.5 cm), right iliac bone (0.55 cm). CA125=5439 U/mL(normal: 0.1-35). Immunohistochemistry (IHC) based on cell block ascitic fluid: positive WT1, ER=40%, PGR negative, Ki67=45% (high grade serous adenocarcinoma). Vitamin D was added to adjuvant dose-dense carboplatin and paclitaxel chemotherapy (6 cycles) followed by debulking surgery (hysterectomy+salpingo-oophorectomy+omentectomy+local lymphadenectomy), then another 6 cycles. Postoperative histological and IHC profile confirmed the block cell profiling. BRCA1+2 tests were negative so she became candidate to olaparib, a poly(ADP)-ribose polymerase inhibitor. After another month of therapy, $^{18}$F-FDG positron emission tomography/computed tomography (PET/CT) showed no metabolic active lesions in pelvic area, neither thyroid gland, mammary gland, pulmonary, in liver, adrenals or bones. Also, the value of CA125 normalized (=10 U/mL), so was total serum calcium (=9.8 mg/dL). **Conclusion:** Nowadays, prompt recognition of a malignancy might embrace a clear beneficial of the outcome even in severe cases like OC. Hypercalcemia may be related to bone metastases or paraneoplasic PTHrP production.

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## P211
### PITUITARY TUMOR AND BLOOD CALCIUM LEVELS

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**Objective:** Patients with pituitary adenomas may associate primary hyperparathyroidism (PHP) – related hypercalcemia in cases with MEN1 (multiple endocrine neoplasia) syndrome, but, on daily practice, the levels of blood calcium may vary with the degree of dehydration or with calcium daily intake (1-5). We aim to introduce an adult female with a pituitary macroadenoma and calcium profile anomalies

**Case report:** This is a 56-year-old, nonsmoking female, with menopause at the age of 48 y, who was admitted a decade ago for persistent headache which lead to the detection of a pituitary tumour of 1.2x0.7 cm in contact with cavernous sinus. A mild elevation of prolactin level (48 ng/mL, normal <29 ng/mL) required dopamine agonists therapy (weekly cabergoline 1.5 mg) while neurosurgery was postponed. During follow-up, IGF-1 values remain within normal limits, so was DXA evaluation, while total serum calcium levels were detected several times mildly elevated (10.5 mg/dL, with normal range 8.5-10.2 mg/dL) in association with a mild elevation of PTH which was not confirmed at reassessment thus the diagnosis of PHP was not confirmed. However, the patient associated two gallstones of 2.2 cm, respective 1.8 cm which required surgical removal of gall bladder. The mild increase of PTH was associated with low levels of 25-hydroxyvitamin D=9 ng/mL (normal >30 ng/mL) which required cholecalciferol supplements. After 10 years since first diagnosed, the pituitary macroadenoma increased to 1.6x1.2 cm and selective hypophysectomy was necessary. No MEN1 syndrome criteria were confirmed.

**Conclusion:** In this case, the presence of mild elevation of calcium levels was probably related to oral diet intake, not with MEN1 syndrome.

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## P212
### ZOLENDRONIC ACID AFTER TERIPARATIDE: PANDEMIC OBSERVATIONS

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**Objective:** Teriparatide for sever osteoporosis is followed by antiresorptive drugs, and one option in patients with gastric intolerance is zolendronic acid or denosumab (1-5). During pandemic lockdown, the access to bone assessment was limited (1-5). Type 1 diabetic patients are particularly at risk for bone loss, but also for COVID-19 infection, thus the importance of respecting the pandemic rules (1-5). We aim to introduce a female case diagnosed with severe menopausal osteoporosis that was followed during post-teriparatide sequence of medication, including during pandemic days.

**Case report:** This is a type 1 diabetic female of 77 y who was first diagnosed with menopausal osteoporosis 8 y ago (lumbar T-score of -3.1 SD) and started medication with weekly alendronate in addition to vitamin D supplements. After 3 y, she suffered a single spontaneous vertebral fracture thus teriparatide was initiated for 2 y (with good tolerance): lumbar T-score went from -3.1 to -1.9 SD. In the meantime, due to bilateral coxarthrosis she needed bilateral hip replacement. Further on, she continued with biannually denosumab for 8 injections, reaching a lumbar BMD-DXA 0.942 g/cm$^2$, T-score of -2 SD, Z-score of -0.8 SD so an intravenous perfusion with zolendronic acid 5 mg was administered plus vitamin D supplements. While she had no additional fracture and glycated haemoglobin A1c remained around 6.2-6.4%, one year later, the pandemic started, so only bone turnover markers (BTM) were assessed, not DXA: suppressed CrossLaps=0.22 ng/mL (normal: 0.33-0.782 ng/mL), osteocalcin=11 ng/mL (normal: 15-46 ng/mL), P1NP=27 pg/mL (normal: 15-45 pg/mL). She continued with vitamin D, and 20 months after injection CrossLaps remained low (=22 ng/mL) with normal osteocalcin (=15 ng/mL), P1NP (=28 pg/mL) and stationary BMD.

**Conclusion:** Zolendronic acid effect in osteoporotic patients is easy to access by blood assays if DXA is not available, while lack of BTM increase is suggestive for a good outcome.

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## P213

### OSTEOPOROSIS-RELATED TO LONG-TERM HYPERTHYROIDISM ON A PATIENT WITH ESOPHAGIAN LEIOYOMA

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**Objective:** Approach of patients with menopausal osteoporosis and associated hormonal and/or metabolic risk factors requires a particular attention, especially in patients with multiple morbidities (1-5). We aim to present a case of a menopausal woman diagnosed with osteoporosis after a long time of uncontrolled hyperthyroidism, also displaying several morbidities that influenced her decision to follow the therapy.

**Case report:** This is a 58-year-old, nonsmoking female, initially admitted for neck compressive symptoms. She is known with suppressed TSH for several years and she refused therapy. A large multinodular goiter is confirmed (2 nodules with calcifications of maximum 2.5 cm at identified at ultrasound). She associates essential thrombocytosis, NYHA class III cardiac failure, a history of pulmonary thromboembolism and a recent diagnosis of oesophageal leiomyoma. Due to cardiovascular risk, after achieving control of thyroid function using thiamazole, $I^{131}$ radioiodine therapy induced iatrogenic hypothyroidism and she continued with levothyroxine substitution. Bone evaluation revealed osteoporosis: lumbar L1-4 BMD of 0.83 g/cm$^2$, T-score of -2.9 SD, Z-score of -2.5 SD. Also, a thoracic T9 vertebral fracture was identified. Due to oesophageal tumour and associated risk of reflux, oral antiresorptive drugs are not indicated. Injectable bisphosphonates and denosumab as well as teriparatide represented a potential therapy which the patient refused due to multiple concomitant drugs for mentioned morbidities. Vitamin D supplements were started.

**Conclusion:** Despite multiple levels of drugs against osteoporosis, real life medicine has shown us that the compliance/adherence to therapy decided by the patient is markedly influenced by concomitant medications and severe non-bone related diseases which might make the picture of osteoporosis and osteoporotic fractures not an essential target to treat.

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## P214

### POST COVID SEQUELAE ORTHOPAEDIC ASSOCIATED SYMPTOMS OF 60 PATIENTS: A CASE SERIES WITH 8 MONTHS OF FOLLOW UP

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Introduction: Post Covid-19, pulmonary complications are well understood but there are no studies that specifically investigate the frequency, characteristics and presentation patterns of orthopaedic associated symptoms in COVID-19 recovered patients. Objective: to evaluate the variety of orthopaedic symptoms and their frequency, localization, and severity in covid recovered patients to understand better, impact of Covid-19 on musculoskeletal system. Methods: Diagnosed & recovered 60 cases of Covid-19, who were admitted between June & July 2020 & visited orthopaedic OPDs for regular monthly follow-up were prospectively analysed for 8 months. Clinical examination and questionnaire about orthopaedic symptoms and their frequency, localization, severity and their use of analgesics & overall quality of life. Results: 60 post covid recovered patient, who were available for 8 months of follow up were included. Complaints of the patients were 81.6% (49) fatigue, 73.3% (44) muscle cramps, 66.7 % (40) large joint arthralgia, 51.6% (31) Small joint arthralgia, 48.3 (29) headache, 36.7% (22) back pain, 23.3% (14) chest pain and 15% (9) non-specific pain. An average of 3 analgesic medicines per week were consumed by study patients. 28 patients were working office population and had taken average of 24 days off in 8 months follow-up. Conclusion: Our 8 months follow-up data revealed that fatigue, muscle cramps, large & small joint arthralgia and back pain can be seen in patients at varying rates for a longer duration after covid recovery, which in turn affects their day-to-day life and PQLI. Long term analgesic intake is another area of concern. Keywords: Post covid sequelae, Orthopedic symptoms, arthralgia, COVID-19, Cramp, Pain

## P215

### BONE MARROW FAT AS IMAGING MARKER OF SKELETAL FRAGILITY IN WOMEN WITH POSTSURGICAL HYPOPARATHYROIDISM

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**Objective:** To assess lumbar spine bone marrow fat (BMF) content in postmenopausal women with chronic postsurgical HypoPT using magnetic resonance spectroscopy and evaluate how it could be related to vertebral fragility.

**Methods:** We studied 28 postmenopausal women with postsurgical HypoPT (mean age 66±6.8 SD years) and 28 healthy age-matched women. In all subjects we assessed: lumbar spine (L1-L4), femoral neck (FN) and total hip (TH) BMD by DXA (Hologic QDR 4500A, USA); trabecular bone score (TBS) on the L1-L4 images by the TBS-iNsight software; vertebral fracture assessment (VFA) by iDXA (Lunar, GE, USA). BMF was measured by 3 Tesla L1-L5 MRI with application of the PRESS spectroscopy sequences on L3 vertebral body.

**Results:** HypoPT subjects had significantly higher mean BMD values than controls (1.044 vs. 0.956 g/cm²; p <0.01), and lower TBS values (1.218 vs. 1.273; p<0.01). Vertebral fractures by VFA were observed in 6/28 (21%) of HypoPT vs. 3/28 (11%) of healthy subjects. Mean BMF values were significantly higher in HypoPT compared to healthy subjects: 79% vs. 60% (p<0.05). The percentage of unsaturated, residual and saturated BMF in the HypoPT group were 5%, 6% and 68%; in healthy subjects 9%, 3%, 48%, respectively. We observed statistically significant negative correlations between BMF values and both BMD (R=0.517; p<0.03) and TBS (R=0.767; p<0.03) in the HypoPT group. When only patients with vertebral fractures were compared, BMF was higher in HypoPT than in healthy subjects (62% vs. 78%; p<0.05).

**Conclusion:** Our results demonstrate that BMF assessed by magnetic resonance spectroscopy at the lumbar spine is increased in postmenopausal women with chronic postsurgical HypoPT and is associated with increased prevalence of fragility fractures at this level. Hence, adipogenesis may be stimulated in the trabecular bone in the absence of PTH and associated with skeletal fragility.

## P216

### FGF23 IS ASSOCIATED WITH TRABECULAR BONE SCORE BUT NOT BONE MINERAL DENSITY IN EARLY STAGES OF CKD: RESULTS OF THE CROSS-SECTIONAL STUDY

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**Objective:** Newer markers of kidney damage and mineral and bone changes in chronic kidney disease (CKD) are needed. This study aimed to evaluate BMD and trabecular bone score (TBS) in relationship with new laboratory markers of CKD, such as FGF23 and klotho.
**Methods:** A cross-sectional study during July 2018-July2019 was conducted. Plasma levels of soluble klotho and FGF23 were determined by ELISA. All patients undergone BMD and TBS measurement. Patients were divided into 2 groups as follows: A - patients in stages G1-G3; B - patients in stages G4-G5 according to KDIGO.
**Results:** A total of 74 CKD patients (42 males, 32 females; mean age 68.8 y) were included in the study. Greater FGF23 levels in group B (N=15) in comparison to group A (N=59) (p=0.001) were observed. FGF23 was associated with glomerular filtration (GF) (R=-0.43; p=0.003), with greater levels of FGF23 at GF <0.8 ml/s. Significant difference in TBS within first 3 CKD stages (mean TBS in G1=1.374 vs. G2=1.304 vs. G3a=1.24; p=0.03) and negative correlation of FGF23 and TBS (R=-0.33; p=0.05) and a positive correlation between klotho and TBS (R=0.419; p=0.04) was observed.
**Conclusion:** This study confirmed that FGF23 is associated with TBS. However, TBS reflects kidney function decline only in first 3 stages of CKD. Thus, FGF23 together with TBS are promising markers of early trabecular bone impairment in CKD.

## P217

### VITAMIN D INSUFFICIENCY IS ASSOCIATED WITH LOWER TRABECULAR BONE SCORE BUT NOT BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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**Objective:** The contribution of vitamin D to fracture risk reduction can be attributed, at least in part, to a beneficial effect on BMD. However, less evidence to explain the effect of vitamin D on bone microarchitecture exists. This study aimed to assess the relationship between 25(OH)D3 levels and BMD and trabecular bone score (TBS) in postmenopausal women.
**Methods:** A cross-sectional study in postmenopausal women (mean age=64 y) from endocrinology outpatient clinic undergoing DXA examination during 10/2015 to 03/2017 was conducted. In all subjects, measurement of BMD and TBS was performed. 25(OH)D3 levels were determined by chromatography using an HPLC system with UV detection (Chromsystem®) (interassay variability CV: 0.8-3%). From total number of 347 subjects; 129 fulfilled inclusion criteria. Study group was than divided in two groups according to serum concentration of vitamin D. A level of 30 ng/ml was considered as the cutoff value.
**Results:** The prevalence of vitamin D insufficiency in the study group was 49.6%. Patients with vitamin D >30 ng/ml (N=67) in comparison to patients with vitamin D <30 ng/ml (N=64) had greater proportion of patients treated with vitamin D supplement (55 vs. 35; p=0.05) and higher TBS values (1,276 vs. 1,241; p=0.05). No difference in L-spine, total hip or neck BMD was observed.
**Conclusion:** This study shows that sufficient vitamin D levels in postmenopausal women are associated with better bone microstructure, as assessed by TBS, but not BMD. A prospective follow-up to better

understand relationship between levels of vitamin D and bone structure is needed.

## P218

### FRACTURE RISK ASSESSMENT AFTER KIDNEY TRANSPLANTATION

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**Objective:** Epigenetic clocks are composed of a selection of CpG sites which have the potential to capture 'biological age' and provide a measure of age acceleration (calculated as the difference between biological and chronological age). Here we investigate the associations between age acceleration (according to three different clocks: Horvath pan-tissue, GrimAge and PhenoAge) and hip DXA parameters.
**Methods:** Participants were recruited across three generations of the Hertfordshire Intergenerational Study; original cohort members, their children, and grandchildren. Hip DXA was performed (Lunar iDXA, GE Healthcare) and whole blood DNA methylation was analysed using the Illumina 850k array (Infinium MethylationEPIC BeadChip) following which GrimAge, PhenoAge and Horvath pan-tissue age acceleration were calculated. Associations with DXA hip measures (including BMD, bone mineral content (BMC) and bone area) were analysed using linear regression in sex-stratified unadjusted models and those adjusted for age and BMI. Results are presented as β coefficients with 95%CIs.
**Results:** A total of 114 participants (39 males, 75 females) were recruited, mean age of 56 y (range 18-88). Relationships varied in different clocks; Horvath pan-tissue age acceleration was not associated with DXA measures in any models. However, greater GrimAge acceleration was associated with significantly lower hip BMC (β=-0.94 (-1.50,-0.38), p<0.01 and lower bone area (β=-0.28 (-0.55,-0.01), p<0.05) in males in fully adjusted models, and with lower hip BMD in males in unadjusted models (β=-0.02 (-0.04,-0.01), p<0.05). Greater PhenoAge acceleration was associated with lower hip BMC in males in models adjusted for age and BMI (β=-0.34 (-0.65,-0.03), p<0.05) and lower hip BMD in males in unadjusted models only (β=-0.01 (-0.02,-0.00), p<0.05). No significant associations were observed in females.
**Conclusion:** Our results demonstrate that the newer iterations of epigenetic clocks (GrimAge and PhenoAge) which were designed to measure age-related phenotypic changes are associated with bone measures at the hip, whereas the first generation clocks (Horvath pan-tissue) were not. These sex-specific associations require further investigation.

## P219

### ASSESSMENT OF THE ASSOCIATION BETWEEN RHEUMATOID ARTHRITIS ACTIVITY AND BODY COMPOSITION

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**Objective:** Rheumatoid arthritis (RA) is associated with altered body composition, which can result in rheumatoid cachexia caused by the
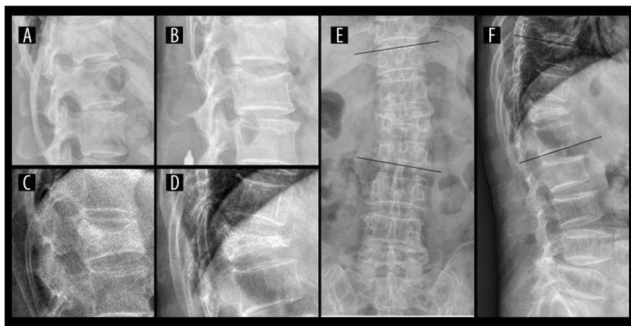
Figure. Diagnosis of osteoporotic vertebral fractures and spinal deformities in thoracolumbar junction region. (A) Grade 0, normal vertebral shape; (B) Grade 1 (mild), a reduction in vertebral height of 20-25%; (C) Grade 2 (moderate), a reduction of 26-40%; (D) Grade 3 (severe), a reduction of over 40%. (E, F) Thoracolumbar scoliosis (>10°) and kyphosis (>15°) measured at T10-L2 region on coronal and sagittal plane using the Cobb method.

## P221

### TIME TO REVISIT 'ABSOLUTE' AND 'RELATIVE' CONTRAINDICATIONS OF VERTEBROPLASTY: CASE SERIES OF 16 PATIENTS WITH NEUROLOGICAL DEFICITS WITH VERTEBRA PLANA AND POSTERIOR/ANTERIOR WALL DEFECTS TREATED WITH VERTEBROPLASTY AND CEMENT AUGMENTED SCREW FIXATION

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**Objective:** To evaluate the efficacy and safety of vertebroplasty with cement augmented pedicle screws for osteoporotic vertebra plana and posterior/anterior wall defects fracture in neurological deficits patients.
**Methods:** It was a case series of thoracolumbar 16-osteoporotic fracture (vertebra plana and posterior/anterior wall defects) patients, were treated by percutaneous vertebroplasty and PMMA cement augmented pedicle screws fixation. Preoperative and postoperative clinical and radiological parameters (kyphotic angle, compression ratio, the visual analog scale (VAS) for back pain, and the Oswestry Disability Index (ODI) were analyzed.
**Results:** The average age of the patient was 68.88. Mean blood loss was 312.5 ml and mean surgical duration was 170.6 min. A significant improvement was noted in VAS (preoperative, 7.90 ±0.60; final follow-up 2.90±0.54) and ODI (preoperative 77.10±6.96, postoperative 21.30 ±6.70). Neurological improvement was noted in all patients (Frankel D). Vertebral height and kyphotic angle of the compressed vertebral bodies were significantly corrected, preoperative 22.14±2.60 to postoperative 10.40±1.40 with 10% (2.5±0.90) loss of correction at final follow-up. No cement leakage was found. No implant related complication was seen. No iatrogenic dural or nerve injury.
**Conclusion:** Treatment with vertebroplasty with cement augmented screw fixation and direct decompression is a great option in treating such a complex situation in fragile age with fragile bones because It provides anterior support with cementing that avoids corpectomy. Short segment pedicle screws fixation avoids stress risers at the junctional area.



## P222

### LONGITUDINAL CHANGE IN BONE MINERAL DENSITY AMONG ADULTS AGED 55 YEARS AND OLDER USING THE HEALTHY AGING LONGITUDINAL STUDY IN TAIWAN (HALST)

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**Objective:** To describe the change in BMD over 6 y among adults aged 55 y and older by sex and osteoporosis status.
**Methods:** Participants included the cohort of healthy adults from HALST having BMD measurements at baseline and at follow-up (follow-up duration (mean±SD): 6.1±0.5 y). BMD of lumbar spine (L1-L4) was measured using DXA by operators following standardized procedures at 4 sites in HALST. Osteoporosis status at baseline was defined by a BMD T-score as osteoporosis (T-score ≤-2.5), osteopenia (-2.5 < T-score < -1), or normal status (T-score ≥-1). Longitudinal BMD change was calculated as the percent change between the baseline BMD and the follow-up BMD. A 3% BMD change has been considered as the least significant change (LSC) at the lumbar spine to be of potential clinical significance beyond measurement imprecision.
**Results:** Among the 1508 participants with BMD measurements at baseline and follow-up; at baseline, 52% (n=782) were women, 62% (n=932) aged 65 y and older, 14% (n=215) had osteoporosis, 33% (n=500) had osteopenia, and 3% (n=47) had a recent history of an

antiosteoporotic medication. At 6 y of follow-up, the largest BMD reduction had occurred among women aged between 55-65 y (-3.1%, 95%CI: -3.8%, -2.4%) (Figure). For all other healthy aging adults, there were no changes in BMD beyond the LSC of 3%.

**Conclusion:** Among healthy adults in Taiwan aged 55 y and older, women aged 55-65, soon after menopause, experienced the most significant BMD loss in lumbar spine in a 6-y observation period. These women may benefit most from potential interventions to reduce bone loss and risk of developing osteoporosis. For the other healthy adults, men aged 55 y and older and women aged 65 y and older, who have relatively stable measurements of BMD over 6 y, a one-time DXA screening appears adequate to identify those at high risk for an osteoporotic fracture.
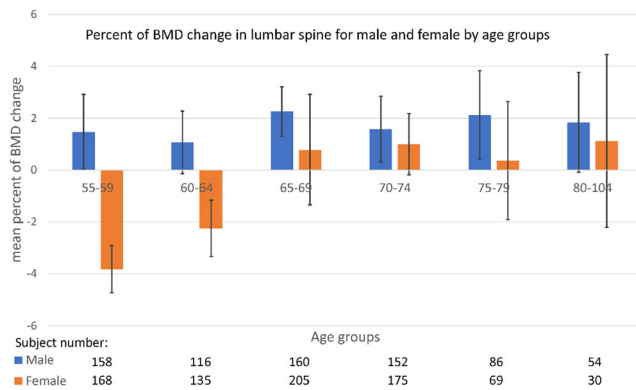


## P223

### DISTAL SODIUM CHANNEL BLOCKERS (DSCB) INJECTION FOR UPPER LIMB NEUROPATHIC PAIN: AN OUTPATIENT CASE SERIES OF 50 PATIENTS AND REVIEW OF LITERATURE

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**Objective:** Evidence points toward voltage-gated sodium channels blockers as a key target for novel analgesics. Sodium channel blocker are the class of drugs that act by inhibition of sodium influx through cell membranes. Blockade of sodium channels slows the rate and amplitude of initial rapid depolarization, reduces cell excitabilities and reduces conduction velocities. DSCB injection is infiltration of local anaesthetic drugs around nerve sheaths at the most terminal branch along its course, which leads to the sodium channel blocking effect upwards towards the dorsal root ganglia and nerve roots, which produce pain due to excitation after the disease complex. This study aimed to assess the usefulness of DSCB injection in upper limb pain complex diseases of various origins.

**Methods:** 50 patients of neuropathic upper limb pain with various severity were followed up for a minimum of 6 months. 20 patients of cervical disc lesion with nerve root compression (group 1), 20 patients of adhesive capsulitis (group 3) and 10 patients with overlapping of both diseases (group 3) were included in the study. A mixture of 2 ml 1% lignocaine, 30 µg clonidine, 40 mg 1ml of methylprednisolone acetate injected in first web space of affected limbs two times, one month apart. Assessment is done by visual analogue scale (VAS) pain score and clinical examination. Significant improvement is considered, if VAS score reduces by 5 or more. 30° or more, pain-free improvement of range of motion (ROM) is considered significant. Number of analgesics taken per week also enquired.

**Results:** Patients in Group 1, 2 and 3 had 50%, 60% & 50%, improvement in VAS score & ROM after first injection and 65%, 75% & 60%, after second injection respectively. 60%, 65% & 50% patients in the respective groups, maintained the improvement at the end of 6-month

examination for both VAS score & ROM. An average of 3 analgesic medicines per week were consumed by study patients.

**Conclusion:** DSCB injection is simpler, safer, cheaper and effective outpatient procedure to treat upper limb pain complex of disease of various origins. However, prospective long term multicentric studies with larger sample size, are required to understand how these distal nerve blocks really work. Long term analgesic intake is another area of concern.

## P224

### ADULT UNTREATED HYPOPITUITARISM AND BONE

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**Objective:** Hypopituitarism associated or ovarian related amenorrhea negatively impacts bone status in teenagers and young adults if left untreated, first by impairing the achievement of peak bone mass, then by anomalies of bone turnovers and estrogen-connected bone loss (1-5). We aim to introduce an adult female case who was noncompliant to hypopituitarism therapy with negative bone effects.

**Case report:** This is a 36-year-old, nonsmoking female who is admitted for nonspecific bone and joints. The family medical history is negative. The personal medical history includes the diagnosis of empty sella-related hypopituitarism (no genetic testing was done) which lead to therapy with growth hormone (GH) from the age of 12-15 y due to GH deficiency; therapy with daily levothyroxine 25 µg from the age of 12 y to 30 y for central hypothyroidism (CH) and delayed puberty which required priming with estrogens followed estro-progestative therapy for hypogonadotropic hypogonadism (HH); despite a good tolerance, the subject decided to stop it and remained in amenorrhea for the last 7 y. On current admission, adequate levels of vitamin D are detected in addition to low BMD for age (a Z-score at lumbar DXA of -2.5 SD). Endocrine panel confirmed HH by FSH/LH ratio =0.166/0.1 mUI/mL, and CH by TSH of 0.6 µUI/mL (normal: 0.5-4.5 µUI/mL), and FT4 of 6.6 pmol/L(normal: 9-19 pmol/L).

**Conclusion:** Adult GH deficiency may also have an impact on bone/muscle status but in some countries, as ours, GH for adults is not applicable. Routine DXA is useful in young adult patients with untreated hypopituitarism in terms of HH.

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## P225

### TYPE 2 DIABETES MELLITUS AND LOW TBS: ANY THERAPY?

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**Objective:** Type 2 diabetes mellitus (2DM) associates not only a large panel of cardiometabolic complications, but also muscle-skeletal damage (1-5). Low trabecular bone score (TBS), blunt bone turnover markers

potentially associated with vitamin D deficit represent the hallmark of 2DM (1-5). We aim to introduce a diabetic male case in relationship to the therapy decision based on low TBS values, but not BMD at central DXA assay.

**Case report:** This is a 68-year-old, nonsmoking male, known with 2DM, chronic high blood pressure, overweight, and persistent hypomagnesemia, is admitted for chronic, nonspecific bone pain. On admission, blood glucose was 187 mg/dL with uncontrolled 2DM (glycated haemoglobin A1c of 7.3% with normal levels <6.5%, under daily metformin 2000 mg/d). 25OHD was of 19 ng/mL, with normal calcium (total serum of 9.3 mg/dL, normal values between 8.5-10.2 mg/dL) and PTH. Serum magnesium of 1.4 mg/dL (normal: 1.6-2.6 mg/dL) with normal thyroid and kidney function, and low alkaline phosphatase=35 U/L (normal: 40-150 U/L) were identified. The bone evaluation revealed normal BMD for age (a T-score of 1.9 SD) with decreased TBS of 1,169. Screening profile spine X-Ray did not identified a fracture. A better control of 2DM and vitamin D supplements were recommended for the moment.

**Conclusion:** If persistent low magnesium might deteriorate the bone quality is debatable. The nonspecific leg pain might be related to low magnesium, diabetic neuropathy and hypovitaminosis D. This case addresses a current challenge of daily practitioners, namely the decision of introducing antiresorptive drugs in type 2 diabetic persons who display normal or high-normal BMD.

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## P226
### ROLE OF THE ENDOVANILLOID/ENDOCANNABINOID SYSTEM IN THE MODULATION OF OSTEOCLAST ACTIVITY IN INDIVIDUALS WITH PAGET'S DISEASE OF BONE

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**Objective:** To compare osteoclast (OC) expression of endocannabinoid/endovanillod (EC/EV) system in patients with Paget's disease of the bone (PDB) and healthy people and to investigate the modulation effect of specific agents targeting EC/EV system on OC activity in this metabolic bone disorder.

**Methods:** In vitro OCs were differentiated from peripheral blood mononuclear cells of patient with PDB and healthy donors. Characterization by real-time PCR and western blot were performed for evaluating the expression of CB2 and TRPV1 receptors. TRAP assay and bone resorption assay were performed to evaluate OCs activity before and after 48 h exposure to CB2 (JWH-133 and AM630) and TRPV1 (resiniferatoxin (RTX), iodoresiniferatoxin (I-RTX) selective drugs.

**Results:** Four women with PDB (3 with polyostotic form) and 4 age-matched controls were enrolled. Real-time PCR evidenced a significant higher expression of CB2 gene in OCs patients with PDB compared to healthy controls, while no between-group difference for TRPV1 gene expression were found. Western blot analysis evidenced a significant increase of CB2 protein expression in patients with PDB compared to healthy controls. TRAP Assay showed a significant reduction of multinucleated TRAP+ OCs (n≥3) after treatment with JWH-133, and no significant changes after treatment with AM630. A significant increase of the number of active OCs was found after treatment with RTX, while treatment with I-RTX induced a significant reduction in the number of OCs in patients with PDB compared to healthy controls. Bone resorption assay showed a significant reduction of resorption areas in in vitro samples treated with JWH-133 while a significant increase of the number and size of bone resorption areas after treatment with AM630 were found. Treatment with I-RTX did not show a significant reduction bone resorption area compared to untreated controls.

**Conclusion:** Our study demonstrate the expression of EC/EV system by OCs in patient affected by PBD suggesting a role of these receptors in this condition. Moreover, the significant impact on bone resorption in using specific agents addressing CB2 and TRPV1 receptors on OCs opens new therapeutic scenarios in patients with PDB in addition to current therapeutic options.

## P227
### SCREENING IN THE DIAGNOSIS OF EARLY DISORDERS OF CARBOHYDRATE METABOLISM

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**Objective:** To assess the significance of screening in identifying early disorders of carbohydrate metabolism in residents of Volgograd.

**Methods:** On the basis of the City Clinical Hospital 25 in 2020, screening of early disorders of carbohydrate metabolism was conducted. The screening involved persons over 40 y of age with risk factors (obesity, hypertension, a history of elevated glycemic levels above 5.5 mmol/l, a family history of type 2 diabetes). The study group consisted of approximately equal numbers of men and women. All subjects were tested for fasting glucose, an oral glucose-tolerance test, and the level of glycated hemoglobin (HbA1c) was determined.

**Results:** The screening involved 100 people who had no history of type 2 diabetes and no complaints of carbohydrate metabolism disorders at the time of the examination. The subjects were treated in hospital for other therapeutic and surgical diseases. The average age of the subjects was 55 ±7.4 y. Of these, 56 (56%) people were found to have a risk of developing carbohydrate metabolism disorders. During the oral glucose-tolerance test, 20 (20%) of the examined patients were found to have impaired carbohydrate metabolism, which was confirmed by the definition of HbA1c. The average level of glycemia according to the screening data was 5.9±1.24 mmol/l, HbA1c 6.3±0.17%. In 6 of the examined individuals (6%), reliable type 2 diabetes mellitus was detected. The differences in the gender ratio by sex were not significant.

**Conclusion:** Screening in individuals with risk factors is an urgent task, since it allows us to identify patients with early manifestations of carbohydrate metabolism disorders, which contributes to the prevention of possible vascular complications.

## P228
### THE ROLE OF ANTIBODIES TO ELASTIN IN VARIOUS CLINICAL VARIANTS OF THE COURSE OF SYSTEMIC SCLERODERMA

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**Objective:** The relevance of studying elastin as an antigen is determined by its high prevalence in organs and tissues that undergo significant deformations under the influence of loads (ligaments, skin, lungs, blood vessels). Elastin, being a high molecular protein, contains a large number of antigenic determinants. The aim of the study was to identify differences in the number of antibodies to elastin in different clinical variants of the course of systemic scleroderma.

**Methods:** We examined 42 patients with SDS, including 11 men (26.2%) and 31 women (73.8%) aged 22-72 y. The average age of the patients was 44.1±15.4 y. The average age of patients at the time of examination was 44.1 y. The average duration of the disease is 9.2 y. Diffuse form of systemic scleroderma was diagnosed in 18 patients (42.9%), limited in 24 (57.1%). Minimal activity of the disease was detected in 16 patients (38.1%), moderate in 22 (52.4%), high in 4 (9.5%) patients. The median duration of the disease in the observed group was 9.2±7.4 y (range 2-27 y). The relationship between the detection of antibodies to elastin and the presence of a certain clinical and immunological variant of systemic scleroderma was studied, characterizing the latter in accordance with the prevalence of the skin process, the rate of formation of the main symptom complex and the spectrum of organ damage. To determine the content of antibodies to elastin, an indirect version of the enzyme immunoassay was used.

**Results:** Most clinical manifestations occurred in approximately equal proportions in patients with the presence of antibodies to elastin and negative for this trait. Statistically significant differences between the clinical groups were found only for joint damage (arthritis/tenosynovitis) and lung damage (bilateral basal pneumosclerosis) (p<0.001). The results obtained should be considered in the light of the possible involvement of antibodies to elastin in the pathogenesis of these clinical manifestations, since it is the ligamentous apparatus and the lungs that are the main place of concentration of elastin fibers. The revealed patterns are not accidental: elastic fibers are found in large quantities in the ligaments and lung tissue, so the autoimmune process affecting elastin is manifested by the corresponding symptoms.

**Conclusion:** Analyzing the results obtained in our study, we can assume the participation of antibodies to elastin in the processes of remodeling of the pulmonary parenchyma leading to a decrease in the elasticity of the pulmonary framework and an aggravation of the processes of fibrosis. Thus, in systemic scleroderma, the presence of antibodies to elastin is associated with damage to the joints and pulmonary parenchyma.

## P229
### PANNICULITIS IN RHEUMATOLOGY PRACTICE: SPECIFIC FEATURES OF CLINICAL COURSE AND OUTCOMES

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**Objective:** Panniculitis (Pn) is a heterogenic group of inflammatory diseases with predominant involvement of subcutaneous adipose tissue and may occasionally be seen in clinical practice by many specialists. Although, fever, skin symptoms and joints involvement alongside with pronounced rise of acute phase inflammation reactants are the reasons for referral to a rheumatologist. At the same time absence of clear diagnostic algorithm would result in delayed diagnosis and, consequently, inadequate treatment. This study aimed to assess clinical course and clinical outcomes of Pn in current rheumatology practice.

**Methods:** The study included 209 pts on the record at VA Nasonova Research Institute of Rheumatology during 2009-2016, (185 females, 24 males, aged 17-80 y) with referral diagnosis of "erythema nodosum nondifferentiated panniculitis" and disease duration from 1 week to 25 y. Patients' assessment included general clinical examination, serological and immunological tests, histological and immunohisto-chemical analyses, chest CT scan, Doppler ultrasonography of the lower extremity veins, and tuberculin skin test. Outcomes were evaluated in 1-6 y.

**Results:** Secondary to underlying nonrheumatic condition Pn was identified in 23 pts. The most prevalent Pn types in remaining 186 cases were erythema nodosum (EN) (121pts), lipodermatosclerosis (LDS) (38) and Weber-Christian disease (WCD) (18). Symmetrical distribution of nodules over upper and lower extremities (ULE) was characteristic for 93% of all EN cases. In LDS populations 68% cases had increased mean BMI, 79% chronic venous insufficiency (CVI), 60% asymmetric distribution of lesions, mostly over medial leg (92%). In WCD patients the nodules were covering all ULE surfaces, and in 14 nodules were found on the trunk. The three Pn types had certain differences in the clinical course: high clinical and lab activity was documented in Löfgren syndrome and WCD pts. Asymmetric distribution of nodules on the legs was characteristic for LDS, nodules on the trunk were specific for WCD. The highest recurrence rate was documented in WCD pts (39.7 per 100 patient-years), the lowest in Löfgren syndrome pts (15.3 per 100 patient-years). The probability of EN recurrence in Löfgren syndrome pts was significantly higher in subjects older than 40 y (OR 3.81; p=0.03), in subjects with late (≥3 months from EN onset) initiation of treatment (OR 8.94; p=0.0008) and in subjects with indurations >5 cm in size (OR 3.65; p=0,03). The probability of LDS recurrence was significantly higher in pts with confluent nodules, forming conglomerate masses (OR 4.33; p=0.037), and pts taking hydroxychloroquine at ≤200 mg/d during ≥6 months (OR 5.25; p=0.019).

**Conclusion:** Comprehensive examination is needed to identify the clinical type of Pn. Symmetrical involvement of all extremities is characteristic for EN in young subjects. Asymmetric nodular rash over lower extremities in subjects with abnormal BMI and CVI is specific for LDS. CWD usually presents with nodular rash on the trunk. Identified risk factor for EN and LDS recurrence should be taken into consideration while writing a treatment plan.

## P230
### RISK FACTORS FOR GASTROINTESTINAL AND RENAL EVENTS BY TYPE OF LONG-TERM NSAID INITIATED: A REAL-WORLD STUDY OF COMMERCIALLY-INSURED PATIENTS WITH OSTEOARTHRITIS

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**Objectives:** The goal of this research was to evaluate the risk factors associated with gastrointestinal (GI) events and acute renal failure (ARF) among patients receiving long-term topical nonsteroidal anti-inflammatory drugs (NSAIDs), oral traditional NSAIDs (tNSAIDs), and cyclooxygenase-2 inhibitors (COX-2s) for management of hip/knee osteoarthritis (OA).

**Methods:** The Optum Healthcare Solutions, Inc. claims database (1/2012-3/2017) was used to identify adult patients ≥18 with ≥2 diagnoses of hip and/or knee OA. The index date was defined as the first prescription after the first OA diagnosis. Patients were assigned to cohorts based on the type of NSAID prescribed on index date. Patients were required to be continuously-enrolled 6 months before (baseline) and 36 months after (follow-up) the index date. Patients were also required to have ≥90 d supply of their cohort type of NSAID during year 1 of follow up. Demographic and clinical characteristics were summarized during baseline. Logistic regressions were conducted to assess the risk factors for GI and ARF, respectively.

**Results:** Data for 23,796 patients were analyzed (18,100 tNSAIDs, 4825 COX-2s, and 871 topical NSAIDs). GI and ARF events during follow-up ranged from 7.3-8.1% and 8.0-11.0% of cohorts, respectively. For both GI and ARF, age and baseline healthcare costs were predictive of incurring these clinical events. In the follow-up period, patients in the tNSAIDs or COX-2s cohorts had an increased trend of a GI event relative to topical NSAIDs (OR=1.15, p=0.33 and OR=1.24, p=0.11, respectively). Other risk factors included a GI event in baseline, such as, iron-deficient anemia of GI origin (OR=11.08, p<0.01). Prominent

risk factors associated with ARF in year 1 of follow-up were being in the tNSAIDs or COX-2s cohort relative to topical NSAIDs cohort (OR=2.04, p=0.04 and OR=1.92, p=0.07, respectively).

**Conclusion:** These findings suggest that important safety considerations associated with long-term NSAID use vary by NSAID type initiated following OA diagnosis. This research stresses the importance of mitigating risk for safe use of NSAIDs.

**Disclosure:** The study was sponsored by Pfizer and Eli Lilly and Company.

## P231
### EFFICACY OF ANTIRESORTIVE TREATMENT IN OSTEOPOROTIC OLDER ADULTS: A NESTED CASE–CONTROL STUDY

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**Objective:** A nested case-control study will be carried out to evaluate the real life efficacy of antiresorptive treatment regarding the prevention of osteoporotic hip fractures in older adults with osteoporosis.

**Methods:** A case-control study nested in a cohort in Spain using the information from BIFAP (Base de Datos para la Investigación Farmacoepidemiológica en Atención Primaria, Database for Pharmacoepidemiologic Research in Primary Care). Cases were defined as women aged 75 y or older with a first diagnosis of osteoporotic hip fracture, using the International Classification of Primary Care (ICPC)-1 codes, recorded between 1 January 2016 and 31 December 2019, and using one of the following drugs: alendronate, etidronate, ibandronate, risedronate, clodronate minodronate, pamidronate, tiludronate, zoledronic acid or denosumab. 3 years of follow-up in BIFAP before the event date. The date of hospitalization served as the index date. All hip fracture cases were double-checked and validated by both BIFAP and the research team. We excluded women with any history of cancer, Paget disease, prevalent hip fracture and fractures resulting from high intense trauma. For each case, X controls same characteristics but with any of the drugs involve the study by the time of the index date of their corresponding case were selected, matched by the same age and calendar year of enrolment in BIFAP.

**Results:** Antiresorptive drugs are usually the first-line treatment in older adults [1]. These drugs have been shown to increase BMD and reduce fragility fractures in osteoporotic patients [2]. Besides this pharmacological prevention has proven to be cost-saving in clinical practice [3]. However, there is no clear evidence in older adults [4]. A study based on screening for osteoporosis in older women did not reduce the incidence of osteoporosis-related fractures [5]. However, the analysis of other national databases has not related the use of bisphosphonates with fracture reduction [6].

**Conclusion:** The purpose of our update study will be to determine the real life evidence of antiresorptive treatment in this specific population.

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## P232
### PROTEOMIC CHARACTERIZATION OF BONE, MUSCLE AND CEREBROSPINAL FLUID IN THE ELDERLY PATIENT WITH HIP FRACTURE: A CROSS-SECTIONAL STUDY

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**Objective:** To describe the proteomic characterization of bone, muscle and cerebrospinal fluid in the elderly patient with hip fracture compared to nonfractured controls.

**Methods:** This study aims to know the characteristics of the proteomics of the bones (femoral head), muscle (gluteus maximus) and cerebrospinal fluid, obtaining a sample of them during the process of osteosynthesis of hip fracture (in case of fracture hip). In the case of nonfractured controls, the sample will be obtained during the hip replacement surgery process (placement of a femoral prosthesis for hip osteoarthritis). Patients who meet the inclusion criteria and sign the informed consent will become research subjects. The blood collection will be carried out in the same admission analysis. The samples of bone, muscle and cerebrospinal fluid will be made in the surgical act of hip osteosynthesis

**Results:** Proteomic analysis has become a tool to assess the biological function of proteins [1]. These tests are useful for discovering potential therapeutic targets. As bone and muscle [3] deterioration (osteoporosis and sarcopenia), together with alterations at the brain level, are very important factors related to hip fracture, knowing its proteomic characteristics in this context becomes a vitally important objective. The proteomic oxidation mechanisms have been studied in young or older populations without incident fracture. Therefore, it is important to study the mechanisms of affectation of these and their affectation in the muscular and bone function. The identification of these modified proteomic compounds (oxy-proteome) [4] can help us understand the mechanisms of protein damage accumulated in bone and muscle and its potential effect accumulates in older people with hip fracture. There is a study of the Osteoporotic Fractures in Men (MrOS) cohort that relates the analysis of 5 proteins with the incidence of hip fracture (CD14, CHL1, CO7, FCGBP, PZP) [5]. The proteomic relationship with hip fracture is related to the proinflammatory state that the accelerated decrease in BMD would have with it [6]. All these studies also indicate that there is a relationship between brain and bone (with a greater number of fractures) without the presence of cognitive impairment being necessary [7]. However, when studying markers in cerebrospinal fluid, it is more common to find studies in mice in the literature, with humans being a less studied subject [8].

**Conclusion:** The purpose of our update study will be to determine the real life evidence of antiresorptive treatment in this specific population.

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## P233
### THE ASSOCIATION BETWEEN OSTEOPOROSIS AND SARCOPENIA IN ALCOHOLIC LIVER CIRRHOSIS

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**Objective:** Osteoporosis and sarcopenia are important complications of alcoholic liver cirrhosis (ALC). The aim of this study was to evaluate the relationship between osteoporosis and sarcopenia in patients with ALC.

**Methods:** We retrospectively evaluated the correlation between osteoporosis and sarcopenia in 112 patients with liver cirrhosis of various etiologies (57 men, 55 women), by measuring the appendicular skeletal muscle mass index (ASMI) using bio-impedance analysis. BMD was measured by DXA osteodensitometry. Of these, 40 patients were diagnosed with alcoholic liver cirrhosis (36%) while 72 patients had liver cirrhosis of viral etiology.

**Result:** The rate of sarcopenia was 13% (14/112), while the rate of osteoporosis and osteopenia was 17% (19/112) and 65% (73/112), respectively. The rate of osteoporosis was significant and increased in patients with sarcopenia and ALC. In the linear regression analysis, sarcopenia was significantly associated with BMD of the lumbar spine (coefficient=-0.149, P=0.014) and femoral neck (coefficient=-0.110, P=0.003). ALC was also significantly associated with low BMD of the lumbar spine (coefficient -0.160, P<0.001) and femoral neck (coefficient=-0.066, P=0.015). In the logistic analysis, sarcopenia (odds ratio=6.16, P=0.039) and cirrhosis (odds ratio=15.8, P=0.002) were independent risk factors for osteoporosis. The IMSA limit values for osteoporosis were 7.33 kg/m$^2$ in men and 5.71 kg/m$^2$ in women.

**Conclusion:** Sarcopenia has been closely associated with osteoporosis and it has been observed that low ASMI could be a potential predictor of osteoporosis in patients with chronic liver disease. Examination of BMD may be needed to detect osteoporosis in patients with cirrhosis.

## P234

### EFFICIENCY OF INTRA-ARTICULAR TREATMENT ON PAIN IN KNEE OSTEOARTHRITIS

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**Objective:** Knee Osteoarthritis is a degenerative disease that occurs in most of the population with age. It represents one of the main causes that lead to disability worldwide.

**Methods:** We analyzed intra-articular treatment methods on a group of 46 patients aged between 60-80 y, diagnosed with knee osteoarthritis. 16 patients were treated with local analgesics and nonsteroidal anti-inflammatory drugs intra-articularly, 16 patients were treated with intra-articular glucocorticoids and 14 patients were treated with intra-articular hyaluronic acid.

**Results:** In patients treated with local analgesics and nonsteroidal anti-inflammatory drugs there was a decrease in pain for about 1 day, in those treated with glucocorticoids the decrease in pain lasted about one month while in patients treated with hyaluronic acid there was no immediate decrease in pain for any of the patients, but the effect later obtained was maintained for an average of 90 days.

**Conclusion:** Intra-articular treatment of knee osteoarthritis may reduce local pain temporary or in the short-term, but it cannot stop the progression of the intraarticular inflammatory process. The use of analgesics or corticosteroids with local anti-inflammatory effect is preferable in hyperalgesic forms but sustainable results are obtained by injecting substances with protective effect on the articular cartilage.

## P235

### VITAMIN D LEVELS, BONE METABOLISM AND BONE MASS IN PATIENTS WITH HEPATIC CIRRHOSIS OF ALCOHOLIC ETIOLOGY

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**Objective:** Osteoporosis is observed in approximately 12-50% of the patients with liver cirrhosis. The negative effects of alcohol are exerted directly on bone cells and indirectly on hormones. Vitamin D is involved in the differentiation of osteoblasts, bone matrix synthesis and bone mineralization, as well as in its decomposition. Vitamin D deficiency has been reported in approximately 2/3 of the patients with liver cirrhosis. Our aim was the determination of vitamin D level, bone metabolic activity and bone mass in patients with hepatic cirrhosis of alcoholic etiology.

**Methods:** 30 male patients with liver cirrhosis of alcoholic etiology were investigated between October 2019 and March 2020. Total vitamin D, PTH and osteocalcin were determined by the ECLIA method (electrochemiluminescence immunoassay) using the Elecsys 2010 analyzer. BMD was measured by osteodensitometry (DXA) using Hologic Horizon A. The analysis of the results was performed using descriptive statistics and hypothesis testing, as well as the nonparametric analysis of the unidirectional variance and the Pearson correlation coefficient.

**Results:** Vitamin D deficiency (<50 nmol/l) was observed in 66.66% of patients, with a higher prevalence in Child-Pugh class C patients. Osteocalcin levels were below the normal limit in 86.7% of patients. CrossLaps was increased in only 20% of patients, but a significant increase was observed in Child-Pugh Class C patients.

**Conclusion:** Vitamin D deficiency is present in most patients with liver cirrhosis of alcoholic etiology. Osteoporosis is a common complication in patients with chronic liver disease. The pathogenesis of osteoporosis is mainly explained by low bone formation, although increased bone resorption has also been reported, especially in women with advanced cholestatic liver disease, due to vitamin D absorption deficiency.

## P236

### OSTEOPOROSIS IN CIRRHOTIC PATIENTS BEFORE AND AFTER LIVER TRANSPLANTATION: THE RELATIONSHIP BETWEEN MALNUTRITION AND INFLAMMATORY SYNDROME

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**Objective:** Liver cirrhosis is associated with osteoporosis and liver transplantation (LT) with increased bone demineralization. This study aimed to investigate the relationship between BMD and bone matrix demineralization in transplant candidates with malnutrition, inflammatory syndrome and altered levels of stress hormones.

**Methods:** We included 100 patients diagnosed with cirrhosis who underwent LT between May 2019 and April 2020. BMD was assessed by osteodensitometry (DXA). Malnutrition has been defined through anthropometry and the assessment of recent weight loss. The hormone TSH, free triiodothyronine (T3), free thyroxine (T4) and growth hormone (GH), cortisol, free testosterone, estradiol, IL-6 and TNF were evaluated in 75/100 patients. Overall, 57/100 patients received LT and 47/100 were followed-up for one year after transplantation. At follow-up, nutritional status and BMD were assessed in all the patients (n=47), while 34/47 had blood samples available for analysis.

**Results:** Forty (40%) transplant candidates had osteopenia or osteoporosis and 38 (38%) were malnourished. Malnutrition was associated with osteopenia/osteoporosis (probability: 3.5, 95%CI 1.4, 9.9). The Z-score of the hip decreased by -0.25 (95%CI -0.41, -0.09) from the initial time of assessment to one year after transplantation. Initially high TNFα values correlated with a more pronounced decrease in BMD (partial correlation (r)=-0.47, p<0.05) as well as high levels of initial cortisol (r=-0.49, p<0.05).

**Conclusion:** Malnutrition in liver cirrhosis appears to be associated with osteopenia/osteoporosis, systemic inflammation (elevated TNF) and systemic stress (elevated plasma cortisol levels). LT improves the quality

of life of these patients but can increase the bone demineralization process in the medium term by increasing the release of stress hormones.

## P237

### OSTEOPOROSIS IN PATIENTS WITH HIP OSTEOARTHRITIS WHO WILL UNDERGO TOTAL HIP ARTHROPLASTY

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**Objective:** Both osteoarthritis and osteoporosis are relatively common diseases in women and their incidence increases with age. Total hip arthroplasty is a surgical procedure whose number is expected to double in the coming years.

**Methods:** In our study we included 43 patients, aged between 59-85 y, who were waiting to undergo total hip arthroplasty. None of the women were known to have been previously investigated for osteoporosis. We evaluated the patients by DXA of the lumbar spine and of the proximal femur bilateral.

**Results:** We found that 33% of patients had osteopenia, while 24% had osteoporosis. These composed the study group. We also found that BMD of the unaffected hip was lower than that of the hip awaiting surgery in 68% of cases. The other patients (43%), in which no changes of osteoporosis or osteopenia were revealed by osteodensitometry composed the control group. The analysis of the postoperative evolution showed an increase in the duration of hospitalization and recovery time for the patients from the study group compared to the control group.

**Conclusion:** Osteoporosis and osteoarthritis may be present at the same time and may have a disabling effect on gait. Assessing the degree of osteoporosis on the joint awaiting total hip arthroplasty is essential for the postoperative evolution and early recovery of patients.

## P238

### PREVALENCE AND CHARACTERISTICS OF BONE DAMAGE IN CIRRHOTIC PATIENTS BEING EVALUATED FOR LIVER TRANSPLANTATION

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**Objective:** We conducted a retrospective study to examine the prevalence of bone disease among patients with cirrhosis who were evaluated for liver transplantation.

**Methods:** We used dual energy bone osteodensitometry in the hip/femoral neck and lumbar spine. The associations of bone diseases with demographic and clinical data, disease etiology and liver function were studied by logistic regression analyzes. Osteopenia and osteoporosis were defined by the criteria of the WHO.

**Results:** We included in the study 66 patients (79% men, mean age of 53 y, range 21-69) of which 62.6% smokers and 23.7% diabetic subjects. The mean BM) was 28 kg/m$^2$. Liver disease was classified as Child-Pugh class A (22%), B (51%) or C (27%); the mean score for endstage liver disease (MELD) was 14.6. The etiology of the liver disease was alcohol (49%), hepatitis C virus (32%), hepatitis B virus (10%), primary biliary cirrhosis (PBC) (2.3%), secondary biliary cirrhosis (2%) or of other causes (4.7%). In total, 50 patients (72%) had bone diseases in the hip/femoral neck and/or in the lumbar spine: overall hip damage, 26% (osteopenia, 22%; osteoporosis, 4%); femoral neck, 48% (osteopenia, 43%; osteoporosis, 5%) and lumbar spine, 63% (osteopenia, 40%; osteoporosis, 23%). By adjusting the values of bone mineral density with age (Z-score) in relation to that defined by the T-score, we observed a decrease in the prevalence of

bone diseases both in the femoral neck (20% compared to 48%) and in the lumbar spine (44% vs. 63%).

**Conclusion:** Bone damage, especially in the lumbar spine, is common in patients with cirrhosis who are being evaluated for liver transplantation. Cirrhosis is a major risk factor for bone disease that remains even when bone density values are adjusted by age. Female gender, lower BMI and tobacco use are major risk factors for bone disease in patients with cirrhosis. Bone osteodensitometry should be included in the assessment of liver transplantation in all patients.

## P239

### COMPARATIVE STUDY OF THE EFFECTS OF CORTICOSTEROID THERAPY VS. BIOLOGICAL AGENTS ON BONE METABOLISM IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** The use of glucocorticoids in the long-term treatment of rheumatoid arthritis may cause possible side effects, including among others, the loss of BMD.

**Methods:** We studied the effects of the treatments used in rheumatoid arthritis on 32 patients, all women aged between 57-68 y, in the postmenopausal period. Half of the patients were treated with high-dose glucocorticoids (40 mg/gc), while the other 16 patients were given a combination of 10-15 mg/Kgc glucocorticoids and biological agents for the next 6 months.

**Results:** Following the 6 months of treatment, the patients were evaluated by DXA of the lumbar spine. The mean T-score for the patients treated with glucocorticoids alone was -2.3, with a maximum value of -2.8 and a minimum value of -2; while the mean T-score for patients treated with both glucocorticoids and biological agents was -2 with a maximum value of -2.4 and a minimum value of -1.4.

**Conclusion:** A lower dose of glucocorticoids in combination with biologic therapy correlates with a lower risk of osteoporosis and its complications.

## P240

### NUTRITIONAL SUPPORT AND PHYSICAL ACTIVITY IN POSTMENOPAUSAL WOMEN WITH OSTEOPENIA OR OSTEOPOROSIS

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**Objective:** In women aged between 40-79, the prevention of osteoporosis and its complications represents a goal of the highest importance. Lifestyle and diet can have a positive or negative effect on the disease.

**Methods:** 23 postmenopausal women with ages between 53-71 y were included in the study. Each patient was assessed by DXA of the lumbar spine. The results showed the lowest T-score of -2.9 and the highest T-score of -1.4 with a mean T-score of -2.1. After the evaluation, the patients were prescribed vitamin D supplements, and their diet was changed so that it contained an increased amount of calcium. The patients were also inducted in a 3 times/week physical exercise class. In addition, the patients were advised to maintain an ideal body weight, to quit smoking and, if necessary, to reduce alcohol intake. A control group was also composed, consisting of 23 patients age- and sex-matched with the study group in which osteoporosis was treated only with medication and dietary supplements, without physical treatment.

**Results:** After 3 months, the patients were reevaluated by DXA of the spine. It was found that the lowest T-score was now -2.8, while the highest T-score was now -1.2 with a mean T-score of -2 in the study group, compared to the control group in which the mean T-score found was -2.2.
**Conclusion:** Dietary control and lifestyle in postmenopausal women can reduce the risk of fractures, help treat osteoporosis, or may even help in preventing its onset. The association of physical exercise improves the T score and helps increase the quality of life of these patients.

## P241

### HYPOPHOSPHATEMIA – MORE OFTEN THAN BELIEVED: A SINGLE LABORATORY DATABASE 15 YEARS RESULTS FROM LATVIA

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**Objective:** A database analysis was conducted to assess phosphorus serum level status among adults in Latvia from E. Gulbja lab electronic database over the past 15 y. Hypophosphatemia may be the reason for different hypophosphatemic syndr.
**Methods:** Pts with hypophosphatemia in the E. Gulbja lab database retrospectively from January 2004 to December 2020 were identified. All hypophosphatemia levels (the reference range 0.80-1.60 mmol/L) was divided into 3 groups (Felsenfeld A et al., 2012) depending on serum phosphorus level – mild hypophosphatemia (0.81-0.65 mmol/L), moderate (0.65-0.32 mmol/L) and severe (<0.32 mmol/L). Also, serum calcium (Ca) (the reference range 2.1-2.6 mmol/L), vitamin D (30-100 ng/mL) and iPTH (12-72 pg/mL) were analyzed.
**Results:** A total of 3173 serum phosphorus samples were analyzed – 1760 females and 1413 males. Pts were, on average, 60.2±14.9SD yrs old. The average age of females – 60.4±15.0 SD yrs and males – 60.0 ±14.8 SD. The number of blood samples with reduced (<0.80 mmol/L) serum phosphorus level was 1803 (56.8%), were mild hypophosphatemia was 1414 (78.4%) were 767 females (54.2%), and 647 males (45.8%) with an average age was 60.0±14.7 SD yrs. Moderate hypophosphatemia were 381 (21.1%) were 206 females (54.1%), and 175 males (45.9%) with an average age was 56.6±15.7 SD yrs. Severe hypophosphatemia was 8 pts (0.5%) – 5 females, 3 males with the average age 56.1±16.4 SD yrs. A total of 1719 (95.3%) serum Ca levels were analyzed, where decreased were 84 (4.9%) and increased were 490 (28.5%). A total of 972 (53.9%) serum iPTH levels were analyzed for pts with hypophosphatemia, where decreases were 4 (0.4%) and increased were 610 (62.8%). A total of 456 (25.3%) serum vitamin D levels were analyzed in pts with hypophosphatemia, were decreased (<30 ng/mL) were 104 (22.8%) and increased (>10 0ng/mL) were 21 (4.6%).
**Conclusion:** Hypophosphatemia is more often than commonly believed. It needs to be examined for various reasons, e.g., hyperparathyroidism, vitamin D deficiency, hypophosphatemic syndr.: vitamin D-dependent rickets type 1-3, X-linked hypophosphatemia, gastrointestinal disorders. These data may facilitate research within all areas of genetic disorders of hypophosphatemia.

## P242

### MINERAL BONE DENSITY, TRABECULAR BONE SCORE AND FRAX® IN PEOPLE WITH DIABETES MELLITUS

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**Objective:** To study indicators of BMD and trabecular bone score (TBS) and to reveal the 10-y fracture risk (FRAX) taking into account the data obtained in persons with type 2 diabetes (DM2).
**Methods:** A clinical study of the type of case-control. The study included 122 people (19 men, 103 women) aged 45-69 y with and without DM2 (among women, only postmenopausal women were included). In the subgroup of people with DM2 were 64 (32 indicated a history of osteoporotic fracture (OF), 32 without a fracture), without diabetes were 58 (29 with OF, 29 without OF). All persons had questionnaire assessment of fracture factors on the FRAX score, anthropometry, DXA, determination of TBS and fracture risk on the FRAX. Statistical data processing using the SPSS program (v.13.0).
**Results:** Persons with DM2 who underwent a fracture had lower T-score values in the femoral neck on the right and left (p=0.047), unlike those with DM2, but without fracture.
However, persons with DM2 had a fracture at high values of T-score in vertebrae and hips in comparison with persons without DM. Using the TBS, we did not get a significant difference in any of the examined groups. The values of FRAX by T-score in the group of persons with DM with fractures were significantly lower (p=0.029 for major fractures, p=0.024 for hip fractures) than in persons without DM with fractures. Among women with DM2 and OF, the FRAX adjusted for TBS was significantly lower for major fractures (p=0.010) than FRAX calculated without DXA. We also found no differences in the risk of recurrent fractures among women with and without DM2 using FRAX without densitometry (p=0.094 for major fractures, p=0.058 for the hip) and FRAX adjusted for TBS.
**Conclusion:** The structure of the bone in diabetes remains unknown. There are conflicting data on the risk of fractures in people with DM2. Peoples with DM2 and fractures have higher BMD values, lower fracture risk according to FRAX corrected for the T-score, have no TBS value, which determines the complexity of diagnosis, search for additional methods for early diagnosis of an increased risk of fractures in patients with DM2.

## P243

### THE RISK OF OSTEOPOROTIC FOREARM FRACTURES IN SUBJECTS WITH DIABETES AND WITHOUT DIABETES IN THE SIBERIAN POPULATION

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**Objective:** An unexpected finding in the general structure of fractures in the Russian Federation was a higher frequency of the forearm fractures compared with other countries. The attention to the forearm fractures, as to osteoporotic fractures (OF), is important for ensuring early detection of individuals at increased risk of future fractures and taking preventive measures. This study aimed to study the frequency of the history of forearm fractures (FF) and their risk factors in patients with type 2 diabetes mellitus (DM2) and without diabetes aged over 50 y.
**Methods:** The cross-sectional study was based on a population cohort (the HAPIEE Project, Novosibirsk) examined at baseline in 2015-2017, in Novosibirsk, n=3878 men and women aged 58-84 y. The study included people who signed the informed consent to conduct the study, excluded individuals who wrote a waiver of taking blood to determine biochemical parameters. In total, the analysis included n=3393 people, 718 of them with DM2 (21.2%). The information was collected on OF over the past 3 y, the registration of sociodemographic data; and risk factors for OF, a study of biochemical blood parameters. The analysis of the association of DM2 and a complex of risk factors with a chance of a

FF was performed. DM was defined by fasting blood glucose ≥7.0 mmol/l (WHO, 1999) and/or history of treated DM. Statistical analysis was carried out by SPSS package (v.13.0).

**Results:** Among 3393 subjects there were 1388 men and 2005 women. The prevalence of FF in the last 3 y did not differ in patients with DM2 compared with those examined without diabetes and was 2.4% and 2.8%, respectively (p=0.557). Men with OF had higher cholesterol and HDL values, women had lower BMI compared with people without fractures. According to the results of a multivariate analysis in women, the chance of a FF is directly associated with smoking in the past, a total cholesterol level of more than 200 mg/dl and inversely associated with a BMI. In men, associations were found of the chance of a FF with an increase in the level of cholesterol. There was no evidence of DM2 with FF.

**Conclusion:** The associations were found between risk factors, such as smoking, hypercholesterolemia and BMI with the FF. The obtained data on the incidence of fractures and their association with risk factors indicate the need for preventive measures for OF, both in people with and without DM2.

## P244
### BODY COMPOSITION OF LONG-LIVING PATIENTS WITH CORONARY ARTERY DISEASE

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**Objective:** Very limited data are available on body composition of long-living patients with coronary artery disease (CAD), therefore, we evaluated body composition of long-living patients with CAD.

**Methods:** 200 hospitalized patients with CAD (females 69.3%, males 30.7%) aged 90-106 y were enrolled in this cross-sectional study. Body composition was assessed by DXA.

**Results:** 70.3% of patients were overweight or obese. Obesity was observed in 30.2% of patients; in 93.5% of them it was 1st degree obesity, 2nd degree was only in 6.5%, and 3rd degree was never met. The body weight deficit was found in only one patient (0.49%). Mean BMI was 27.6 (18.2-38.8) kg/m$^2$. Women had more fat mass then men: total fat 39.8% vs. 30.0% (p<0.0001), lower extremities fat 42.4% vs. 27.4% (p<0.0001). Mean total mass of lean tissue in women was 38.4 kg, and in men 48.8 kg (p<0.000001). The musculoskeletal index remained within the normal range in 77.2% and was below normal in 22.8% of patients. A decrease in the musculoskeletal index was observed in 22.9% of men and 19.1% of women (p=0.5). The mean total T-score was -1.75 SD. Decrease of total BMD (T-score) ≤ -2.5 SD was detected in 40%, and normal total T-score in 30.7% of patients. The greatest BMD was recorded in lumbar spine (1005.6±190.6 mg/cm$^3$), the lowest BMD in ribs (626.2±83.9 mg/cm$^3$). As expected, female patients had lower BMD in all parts of the body (p<0.0001). A significant positive correlation was found between BMD and the fat mass in all parts of the body (r=0.6; p<0.000001). A positive correlation was found between the lean mass and BMD (r=0.64; p<0.000001). A negative correlation was found between the fat and lean mass, in particular, in lower extremities (r=-0.47; p<0.000001). Muscle strength (according to dynamometry data) positively correlated with lean tissue content (r=0.55; p<0.000001). The content of lean tissue was positively correlated with the distance covered in the 6-min walk test (p=0.007).

**Conclusion:** Study results demonstrated some features of body composition in patients with CAD aged 90 years or older. The proportion of overweight patients with normal indices of BMD and lean mass was relatively high. Significant relationships between the bone, adipose and lean tissues were demonstrated.

## P245
### BONE MINERAL DENSITY AND METABOLISM IN VERY ELDERLY PATIENTS WITH CONGESTIVE HEART FAILURE

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**Objective:** There are few data available on the relationship of heart failure and osteoporosis among very elderly patients, therefore we investigated BMD and metabolism in very elderly patients with heart failure.

**Methods:** The study enrolled 125 patients (38 men, 87 women, aged 75-98 y) hospitalized with coronary artery disease (CAD). Study group comprised 61 patients with clinically significant CHF (NYHA FC III-IV), control group 64 CAD patients without CHF symptoms. Main exclusion criteria were any other diseases that could cause osteoporosis and administration of medications reducing BMD. Lumbar spine and proximal femur BMD was measured by DXA. Fracture risk was measured under FRAX model, and osteoporosis standard risk factors were analyzed. Osteocalcin concentration in the blood serum was measured by immunochemiluminescent method, and β-CrossLaps level (degradation products of collagen type I) by electrochemiluminescence.

**Results:** BMD in the CHF patients was lower (both in absolute values and by the T-score) vs. the control group (age-matched patients with similar main disease of CAD). Largest differences were recorded in proximal femur: BMD in the CHF patients was 719.8 ±188.2 mg/cm$^3$ vs. 797.7±161.7 mg/cm$^3$ (p=0.02) in the control group. Greater differences in BMD were detected in female patients (p=0.007). Femoral neck BMD in the CHF patients was 649.4±137.1 mg/cm$^3$ vs. 696.2±121.8 mg/cm$^3$ (p=0.03) in the control group. There were no significant differences found in lumbar vertebrae BMD between the groups (p=0.4). Proximal femur BMD had normal values only in 5% of the CHF patients, whilst normal BMD values in the control group were in 31% of cases (p=0.003). A similar trend was found for lumbar spine BMD, but these group differences did not achieve statistical significance (p=0.11). CHF impact on BMD was also confirmed during multiple regression analysis. It found that ultimate significant factors determining proximal femur BMD were CHF (β=-0.375, p=0.005) and female sex (β=0.698, p<0.0001). Reduced osteoblast function was observed in CHF patients: the mean osteocalcin level in the CHF patients was 1.2±1.7 ng/ml vs. 4.2±4.1 ng/ml (p=0.03) in the control group. In 60.6% of the CHF patients, osteocalcin concentration was below the lower limit of normal (p=0.02 vs. control). Also, mean β-CrossLaps level in the CHF patients reached 0.73±0.4 ng/ml vs. 0.4±0.1 ng/ml (p=0.003) in the control group. β-CrossLaps level was increased in 21.7% of the CHF patients, but no one had high β-CrossLaps values in the control group (p=0.03). There was negative correlation between β-CrossLaps concentration and BMD, especially in the proximal femur (r=-0.4, p=0.03). Negative correlation was found between TNFα level with its serum concentration higher in the CHF patients (p=0.04) and BMD, especially in the proximal femur (r=-0.9, p=0.03). In patients with decreased leptin concentration (found only in the CHF patients), BMD values were lower than in those with normal or increased serum leptin concentration (p=0.006 for the proximal femur).

**Conclusion:** These study findings suggest that BMD in very elderly CHF patients is noticeably lower vs. the patient group similar in age and main diseases. This study has demonstrated significantly reduced osteoblast function in CHF patients and slight increase in bone resorption. Further studies of bone tissue condition in CHF patients with large patient sample and research into mechanisms of relationship between osteoporosis and heart failure are reasonable.

## P246

### INCREASING THE DETECTION OF VERTEBRAL FRACTURES (VFS) USING AI ON CT PERFORMED FOR ALL CLINICAL INDICATIONS

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**Objective:** Despite their prognostic value, reporting of vertebral fractures (VFs) on routine imaging is commonly low. We report on the diagnostic accuracy and potential for clinical impact of software which detects VFs.
**Methods:** A convolutional neural network based VF detection tool was generated utilizing a training set of 1832 Computed tomography (CT) scans including compression fractures indexed according to the Genant classification as mild, moderate, and severe. Ground truth was established by three expert radiologists. Validation was performed on a novel dataset of 611 CT scans of the chest and abdomen/pelvis. To assess the potential for clinical impact, the software was applied to 76,069 anonymized CTs acquired from a USA based integrated health delivery system comprising 24 hospitals and 7 clinics. The threshold for a positive result was set at the presence of at least one moderate VF. Each corresponding CT report was evaluated by a combination of human and natural language processing for the reporting of vertebral compression fracture. 290 studies were randomly selected and reviewed by two expert radiologists to verify consistent algorithmic accuracy in this data set.
**Results:** On the validation dataset of 611 examinations, the software achieved an overall AUC of 0.95 with sensitivity 90.6% and specificity of 86.6% for the detection of VFs. VFs were noted in 4996 (6.6%) of 76,069 radiology reports; of these, 3167 were also detected algorithmically. VFs were detected by the software in a total of 11,890 (15.6%) CT examinations. Of the 290 CTs analyzed for consistent accuracy, results achieved a negative predictive value of 90.7% and positive predictive value of 58.2%. Of the 94 false positive cases, 72 (76.6%) comprised studies with mild compression fractures.
**Conclusion:** An automatic VF detection tool with high diagnostic accuracy demonstrates potential to substantially improve the current reporting gap for vertebral compression fractures, increasing the detected moderate-severe VFs by 138%.
Clinical relevance/application: Vertebral fractures are commonly underreported. A tool to increase reporting of vertebral fractures can potentially increase preventative interventions for subsequent major osteoporotic fractures.

## P247

### VITAMIN D STATUS IN BREAST CANCER PATIENTS UNDER HORMONE THERAPY

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**Objective:** Hormone therapy, particularly aromatase inhibitors, are the cause of a decrease of estrogens and their use is correlated with an increased risk of bone loss and fractures when they are used between 2-5 y. 25 (OH) vitamin D around 30 ng/ml is needed to prevent reactive hyperparathyroidism, bone loss and the resulting osteoporotic fractures. Some studies also seem to show a protective effect of vitamin D against breast and colorectal cancer. The purpose of this study is to assess the vitamin D status in patients followed for breast cancer and receiving hormone therapy, especially those under aromatase inhibitors.
**Methods:** Transversal and descriptive monocentric study conducted in the rheumatology department at Ibn Rochd University Hospital, in bone diseases unit. The patients included are those who are followed in oncology for breast cancer under hormone therapy and referred to rheumatology for an evaluation of the bone loss. Those who were under other anti-cancer treatments were excluded. All patients underwent a complete phospho-calcic and vitamin D explorations. Those with low vitamin D have received supplementation prior to performing a DXA. We included demographic data, those related to neoplastic disease, then the results of blood and urinary explorations. Vitamin D deficiency was defined by a 25 (OH) D level <10 ng/ml and an insufficiency when it was between 10-30 ng/ml.
**Results:** 188 patients under hormone therapy were recruited, 160 of whom were using aromatase inhibitors and only 28 on tamoxifen. The average age was 54.3 years old. The majority were postmenopausal (98%). The long-term use of corticosteroids we the only other risk factor for bone loss, noted in 13% of cases. 87% of patients had low vitamin D at the time of the consultation; 70% were in deficient. The mean value of vitamin D was at 19.35 ng/ml. The mean serum calcium was at 90.82 mg/l, mean calciuria was at 100.5 mg/24 h, mean serum phosphate was at 42.57 mg/l and PTH at 70.6 pg/ml (Table). The lack of vitamin D had been corrected. Treatment with bisphosphonates was associated with it for those with osteoporosis (T-Score <-2 SD).
**Conclusion:** A very large percentage of patients starting adjuvant aromatase inhibitors therapy have severe vitamin D insufficiency compared to women of the same age. Our results join those of the literature. This vitamin D insufficiency or deficiency are reversible, and studies are underway to analyze the effect of such substitution on bone loss and fracture risk in these patients under aromatase inhibitors. Several recent studies tend to show the potential role of low vitamin D levels in terms of increased risk of recurrence and death from breast cancer. For all these reasons, the evaluation of vitamin D and its supplementation are necessary and important in women with breast cancer treated with antiestrogens.

Table. Characteristics of the population and the results of vitamin D and phospho-calcic explorations

| | |
| --- | --- |
| Patients under hormone therapy (HTT) | 188 (94%) |
| Types of hormone therapy | |
| Aromatase inhibitors | 160 (85%) |
| Tamoxifen | 28 (15%) |
| Patients mean age | 54.3 y |
| Average age of breast cancer diagnosis | 56.12 y |
| Menopausal patients | 184 (98%) |
| Secondary menopause linked to HTT | 38% |
| Others risk factors of bone loss justifying specialized monitoring | |
| Long term use of corticosteroids | 13% |
| Metastatic cancer | 15.18% |
| Patients with low vitamin D : | |
| *vitamin D deficiency (<10 ng/ml ) | 164 (87%) 115 (70%) |
| *vitamin D insufficiency (10-30 ng/ml) | 49 (30%) |
| Mean value of 25(OH)vitamin D | 19.35 ng/ml |
| Mean calcemia | 90.82 mg/l |
| Mean calciuria | 100.5 mg/24-h |
| Mean serum phosphate | 42.57 mg/l |
| Mean PTH | 70.6 pg/ml |

## P248

### DIAGNOSIS AND TREATMENT OF MYOTONIC AND MYOFASCIAL SYNDROMES OF NECK PAIN

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**Objective:** The dynamic monitoring of 195 patients with myotonic and myofacial syndromes of neck pain was done against the control group of 45 people.

**Methods:** MRI of cervical and vertebrocranial areas of spinal column, electromyography of 7-9 relevant muscles, finding of the "key" muscle and the overall computer aided assessment of osteomuscular, cardiorespiratory and oxygen transport system disorders.

**Results:** Clinical and electromyographic criteria for diagnosis of myotonic and myofascial syndromes of neck pain were identified based on the occurrence rates. The role of major system disorders in pathogenesis of neurological manifests of neck pain was studied. New therapeutic approaches to stopping pain and myotonic syndromes were developed; the effectiveness of early rehabilitation measures was demonstrated. The prevailing myotonic syndromes were identified which were the musculus obliquus capitis inferior syndrome (in 68, or 39.4% patients); superscapular area syndrome (33% of patients); musculus scalenus anterior and musculus scalenus medius syndromes (18.9%); musculus pectoralis minor syndrome (9.7%). Hypodynamia caused system disorders were noted in 78.3% patients including excessive body mass and fat content; reduced blood circulation rate and heartbeat volume and the pronounced decrease of $PWC_{170}$. The most informative spondylographic findings were reduced thickness of posterior areas of intervertebral disks from CI to CVII (52.3 to 77.9% of patients), cervical lordosis impression (76.4%) and uncovertebral arthroses (58.2%).

**Conclusion:** The most seriously affected ("key") muscles in neck pain patients were found. Diagnosis and treatment strategies for neck pain patients were developed.

## P249
### SOME TECHNICAL MEANS OF REHABILITATION FOR PATIENTS WITH LOW BACK PAIN

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**Objective:** 78 patients with myotonic (MT) syndrome.

**Methods:** Patients went through the clinical estimation of neurologic status, manual testing of muscles, CT and MRI of back bone lumbar department, interferential and needle electromyography of the most damaged muscular groups, dosed loading veloergometry, revasography of feet, and shins.

**Results:** Medical rehabilitation complex on damaged extremity was approbated in 27 patients with MT syndrome. The complex included oral reception of katadolon (100 mg 3 times a day for 10 days), tractions on Fintrac-471 table (with force from 3-55 kg, a course of 8-10 sessions) and also acupuncture with use acupuncture points of general action with vascular autonomic nervous system orientation (G14, MJ6, E36, RP6, TR5, V40) and locally segmented points on the most damaged muscular groups (AT60, VB30 with deep introduction to piriform muscle; VB 34, VB41, F3).

**Conclusion:** After treatment damaged extremity pain has completely disappeared in 19 patients, pain essentially decreased and increased tolerance of physical activity in 6 patients. It is established that katadolon shows not only analgesic and neuroprotective, but also myorelaxing action on muscles of pelvic girdle and feet in patients with acute and chronic pain syndrome.

## P250
### CLINICAL AND IMMUNOLOGICAL DISORDERS IN MULTIPLE SCLEROSIS PATIENTS WITH THE PRESENCE OF FOOD ALLERGY

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**Objective:** 102 multiple sclerosis patients 19-33 years old were examined against the control group of 20 healthy people.

**Methods:** MRI and immunological studies.

**Results:** All patients on the level of IgE in blood serum of 20 basic food products are divided into four groups: the first (13 pers, 12.7%) with the absence of IgE in serum, second (29 pers, 28.5% ) with the presence of IgE (threshold 0.35-0.69 IU/ml); third (45 pers, 44.1%) with a moderate increase in IgE (0.70-3.49 IU/ml); fourth (15 pers, 14.7%) with a significant increase in IgE (3.50-17.49 IU/ml) in serum. Patients first group without clinical signs of apparent exacerbation of MS were observed in blood eosinophilia, and the brain MRI revealed hyperintense foci in a single T-2W mode, indicating the absence of active demyelinating process. Patients with the second group with a slow chronic course of MS were determined by individual eosinophils (18.1%), indicating that they have a weak allergic reaction. Identification of individual hypo- and hyperintense lesions on brain MRI evidence of chronic course of demyelinating process in the presence of rare clinical exacerbations was seen by us as secondary progressive MS. In the third group investigated the apparent worsening of the process of clinical signs detected a moderate increase in serum IgE (45 pers, 44.1%) in the presence of explicit eosinophilia (11.8%).

**Conclusion:** Markers of exacerbation of MS is the simultaneous moderate increase in serum IgE eosinophilia, and the appearance of new lesions on MRI gipointensivnyh brain.

## P251
### THE LONG TERM RESULTS OF TREATMENT AND REHABILITATION OF MULTIPLE SCLEROSIS PATIENTS

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**Objective:** Long term results of treatment of multiple sclerosis were studied.

**Methods:** The dynamic monitoring of 110 patients over the period of 1-1.5 y following the successful in-hospital treatment of MS was carried out. Clinical methods, CT and MRI of cerebrum and spinal cord, and a patented radioimmunobiological assay of the myelinotoxic activity (MTA) of blood serum were used.

**Results:** Four groups of patients were distinguished: group 1 (36 patients; 32.7%) had patients with low MTA level (4.56*0.7 units) after successful hormone therapy. No rehabilitation was required out afterwards. Group 2 included 41 patients (37.3%) with low MTA level (3.76*0.81) after hormone and corrector therapy; a rehabilitation course was carried out at a later stage. Group 3 consisted of 22 patients (20.0%) that required long term immunomodulating therapy due to a higher rate of demyelinisation (MTA=19.2*0.43). The remaining 11 patients (group 4, 10.0%) with moderate rate of demyelinisation (16.4*0.52) were prescribed general health improvement therapy and rehabilitation based on intensive motional activity and physical exercise.

**Conclusion:** Hormone therapy helps to reduce the demyelinisation rate to acceptable level within 2-4 months. The subsequent rehabilitation helps to achieve the extended remission period. However, long time after treatment of acute MS the hormone therapy is not justified.

## P252
### USE OF MRI AND MTA ASSAY OF BLOOD SERUM FOR DIAGNOSIS OF INITIAL PHASE OF MULTIPLE SCLEROSIS

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**Methods:** MRI of cerebrum and spinal cord and a patented method for measuring the myelinotoxic activity (MTA) of blood serum and spinal fluid were used. 75 initial MS patients 16-35 years old were examined.

**Results:** Monosymptomatic start of MS was found in 46 (61.3%) patients, and polysymptomatic MS in 29 (38.7%) patients. MRI of cerebrum and spinal cord revealed focal points of decreasing T-1W / increasing T-2W signal in 50 (70.7%) of examined patients. Therefore, the diagnostic importance of MRI of cerebrum and spinal fluid at the initial phase of MS is not very high. Two groups of patients were distinguished on the basis of MTA measurements. Group 1 included 46 monosymptomatic patients with slightly increased MTA of blood serum (9.8±1.3 units compared to 3.9±0.82 in control group) and spinal fluid (11.2±1.2 units compared to 5.9±1.4 in control group). Group 2 consisted of patients with polysymptomatic course of MS. Clear increase in MTA level (18.9±0.92 for blood serum and 23.4±0.7 for spinal fluid) compared to both control group and group 1 was noted.

**Conclusion:** The diagnostic importance of MRI of cerebrum is not high at the initial stage of MS. However, MRI in combination with MTA assay of blood serum greatly helps to reveal the initial MS in vast majority of cases.

## P253

### CANDIDA PERIPROSTHETIC JOINT INFECTION: SIGNIFICANT DIFFERENCES BETWEEN ALBICANS AND NON-ALBICANS GROUP

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**Objectives:** Approximately 1% of all periprosthetic joint infections (PJI) are caused by fungal microorganisms. Previous systematic analyses have focused on the impact of treatment rather than the role of the causative fungal agent itself, and there is lack of knowledge on Candida strain-dependent patient characteristics and clinical outcome. For that reason, it was the goal of the present study to compare Candida albicans and non-albicans PJI concerning patient characteristics, diagnosis, treatment and outcome.

**Methods:** Inclusion criteria were: (1) Candida PJI, (2) of a THA or TKA, (3) treated in our department between the years 2010-2018. All patients were regularly invited to our specialized outpatient clinic for follow-up examinations after treatment (6-12 weeks postoperatively and thereafter half-annually). In addition, all included patients were prospectively followed up at the end of the present study. A PJI was defined according to IDSA, a reinfection according to the modified Delphi Consensus criteria. Statistical analysis was performed using t-test, chi-square test with Yates correction, and log rank test for reinfection rate.

**Results:** Besides age and the affected joint, no significant differences were found between albicans and non-albicans strains. However, the reinfection rate was significantly higher in patients with Candida albicans PJI compared to non-albicans Candida PJI (Table).

**Conclusion:** To the authors best knowledge, this is the first study to compare albicans to non-albicans Candida PJI. While age and affected joint might play a confounding role, we speculate the causative Candida sub strain to play a decisive role in disease progression.

Table. PJI characteristics

| | Candia albicans PJI | non-albicans Candida PJI | p |
|---|---|---|---|
| Count [n] | 17 | 12 | - |
| Gender distribution [n] | 5 males; 12 females | 8 males; 4 females | 0.108 |
| Age [y] | 75.83±7.29 | 64.11±15.71 | 0.012 |
| Follow-up time [months] | 26.70±33.48 | 42.01±30.95 | 0.223 |
| Affected joint [n] | hip: 12; knee: 5 | hip: 2; knee: 10 | 0.013 |
| CCI | 5.88±2.00 | 4.67±2.10 | 0.126 |
| CRP [mg/L] | 66.85±72.53 | 30.33±28.88 | 0.111 |
| Additional bacterial infection [%] (n) | 76.47% (13) | 75.00% (9) | - |
| Reinfection [%] (n) | 52.9% (9) | 16.6% (2) | 0.044 |

## P254

### INTRAVENOUS ZOLEDRONATE FOR POSTMENOPAUSAL OSTEOPOROSIS: SYSTEMATIC REVIEW AND META-ANALYSIS

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**Objective:** Osteoporosis compromises bone strength and increases fracture risk. Fractures are responsible for high morbidity leading to low quality of life and high mortality. Zoledronate inhibits the activity of osteoclasts, preventing loss of bone mass and reducing risk of fractures. This study aimed to determine the efficacy and safety of zoledronate therapy for preventing and treating postmenopausal osteoporosis.

**Methods:** We searched CENTRAL, MEDLINE, Embase, LILACS, four trial registers, two conference abstract books and the bibliographies of included studies until May 2020. Selection criteria: We included all randomised controlled trials (at least one year long) comparing zoledronate with placebo or other bisphosphonates in postmenopausal women. Data collection and analysis: We used standard methodological procedures expected by Cochrane reviews. Two review authors independently assessed risk of bias and extracted data about efficacy and safety.

**Results**: We included in this review 13 trials with 12,871 participants. Nine trials accounted for 10,068 osteoporotic women (5 studies compared zoledronate with placebo; one investigated different doses and frequencies of zoledronate vs. placebo; 2 compared zoledronate with alendronate; and one assessed zoledronate vs. ibandronate). Four trials accounted for 2803 osteopenic women (2 studies compared different doses and frequencies of zoledronate with placebo; and other 2 assessed different frequencies of zoledronate vs. placebo, with a long follow-up period). Trials size varied from 50-7765 participants. Participants mean age ranged from 54-73 y. We rated seven studies at unclear or high risk of bias for at least 2 domains, and 4 at low risk of bias for all domains. The most common sources of bias were no description of random sequence generation and allocation concealment, and lack of blinding of participants and personnel. Based on one study comparing zoledronate 5 mg yearly with placebo for osteoporotic women during a 3-y period: the rate of morphometric vertebral fracture is 33 women per 1000 in the zoledronate group (range 26-41) and 109/1000 in the control group (absolute difference of 7.6% fewer events (8.3% fewer to 6.8% fewer) (high certainty evidence)); the rate of nonvertebral fracture is 79 women per 1000 in the zoledronate group (range 68-94) compared with 106/1000 in the control group (absolute difference of 2.6% fewer events (3.8% fewer to 1.2% fewer) (moderate certainty evidence; downgraded for imprecision)); the rate of hip fracture is 14 women per 1000 in the zoledronate group (range 10- 20) and 23/1000 in the control group (absolute difference of 0.9% fewer events (1.3% fewer to 0.3% fewer) (moderate-certainty evidence; downgraded for imprecision)); the rate of

cardiovascular event is 57 women per 1000 in the zoledronate group (range 47-68) and 53/1000 in the control group (absolute difference of 0.3% more events (0.6% fewer to 1.5% more) (moderate certainty evidence; downgraded for imprecision)); the mean percentage difference in CTX is 63.16% lower (51.44% lower to 74.88% lower) with zoledronate and 13.99% higher with placebo (moderate certainty evidence; downgraded for imprecision); the mean percentage difference in BMD is at lumbar spine, 6.67% higher (5.34% higher to 8% higher) with zoledronate and 0.27% lower with placebo; and at total hip, 6.07% higher (5.91% higher to 6.23% higher) with zoledronate and 1.88% lower with placebo (high certainty evidence). Based on one study comparing zoledronate 5 mg each 18 months with placebo for osteopenic women during a 6-y period: the rate of morphometric vertebral fracture is 25 women per 1000 in the zoledronate group (range 16-39) and 64/1000 in the control group (absolute difference of 3.9% fewer events (4.8% fewer to 2.5% fewer) (moderate certainty evidence; downgraded for imprecision)); the rate of nonvertebral fragility fracture is 108 women per 1000 in the zoledronate group (range 87-135) and 178/1000 in the control group (absolute difference of 6.9% fewer events (9.1% fewer to 4.3% fewer) (moderate certainty evidence; downgraded for imprecision)); the rate of hip fracture is 8 women per 1000 in the zoledronate group (range 3-19) and 12/1000 in the control group (absolute difference of 0.4% fewer events (0.9% fewer to 0.7% more) (moderate certainty evidence; downgraded for imprecision)); the rate of cardiovascular event is 118 women per 1000 in the zoledronate group (range 93-150) and 128/1000 in the control group (absolute difference of 1% fewer events (3.5% fewer to 2.2% more) (moderate certainty evidence; downgraded for imprecision)); the mean percentage difference in CTX is 58.3% lower (56.96 to 59.64% lower) with zoledronate and 10.2% higher with placebo (high certainty evidence); the mean percentage difference in BMD is: at lumbar spine, 8.46% higher (8.43% higher to 8.49% higher) with zoledronate and 1.14% lower with placebo; and at total hip, 7.44% higher (7.42% higher to 7.46% higher) with zoledronate and 3.97% lower with placebo (high certainty evidence).

Conclusion: Moderate to high certainty evidence indicates zoledronate is efficacious and safe during a 3-y period (5 mg yearly) for osteoporotic women and a 6-y period (5 mg each 18 months) for osteopenic women. Evidence supports the action of zoledronate lasts for more than 12 months, increasing bone mass and reducing bone markers. This might justify carrying out studies for osteoporotic women with longer intervals and large number of participants to evaluate reduction in number of fractures. The toxicity profile of zoledronate appears acceptable, with frequent nonserious transient adverse effects.

## P255
### DXA UNITS SPECIFIC CHARACTERISTICS ANALYSIS: RESULTS FROM LAST 5 YEARS IN LATVIA

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Objective: Osteoporosis (OP) is a bone disease that occurs when the body loses too much bone, makes too little bone, or both. As a result, bones become weak and may cause low energy trauma fractures, leading to severe disability and death. In 2019, there were 6762 unique pts with femoral prosthesis and osteosynthesis surgery registered in Latvia. In 2019, 21,615 pts received reimbursement drugs for the treatment of osteoporosis. DXA has an essential role in evaluating individuals at risk of OP and helping clinicians advise pts about the appropriate antifracture treatment. The main aim of this study was to analyse the specific characteristics of each DXA units/cabinet during the 5 y and the availability of diagnostic units for OP and osteopenia diagnosis in different parts of Latvia.

Methods: In 2009 Latvian Osteoporosis and Bone Metabolic Disease Association made a united register for all Latvia's DXA and QCT units. The annual characteristics of the DXA units are analysed each year at the particular Association and medical staff Conference, which was based on the EU OP Consultation Panel Questionnaire (2008) 6 questions (modified). For the last 5 y starting from 2016, data have been collected and analysed in this cross-sectional study.

Results: As of 2020 and 2021, there is a total of 24 DXA units in Latvia. 12 DXA units are located in the capital city Riga, and 12 are located in different regional cities. IOF has recommended a DXA unit count of 10.6 per 1 million citizens, which Latvia fulfils with 24 DXA units per 1.93 million citizens. Despite a steady increase of DXA units from the 1st DXA unit in 1989, 17 units in 2009 to 24 DXA units in 2020/2021, the amount of DXA scans carried out decreased from 27,864 scans in 2016 to 26,884 scans in 2020. The number of pts diagnosed with OP had dropped from 11,376 pts in 2016 to 10,288 pts in 2020. The waiting time has increased from 17.6 days in 2016 to 17.5 days in 2020.

Conclusion: We conclude that for the last 5 yrs, DXA scans have decreased, and the number of pts diagnosed OP has reduced. Further data collection is needed. It is necessary to reduce the increasing waiting time for DXA. There is also a need to educate patients and GP, medical staff about OP.

## P256
### SEVERE OSTEOPOROSIS: PANDEMIC PICK UPS

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Objective: During COVID-19 pandemic, the access to skeleton investigations for osteoporosis was in many cases postponed, thus consequences on fracture risk (FR) might be expected in terms of not continuing the antiosteoporotic medication or not initiating it if needed. Reduced physical activity might reduce the risk of fall, on one hand, but associated sarcopenia and inhibition of bone formation due to lack of physical exercise increase the FR, on the other hand (1-5). This is a case report of a female with severe osteoporosis who delayed the presentation for diagnostic during first 15 months of pandemic.

Case report: This is a 73-year-old female, known with a history of osteoporosis since 2005. She also associates FR: chronic therapy with different SSRIs for depression, multinodular goiter-related hyperthyroidism (which was treated with radioiodine therapy). She has chronic therapy for arteria hypertension, hyperlipemia and hiatal hernia. At diagnostic, after initial lumbar T-score=-3.5 SD, she refused therapy until 2015 (when T-score decreased to -4 SD), thus she began therapy with intravenous ibandronate until 2017 when she experienced a vertebral fracture and daily 20 μg of teriparatide was initiated, starting from a DXA-BMD of 0.783 g/cm$^2$, T-score of 3.1 SD. After 8 months, the treatment was stopped because of her lack of compliance, so she continued with annual zolendronic acid 5 mg until of T-score of -2.6 SD, BMD=0.856 g/cm$^2$. In March 2020, when lockdown pandemic were initiated, she had to come to reassessment, but delayed it, and refused medication based on telemedicine recommendations, except for daily 1000 UI vitamin D. 14 months later, central DXA showed lumbar L1-3 BMD of 0.824 g/cm$^2$, T-score of -2.9 SD, Z-score of -0.7 SD, hip BMD of 0.682 g/cm$^2$, T-score of -2.6 SD, Z-score of -0.4 SD; 25-hydroxyvitamin D of 29 ng/mL, PTH of 55 pg/mL, suppressed CrossLaps of 0.287 ng/mL (normal: 0.33-0.782 ng/mL), osteocalcin of 17 ng/mL (normal: 15-46 ng/mL), P1NP of 27 pg/mL (normal: 15-45 pg/mL); an additional T4 thoracic fracture. Zolendronic acid was further recommended.

**Conclusion:** During pandemic lockdown, the usual serial assays and decision of therapy were less adequate based on telemedicine.

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## P257

### AGE-RELATED MUSCLE STRENGTH DECLINE IN EAST AND WEST: OBSERVATIONS FROM TWO HARMONISED COMMUNITY DWELLING COHORTS IN UK AND JAPAN

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**Objective:** Age-related decline in muscle strength is associated with clinical outcomes including disability and increased mortality. However, no previous study has compared its prevalence, demographic and lifestyle associates, in comparable populations in different geographic regions. Here we (1) consider the prevalence of this condition in harmonised UK and Japan population based cohorts of older community dwelling adults, and (2) report lifestyle associations with the condition.

**Methods:** UK study participants (1572 men; 1415 women) were recruited from the Hertfordshire Cohort Study, a cohort study of community-dwelling adults. Japanese participants (520 men; 1028 women) were recruited from the ROAD study, a study of community dwelling Japanese adults. Lifestyle questionnaire data from the two cohorts were harmonised. Age-related muscle strength decline was measured in both studies using a dynamometer, with low values classified as grip strength of <30 kg in men and <20 kg in women.

**Results:** The median age of UK participants was 65.8 (IQR 63.5-67.8) years in men and 66.5 (IQR 64.5-68.7) years in women, while in Japan this was 68 (IQR 58-76) years in men and 67 (57-74) years in women. The prevalence of age-related muscle strength decline in the UK was 3.0% in men and 10.3% in women, higher than Japan (11.5% men and 16.1% women). In both cohorts, women were at greater risk of muscle strength decline (UK: OR 3.73, 95%CI 2.66,5.23, p<0.001; Japan: OR 1.47, 95%CI 1.07-2.01, p=0.02), while greater height was protective (p<0.001). Smoking was not associated with muscle strength decline in either cohort, though drinking alcohol was protective in Japanese women (OR 0.60, 95%CI 0.38-0.95, p=0.03). Age at leaving education was a predictor of age-related muscle strength decline in both cohorts, particularly in Japan, where more time spent in education was protective in both genders (p<0.001); in the UK, this was significant in women only (p=0.01).

**Conclusion:** Despite a different prevalence of age-related muscle strength decline in comparable cohorts based in UK and Japan, the anthropometric and lifestyle determinants of the condition were very similar. These findings suggest that a global approach to prevention may be appropriate.

## P258

### LIFESTYLE AND PHYSICAL WORKLOAD AS RISK FACTORS FOR KNEE OSTEOARTHRITIS: CLINIC-BASED CASE-CONTROL STUDY

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**Objective:** To examine possible relationships between age, "lifestyle-modifiable factors" (BMI, tobacco smoking, sports), and symptomatic knee osteoarthritis in a clinic-based case–control study. Additionally, the study aims to investigate the mode of interaction between BMI and physical workload with respect to the risk of symptomatic knee osteoarthritis.

**Methods:** In five orthopedic clinics and five practices, 87 male patients aged 25-70 with radiographically confirmed knee osteoarthritis associated with chronic complaints were recruited. The control group comprised 261 male control subjects. In a structured personal interview, body weight at different ages, body height, cumulative amount of smoking, and cumulative duration of different sports activities until the date of first diagnosis of knee osteoarthritis were elicited. Adjusted odds ratios (ORs) and 95%CIs were calculated using unconditional logistic regression analysis. Analyses were performed using R studio version 3.6.1.

**Results:** Age and overweight were strongly associated with the diagnosis of knee osteoarthritis. Compared with people less than 35 years old, those who were at least 65 years old had an OR of 16.3 (95%CI 6.1-58.7) for knee osteoarthritis. Patients with BMI ≥28.41 kg/m$^2$ had a strongly elevated risk of knee osteoarthritis (OR 9.6; 95%CI 4.5-24.2) compared to those with a BMI <22.86 kg/m$^2$. Alternatively, heavy tobacco smoking (≥10 pack/week) was associated with a decreased knee osteoarthritis risk in comparison with never-smoking (OR 0.2; 95%CI 0.1-0.5). Ball games (handball, volleyball, etc.) and cycling were associated with symptomatic knee osteoarthritis (OR 3.1; 95%CI 1.2-7.3 and OR 3.7; 95%CI 1.6-8.6 in the highest category of cumulative duration, respectively); to a weaker degree jogging, swimming, and soccer also were positively related to symptomatic knee osteoarthritis. Combining the two parameters, BMI and kneeling/squatting into one variable led to a multiplicative interaction mode for symptomatic knee osteoarthritis. For persons with elevated BMI in combination with moderate to high exposure to occupational kneeling/squatting, the attributable risk was 5.1%.

**Conclusion:** In accordance with the literature, we find a strong association between BMI and knee osteoarthritis risk. Considering the relatively high prevalence of occupational manual materials handling, prevention of knee osteoarthritis should not only focus on body weight reduction, but should also take into account work organizational measures particularly aiming to reduce occupational lifting and carrying of loads.

## P259

### EFFICACY OF THE THROMBOCYTE DERIVED PRODUCT IN KNEE PTOA TREATMENT

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**Objective:** At the absence of confirmed evidence based efficacy of the OA pharmacologic treatment and rather high prevalence of post-traumatic OA (PTOA), particularly of the knee, the development of new approaches for the PTOA treatment is needed. This study aimed to study efficacy and safety of the platelet autologous plasma (PAP) comparing to standard treatment in young patients with symptomatic knee PTOA.

**Methods:** Study included 62 patients (mean age 38.29±3.51 y) with established symptomatic knee PTOA (mean time from trauma: 46.87 ±2.09 months), I-II stages (X-ray). Patients with prominent known primary OA risk factors (obesity, metabolic diseases), after knee surgery, with other arthritis or any other uncontrolled diseases and disorders were not included in the study. All patients consented to participate in the study and were divided into 2 groups: Gr.1 received standard treatment (NSAIDs, exercises, multimodal physiotherapy), Gr.2 received the course of 3 intra-articular injections of PAP in addition to the standard treatment.

**Results:** During early observation period (first 2 weeks) all patients with PTOA demonstrated significant improvement in pain and functional activity, comparing to baseline values but patients from Gr.2 demonstrated better daily living activities and better points in KOOS sport and recreation subscales. In 4 weeks the difference between groups were more prominent, with better results of treatment in group treated with PAP. Later, during the late observation period, second group still demonstrated better outcomes (both comparing to the baseline and to the first group), while Gr.1 patients partly returned to the baseline levels; after 3-6 months one-third of Gr.1 patients experienced 1-2 OA exacerbations, accompanied by repeated NSADs use; in Gr.2 only 6.45% of patients has had 1 OA exacerbation (p<0.05). During next 12 months of supervision the majority of Gr.2 patients still had better knee functional capacity and less pain comparing to the baseline, while Gr.1 patients showed no significant difference with baseline in all KOOS parameters. No significant complications were observed during PAP use, except of temporary local pain at the injection site.

**Conclusion:** Use of the PAP intraarticular injections in addition to the standard PTOA treatment improves both early and late results of treatment, decreases the number of OA exacerbations and need in NSAIDs use during 12 months after treatment.

## P260
### OSTEOSARCOPENIA AND TYPE 2 DIABETES MELLITUS: A CASE-CONTROL STUDY
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**Objective**: Osteosarcopenia has been defined as the coexistence of low bone density (osteopenia/osteoporosis) and sarcopenia. Osteoporosis is characterized by alterations in bone microarchitecture and decreased BMD resulting in an increased risk of fractures, whereas sarcopenia is the progressive decrease of both muscle mass and function that increases the risk of falls. Type 2 diabetes mellitus (T2DM) is associated with poor bone strength and muscle wasting, although the risk of osteosarcopenia in patients with T2DM is not known so far. The aim of this study is to investigate the association between osteosarcopenia and T2DM in postmenopausal women (PMW).

**Methods:** PMW referring to our outpatient service of Physical & Rehabilitation Medicine for the management of metabolic bone disorders were enrolled. For all patients, DXA scans to measure bone density and body composition parameters were performed. DXA-derived outcome measures were femoral neck and lumbar spine BMD T-scores, and appendicular lean mass. We also measured hand grip strength and the Short Physical Performance Battery (SPPB) score to assess muscle strength and physical performance, respectively. Levels of physical activity were assessed according to the International Physical Activity Questionnaire. Data were analyzed to calculate between-group differences for the outcomes investigated.

**Results:** 36 PMW (12 T2DM, cases, and 24 non-T2DM, age-matched controls) were enrolled. Patients with T2DM showed a higher risk of osteosarcopenia compared to controls (OR 5.0, 95%CI 1.05-23.79, p=0.043). Moreover, hand grip strength was significantly lower in T2DM group (10.09±4.02 kg vs. 18.40±6.83 kg; p=0.001). However, T2DM patients did not show a significantly higher risk of severe osteosarcopenia (osteosarcopenia combined with poor physical performance, SPPB <8; OR 5.0, 95%CI 0.94-26.49) compared to the control group.

**Conclusion:** PMW affected by T2DM are at higher risk of osteosarcopenia vs. nondiabetic patients. Further research on a large cohort is required to improve knowledge about the association between osteosarcopenia and diabetes.

## P261
### TRABECULAR BONE SCORE IDENTIFIES EARLY BONE INVOLVEMENT IN PATIENTS WITH MULTIPLE SCLEROSIS: A CASE-CONTROL STUDY
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**Objective:** To investigate bone involvement in patients with multiple sclerosis (MS), particularly looking for instrumental parameters of early bone damage.

**Methods:** We enrolled MS patients with mild disability (EDSS $\leq$3.5) and as control group patients referred to our outpatient service of Physical and & Medicine for the management of metabolic bone diseases. We assessed BMD at total body-less head (TBLH), femoral neck (FN) and lumbar spine (L1-L4) using DXA (GE Lunar) and trabecular bone score (TBS) and evaluated muscle performance using the Short Physical Performance Battery (SPPB). Based on SPPB scores, we identified two groups among MS patients: group A, "poor performance" (SPPB score $\leq$8) and group B, "high performance" (SPPB score>8). Finally, we performed a statistical analysis to investigate the differences in qualitative and quantitative bone parameters across each group.

**Results:** We included 13 MS patients, mean aged 57.35±7.96 y and 13 age-matched controls, mean aged 57.62±7.51 y. In the MS group, DXA examination showed the following results: TBLH BMD = 1.114±0.20 g/cm$^2$, T-score = -0.30±1.25 SD, Z-score = -0.13±0.99 SD; L1-L4 BMD = 1.126±0.14 g/cm$^2$, T-score = -0.56±1.19 SD, Z-score = -0.06±1.27 SD; FN BMD=0.865±0.134 g/cm$^2$, T-score = -1.19±0.95 SD, Z-score = -0.39 ±0.93 SD. In the control group DXA examination revealed: TBLH BMD = 1.206±0.34 g/cm$^2$, T-score = 0.369±1.32 SD, Z-score = 0.90±1.11 SD; L1-L4 BMD = 1.18±0.28 g/cm$^2$, T-score = -0.09±2.17 SD, Z-score = 0.65±1.98 SD; FN BMD=0.96±0.20 g/cm$^2$, T-score = -0.40±1.43 SD, Z-score = 0.39±1.21 SD. The mean TBS was 1.222±0.83 in MS group, with degraded (TBS <1.2) or partially degraded (1.2<TBS>1.350) microarchitecture in 11 patients while mean TBS was 1.350±0.09 in the control group (6 patients with 1.2<TBS>1.350). We found statistically significant between-group differences for TBS and SPPB (p<0.001). In the MS group, not statistically significant difference was reported for TBS between patients with poor physical performance and those with high physical performance.

**Conclusion:** In MS patients with mild disability, TBS could be useful for early identification of bone involvement. Altered bone microarchitecture might be influenced by inflammatory milieu of MS itself rather than impaired physical performance in affected patients.

## P262
### DIGITAL OSTEOARTHRITIS AND PREDICTING SEVERITY FACTORS
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**Objective:** Hand osteoarthritis (OA) is one of the most common localizations of OA affecting mainly women. The etiology appears to be multifactorial and the disease heterogeneous, comprising several clinical, radiological and ultrasound subsets. Erosive digital OA is most often painful, has inflammatory signs, causes functional impairment and has a more unfavorable course than that of nonerosive osteoarthritis of the hand. The objective of our study is to determine the clinical profile of patients with digital OA (DOA) as well as the predictive factors associated with the severity of this pathology.

**Methods:** We performed a trans-sectional descriptive study of 38 patients with DOA meeting the criteria for ACR. SPSS.20 Software was performed to data analysis.

**Results:** There were 38 patients: 84% women and 16% men, mean age 61 y. The BMI was 24 kg/m$^2$, 47.36% had had a manual profession, 50% had ≥1 comorbidity, 21.05% hypercholesterolemia, 39.47% osteoporosis, and 29% associated thyroiditis. 28.12% of the women were in perimenopause and 9.37% had a history of hysterectomy. Pain visual analog scale (VAS) was 3.47/10, Dreiser's score was 7.87, CRP was 5 mg/L. Regarding the evaluation of quality of life, the SF-36 was 61.47/100, the AIMS score was respectively 1.84 for social activity, 2.34 for pain, 1.34 for depression, and 3.63 for physical activity. Knee and/or hip OA was associated in 92.10% and 44.43% of cases. 66% had reported the presence of finger nodules in the mother in family history. The injury was more severe on the side of the dominant hand in 39.47% of cases. 60.52% of patients presented Heberden's nodules, 34.21% of Bouchard's nodules, 63.15% an adductus inch and 13.15% an inch in "M" deformation. Metacarpophalangeal, proximal interphalangeal, distal interphalangeal and trapeziometacarpal were found respectively: clinically in 24%, 58%, 87% and 76% of cases, in 10.5%, 37%, 68% and 82% after X-ray analysis and in 8%, 37%, 74% and 92% after ultrasound examination. Regarding the "erosive" DOA, 79% of patients presented at least one clinical and/or imaging criterion suggesting an erosive form. 7.89% of patients had stiffness, 13.15% erythema, 34.21% swelling and 60.52% paresthesias. On the hands X-ray: 7.89% had a "gull-wing" appearance, 78.94% presented with pinching and 2.63% with ankylosis of the joint space. 28.94% had appearance of erosion/reconstruction on ultrasound. Regarding therapy, 66% had taken analgesics, 21% of NSAIDs, 68% used topical balms, 37% an OA drugs and 18% a hand orthosis. Age ≥60 y, BMI ≥24, presence knee and/or hip OA (overweight/osteophyte correlation was 36.84%), the presence of nodules, comorbidities, thyroiditis, osteoporosis, history of hysterectomy and Dreiser score were correlated with DOA severity. Whereas, perimenopause, manual occupation, VAS pain, CRP and quality of life score outcomes were not significant for seriousness of this impairment.

**Conclusion:** DOA is a very heterogeneous degenerative disease. The main difficulty lies in identifying the predictive factors of an evolution towards a severe erosive form leading to a significant degree of disability and altering the quality of life. To date, the treatments remain unsatisfactory, the place of DMARDs remains to be defined in this pathology.

## P263
### MYOGENIC AND STRESS FACTORS ARE DIFFERENTIALLY EXPRESSED IN SKELETAL MUSCLE OF OLDER ADULTS WITH LOW MUSCLE STRENGTH

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**Objective:** Sarcopenia is a growing concern in the ageing population. This study aimed to compare protein expression profiles relevant in the context of muscle ageing, such as myogenic, catabolic and stress-related pathways between older adults with low compared to preserved muscle strength.

**Methods:** Through biopsies of the m. vastus lateralis, muscle protein expression profiles from 11 older adults that exhibited low muscle strength (6♀ and 5♂) were compared with the profiles of 13 older adults with preserved muscle strength (8♀ and 5♂), using western blotting technique. Low muscle strength was defined according to EWGSOP2 sarcopenia diagnostic criteria, e.g., chair stand test >15 s or grip strength <27 kg (male) or <16 kg (females).

**Results:** The low strength group was older (mean±SD; 78.0±5.0 vs. 71.5 ±2.6 y; p<0.001), but weight (75.6±4.6 vs. 72.8±2.9 kg; p=0.617) and BMI (26.7±2.5 vs. 27.2±6.0 kg/m²; p=0.782) were not different from the preserved strength group. Performance significantly differed between the low vs. preserved strength group for the chair stand test (17.5±4.9 vs. 9.1 ±1.5 s; p<0.01), gait speed (1.0±0.2 vs. 1.4±0.1 m/s; p<0.001) and SPPB test (median 9 [5-12] vs. 12 [10-12]; p<0.01) but hand grip strength was not different (26.7±3.4 vs. 29.7±2.7 kg; p=0.559). Catabolic pathways, i.e., ubiquitin-proteasome system (i.e., FOXO1/3a, MuRF1) and autophagy (i.e., LC3b, Atg5) were not differentially expressed between both groups, whereas myogenic factors (i.e., Pax7, MyoD) were systemically upregulated (~2-fold), in the low strength group. Stress markers CHOP and p-ERK1/2 were higher expressed (~1.5-fold) in the muscle of the low strength group. Surprisingly, expression of the inflammatory markers p-65NF-κB was higher (~7-fold) in muscle of normal strength older adults.

**Conclusion:** Older adults with low muscle strength differ in muscle expression profile, characterized by a higher expression of myogenic and stress factors. Whereas stress factors might reflect the age-related deterioration of tissue homeostasis, e.g., due to misfolded proteins (CHOP), chronic upregulation of myogenic markers might be an attempt to compensate for the gradual loss in muscle quantity and quality. These data might provide valuable insights in the processes that underlie the final stages of sarcopenia (at higher age), which can be different from gradual muscle wasting (e.g., characterized by upregulated catabolic processes).

## P264
### PREDICTIVE VALUE OF ULTRASOUND IN DIGITAL OSTEOARTHRITIS

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**Objective:** Digital osteoarthritis (DOA) is a complex degenerative pathology with sometimes noisy joint manifestations that can mimic inflammatory rheumatism. The osteoarticular ultrasound, is a valuable addition to the clinical examination, remains little used for diagnosis and monitoring DOA. The objective of our study is to analyze the ultrasound characteristics of arthritic hands OA in order to know the lesions and to better correlate the clinical data with the sonographic results.

**Methods:** We performed an ultrasound study of 38 patients (76 OA hands) suffering from DOA meeting the ACR criteria. SPSS.20 Software was performed to data analysis.

**Results:** There were 38 patients: 84% women, 16% men, mean age 61 y. 47.36% had a manual profession, 39.47% had associated osteoporosis, 66% had reported the presence of finger nodules in the mother in family history. 60.52% of patients presented with Heberden's nodules, 34.21% with Bouchard nodules, 63.15% an adductus inch and 13.15% an inch in "M" deformation . Impairment of metacarpophalangeal, proximal interphalangeal (PIP), distal interphalangeal (DIP) and trapeziometacarpal were found respectively: clinically in 24%, 58%, 87% and 76% of cases, and in 8%, 37%, 74% and 92% after ultrasound examination. The impairment was more severe from side of the dominant hand in 39.47% of cases clinically vs 52.63% after an ultrasound analysis. Regarding "erosive" DOA, 36.84% of patients presented at least one clinical and/or sonographic criterion suggesting an erosive form. 7.89% of patients had rigidity, 13.15% erythema, 34.21% swelling and 60.52% paresthesia. According to ultrasound, 28.94% showed an erosion/reconstruction aspect. 26.31% of the patients had presented an effusion of the PIP, 47.36% an effusion of the DIP, grade 1 Doppler signal was found in 15.78% with a strong clinical correlation and positive ultrasound signs in 65.78% of cases, no synovitis was reported.

**Conclusion:** DOA is a very heterogeneous disease, the added value of ultrasound appears to be of interest in the diagnosis and monitoring patients with this pathology.

## P265

### EVALUATION AND TREATMENT OF AROMATASE INHIBITOR-INDUCED BONE LOSS

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**Objective:** Hormone therapy, especially anti-aromatases (AI) used as adjunctive treatment of breast cancer have revolutionized cancer management, but they induce bone loss and increase the risk of fracture. Purpose of the study was to assess bone statues in patients under AI for breast cancer, and the management of those with osteoporosis.
**Methods:** This is a descriptive, analytical study, carried out in the rheumatology department, in bone disease unit. Inclusion criteria were patients followed for breast cancer in the oncology department, treated by AI and referred to the rheumatology department for bone evaluation and management. All patients with vitamin D loss have been supplemented before performing the DXA. Exclusion criteria were patients having received another type of hormone therapy and presenting other risk factors of osteoporosis. Demographic data were identified, and all these patients received a measurement of BMD.
**Results:** Among 200 patients followed for breast cancer, 92 (46%) under AI were include. The mean age was 58.22 y (41-75 y). 97% of the study group were postmenopausal and 38% of them had postmenopause secondary to treatment. 85 patients (92.4%) had osteoporosis and 7 (7.6%) patients had osteopenia. The average time between the start of anti-aromatase therapy and the discovery of bone loss was 20.3 months. On bone densitometry, the lumbar spine was the most affected site (87%) with an average T-score at -2.84 and an average BMD at 0.843, followed by the femoral neck (16.5%) and the total hip (13.7%). All osteoporotic patients were treated with bisphosphonates: alendronate (60%), risedronate (17% ) and zoledronate(12%).
**Conclusion:** The anti-estrogenic effect of AIs interferes with bone metabolism during treatment for breast cancer, which increases the risk of bone loss of risk of fracture. The frequency of bone loss in our series is estimated at 46%. Assessment of bone status and the long-term follow-up should be systematic in all patients followed for breast cancer on AI. The hygiene and dietary measures and the supplementation of phospho-calcium deficits must be corrected in patients in addition osteoporosis treatment according to specific recommendations.

Table. Patients characteristics, bone status under AI and the management of osteoporosis

|  | Results |
|---|---|
| Total patient | 92 |
| Mean age | 58.22 y |
| Average age of cancer diagnosis | |
| | 46.75 y |
| Time from medication by AI bone loss diagnosis | 20.3 months |
| Menauposal patients | 97% |
| Menopause secondary to AIs | 38% |
| Osteoporotic patients | 85 (92.4%) |
| Patients with osteopenia | 7 (7.6%) |
| Osteoporotic sites | |
| Lumbar spine | 88% |
| Femoral neck | 17% |
| Total hip | 14% |
| Metastatic cancer | 15.18% |
| Bone | 75% |
| Other | 25% |

| Phosphocalcic statues (average value) | |
|---|---|
| Calcemia | 92.83 mg/l |
| Calciuria | 131.8 mg/24-h |
| Phosphatemia | 48.09 mg/l |
| 25 OH vitaminD | 19.78 ng/ml |
| PTH | 79 pg/ml |
| Bisphosphonate therapies | |
| Alendronate | 60% |
| Risedronate | 17% |
| Zoledronate | 12% |

## P266

### ULTRASONOGRAPHIC AND ELASTOGRAPHIC CHANGES IN THE ACHILLES TENDON AND RETROCALCANEAL BURSA IN HEALTHY POPULATION REGARDING HABITUAL PHYSICAL ACTIVITY

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**Objective:** Ultrasound examination, including elastography, has been a subject of interest in the evaluation of patients with suspected or diagnosed spondyloarthritis. It has been demonstrated that physical activity, in the general population, leads to adaptive morphological changes in the muscles and, it is expected, also at the tendon level. The characterization of these changes should be considered when applying the parameters of normality to the morphological characteristics of such well-studied structures as the Achilles tendon. The purpose of this study is to determine whether certain patterns of sporting activity (high, low or sedentary) are associated with morphological changes of the Achilles tendon and retrocalcaneal bursa.
**Methods:** 180 consecutive healthy volunteers, medical students or their relatives, frequent users of 3 sports centers, and a group of volunteer female employees of a large warehouse in the northern area of Madrid, were recruited between December 2019 and January 2020. To avoid the possible effect of degenerative changes, only adult subjects under 35 y of age were included. The percentage of lean mass was obtained by impedanciometry of four extremities. Ultrasound measurements performed (Figure 1): tendon thickness at the calcaneal border (TH) and at 1 cm proximal to this (TH-1), tendon diameter at the calcaneal border (TD) and at 1 cm proximal to this (TD-1), cross-sectional area at the calcaneal border (TA) and at 1 cm proximal to this (TA-1), bursa height (BH) and enthesis length (TEL). Elastography was measured in m/s.
**Results:** Characteristics of the study population: 112 women, mean age 23.8 SD 2.7 y, 35% sedentary, 77.8% right-handed. All ultrasound measurements except BH presented statistically significant differences according to sex (Table 1). Differences in tendon morphological characteristics were only identified between high-impact sports participants and the rest of the volunteers, regardless of sex (Table 1). A significant correlation was detected between lean mass percentage and TH (Pearson 0.22, $P<0.002$), TH-1 (Pearson 0.364, $P<0.001$), and TEL (Pearson 0.293, $P<0.001$). Wave conduction velocity (elastography) in the tendon of males was 6.02 SD 1.6 and in females 5.4 SD 1.73 m/s ($P=0.038$). Overall high-impact athletes had a velocity of 5.03 SD 1.68 and sedentary athletes 6.91 SD 0.93 m/s ($P<0.001$).
**Conclusion:** Physical activity leads to structural changes in the Achilles tendon. High-impact physical activity should be taken into account in patients in whom ultrasound examinations or elastographic studies are performed, since normal parameters may require revision.
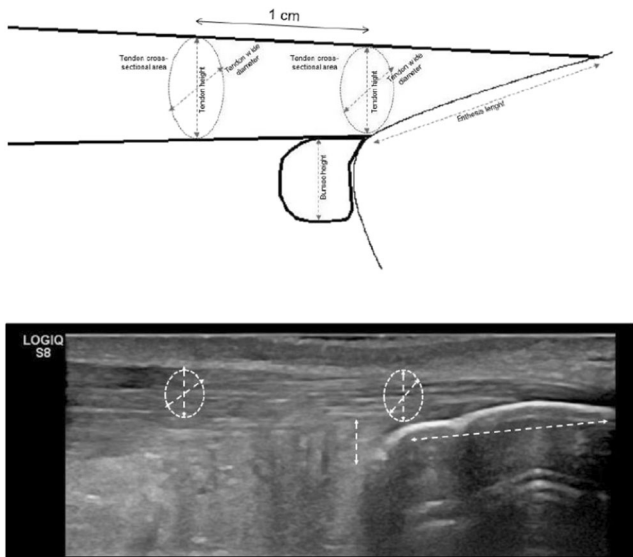
Figure 1. Representative scheme of the measurements taken during the ultrasound examination of the Achilles tendon.

Table 1. Results of the ultrasound examination of the entire cohort studied according to sex (female:female; male:male) and degree of physical activity (sedentary:sedentary; low impact:low impact; high impact:high impact). P-value: P-value.

| | Sedentarios | | | | Bajo impacto | | | | Alto impacto | | | | |
| | Mujer | | Hombre | | Mujer | | Hombre | | Mujer | | Hombre | | P-valor |
| | Media | SD | Media | SD | Media | SD | Media | SD | Media | SD | Mean | SD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TH mm | 3.49 | .60 | 3.77 | .41 | 3.94 | .46 | 4.26 | .42 | 3.91 | .53 | 4.44 | .97 | <0.001 |
| TH-1 mm | 3.52 | .56 | 3.85 | .49 | 3.51 | .89 | 4.18 | .59 | 3.95 | .65 | 4.65 | .75 | <0.001 |
| TD mm | 18.59 | 2.01 | 19.50 | 2.50 | 18.29 | 2.43 | 20.72 | 1.73 | 18.80 | 2.52 | 19.88 | 1.66 | 0.003 |
| TD-1 mm | 18.87 | 1.98 | 19.62 | 2.22 | 18.39 | 2.36 | 20.92 | 1.72 | 18.59 | 2.64 | 19.75 | 1.77 | 0.009 |
| TA mm² | 0.60 | 0.15 | 0.70 | 0.17 | 0.59 | 0.09 | 0.74 | 0.10 | 0.62 | 0.11 | 0.77 | 0.13 | <0.001 |
| TA-1 mm² | 0.59 | 0.11 | 0.70 | 0.09 | 0.63 | 0.10 | 0.77 | 0.10 | 0.66 | 0.12 | 0.80 | 0.11 | <0.001 |
| BH mm | 1.62 | .73 | 2.13 | .61 | 1.66 | .75 | 2.28 | .71 | 2.62 | 1.16 | 2.45 | 1.12 | 0.504 |
| TEL mm | 18.97 | 2.49 | 18.49 | 1.92 | 18.56 | 2.46 | 20.02 | 2.93 | 17.82 | 2.51 | 20.73 | 2.50 | <0.001 |

Table 2. Results of the elastographic study. All measurements were made in m/s. The results were grouped by sex, degree of activity, and leg dominance.

| | | Dominant leg | | | | |
| | | Right | | Left | | P-value |
| | | Media | SD | Media | SD | |
|---|---|---|---|---|---|---|
| **Right tendon** | Sedentarian | 7,11 | ,92 | 6,65 | 1,42 | 0.372 |
| | Low impact | 6,74 | 1,10 | 5,38 | . | - |
| | High impact | 5,13 | 1,79 | 4,02 | 2,06 | 0.009 |
| **Left tendon** | Sedentarian | 7,01 | ,93 | 5,39 | 1,47 | 0.001 |
| | Low impact | 6,62 | 1,12 | 4,91 | . | - |
| | Hig impact | 5,47 | 1,59 | 4,52 | 1,24 | 0.003 |

**P267**

**EFFECTS OF FREQUENT WEARING OF HIGH HEELS ON ACHILLES TENDON ULTRASTRUCTURE AND ELASTOGRAPHY IN HEALTHY YOUNG WOMEN**

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**Objective:** Both for aesthetic and occupational reasons, high-heeled shoes have become widespread among the western female population, although it is becoming less frequent with advancing age. Like certain physical activities performed regularly, the use of heeled shoes leads to postural changes in plantar support that in turn could lead to the development of adaptive processes of the Achilles tendon. The effect that the use of heels would have on the echostructure and elasticity of the Achilles tendon is not well known, however, given the relative extension of their use among women, it would be convenient to know them at the time of echography evaluation of a patient with suspected spondyloarthritis. In the same way, patients with spondyloarthritis who wear heels may undergo morphologic changes attributable to the footwear rather than to the disease itself, and this will be of great interest during clinical follow-up. The purpose of the present study was to compare the ultrasonographic and elastographic findings of women who wear heels for work purposes with healthy, athletic, or sedentary volunteers who do not wear this type of footwear regularly. **Methods:** 112 female volunteers were recruited, 58 frequent heel wearers (>4 cm, >15 h/wk, >1 y). An ultrasound examination of the Achilles tendon and the retrocalcaneal bursa was performed as well as an elastographic study of three foci of the longitudinal plane of the tendon. Direct comparisons were made of the measurements obtained according to the use or non-use of heels. **Results:** Heel wearers reported a mean of 35.2 SD 10 h/wk of heel use. The enthesis length of heel wearers and non-heel wearers was 18.7 SD 2.4 mm and 17.7 SD 2.5 mm, respectively (P=0.0043; Mann-Whitney U=1218.0). No other significant morphological differences were detected. Elastography among heel wearers had a conduction speed of 6.95 SD 0.93 m/s and among non-wearers, 5.02 SD 1.58 m/s (P<0.001). Among heel wearers, a positive correlation (Figures 1 and 2) was observed between the number of h/week of use with thickness in the longitudinal plane, transverse diameter, and cross-sectional area of the tendon (Pearson coef. 0.420, 0.530, and 0.633, respectively; P<0.001 in all cases). **Conclusion:** Regular heel wear in women leads to the greater length of the Achilles enthesis and greater stiffness of the fibrillar structure. In addition, the morphological changes of the tendon correlate directly with the time of exposure to the use of this type of footwear. Our findings suggest that when performing an ultrasound evaluation of the Achilles tendon, we should take into account the history of frequent use of high heels.
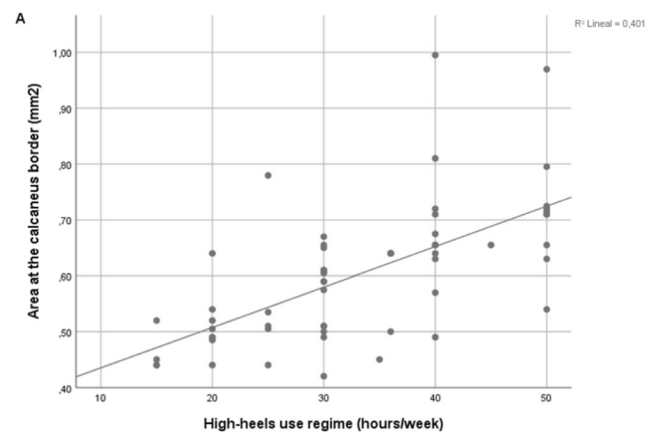


Figure 1. Dot plot showing the correlation between time of exposure to wearing high-heeled shoes and the cross-sectional area of the Achilles tendon at the edge of the calcaneus (talocalcaneal emergence point).
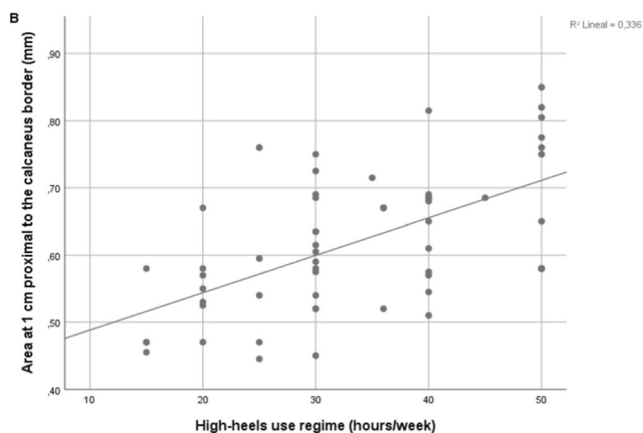
Figure 2. Dot plot showing the correlation between time of exposure to wearing high-heeled shoes and the cross-sectional area of the Achilles tendon at 1 cm proximal to the edge of the calcaneus (talocalcaneal emergence point).

## P268

### CLINICAL SERVICES RECOVERY MATRIX (CSR-MATRIX): THE EXAMPLE OF PATIENT STRATIFICATION FOR THE RESTORATION OF BONE HEALTH ASSESSMENT SERVICES DURING THE ONGOING HEALTHCARE CRISIS

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**Objective:** Facilitate the safe recovery of health services after the initial COVID19 healthcare lockdown, ensuring equal reliable care.

Methods: After the initial reaction to Covid19, with increasing pressures on elective patient care, we designed CSR-MATRIX, a dynamic Clinical-Service-Recovery tool. Based on the national risk alert level information[1], the population COVID-19 risk assessment[2], the Royal College of Radiologists guidelines[3] and Royal Osteoporosis Society guidance[4], we developed CSR-MATRIX and stratified bone health assessment patient referrals for our bone mineral densitometry and vertebral fracture assessment services at our Trust according to low, medium, high COVID-19 clinical risk and examination priority. The matrix is adaptable to different national risk alert levels, various clinical services, their patients' needs and providers' preferences. We implemented the CSR-MATRIX in 2 DXA units, trained 3 radiographers with a 4-h session and a follow-up discussion.

**Results:** In June 2021 we had 3957 referrals for BMD (<5% CT-BMD); 87% of these were from mid-January 2020 onwards. User1: Reviewed 87 referrals in 5 d, User2: 462 referrals in 7 d, User3: 257 referrals in 8 d (a day is a 7-h shift, other nonscanning tasks were also performed). In 8 d, 20.4% of the referrals had been reviewed and stratified, in 3 d 153 patients had been identified for immediate scanning, which corresponded to up to 8 working days for the 3 DXA scanners under COVID-19 public safety measures (1 patient at a time, disinfection in between patients, patients waiting outside hospital).

**Conclusion:** Healthcare services are the first to bear the burden in emergency events, even more so in pandemics. Shutting down elective care created an immense load to the already strained health services. The CSR-MATRIX is a pragmatic, flexible tool that can be used to stratify healthcare users fairly and safely in a responsible standardised manner.

**References:**
1. GOV.UK. Our plan to rebuild: The UK Government' COVID-19 recovery strategy, 11/May/2020
2. NHSDigital. COVID-19 Population Risk Assessment, 2020
3. RCR. COVID-19 interim guidance on restarting elective work, 7/May/2020
4. ROS. Toolkit: DXA restoration of service, 2020.



Part of the completed matrix from two users

## P269

### BIOELECTRICAL IMPEDANCE ANALYSIS FOR PREDICTION OF BONE MINERAL DENSITY IN HEMODIALYSIS PATIENTS

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**Objective:** The risk of fractures in CKD patients is significantly increased. Assessment of BMD by DXA is proved to be effective for prediction of fractures in dialysis patients. However X-ray densitometers are not always available in dialysis centers, and there are not criterion, except fractures and FRAX, to select patients who need BMD analysis. Bioelectrical impedance analysis (BIA) is not expensive and can be available at any center. The aim of the study was to assess the coherence between body composition estimates analyzed by BIA and bone mineral density measured by DXA in patients with CKD stage 5D.

**Methods:** Body composition, was analyzed by Tanita BC-401 and BMD was measured by DXA (Hologic QDR Discovery W). Study included 64 patients with CKD Stage 5 (30 men, 34 women) on hemodialysis. The average age of patients was 44.5±9.0 y, the duration of RRT patients from 12-201 months. Methods of descriptive statistics included the estimation of the mean with SD and the median with quartiles (25-75%). Intergroup differences were evaluated by parametric (student's t-test) and nonparametric analysis methods (Mann–Whitney U test). Spearman correlation was performed to analyze relationship between variables. In each of these methods the level of significance was set at P-values <0.05.

**Results:** Comparative analysis of body composition showed women had more fat in the body (both% and kg) and men had more lean mass in kg. Results of BIA of dialysis patients:

Table.

| Variables | male | female | p |
|---|---|---|---|
| Body fat (%) | 20.8 ±8.8 | 30.9 ±5.1 | <0.001 |
| Body lean ass (%) | 20.5 ±4.1 | 19.6 ±2.5 | >0.05 |
| Body fat mass (kg) | 16.6 ±7.9 | 20.7 ±4.8 | <0.05 |
| Body lean mass (kg) | 15.1 ±2.2 | 13.1 ±2.1 | <0.05 |

In whole group of dialysis patients BMD $g/cm^2$ of the distal arm correlated with height (r=+0.8; p<0.001), weight (r=+0.5; p<0.01), lean body mass (kg) (r=+0.5; p<0.01) and fat (%) ( (r= 0.41; p<0.05). T-score of the distal arm correlated with weight (r=+0.41; p<0.01), BMI (r=+0.51; p<0.05), lean body mass (r=+0.36; p<0.05). Z-score of the distal arm correlated with weight (r=+0.5; p<0.01), BMI (r=+0.51; p<0.01), and fat (kg) (r=+0.38; p<0.05). BMD $g/cm^2$ of the lumbar spine (L1-L4) correlated with height (r=+0.35; p<0.05) and lean body mass (kg) (r=+0.5; p<0.01). T-score of the lumbar spine correlated with lean body mass (kg) (r=+0.36; p<0.05). Z-score does not real any significant correlation with the other variables. BMD $g/cm^2$ of the total hip correlated with height (r=+0.39; p<0.05) weight (r=+0.54; p<0.01), lean body mass (kg) (r=+0.42; p<0.05). T-score of the total hip correlated with weight (r=+0.44; p<0.01), lean body mass (r=+0.34; p<0.05), fat (kg) (r=+0.35; p<0.05). Z-score of the total hip correlated with weight (r=+0.39; p<0.05), lean body mass (r=+0.34; p<0.05), fat (kg) (r=+0.38; p<0.05). When we analyzed men and women separately revealed that in men body fat (kg) showed more influence on BMD (r=+0.57; p<0.01), T-score (r=+0.57; p<0.01), and Z-score (r=+0.65; p<0.001) of the distal arm than in women.

**Conclusion:** BIA is not the best method for prediction of BMD in dialysis patients and does not reveal great advantage before constitutional characteristics of the patients. Maybe more sophisticated equipment than we used in the study will show better results. We will try to study this in the future.

**P270**

**ULTRASOUND CHARACTERIZATION OF THE PLANTAR FASCIA: A COMPARATIVE STUDY BETWEEN PATIENTS WITH SPONDYLOARTHRITIS AND HEALTHY VOLUNTEERS, HIGH-IMPACT ATHLETES AND HIGH-HEEL USERS**

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**Objective:** The plantar fascia is one of the most frequently affected enthesis territories in patients with spondyloarthritis. Plantar fasciitis, not related to these diseases, is also a frequent pathology linked to alterations in the biomechanics of plantar support. The plantar fascia, moreover, is one of the most relevant structures in plantar flexion of the foot and is therefore subject to bodyweight loading in high-impact sports. Although plantar fasciitis is defined clinically, it is noted by demonstrating an increase in its thickness. The purpose of the present study is to determine whether there are differences between the plantar fasciae of healthy subjects, high-impact athletes, high-heel users, and patients with spondyloarthritis (with plantar fascia involvement).

**Methods:** between December 2019 and January 2020, sedentary healthy volunteers (medical students and relatives), basketball and volleyball players, female workers of a department store heel wearers (>4 cm, >15 h/wk, >1 y), and patients with a known diagnosis of spondyloarthritis and plantar fascia involvement were recruited. An ultrasound examination of the plantar fascia of the dominant foot was performed in the longitudinal plane, at the level of the calcaneal border and 10mm distal to it. To exclude changes attributable to age, volunteers under 35 y of age were included. The ultrastructure of the fascia was dichotomously assessed as normal or altered. All scans were performed by an expert sonographer unrelated to the type of volunteer being scanned.

**Results:** 46 sedentary volunteers (<2 h weekly exercise), 42 federated basketball and volleyball players, 58 female heel wearers, and 26 patients diagnosed with spondyloarthritis and plantar fasciitis were included. Table 1 summarizes the demographic and anthropometric characteristics of the included subjects. The thicknesses of the plantar fascia heights in the longitudinal plane at the height of the calcaneal border are shown in Table 2. No statistically significant differences were identified between the thickness of the patients and the high-impact athletes. Statistically significant differences were identified in the comparisons between the remaining three height means, depicted in Figure 1. The proportion detecting altered echostructure occurred in 76.9% of patients, 38% of high-impact athletes, and 10.3% of heel wearers, and 8.6% of sedentary people. Statistical comparison of these proportions is shown in Figure 1.

**Conclusion:** The ultrasound changes observed in the plantar fascia in patients with spondyloarthritis and plantar fasciitis are similar to those presented by high-impact athletes both at the level of ultrastructure and fascia thickness. According to these results, it is advisable to know the history of sports activities of patients with suspected spondyloarthritis or under follow-up for this diagnosis when evaluating the plantar fascia ultrasonographically.

Table 1. Demographic and anthropometric characteristics of the population studied.

| | Asymptomatic volunteers | | | SpA patients |
|---|---|---|---|---|
| | Sedentarian N=46 | High impact athletes N=42 | High-heels users N=58 | N=26 |
| Age (years) | 23.8 DE 3.1 | 25.5 DE 3.9 | 26.8 DE 2.3 | 36.9 DE 3.9 |
| Female sex, % | 29, 63% | 33, 78.5% | 58, 100% | 8, 30.7% |
| BMI $g/cm^2$ | 25.7 DE 2.6 | 23.4 DE 2.8 | 23.8 DE 3.8 | 25.6 DE 3.4 |
| % lean mass | | | | |
| Men | 36.3 DE 5.4% | 47.3 DE 4.3% | - | 34.9 DE 5.2% |
| Women | 32.7 DE 6.2% | 43.7 DE 3.9% | 33.7 DE 5.3% | 31.3 DE 5.9% |

Table 2. Results of the ultrasound assessment of the plantar fascia.

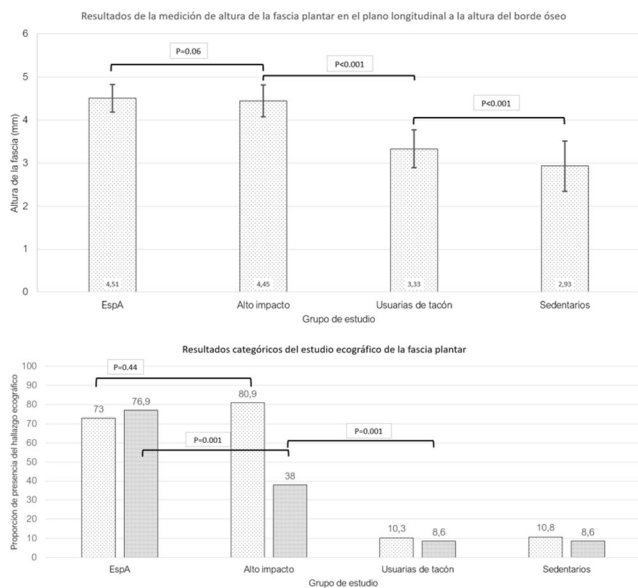| | Asymptomatic volunteers | | | SpA patients |
|---|---|---|---|---|
| | Sedentarian N=46 | High impact athletes N=42 | High-heel users N=58 | N=26 |
| Fascia height at the talocalcaneal border (mm) | 2.93 DE 0.58 | 4.45 DE 0.37 | 3.33 DE 0.44 | 4.51 DE 0.32 |
| Height of the fascia 10 mm distal to the talocalcaneal edge | 2.77 DE 0.53 | 4.19 DE 0.32 | 3.19 DE 0.37 | 4.43 DE 0.39 |
| Presence of calcaneal enthesophyte | 5 (10.8%) | 34 (80.9%) | 6 (10.3%) | 19 (73%) |
| Echostructure alteration | 4 (8.6%) | 16 (38%) | 6 (8.6%) | 20 (76.9%) |

Figure 1. Comparisons of quantitative (superior) and categorical (inferior) ultrasound findings among groups studied.

## P271

### AMINO ACID METABOLITE PROFILE OF LOW BMD IN IRANIAN ELDERLY: BUSHEHR ELDERLY HEALTH PROGRAM

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**Objective:** Amino acids play an important role in bone health and have been the most frequently reported metabolites associated with low BMD in metabolomics studies. We hypothesized that amino acid metabolic profile may be an early indicator of bone deterioration in the elderly population reflected in BMD.

**Methods:** We randomly selected 400 individuals from 2384 elderly men and women participating in the second stage of the Bushehr Elderly Health (BEH) program, a population-based prospective cohort study that is being conducted in Bushehr, a southern province of Iran. Frozen plasma samples were used to measure 34 amino acid and derivatives metabolites using the UPLC-MS/MS-based targeted metabolomics platform. We conducted the least absolute shrinkage and selection operator regression analysis to examine the ability of measured metabolites to predict low BMD.

**Results:** When adjusted for possible confounders (age, BMI, diabetes, smoking, physical activity, and sex), 5 metabolites were associated with femoral neck BMD, 17 metabolites with total hip BMD, and 8 metabolites with lumbar spine BMD (17 metabolites in total). Four metabolites (L-glutamine, L-tryptophan, 3-methylhistidine, and L-leucine) were associated with all 3 sites BMDs. We also observed that lower leucine, valine, tryptophan, and 3-methylhistidine, and higher glutamine could differentiate osteoporosis from non-osteoporosis in both women and men (Figure).

**Conclusion:** We found several amino acid metabolites associated with bone status in elderly individuals. Further studies are required to evaluate the bone health effect of these metabolites and their usefulness as clinical biomarkers for osteoporosis prediction.
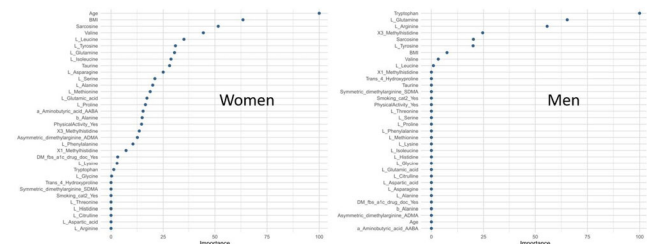
## P272

### ASSESSMENT OF REHABILITATION PROGNOSIS IN PATIENTS WITH NEUROPATHIES

A. Filipovich[1]

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The evaluation of the rehabilitation potential and the rehabilitation prognosis in 30 patients with neuropathies, mainly of traumatic genesis was carried out. of traumatic genesis during the rehabilitation period was carried out. Taking into account rehabilitation potential and rehabilitation prognosis determination, a list of indications for specific rehabilitation measures (type, frequency, duration, number of procedures in the course), an individual rehabilitation program (IRP) was formed.

Rehabilitation prognosis was determined in relation to specific categories of disabilities (movement, selfcare) in the early and late recovery periods, based on nosology, the severity of syndromic and functional disorders, the nature of the recovery process, taking into account age, comorbidity, intoxicating factors (alcohol use, smoking), the assumed influence of environmental factors.

Rehabilitation prognosis was assessed taking into account the probability of realization of the goals of rehabilitation in relation to separate components of the rehabilitation potential, mainly according to the degree of severity of the statodynamic disturbances. For patients with high severity of disabilities (mostly with traumatic sciatic nerve injury) with functional class (FC) 3 of the ability to move or selfcare, prognosis was made taking into account anticipated recovery in the six-month period after rehabilitation of active daily activities. In patients with disability categories within FK2 (mostly with upper extremity nerve damage), prognosis was based on the expected recovery of the ability to perform activities of daily living in the 6-month period after rehabilitation. was based on the expected recovery of the ability to work and accordingly realization of the labor prognosis.

Favorable rehabilitation prognosis was determined when a high probability of full restoration of the impaired activity categories (self-care, movement) with of objective possibilities (rehabilitation means

and conditions) for the realization of the rehabilitation potential in full taking into account the full recovery of the everyday activity and the ability to work. ability to work. The rehabilitation prognosis was defined as doubtful, with probable possibility of partial realization of the rehabilitation potential in cases of insufficient effectiveness of measures to implementation of IPR, with the prognosis of partial restoration of the impaired categories of vital functions with a decrease in the degree of their limitations.

An unfavorable rehabilitation prognosis occurred when the impossibility of partial restoration of the impaired categories of vital activity and reduction of the degree of their limitations, the impossibility of realizing the rehabilitation potential. These cases occurred with progression of musculoskeletal pathology, pathogenically unrelated to the traumatic factor.

## P273
### REHABILITATION AND EXPERT DIAGNOSIS OF DISORDERS, DISABILITIES IN PATIENTS WITH NEUROPATHIES ON THE BASIS OF ICF

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In the course of the research, the algorithm of the rehabilitation evaluation of neurological disorders, restrictions of vital functions in patients with statodynamic disturbances caused by traumatic and compression-ischemic neuropathies was developed on the basis of the International Classification of Functioning, Disability and Health (ICF). The algorithm provides for certain stages, interrelations 117 in the assessment of body function and structures, activity, and participation both in conducting rehabilitation measures, as well as medical and social expertise, and is carried out with the aim of standardizing the medical services rendered. Within the framework of the presented general model of ICF use a three-level diagnostic algorithm for expert evaluation of impairments and disabilities has been developed, which optimized for the already existing technology of examining patients by specialists of medical and rehabilitation expert commissions, which use a system of quantitative assessment of impairments, limitations of vital activity in the category of "functional class".

In the course of the study, a list of methods for objectification of the presence and severity of statodynamic impairments was developed. The detailed list of methods intended for practical use, includes a number of separate diagnostic tables. The diagnostic list contains such categories as the assessed diagnostic expert attribute or indicator, assessment technique (expert-rehabilitation diagnostics), registered and analyzed indicators, peculiarities of carrying out methods, nature of changes in pathology. It is suggested to perform the assessment (as markers of "function" state in the ICF system): statodynamic status (muscle strength and muscle tone, deep reflexes, skin reflexes, pathological reflexes); simple sensorimotor reactions and complex sensorimotor reactions with Schilder, Stewart-Holmes tests; static coordination of upper and lower extremities; dynamic coupled coordination of trunk, upper and lower extremities; biomechanical assessment of walking function, active and passive movements in joints and spine; simple and complex types of sensitivity. Assessment (as markers of "structures" condition): results of ultrasound diagnostics of nerve structures and vascular segment with evaluation of presence and expression of morphological changes in nerve structures, results of electroneuromyography diagnostics - conduction velocity, rhythm, symmetry of electrical velocity, rhythm, symmetry of electrical activity, character of response to functional tests; peripheral emodynamic indexes, Peripheral hemodynamic indices in the segments of the affected limb using rheovasography and rasospasmography. using rheovasography and calculation of rheographic index, index of venous outflow obstruction.

## P274
### THE CURRENT PROBLEMS OF DIAGNOSIS AND THERAPY OF OSTEOPOROSIS IN THE MODERN MEGAPOLIS

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**Objective:** Saint Petersburg is a second biggest city in Russia with very well developed high quality health care system. It has many centers with modern diagnostic equipment for diagnosis and therapy of osteoporosis. There are no significant problems with the availability of osteoporotic drugs. At the same time the problem of early diagnosis and therapy of osteoporosis is still exists. The aim of this study was to investigate the level of the diagnosis and treatment of osteoporosis in patients admitted with low-trauma fractures to trauma and orthopaedics department of a big municipal hospital.

**Methods:** We analyzed cases of 101 patients (77 women, 24 men) with low-trauma fractures. The average age was 65.4±16.3 y. 15 women were premenopausal and 62 postmenopausal. The average BMI was 26.4±6.3. All patients were interviewed for the presence of osteoporosis risk factors, its diagnosis and treatment before the fracture, the presence of comorbidities, and physical activity before the fracture. The results were processed using the standard software for applied statistical analysis.

**Results:** 47 patients had fractures of the femur (32 femoral neck fractures, 8 diaphyseal fractures, 7 femoral pertrochanteric). 28 patients had tib-fib fractures, 12 had fractures of shoulder bones and distal forearm. 32 patients had a previous history of a low-energy fractures. 23 patients noted the presence of low-energy fractures in close relatives. 31 patients underwent hip arthroplasty, 35 patients underwent metal osteosynthesis. The average age of patients at the time of the first low-energy fracture was 62.7+13.0 y. 49 people smoked before the first fracture. 20 patients continued to smoke afterwards. The average duration of smoking is 20.6+17.7 y. 11 patients consumed alcohol more often than once a week, 1 patient 3-4 times a week and 1 everyday. One patient reported drinking binges. 8 patients received long-term glucocorticosteroid therapy. 25 patients had spontaneous falls during the year preceding the fracture. The average number of falls was 3.0±2.2 per year. 31 patients were diagnosed with coronary heart disease, 54 hypertension, 18 chronic heart failure, 18 chronic cerebrovascular accident, 7 chronic kidney disease stages 2-3, 4 type 2 diabetes mellitus. Densitometry (DXA) was performed in 11 patients before admission to hospital. Osteoporosis was diagnosed in 7 patients, osteopenia in 3 patients. Only eight patients received osteoporosis treatment: 4 patients consumed vitamin D and calcium supplements irregularly, 3 patients received short-term treatment with bisphosphonates, 1 patient had single denosumab injection. Most patients reported a lack of available information about the possibility of diagnosing and treating osteoporosis before the fracture and after the first fracture.

**Conclusion:** We revealed the common risk factors for fractures in the studied group: female gender, postmenopausal age, smoking, alcohol abuse, glucocorticosteroid intake, falls, and previous low-energy fractures. The most common comorbidities were diseases of the cardiovascular system, which increase the risk of falls. At the same time we revealed problems with primary and secondary prevention of fragility fractures. The lack of information about osteoporosis, simple ways to prevent and diagnose the disease is the main problem. Health care professionals should provide patients with more accessible information about osteoporosis. Awareness among clinicians and health care professionals on osteoporosis should be increased to overcome the burden of the disease.

## P275

### EXAMINING THE RELATIONSHIPS BETWEEN TREATMENT AND PAIN AND PHYSICAL FUNCTION OUTCOMES IN PATIENTS WITH OSTEOARTHRITIS: A MEDIATION MODELING APPROACH

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**Objective:** To better understand the complex relationships between treatment and pain and physical function (PF) outcomes, we investigated a set of mediation models of osteoarthritis patients' responses to tanezumab.

**Methods:** Data came from 2 randomized trials of tanezumab (Study 1: NCT02697773[1], Study 2: NCT02709486[2]). A set of mediation models was used to explore the interrelationships among treatment, PF as measured by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC*) PF scores, and pain (WOMAC Pain scores) as a mediator of the effect of treatment on PF: (a) cross-sectional mediation models, (b) longitudinal mediation models, and (c) pseudo steady-state longitudinal mediation models. Variables in the cross-sectional mediation models were: treatment (tanezumab vs. placebo), pain and PF scores (models were assessed separately at weeks 2, 4, 8, 12, 16, or 24). The longitudinal mediation models estimate relationships using data from all weeks simultaneously. The longitudinal steady-state mediation model also uses all available data at weeks 2, 4, 8, 12, 16, and 24 with the assumption that relationships among variables in the model are the same at all time points.

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**Results:** The cross-sectional and longitudinal mediation models showed that the indirect effect of treatment through pain on PF was stable across time (cross-sectional: 78.8-95.1%, all P<0.0001; longitudinal: 70.5-86.6%, all P<0.0001), indicating that a pseudo steady-state model is appropriate. The longitudinal steady-state mediation models showed that the indirect effect of the treatment on PF was 77.8% in Study 1 and 74.1% in Study 2 (P<0.0001, respectively), while the direct effect of the treatment on PF was 22.2% for Study 1 (P=0.0003) and 25.9% for Study 2 (P=0.0019).

**Conclusion:** At least 75% of the treatment effect of tanezumab on physical functioning can be explained by the improvements in pain. However, tanezumab has an additional effect on physical functioning (approximately 25%), which is independent of improvements in pain. Research is needed to explain this effect and evaluate additional mediators (e.g., sleep, fatigue, method variance) that may contribute to the observed direct effect.

**References:**

1. Schnitzer TJ, et al. JAMA 2019;322:37.
2. Berenbaum F, et al. Ann Rheum Dis 2020;79:800.

**Disclosures:** Robert H. Dworkin, PhD, has received in the past 5 years research grants and contracts from the US Food and Drug Administration and the US National Institutes of Health, and compensation for serving on advisory boards or consulting on clinical trial methods from Abide, Acadia, Adynxx, Analgesic Solutions, Aptinyx, Aquinox, Asahi Kasei, Astellas, AstraZeneca, Biogen, Biohaven, Boston Scientific, Braeburn, Cardialen, Celgene, Centrexion, Chromocell, Clexio, Collegium, Concert, Confo, Decibel, Dong-A, Editas, Eli Lilly, Ethismos (equity), Eupraxia, Glenmark, Gloriana, Grace, Hope, Immune, Lotus, Mainstay, Merck, Neumentum, Neurana, NeuroBo, Novaremed, Novartis, Olatec, Pfizer, Phosphagenics, Quark, Reckitt Benckiser, Regenacy (also equity), Relmada, Sanifit, Scilex, Semnur, SIMR Bio, SK Life Sciences, Sollis, SPRIM, Teva, Theranexus, Trevena, Vertex, and Vizuri. Dennis C. Turk has received research grants and contracts from the US Food and Drug Administration and US National Institutes of Health and has received compensation for consulting on clinical trial and patient preferences from AccelRx, Eli Lilly and Company, Flexion, GlaxoSmithKline, and Pfizer. David A. Williams has received research grants from the National Institutes of Health and has received compensation for consulting on clinical trials and behaviourally based interventions with Swing Therapeutics, Inc. and Community Health Focus Inc. John D. Markman has the following to disclose: Ad board: Clexio Biosciences, Flexion Therapeutics, Quark Pharmaceuticals, Quartet Medicine, Collegium Pharmaceutical, Purdue Pharma, Biogen, Novartis, Aptinyx, Nektar, Allergan, Grünenthal, Eli Lilly and Company, Depomed, Janssen, Teva Pharmaceutical Industries, KemPharm, Abbott Laboratories, Plasma Surgical, Chromocell, Convergence Pharmaceuticals, Inspirion, Pfizer, Sanofi, Daiichi Sankyo, and Trevena. Consultant: Trigemina, Editas Medicine, and Plasma Surgical. Data safety monitoring board: Novartis and Allergan. Jerry A. Hall is an employee of Eli Lilly and Company with stock and/or stock options. Andrew G. Bushmakin, Lucy Abraham, David C. Semel, Joseph C. Cappelleri, and Ruoyong Yang are employees of Pfizer with stock and/or stock options.

## P276

### THE CASE OF X-LINKED HYPOPHOSPHATAEMIA (XLH)
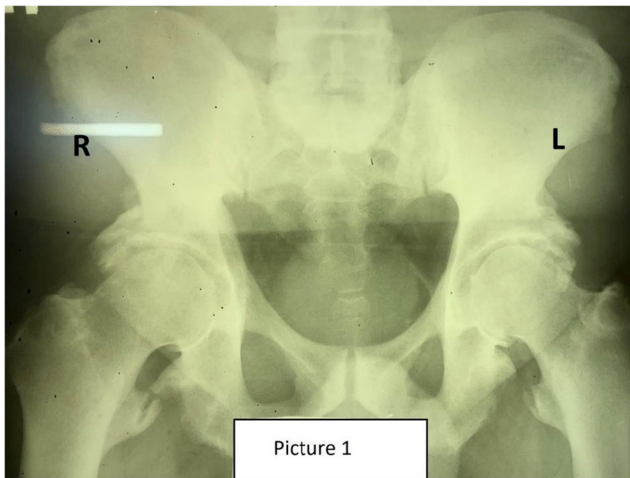
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**Objective:** To improve diagnostics of XLH as a rare lifelong disease in adult rheumatological practice.

**Methods:** Based on clinical observation of 51 y.o. male with an erroneous diagnosis of ankylosing spondylitis (AS).

**Results:** Patient R. presented chronic diffuse musculoskeletal pain during 15 y, both of inflammatory and mechanical character, morning stiffness up to 90 min. There was no synovitis. Patient was of short stature – 1.70 m. Patient assessed pain VAS as 7.5/10. Chronic use of NSAIDs with a weak effect. CRP – 5 mg/dl, ESR – 12 mm/h, HLA-B27 – negative. No MRI signs of inflammatory bone edema in sacrum and iliosacral joints were identified. There was calcification of anterior and posterior longitudinal ligaments at levels C5-T7. Sacroiliac joints were poorly differentiated. Massive marginal bony outgrowths in both acetabular cavities, greater and lesser trochanters. X-ray slits were not narrowed. Bony growths in the area of the ischial bones (hyperostosis) and enthesites are very characteristic, present at the attached X-Ray (Picture 1). Further examination showed: serum phosphorus was decreased to 0.6 mmol/l (normal range 0.81-1.45), serum PTH was normal – 29.4 pg/ml (15.0-65.0). Phosphorus in 24-h urine was elevated to 71.8 mmol/24-h (12.9-42.0). XLH diagnosis should be confirmed by molecular genetic analysis or determination of FGF23 levels before treatment, if possible. Traditional treatment includes alphacalcidol, phosphates. Burosumab – fully human IgG1 monoclonal antibody against FGF23 was approved by FDA, 2018.

**Conclusion:** Serum phosphorus level decrease is a mandatory, although not specific, sign of hypophosphatemia. Clinical diagnosis of XLH should be based on symptoms of rickets and osteomalacia in combination with a hypophosphataemia and kidney loss of phosphorus. Calcium and vitamin D deficiency are absent. Rheumatologists should be aware of signs and symptoms of XLH and assess the serum phosphorus level in patients with existing or suspected AS.

Picture 1

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## P277
### IMPACT OF NON-HIP FRACTURES IN ELDERLY WOMEN: A NARRATIVE REVIEW

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**Objective:** The association of hip fractures with adverse outcomes is well established but, for non-hip fractures, this association still needs to be further investigated. The objective of this narrative review is to describe the state of the art with regards to the health impact of clinically relevant non-hip fracture locations in postmenopausal women. **Methods:** PubMed and Scopus databases were searched from January 2010 until December 2020. Studies were included when the crude rates and/or relative risk of one-year subsequent fractures and/or mortality were reported as well as the precise fracture site. **Results:** Twenty-three studies met the inclusion criteria. Regarding mortality rates, there was a high variability between studies, with higher rates for vertebral, proximal humerus and pelvic fractures. There was a small or no impact of wrist, ankle or tibia fractures. The mortality rate increased with age after vertebral, proximal humerus and wrist fractures. Moreover, proximal humerus and vertebral fractures were associated with a higher mortality risk. Although it is claimed that fracture risk is increased after any fragility fracture, few studies have actually investigated fracture risk according to the site of an index fracture. Our review indicates that the one-year risk of subsequent fracture is significantly increased after an initial proximal humerus, vertebral or pelvis fracture. **Conclusion:** This narrative review indicates that, besides hip, fractures of vertebrae, proximal humerus or pelvis deserve more attention when trying to prevent adverse outcomes of osteoporosis. More studies on the topic of non-hip fractures are urgently needed.

## P278
### GREATER PQCT CALF MUSCLE DENSITY IS ASSOCIATED WITH LOWER HIP FRACTURE RISK, INDEPENDENT OF FRAX, FALLS AND BMD: A META-ANALYSIS IN THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY

N. C. Harvey[1], E. Orwoll[2], J. A. Cauley[3], T. Kwok[4], M. K. Karlsson[5], B. E. Rosengren[5], E. Ribom[6], P. M. Cawthon[7], K. Ensrud[8], E. Liu[9], K. A. Ward[1], C. Cooper[1], J. A. Kanis[10], M. Lorentzon[11], C. Ohlsson[12], D. Mellström[12], H. Johansson[9], E. V. McCloskey[13]

**Objective:** To investigate the predictive performance of pQCT measures of both calf muscle density (an established surrogate for muscle adiposity) and size (cross-sectional area, CSA) for hip fracture (HF).
**Methods:** pQCT (Stratec XCT2000/3000) measurements at the tibia were undertaken in the MrOS US, Hong Kong (HK) and Swedish Gothenburg (SW) cohorts. Analyses were by cohort and synthesised by meta-analysis. The predictive value for incident HF, using an extension of Poisson regression adjusted for age and follow-up time, was expressed as gradient of risk (GR=hazard ratio per SD increase in the exposure). Further analyses adjusted for femoral neck(fn) BMD T-score, FRAX 10-y fracture probability (major osteoporotic fracture) and prior falls (y/n, in the preceding 12 months).
**Results:** We studied 1008 (US), 1662 (HK), 581 (SW) men, mean (SD) age 77.0 (5.1), 73.9 (4.9), 80 (3.4) y, followed for a mean (SD) 7.9 (2.2), 8.1 (2.3), 4.4 (1.6) y, with 31, 47, and 34 incident HF respectively. Both greater muscle cross-sectional area (CSA) and greater muscle density (suggesting lower muscle adiposity and higher muscle quality) were associated with a lower risk of incident HF [GR: 0.79 (95%CI:0.65,0.96) and 0.83 (95%CI:0.69,0.99) respectively]. The pattern of associations was not materially changed by adjustment for prior falls or FRAX probability. In contrast, after inclusion of fnBMD T-score, the association for muscle CSA was attenuated [GR: 0.97 (95%CI:0.80,1.19)], whereas that for muscle density was not materially changed [GR: 0.74 (95%CI:0.62,0.89)].
**Conclusion:** pQCT measures of greater calf muscle density and cross-sectional area were both associated with lower incidence of hip fractures in older men, but only muscle density remained an independent risk factor for fracture after accounting for femoral neck BMD T-score. These findings demonstrate a complex interplay between measures of bone, and muscle size and quality, in determining fracture risk.

## P279

### THE BEST PREDICTIVE FACTORS AMONG CLINICAL AND STRUCTURAL CHANGES ASSOCIATED WITH KNEE REPLACEMENT: A NESTED CASE-CONTROL STUDY

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**Objective:** In the search in osteoarthritis (OA) patients for knee replacement (KR) predictors, very little information is available on the role of the concomitant symptoms, malalignment, and structural changes on a study population over an extended period of time. With the use of a nested case-control study allowing to measure the effect of various clinical and structural joint features in different time frames before KR, we investigated which changes in OA risk factors were most associated with the occurrence of KR.

**Methods:** Participants were from the Osteoarthritis Initiative: 195 KR cases were matched with 468 controls. They had a KR after cohort entry (cases), and controls matched for age, gender, income, WOMAC pain, Kellgren-Lawrence grade, and duration of follow-up. Changes were calculated as differences between the values at KR and baseline discriminating women and men. Conditional logistic regression analyses were performed.

**Results:** Worsening of WOMAC scores (crude odd ratios 1.02-1.20, p≤0.012), KOOS (1.02-1.04, p≤0.014), and knee injuries sustained 30-40 years before KR (women 2.70, p=0.034) were associated with the occurrence of KR. Also associated with KR were cartilage volume loss in the lateral compartment (>0%, overall 1.76, p=0.025; women 1.93, p=0.047) and medial compartment (≥10%, overall 1.54, p=0.027; men 2.34, p=0.008) and an increase in bone marrow lesions (BMLs) for women (1.09, p=0.048). The association of risk factors with KR was reinforced when patients presented both an increase in WOMAC pain and cartilage volume loss (1.85, p=0.001). Pain medication usage, mainly narcotics and intra-articular steroid injections (IASI), was also associated with KR. IASI in the follow-up period did not demonstrate a detrimental effect on cartilage loss, in cases and controls, indicate that structural changes were not causal of KR.

**Conclusion:** This study provides further evidence that worsening of OA symptoms, cartilage volume loss, BMLs, and, to a lesser extent, older injuries are important risk factors for KR occurrence, particularly in women. Previous use of pain medication and IASI were associated, but not causal, with the imminent occurrence of KR, a finding of clinical importance.

**Disclosure:** JPP and JMP are shareholders, JPR and MD are consultants, and PP an employee in ArthroLab Inc.

## P280

### AN AUTOMATED PATIENT- AND GENDER-SPECIFIC MODEL FOR EARLY KNEE OSTEOARTHRITIS STRUCTURAL PROGRESSOR SCREENING

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**Objective:** There is a need for an automated screening system for the early detection of knee structural progressors in osteoarthritis (OA). Our aim was to build a patient- and gender-based machine learning (ML) model that bridges major OA risk factors and serum levels of adipokines/related inflammatory factors at baseline for early prediction of at-risk knee OA patient structural progressors over time.

**Methods:** The serums (n=677) were from the Osteoarthritis Initiative (OAI) cohort. The model development used baseline serum levels of six adipokines, three related inflammatory factors, and their ratios (36), as well as two major OA risk factors (age and bone mass density [BMI]) (n=47 variables). Subjects were classified for their probability of being structural progressors using our published prediction model[1], including baseline, two X-rays, and three magnetic resonance imaging variables. Five ML classification methodologies were evaluated; the support vector machine demonstrated the best accuracy and was further used for the identification of the most important variables in relation to being structural progressors and the model development. A reproducibility analysis was performed with an external cohort from a clinical trial.

**Results:** Data revealed that the combination of age, BMI, and the ratios CRP/MCP-1 and leptin/C-reactive protein (CRP) are the most important variables in predicting OA structural progressors in both genders. Classification accuracies for both genders in the testing stage (OAI) were >80%, with the highest sensitivity of CRP/chemoattractant protein-1 (MCP-1). Reproducibility analysis demonstrated an accuracy ≥92%; the ratio CRP/MCP-1 showed the highest sensitivity in women and leptin/CRP in men.

**Conclusion:** This study offers a new automated patient- and gender-specific model, using only three baseline serum biomarkers and two demographic factors for identifying, at an early stage, individuals at-risk of being knee OA structural progressors. This model is a new step toward precision medicine, as it will significantly improve early clinical prognosis of knee OA patients with real time patient monitoring.

**Reference:** 1. Jamshidi A, et al. Ther Adv Musculoskelet Dis 2020;13;12.

**Disclosures:** JPP and JMP are shareholders and FA an employee of ArthroLab Inc.

## P281

### MULTIMORBIDITY AND FRAGILITY FRACTURES: A NATIONWIDE STUDY

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**Objective:** Multimorbidity is very common in elderly patients and there is insufficient knowledge in Portugal about the burden of multimorbidity in patients with prevalent fragility fractures (FF). The aim of this cross-sectional study is evaluate the association between multimorbidity with a prevalent FF in women with 50 years old and more.

**Methods:** Women aged 50 y and older from the EpiReumaPt study (2011-2013), a nationwide, population-based study, were evaluated. Selfreported data regarding sociodemographic, health-related quality of life, physical functions, FF and multimorbidity was collected through a semistructured questionnaire. Women with prevalent FF were compared with women without prevalent FF.

**Results:** The estimated prevalence of FF in women older than 50 y of age was 17.5%. Wrist fractures were the most prevalent fracture site (18.6%) and 57.1% of women reported one prevalent FF in the last twelve months. We verified that 43.7% of women with FF reported having had at least one fall in the previous year. A higher prevalence of multimorbidity (74.6%) has been found in the group of women with FF, after adjusted for age group, marital status, NUTSII and educational level. A statistically significant difference between Azores and Lisbon regions was found. For women with multimorbidity the probability of having a FF is 40% higher relatively to women with just one or no selfreported noncommunicable chronic diseases. In the group of women with FF, rheumatic disease and hypertension (62.7% and 58.6%, respectively) were the two most selfreported noncommunicable chronic diseases. Having FF combined

with multimorbidity brings increased risk to a lower quality of life and a higher degree of disability.

**Conclusion:** Women after 50 years old in Portugal with multimorbidity had a significant higher FF incidence compared with women at the same age with just one or no selfreported noncommunicable chronic diseases. FF combined with multimorbidity brings increased risk to a lower quality of life and a higher degree of disability. This study should emphasize the need to redesigned health services to care for patients in order to prevent noncommunicable chronic diseases and FF, especially in patients older than 50 years old.

## P282

### MUTATION DETECTION IN POSTMENOPAUSAL PATIENTS WITH OSTEOPOROTIC HIP FRACTURE USING TARGETED NEXT GENERATION SEQUENCING

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**Objective:** To identify disease-causing mutation in the vitamin D receptor (VDR) gene in a group of postmenopausal women with osteoporotic hip fracture using targeted next generation sequencing (NGS).

**Methods:** A total of 26 unrelated women with osteoporotic hip fracture admitted at the Philippine Orthopedic Center were included. Custom AmpliSeq™ *VDR* gene panel was designed to specifically target the VDR gene using Ion Torrent Personal Genome Machine.

**Results:** A total of 1322 unique variants in the whole 101 kb VDR gene in this group of patients with osteoporotic hip fracture was determined. Noteworthy is the identification of two novel heterozygous frameshift mutations. Of the two mutations, particularly interesting is the p.K111fs that is found in the nuclear receptor's hinge region between VDR's ligand binding domain and DNA binding domain.

**Conclusion:** Targeted NGS was successful in surveying the VDR gene for polymorphisms correlated with osteoporotic hip fracture. Through NGS technologies, we were able to sequence thousands of variants in postmenopausal patients with fragility fractures. Two of these genetic variants were found to potentially cause osteoporotic hip fracture in women volunteers. Such can provide valuable insight in VDR control as well as elucidate mechanism of disease pathogenesis.

## P283

### DISCOVERY OF GENETIC MARKERS CORRELATED WITH VITAMIN D: A STRATEGY TO OPTIMIZE DIETARY VITAMIN D RECOMMENDATION FOR MULTIPLE HEALTH OUTCOMES IN THE PHILIPPINES

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**Objective:** In the Philippines, based on the 2013 National Nutrition Survey, vitamin D deficiency was highest in Benguet at 60.3% and lowest in Cagayan, but still very high, at 19.5%. With vitamin D implicated in a wide range of multiple health outcomes, a fuller understanding of the determinants of vitamin D status is needed and must include consideration of inherited characteristics. The study determined the relationship of serum vitamin D levels and genetic variations in 502 lifestyle related genes among adult respondents, age 21 years old and above, from the 2013 Philippine National Nutrition Survey (NNS).

**Methods:** The study followed a cross-sectional research design. A total of 1160 adult respondents of the 2013 NNS and living in metro Manila, Philippines were included in the study. Anthropometric, biochemical, clinical and dietary data were generated through validated questionnaires, physical examination and laboratory analyses. Total serum 25-hydroxyvitamin D (25OHD3) was determined using electrochemiluminescence binding assay method. Genomic DNA was used for massively parallel sequencing of 502 lifestyle related genes.

**Results:** Of the study participants, 56% were classified as having low serum 25OHD3 concentration (<75 nmol/mL). Low 25(OH)D was associated in the following gene/genotypes: KNG1 rs11924390 T/T; ANKH rs2454873 G/G; NPFFR2 rs4129733 T/G; SH2B1 rs4788102 G/A; RAP1A rs494453 T/T and CRHBP rs7728378 T/C. These genes were previously associated to the risk of osteoporosis, obesity, type 2 diabetes mellitus, and stress response.

**Conclusion:** Large-scale analysis of genes associated with lifestyle disease and other determinants of overall health have shown great utility in the discovery of genes and polymorphisms that play a role in vitamin D nutrition. It is envisioned that understanding how genetic variations interact with environmental factors, especially nutrition may hold the key to better prevention and management of nutrition-related diseases and may be basis for future innovative genome-based functional food product development enriched with vitamin D.

## P284

### COST-EFFECTIVENESS ANALYSIS OF FRACTURE LIAISON SERVICE IN SECONDARY PREVENTION OF FRAGILITY FRACTURES IN SPAIN

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**Objective:** To assess the cost-effectiveness of a Fracture Liaison Service [FLS] model compared to standard care for secondary prevention of fragility fractures in Spain.

**Methods:** Disease progression was simulated with a Markov model through 7 health states (with and without anti-osteoporotic [OP] treatment, subsequent hip, vertebral, forearm and humerus fracture, and death) within a cohort of OP patients after initial fragility fracture who were candidates to initiate anti-OP treatment with a mean age of 65 years old and a mean proportion of females of 90.7%. A time horizon of 10 y and a 6-month duration per cycle was set. Clinical, economic, and quality of life parameters were drawn from the literature and local clinical practice. Use of resources and treatment patterns were validated by a panel of experts. The Spanish National Health System [NHS] perspective was adopted, taking into account direct healthcare costs expressed in 2020 Euros. A time preference discount rate of 3% was applied to costs and healthcare outcomes. Uncertainty of the parameters was assessed through an extensive range of deterministic, scenario and probabilistic sensitivity analyses.

**Results:** Implementing FLS for the secondary prevention of fragility fractures in Spain would provide a greater anti-OP treatment initiation and persistence. This would reduce subsequent fragility fractures, which would result in a reduction of disutilities and deaths. The results of this analysis showed a greater clinical benefit (0.01 and 0.08 life-years and quality-adjusted life years [QALYs] gained per patient, respectively) compared to standard of care. This would imply a higher cost (€563.69/patient) leading to an incremental cost-utility ratio of €6,855.23 per QALY gained. The multiple sensitivity analyses showed limited

dispersion of the base case results, corroborating their robustness and conservative approach.

**Conclusion:** From the NHS perspective and considering the locally established willingness-to-pay thresholds, the implementation of FLS would be cost-effective in the Spanish setting in comparison with standard care for secondary prevention of fragility fractures.

## P285

### EFFECT OF AROMATASE INHIBITORS ON BONE MINERAL DENSITY AND TRABECULAR BONE MICROARCHITECTURE IN PATIENTS WITH BREAST CANCER

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**Objective:** Aromatase inhibitors (AIs) are important components of adjuvant endocrine therapy in postmenopausal women with estrogen receptor positive breast cancer. The aim of our study was to assess the effect of Aromatase inhibitors (AIs) on BMD and trabecular bone microarchitecture in patients with breast cancer.

**Methods:** We studied 52 postmenopausal women (between 45-70 y) receiving adjuvant therapy (anastrozole or letrozole) after breast cancer. We measured lumbar spine (LS) and proximal femur (PF) BMD using DXA; trabecular bone score (TBS) was calculated using TBS iNsight software. DXA baseline assessment was obtained within 3 months of commencing therapy and after 2 y of treatment. Patients were divided in two groups: in group 1 were enrolled 27 patients with normal BMD and partially degraded bone microarchitecture (mean TBS - 1,312); in group 2 – 25 patients with T-score <-2 and partially degraded bone microarchitecture (mean TBS - 1,245). Patients in group 1 received Ca and Vit D, patients in group 2 started oral bisphosphonate (OB). DXA BMD and TBS values were assessed after 24 months of therapy.

**Results:** After 2 y interval in women from group 1 bone loss estimated to 6.1%, TBS decreased by 5.8%. In patients treated with OB DXA BMD value decreased by 2.7%, TBS decreased by 6.4%.

**Conclusion:** An AI treatment is associated with significant BMD loss and degraded bone microarchitecture. Bisphosphonates did not show positive effect on bone microarchitecture.

## P287

### EPIDEMIOLOGY AND SECULAR TRENDS OF PELVIC FRACTURES: A RETROSPECTIVE, POPULATION-BASED, NATIONWIDE OBSERVATIONAL STUDY

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**Objective:** Fractures of the pelvis and acetabulum are associated with osteoporosis, reduced mobility and imminent risk of further fractures. Still, the epidemiology of these central fractures has received little attention. This study aimed to describe the annual incidence of pelvic and acetabular fractures in Belgium.

**Methods:** We conducted a retrospective, nationwide, population-based study using the National Institute for Health and Disability Insurance database. Multiple codes for the reimbursement of the diagnosis and treatment of pelvic and acetabular fractures were collated and (since 2006) linked to the patients' age group, sex and region.

**Results:** From 1988-2018, 91317 pelvic and acetabular fractures were diagnosed. The overall incidence increased from 15.8/100000 persons/y in 1988 to 29.7/100000 persons/year in 2006 and to 37.6/100.000 persons/

y in 2018. These fractures showed a bimodal incidence, with a small peak in children (particularly boys), and an exponential increase in older adults, being twice as high in women vs. men. By linear regression, there was a significant decline in fracture incidence between 2006-2018 in the 20-29 y age group (9.8 to 8.7/100000 person-years, p=0,0015), and an increase in age groups 30-39 y (6.3 to 8.2/100000 person-years, p=0.0176), 50-59 y (14.8 to 22.0/100000 person-years, p=0.0002), 60-69 y (30.6 to 42.1/100000 person-years, p=0.0136). Between 2006-2018, 5957 patients (12.36%) underwent pelvic or acetabular fracture surgery. Surgical repair was performed in 2088 patients with acetabular fractures and 3869 patients with pelvic fractures. There were 3622 (60.8%) surgeries in patients younger than 60 y and 2335 (39.1%) in patients 60 y and older. For acetabular fractures, the proportion of surgical treatment was higher in Brussels (7.6%) compared to other regions (Flanders 3.8%, Wallonia 5.2%, both p<0.0001).

**Conclusion:** There is an increasing incidence of pelvic and acetabular fractures in Belgium, due to both a rising age-adjusted incidence and aging of the population. Most fractures are managed non-surgically, albeit with significant regional differences. Younger adults have the highest proportion of surgical treatment, but given the much higher incidence in older adults, there is a considerable amount of operations in older adults too. Our findings inform regional policy making for fragility fractures of the pelvis.

## P288

### TREATMENT GAP AMONG PATIENTS WITH PRIMARY OSTEOPOROSIS: A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS

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**Objective:** Despite clinical guidelines, patients (pts) diagnosed with osteoporosis (OP) or a recent fragility fracture (fx) are often not treated; we explored treatment gap characteristics and magnitude.

**Methods:** To investigate treatment rate, we conducted a PRISMA-compliant systematic literature review (SLR) and random-effect meta-analysis (MA) on MedLine publications to June 2020. Observational studies including pts with diagnosed OP or incident fx reporting quantitative treatment rate estimates were included. Each SLR step involved 2 independent reviewers and several subgroup MAs were run.

**Results:** 139 articles were included in the SLR (N=3,911,151 pts) and 131 in the MA (N=2,092,369 pts). The overall pooled treatment rate was 29.7% (95%CI 25.2-34.7), notably lower in high-quality studies (Table). Pooled treatment rates were similar across different geographies. Pts with history of fx prior to index date had higher treatment rates compared with pts without history of fx (42.2% vs. 21.1%). Vertebral fx pts were more likely to receive OP treatment (Table).

**Conclusion:** This study confirms the concerning level of undertreatment of primary OP pts as a worldwide challenge. High-quality real-world studies show that only one in four pts with OP or fx are treated. Pts with multiple fx are more likely to receive OP treatment but still at a far from optimal rate (42.2%).

Table: Overall treatment rates – pooled estimates

| | Number of studies (n) | Number of pts (n) | Pooled treatment rate % (95% CI) |
|---|---|---|---|
| **Region** | | | |
| North America | 58 | 880,708 | 29.8 (23.5–37.1) |
| Europe | 36 | 603,158 | 28.5 (19.8–39.2) |
| Asia/Pacific | 33 | 607,697 | 30.3 (21.9–40.3) |
| Middle East | 4 | 806 | 34.0 (30.0–38.2) |
| **History of fracture** | | | |
| Yes[a] | 9 | 34,151 | 42.2 (26.5–59.8) |
| No[b] | 10 | 180,474 | 21.1 (10.8–37.0) |
| Mixed[c] | 29 | 218,548 | 29.6 (18.6–43.6) |
| Not available | 94 | 1,742,362 | 28.9 (24.0–34.3) |
| **Index[d] fracture site** | | | |
| Hip/femur | 49 | 468,226 | 26.1 (19.6–33.7) |
| Vertebral | 16 | 390,089 | 35.0 (27.8–42.9) |
| Wrist/humerus | 17 | 118,404 | 15.1 (10.6–21.1) |
| **Study quality[e]** | | | |
| High | 26 | 867,269 | 26.6 (20.0–34.6) |
| Intermediate | 69 | 641,238 | 27.7 (21.5–35.0) |
| Low | 36 | 583,862 | 37.0 (26.9–48.4) |

[a]100% pts; [b]0% pts; [c]0–100%, not inclusive; [d]event expected to trigger treatment; [e]Assessed by NIH score. CI: confidence interval.

## P289
## FACTORS ASSOCIATED WITH BONE METABOLISM PARAMETERS IN PRIMARY HYPERPARATHYROIDISM BEFORE AND AFTER SURGERY

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**Objective:** Although primary hyperparathyroidism (PHPT) is usually asymptomatic and diagnosed incidentally, unwanted effects of excessive PTH can be observed during diagnosis of PHPT. The aim of this study is to identify the factors affecting BMD values and changes in bone metabolism parameters before and after surgical intervention for PHPT.
**Methods:** A total of 214 patients (59.6±12.2 y, F/M: 187/27) diagnosed PHPT were included in the study. 145 patients underwent to the surgery (59.1±11.8 y, F/M: 123/22) and 69 patients were followed under medical treatment. Preoperative and postoperative first year available data such as demographic parameters, clinical characteristics, laboratory data, adenoma diameter and location with neck USG and sestamibi imaging, BMD measurements.
**Results:** DXA measurements revealed osteopenia in 88 (41.1%) and osteoporosis in 55 (25.6%) of all patients at the time of diagnosis. Hypercalcemia and hypercalciuria were observed in 205 (95.8%) and 75 (35.0%) of the patients. Serum Ca (p<0.01), PTH (p<0.05) and ALP (p<0.05) levels were significantly higher in hypercalciuric patients compared to normocalciuric patients. Postoperative in the first year, serum Ca (p<0.0001), PTH (p<0.0001), ALP (p<0.0001), 24-hour urinary Ca levels (p<0.0001) decreased compared to preoperative values, and serum P (p<0.0001) level increased significantly. L1-L4 lumbar spine BMD increased compared to preoperative period (p<0.05) while both femoral neck and L1-L4 lumbar spine BMD values at the time of diagnosis in patients under medical treatment were similar in the first year. At the diagnosis, PTH levels correlated with L1-L4 lumbar spine (p<0.01, r=-0.22), femoral BMD (p<0.001, r=-0.26), ALP (p<0.0001, r=0.36), serum Ca (p<0.0001, r=0.53), 24-h urinary Ca (p<0.05, r=0.15) and the maximum diameter (p<0.0001, r=0.52) while negatively

correlated with levels of serum P (p<0.0001, r=-0.49) and 25-OH vitamin D (p<0.0001, r=-0.26) in whole group.
**Conclusion:** Osteoporosis and osteopenia observed more frequent in PHPT than estimated population frequency. One year after surgery, while normocalcemia and normal PTH levels achieved improvement in BMD observed at lumbar spine.

## P290
## THERAPEUTIC ADHERENCE IN PATIENTS WITH PREVIOUS OSTEOPOROTIC VERTEBRAL FRACTURE

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**Objective:** To evaluate the adherence to osteoporosis therapies in a sample of patients with previous osteoporotic vertebral fracture.
**Methods:** This study was a longitudinal observational analysis characterizing osteoporosis medications adherence in those patients who started treatment between January and December 2018. Data were obtained from patients attended in our Fracture Liaison Service (FLS) with at least one osteoporotic vertebral fracture. We measure the percentage of patients who retained the treatment verified by electronic prescription after 24 months. In addition, descriptive data was collected including age, sex and osteoporosis treatment.
**Results:** The total number of patients evaluated was 83. After exclusion of patients with a fewer than 6 months of follow-up, the final study population was 64, mean age 69.8 y, 90.6% women. 10 (15.6%) received alendronate, 1 (1.6%) risedronate, 10 (15.6%) zoledronate and 43 (67.2%) denosumab. 5 patients who received denosumab (11.6% of them) showed no adherence, only 1 patient who received alendronate and 1 patient with zoledronate (10% of each) showed no adherence.
**Conclusion:** Patients with vertebral fractures who continue follow-up for more than 6 months in our FLS showed optimal therapeutic adherence to osteoporosis medications.

## P291
## CORRELATIONS BETWEEN CLINICAL PARAMETERS AND SERUM CYTOKINE LEVELS IN OSTEOARTHRITIS PATIENTS WITH OBESITY

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**Objective:** Obesity is a most frequent factor which can influence on development and progression of osteoarthritis (OA) and has similar mechanisms of immunopathogenesis. This study aimed to explore the symptoms and the proinflammatory serum cytokine levels in OA (hand, knee, hip) patients with obesity and to estimate relationships between clinical and immunological features.
**Methods:** Patients who participated in this study (n=250) were divided in two groups: patients with bilateral hand, knee and hip OA (n=169) and obesity and control group (n=81) which had only hand, knee and hip OA without such comorbidity. All patients were comparable in age, sex and duration of OA. We assessed serum cytokine levels (IL-1b, IL-6, IL-10, IL-18), NO including adipokines such as adiponectin and leptin, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR). Various symptoms of OA and mental health were measured using visual analog scale (VAS), Functional Index for Hand Osteoarthritis (FIHOA), WOMAC Knee/Hip, Knee injury and Osteoarthritis Outcome Score (KOOS), Hip injury and Osteoarthritis Outcome Score (HOOS) and with short-form 36 (SF-36), Psychological Health Questionnaire (PHQ9), Coping Strategy Questionnaire (CSQ). We used U-Mann-Whitney test

to detect differences between groups. Correlation was assessed using Spearman correlation coefficient ($r_s$).

**Results:** Patients with OA and obesity are characterized by the prevalence of KOOS symptoms (median (Me) 61.1; interquartile range (IQR) 55.5-69.4; p<0.001) and low values of mental health (SF-MH) (Me 52; IQR 44–64; p<0.001). Statistically significant differences in serum cytokine levels were not found but correlation analysis identified the relationships between clinical parameters and such cytokines as IL-1b, IL-6, IL-10, IL-18 in OA patients with obesity. Some data are presented (Table). Patients with OA and obesity had high leptin level (Me 54.7; IQR 32.5–64.1; p<0.001). Correlation analysis showed the relationships between adiponectin level and physician's global assessment (VAS) (r=0.9, p=0.01), CRP and KOOS symptoms (r=0.8, p=0.04) in group OA patients with obesity also.

Table. Correlations between clinical parameters and serum cytokine levels in studied groups.

| Cytokines | OA patients with obesity n=169 | | | | | |
|---|---|---|---|---|---|---|
| | Pain | Total score | Sport activity | Physical Functioning | Bodily pain | Physical health |
| | (WOMAC Knee) | (WOMAC) | (KOOS) | (SF36-PF) | (SF36-BP) | (SF36-PH) |
| IL-1b (pg/ml) | 0.002* | 0.01* | 0.05 | 0.03* | 0.41 | 0.10 |
| IL-6 (pg/ml) | 0.17 | 0.13 | 0.24 | 0.13 | 0.01* | 0.01* |
| IL-10 (pg/ml) | 0.24 | 0.35 | 0.01* | 0.13 | 0.49 | 0.29 |
| IL-18 (pg/ml) | 0.24 | 0.35 | 0.29 | 0.05 | 0.17 | 0.01* |

Table legend: * r - p<0.005;

**Conclusion:** Such comorbidity as OA and obesity has clinical and laboratory features of progression of OA. Such immunological factors as serum cytokines concentrations, adipokines, CRP are linked with the severity of obesity-associated OA. A different variation of correlations may suppose role of this proinflammatory factors in the pathogenesis of this OA phenotype. These data should be verified by larger studies.

## P292
### ULTRASOUND ASSESSMENT OF GOUT LESIONS IN AN ALGERIAN POPULATION WITH ASYMPTOMATIC HYPERURICEMIA

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**Objective:** Hyperuricemia is a common biological abnormality, often clinically asymptomatic. However, it can announce a gout and be linked to many diseases such as metabolic syndrome, high blood pressure or kidney disease. In fact, the majority of learned societies do not recommend any urate lowering therapy (ULT) as long as the hyperuricemia remains asymptomatic. But it turns out that part of the population with asymptomatic hyperuricemia (AH) develops a gout after a few years particularly with genetic predisposition, but also on certain risk factors that need to be confirmed. By this way, musculoskeletal ultrasound (MUS) can detect "asymptomatic gout" by visualizing signs of urate deposits (UD) in subjects with AH. Our main objective is already to estimate the prevalence of specific signs of gout in Algerian population with AH and assess the factors exposing to UD.

**Methods:** This is a descriptive cross-sectional study from January 2017 to February 2019, with the recruitment of subjects with AH and serum urate level > 60 mg/L, who do not take any ULT and have not associated any chronic inflammatory rheumatism, where we performed a MUS of the knees, metatarsophalangeal joints MTP1, MTP2 and metacarpophalangeal joint MCP2 and MCP3 with the Achilles, patellar and quadricipital tendons.

**Results:** We retained 258 subjects with AH, 132 women and 126 men (sex ratio=0.95), the mean age was 59 y, the mean BMI was 28.4 kg/m$^2$, 42 patients were under diuretics, 37 patients reported being on low-dose of aspirin 100 mg daily. The mean rate of serum urate levels was 78±10 mg/L, the prevalence of UD found at the MUS was 22% (n=58), among them 36% (21/58) had a sign of the double contour DC on the MTP1 and 29% (17/58) on the knee, 7% (4/58) had tophi on the MTP1 and 3% (2/58) had urate aggregates. The factors reported to be linked to UD in the sample were: the male gender (p=0.0016); the high uric acid level (p= 0.0355); BMI (p=0.0427); taking diuretics for women (p=0.0002).

**Conclusion:** Through this work, it is clear that elementary ultrasound lesions related to gout disease are common in a population with AH and concerned one fifth of subjects in our study with a higher risk in men and subjects with obesity and high uric acid level, but also in women taking diuretics. These results need to be enhanced with a randomized controlled study in order to better determine the predisposing factors for gout in any subject with AH.

## P293
### PREVALENCE OF SARCOPENIA IN ELDERLY PATIENTS ADMITTED TO HOSPITAL WITH ACUTE CEREBROVASCULAR DISEASE

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**Objective:** To define the muscle mass, muscle strength and prevalence of pre- and sarcopenia in patients admitted to the hospital due to a new ischemic stroke and a transitory ischemic attack (TIA).

**Methods:** 60 patients (35 women, 25 men, average age 72.9±11.6 y, 10 patients had TIA, 50 - ischemic stroke) were analyzed with bioelectrical impedance analysis (BMI). Skeletal muscle mass index (SMMI) was calculated as skeletal muscle mass (kg)/height (m)$^2$. Muscle strength was measured in all patients using a Jamar hand dynamometer.

**Results:** The cutoff values for SMMI were in conformity with the consensus of EWGSOP1 (<10.76 kg/m$^2$ in men, <6.76 kg/m$^2$ in women). Cutoff values for grip strength were according to EWGSOP2 (< 27 kg in men, < 16 kg in women). In our study, the mean SMMI was 10.9±1.4 kg/m$^2$ (11.6±0.9 kg/m$^2$ in males, 10.5±1.0 kg/m$^2$ in females). All women had muscle mass value higher than EWGSOP1 cutoff values. On the contrary, 6 out of 25 males (24%) had decreased muscle mass. The mean hand grip strength was 25.2±12.7 kg (36.8±10.2 kg in men, 16.9±4.4 kg in women).According to the EWGSOP2 criteria 19 out of 35 women (54%) and 6 men (24%) performed decreased muscle strength. In our study, only 2 patients (both males) fulfilled criteria for sarcopenia diagnosis, however 23 patients (predominantly females) were diagnosed with presarcopenia due to reduced muscle strength and preserved muscle mass.

**Conclusion:** The elderly patients with a new ischemic stroke or TIA assessed with BMI and hand grip strength demonstrated low prevalence of sarcopenia in our study (3.3%). Nevertheless 39.6% of patients (54% of females) had decreased hand grip strength and can be considered as presarcopenia patients.

## P294
### BONE MINERAL DENSITY STATUS AND PATHOLOGICAL FRACTURES IN CHUVASH PATIENTS WITH NEWLY DIAGNOSED PAGET'S DISEASE

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**Objective:** This study was to evaluate BMD of the central parts of the skeleton according to DXA and to conduct a retrospective assessment of pathological fractures in patients with a newly diagnosed diagnosis of Paget's disease (PD) the ethnic Chuvashia region of Russia where this pathology is rear.

**Methods:** In the blood were studied the total calcium, phosphorus, creatinine, alkaline phosphatase (ALP). The assessment of the BMD of the lumbar spine (LI-LIV) and the proximal parts of both femurs was performed by the DXA method.

**Results:** The new diagnosis of PD was establish in Regional Medical Center from October 2011 to November 2020 in 21 patients (11 men, 10 women) with a mean aged $59.0\pm10.9$ y. The diagnosis of PD was established on average $7.6\pm5.3$ y after the clinical manifestation. In 18 cases (85.7%) was diagnosed a polyostotic type of PD, and only 3 cases monostotic type of the disease. PD was detected at the intermediate stage in 15 people (71.4%) or at the late stage in 6 people (28.6%). The activity of alkaline phosphatase increase by 1.5-9.5 times with normal content of total calcium ($2.3\pm0.2$ mmol/L), phosphorus ($1.1\pm0.2$ mmol/L) and creatinine ($88.3\pm21.9$ mmol/L). According to the DXA, the average T-test values in the lumbar spine were $-3.16\pm1.93$ CO, and in the proximal femur $-2.18\pm1.20$ CO. Osteoporosis was detected in 78.6%, osteopenia-in 14.3% of cases. More frequently PD affected pelvic bones (33.3%), femoral (38.1%) and tibial (14.3%) bones, lower thoracic and lumbar spine (19.0%). 52.4% of patients with PD had a history of pathological fractures. Compression fractures of the vertebral bodies were found in 6 people, fractures of the proximal femur in 5 people, pelvic bones in 1 person, surgical neck of the humerus in 1 person. 6 out of 11 patients had a history of low-energy multiple fractures history. Secondary coxarthrosis and/or gonarthrosis of the third radiological stage was detected in 17 patients (81%).

**Conclusion:** All rear cases of PD in Chuvash were detected at the advanced stages when complications of this disease have already developed.

## P295
### POTENTIAL CLINICAL USEFULNESS OF BIOMARKERS IN CURRENT MEDICAL APPLICATIONS

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**Objective:** Biomarkers are potentially useful in the contexts of primary, secondary and tertiary prevention. The main characteristics of an ideal biomarker include that they are safe and easy to measure with a scientific evidence to suggest that biomarker is any substance, structure or process that can be measured in the body or its products and influence or predict the incidence of outcome or disease [1,2]. Additionally, variation in biomarker levels with gender and ethnicity should be elucidated, and the biomarker should have good performance characteristics. Risk prediction scores can combine information from several different biomarkers in order to estimate an individual's risk of developing an outcome, such as disease or death.

**Methods:** As reported in several publications, biomarkers are potentially useful along several points of a disease continuum. They can be useful in the context of primary prevention, for preventing disease itself. Moreover, they can facilitate secondary prevention by the early detection of disease via screening, detection of subclinical disease, and by helping the monitoring of disease progression. Biomarkers are also useful for the purpose of tertiary prevention, allowing guide treatment to avoid morbidity owning to established disease [3].

**Results:** The most important aim of identifying biomarkers that can accurately predict disease is to prevent disease in those at greatest risk

and to personalize treatment according to maximal potential patient benefit. With the completion of the human genome project and the rapid expansion of the "omics field (i.e., genomics, proteomics, metabolomics, lipomics, ribomics and pharmacogenomics.

**Conclusion:** There is a growing interest in the field of biomarkers in most subspecialties of medicine. Discrimination, calibration and risk reclassification are the usual classical methods which allow to assess the clinical utility of biomarkers, and each method has strengths and weaknesses that should be considered when employed to assess a biomarker.

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## P296
### SARCOPENIC OBESITY AND FUNCTIONAL PROGNOSIS IN WOMEN WITH SUBACUTE HIP FRACTURE: A SHORT-TERM PROSPECTIVE STUDY

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**Objective:** To evaluate the effect of sarcopenic obesity on ability to function in women with subacute hip fracture.

**Methods:** We prospectively studied one sample of women with subacute hip fracture. At admission to our rehabilitation hospital, we assessed grip strength by a Jamar dynamometer and body composition by DXA. Sarcopenia was defined according to the criteria released by EWGSOP2 in 2019, with both grip strength <16 kg and appendicular lean mass $(aLM)/(height)^2$ <5.5 kg/m$^2$. Alternatively, aLM <15 kg was substituted for $aLM/(height)^2$ <5.5 kg/m$^2$ to define sarcopenia. Obesity was diagnosed with fat mass exceeding 40% of total body mass. Ability to function in activities of daily living was assessed by the Barthel index.

**Results:** We evaluated 183 of 200 women. Sarcopenic women had lower Barthel index scores assessed at the end of subacute inpatient rehabilitation (U=367,0; z=-3.8; P<0.001) and lower Barthel index effectiveness (U=374.5; z=-3.68; P<0.001) than non-sarcopenic women. Conversely, we found no significant differences in function between obese and non-obese women. The concurrent presence of sarcopenia and obesity did not worsen the functional prognosis vs. the presence of isolated sarcopenia. After adjustment for Barthel index scores before rehabilitation, age, hip-fracture type and cognitive impairment, sarcopenia was significantly associated with Barthel index scores (P=0.008) and Barthel index effectiveness (P=0.004), whereas obesity was not. The results did not materially change when aLM <15 kg was substituted for $aLM/(height)^2$ <5.5 kg/m$^2$ to confirm sarcopenia in the women whose hand grip strength was <16 kg.

**Conclusion:** The concurrent presence of obesity did not worsen the negative prognostic role of sarcopenia in the short-term recovery of ability to function in women with subacute hip fracture.

## P297
### ASSOCIATION BETWEEN SARCOPENIA AND OSTEOPOROSIS IN SUBACUTE HIP FRACTURE: A CROSS-SECTIONAL STUDY OF 262 WOMEN

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**Objective:** To assess the association between sarcopenia and osteoporosis in women with a fragility fracture of the hip.

**Methods:** We studied 262 of 290 women with subacute hip fracture. A scan by DXA was performed to assess body composition. A Jamar dynamometer was used to measure hand grip strength. Sarcopenia was diagnosed with both hand grip strength <16 kg and appendicular lean mass (aLM) <15 kg, according to the EWGSOP2 criteria released in 2019. Osteoporosis was identified with low femoral BMD (threshold fixed at 2.5 SD below the mean of the young reference population).

**Results:** Osteoporosis was found in 189 of the 262 women (72%; 95%CI from 67% to 78%) whereas sarcopenia in 147 of the 262 (56%; 95%CI from 50% to 62%). The unadjusted odds ratio to have osteoporosis for a sarcopenic woman was 2.93 (95%CI from 1.69 to 5.19, P<0.001). After adjustment for age, time interval between fracture and DXA scan and body fat percentage the odds ratio was 2.30 (95%CI from 1.27 to 4.14; P=0.006). Data did not materially change after substituting BMI for body fat percentage among the independent variables in the regression model: the adjusted odds ratio to have osteoporosis for a sarcopenic woman became 1.94 (95%CI from 1.05 to 3.56; P=0.033).

**Conclusion:** We show a positive association between sarcopenia and osteoporosis in 262 women with a fragility fracture of the hip. We contribute to the concept of tight links between bones and muscles in the poorly investigated population of older women with a fragility fracture of the hip. It is noteworthy that the EWGSOP2 sarcopenia definition can successfully capture the women with concomitant osteoporosis.

## P298

### INCREASED PSYCHOLOGICAL STRAIN AMONG ORTHOPAEDIC HEALTHCARE WORKERS IS ASSOCIATED WITH LONGER WORKING HOURS AND HAS POTENTIAL IMPACTS ON FAMILY RELATED ADJUSTMENTS

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**Objective:** To investigate the psychological strain experienced by orthopaedic healthcare workers and attributing factors during the COVID-19 pandemic.

**Methods:** We surveyed healthcare workers in an outpatient musculoskeletal clinic with a questionnaire based on the validated Caregiver Strain Index[1]. We have previously shown the prevalence of psychological strain during the pre-peak phase of the pandemic.[2] The same group was followed up 6 months later (post-peak phase) to evaluate the downstream psychological strain.

**Results:** Of the 57 participants who were followed up, 30 (52·6%) experienced a greater level of strain (Group A), similar to the prevalence in our previous study (51·6%). Significantly, participants in Group A work longer hours per day compared to Group B (8.8±1.6 vs. 8.0±1.5; mean difference, 0.8; 95%CI, 0.0 to 1.6; p=0.043). "Family adjustments" (84.2%) garnered the most positive responses.

**Conclusion:** Longer working hours contributes to psychological strain and measures should be designed to mitigate this. Potential impact on family life of healthcare workers is an unrecognised toll which should receive more attention. Health ministries should ensure measures to safeguard the mental health of healthcare workers to avoid reactive strategies during a pandemic.

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Table 1. Population Demographics

| | | Pre-Peak Phase | | | Post-Peak Phase | | |
|---|---|---|---|---|---|---|---|
| | | Group 1 (n = 32) | Group 2 (n = 30) | p-value | Group A (n = 30) | Group B (n = 27) | p-value |
| Age (years) | | 40.4 ± 13.4 | 39.4 ± 11.9 | 0.756 | 39.6 ± 13.0 | 44.2 ± 15.3 | 0.223 |
| Gender (F:M) | | 24 : 8 | 21 : 9 | 0.659 | 20 : 10 | 20 : 7 | 0.576 |
| Race | Chinese | 14 | 7 | | 11 | 8 | |
| | Malay | 11 | 9 | 0.172 | 11 | 11 | 0.204 |
| | Indian | 5 | 7 | | 7 | 3 | |
| | Others | 2 | 7 | | 1 | 5 | |
| Marital status | Single | 11 | 9 | | 9 | 7 | |
| | Married | 20 | 19 | 0.762 | 20 | 18 | 0.753 |
| | Widowed | 0 | 1 | | 0 | 1 | |
| | Divorced | 1 | 1 | | 1 | 1 | |
| Living status | Alone | 0 | 0 | | 1 | 0 | |
| | With family | 32 | 28 | 0.138 | 28 | 26 | 0.632 |
| | With partner | 0 | 2 | | 1 | 1 | |
| Vocation | PSA | 19 | 9 | | 13 | 10 | |
| | HCA | 2 | 2 | | 1 | 2 | |
| | Nurse | 3 | 10 | 0.095 | 7 | 8 | 0.233 |
| | OT | 2 | 1 | | 0 | 0 | |
| | Doctor | 6 | 8 | | 9 | 4 | |
| Working hours (hour/day) | | 8.4 ± 1.8 | 8.6 ± 1.1 | 0.733 | 8.8 ± 1.6 | 8.0 ± 1.5 | 0.043 |
| Work experience (year) | | 10.0 ± 9.5 | 11.4 ± 11.5 | 0.623 | 11.2 ± 11.7 | 14.8 ± 13.3 | 0.281 |

PSA = Patient Service Associate; HCA = Healthcare Assistant; OT = Orthopedic Technician

## P299

### MANAGING A FLS IN A BRAZILIAN HEALTHCARE PROVIDER DURING COVID'S PANDEMIC

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**Objective**: Fiosaúde is a healthcare provider that has approximately 15,000 beneficiaries. 27% of them are over 60 y of age. In January of 2015 we started an FLS (PREVREFRAT) in the Fiosaúde Clinic. Men and women over 50 y of age with a history of fragility fractures were referred. From 2016, patients with a high risk of fractures (BMD <2.5 SD in the lumbar spine or neck or total femur) were referred without previous fractures. The objective of this presentation is to demonstrate the cost-effectiveness of FLS in this environment comparing the years 2019 and 2020 (pandemic).

**Methods:** 119 patients participating in the FLS were evaluated in the years 2019 and 2020. 109 women and 10 men, aged between 53-96 y (mean 74 y). 44 patients were treated with zoledronic acid 5 mg, 54 with denosumab 60 mg, 1 with ibandronate and 20 with calcium and vitamin D (12 zoledronic acid drug holiday). Subsequent fracture outcome and costs were compared during the years 2019 and 2020. Usually, patients using zoledronic acid were infused at home and patients received denosumab during regular visits. With the advent of the pandemic, denosumab patients also started to receive it at home. There was great concern about the rebound effect due to the suspension or delay in the application of denosumab. No patient was delayed for more than 30 days. In patients using zoledronic acid, due to the characteristics of the drug, greater tolerance was allowed. Communication tools such as telemedicine, e-mail and phone calls were widely used in the monitoring and scheduling of patients.

**Results:** In 2019 there were 3 subsequent fractures and 1 subsequent fracture in 2020. In this environment the cost of a fragility fracture is $10500. The annual cost (including medical fees, medication and laboratory and imaging tests) in 2019 was US $42056 and US $47726 in 2020 (US $5670 difference). The isolated cost of home application of denosumab was US $1481.20. 53.8 fractures were avoided in 2019 and 54.74 in 2020, generating savings of US $56510 in 2019 and US $57470 in 2020 (difference of US $9660).

**Conclusion:** Adequate planning and concentrated efforts, especially by the Nursing team, allowed the FLS to function following their effectiveness and safety protocols, respecting their deadlines in such an

atypical and risky moment. Despite rising costs to face the challenges posed by the pandemic, the FLS in the healthcare provider environment has proved to be highly cost-effective.

## P300
### INDICATIONS OF CYCLIC ANTI-PEPTIDE CITRULIN ANTIBODIES: EXPERIENCE OF THE RHEUMATOLOGY DEPARTMENT

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**Objective:** Anti-cyclic citrullinated peptide antibody (anti CCP) is known to be a useful marker for the diagnosis of rheumatoid arthritis (RA). Its specificity for rheumatoid arthritis is reported to be 89-98%, is of particular interest as it is higher than all other serological markers reported previously. Recently, the additional usefulness of anti CCP as a predictor of joint destruction has attracted attention. In contrast to its specificity in RA, the positivity of anti CCP can be seen in other diseases.

**Methods:** A retrospective, descriptive study of records of patients with a positive anti CCP in rheumatology department over a period of 32 months from January 2018 to August 2020.

Inclusion criteria: all patients who were requested and found to be anti CCP positive, they were all tested in the same laboratory. Exclusion criteria: all patients with negative anti CCP.

**Results:** There were 67 patients, 59 women and 8 men, with a sex ratio M/F of 0.13. The average age of the patients was 52 y, with extremes ranging from 33-81 y. Diabetes and hypertension were the most common comorbidities in 25% of the patients. Joint signs included inflammatory articular pain and arthritis. Biological inflammatory syndrome was present in >62%. RA was retained in 49 patients, 9 psoriatic arthritis, 6 Sjögren's syndrome and 3 for other connective tissue diseases.

**Conclusion:** Our data illustrate that anti CCP antibodies can be linked to joint damage not only in RA but also in other rheumatic diseases. Recently, some studies have reported the relationship between the presence of anti CCP antibodies and joint damage in non-RA diseases. Gottenberg and colleagues in a work on Sjögren's syndrome, reported that 7.5% of patients with anti CCP(+). These findings in the literature, are fully consistent with our results. Indeed, RA was the predominant diagnosis in our series followed by rheumatic psoriasis. However, our results, as well as others reported in the literature, suggest that anti CCP may be useful as a marker of joint inflammation not only in RA but also in others.

From this work it appears that the positivity of anti CCP is not pathognomonic to RA, other pathologies mentioned above may be associated. Therefore, it would be wise that further studies concerning anti CCP in non-RA diseases should clarify this issue.

## P301
### RETROSPECTİVE COMPARISON OF THE EFFECT OF IL-17 BLOCKER THERAPY AND ANTI-TNF AGENT THERAPY ON BONE MNERAL DENSTY IN AXIAL SPONDYLOARTROPATHY PATENTS

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**Objective:** Axial spondyloarthropathy (AxSpA) is a chronic inflammatory disease of the axial skeleton characterized by inflammatory low back pain. Osteopenia and osteoporosis may accompany since the early stages of the disease. TNFα, which plays a key role in inflammation, is also an osteoclast activator. Anti-TNFα agents and IL-17 blockers used in AxSpA treatment, which have been used in recent years, have positive effects on BMD in patients with AxSpA by reducing inflammation. This study was conducted to compare the BMD measured by DXA in patients with AxSpA under anti-TNFα and IL-17 blockers treatment.

**Methods:** 66 patients who have been diagnosed with AxSpA according to the 2009 Assessment in SpondyloArthritis International Society (ASAS) criteria were involved in our study. 27 of 66 patients were treated with anti-TNFα and 39 patients were treated with IL-17 blocker (secukinumab). All patients' sociodemographic data, medications, anteroposterior lomber, femur neck and femur total DXA values (BMD, T-score and Z-score) taken at the beginning of the study and 1-y later were evaluated. Erythrocyte sedimentation rate (ESR) and C-reactive 9rotein (CRP) and 25(OH)vitD levels results were evaluated. Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and Bath Ankylosing Spondylitis Functional Index (BASFI) values, which are disease activity and function indicators, were evaluated at the beginning and after 1 y. Outcome values were compared between those receiving IL-17 blocker therapy and anti-TNFα agent therapy.

**Results:** In this study, 66 patients were included for evaluation. (37.8% of them were women (n:25) and 62.1% of them were men (n:41)). Average duration of disease was 5.3±2.7 y (range: 1-12 y). Patients' clinical data were similar in patients treated with both anti-TNF and IL-17 blocker. Statistically significant negative correlation was detected between patients' age and femur total BMD values (r: -0.298 p:0.015). The mean lumbar region (L2-L4) BMD value of the patients was 1.07±0.29 and femoral neck BMD value was 0.93±0.27. In patients using both anti-TNF and IL17 blockers, a statistically significant increase was found in the lumbar region (L1-L4, L2-L4), femoral neck and femur total BMD after 1 y of observation (p<0.05). In patients using anti-TNF, an increase of 9.5% in lumbar (L2-L4) BMD and a 1.6% increase in femoral neck BMD was found. In patients using IL-17 blocker, there was a 5.1% increase in lumbar (L2-L4) BMD and a 1.1% increase in femoral neck BMD. Compared to patients using anti-TNF, the rate of increase in femur total BMD was higher in patients using IL-17 blocker (p=0.013). Patients who were previously treated with another biological drug (anti-TNF agent) had a higher rate of increase in BMD at the end of 1 y than naïve patients (p<0.01).

**Conclusion:** BMD decreases in time in AxSpA patients due to inflammation. Pharmacological treatments that suppress inflammation, such as anti-TNFα and IL-17 blockers, have been found to increase bone mineral density values as well as ceasing the loss of in bone mineral density. The positive effect of IL-17 blockers on femur total bone mineral density was determined more than anti-TNFα agents.

## P302
### RENAL SAFETY OF ZOLEDRONIC ACID IN PATIENTS WITH BORDERLINE KIDNEY FUNCTION AT A METABOLIC BONE CENTRE IN THE UK

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**Objective:** Zoledronic acid is a bisphosphonate widely used for the treatment of osteoporosis that leads to improvements in bone mineral density and reductions in fractures. A potential side effect is nephrotoxicity and acute kidney injury (AKI). Advice from the UK Medicines and Healthcare products Regulatory Agency (MHRA) in 2019 stated that creatinine clearance (CrCl) and not estimated glomerular rate (eGFR) should be used to guide and make decisions about treatment and that patients should not receive zoledronic acid if their CrCl is below 35 ml/min. The objective of this study was to review the safety of our previous practice using eGFR and the clinical impact of implementing the MHRA recommendations.

**Methods:** The study was performed at the Metabolic Bone Centre (MBC) in Sheffield Teaching Hospitals, UK. Data on all the patients

who had zoledronic acid infusions from 1/09/2015 to 1/10/2020 at the center were retrieved and evaluated.

**Results:** Data on 4405 patients were retrieved. Serum creatinine in the 14 days post-infusion was available for a total of 969 infusions and amongst them, 160 (16%) infusions were given with baseline CrCl <35 ml/min. AKI was observed within 14 days following 45 infusions (4.5%). Only 9 infusions resulted in AKI with a pre-treatment of CrCl <35 ml/min. If the MHRA rules had been followed (calculating CrCl for patients aged ≥75 y and/or extreme BMI <18 or >40 kg/m$^2$), 996 infusions with baseline CrCl <35 ml/min would not have been given. Logistic regression showed that both CrCl and eGFR were significant factors in predicting AKI within 14 days, but that the currently recommended cutoff of CrCl 35 ml/min had poor sensitivity. The areas under the curve for each marker were 0.608 and 0.627, respectively, suggesting that neither are sensitive in predicting AKI.

**Conclusion:** This study suggested that zoledronic acid could be contributing to the development of AKI in some patients. Estimated GFR is better validated than CrCl and so is preferable to use. Since low eGFR is at least as good a predictor of AKI as CrCl, it should be used in everyday clinical practice.

## P303
### A NEW WEARABLE TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION DEVICE IS MORE EFFICIENT AND BETTER TOLERATED THAN WEAK OPIOIDS IN THE TREATMENT OF KNEE OSTEOARTHRITIS PAIN

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**Objective:** To compare the analgesic efficacy and safety of a new wearable transcutaneous electrical nerve stimulation (W-TENS) to weak opioids (WO) in the treatment of moderate to severe, nociceptive, chronic pain in knee osteoarthritis (KOA) patients.

**Methods:** ArthroTENS study is a noninferiority, multicentric, prospective, randomized, single-blinded for primary efficacy outcome, controlled, 2-parallel groups, clinical study comparing W-TENS to WO over a 3-month controlled period with an additional optional noncontrolled 3-month follow-up in W-TENS group. Patients had KOA (ACR criteria) with baseline pain intensity (PI) ≥4 on a numerical rating scale (NRS), after failure to level 1 analgesics/NSAIDs, a Kellgren-Lawrence grade ≥2 and were assessed at baseline, month 1 and month 3. The co-primary outcomes were KOA PI at 3-month and the number of adverse events (AEs) over 3 months. Secondary outcomes included WOMAC function, EuroQol, responder rates defined by PI reduction ≥30 and ≥50% and OMERACT-OARSI response criteria. The noninferiority margin was defined as 0.825 on PI reduction.

**Results:** The noninferiority of W-TENS was demonstrated in both the per protocol (PP) and intent-to treat (ITT) populations. At M3, PI in PP population was 3.87 (2.12) compared to 4.66 (2.37) (delta: -0.79 (0.44); 95%CI (-1.65; 0.08)) in W-TENS and WO groups, respectively. A planned superiority analysis performed, demonstrated that W-TENS was significantly superior to WO at M3 (p=0.0124). At M3, PI reduction in W-TENS group reached the absolute minimal clinically important difference: -2.1 (2.3) on the NRS (equivalent to -20 mm on a 0-100 visual analog scale), which means being "much better". In the WO group, only a 1.1 (2.1) PI reduction was observed at M3, which means being "slightly better". OMERACT-OARSI responders were 54.5% in W-TENS group compared to 32.7% in WO group (p=0.021). The number of AEs was significantly lower (p<0.001) in W-TENS group (n=7) than in WO (n=36) group.

**Conclusion:** W-TENS was more effective and better tolerated than WO in the treatment of nociceptive KOA chronic pain and could represent an interesting non-pharmacological alternative to WO or NSAIDs.

## P304
### BILATERAL FATIGUE ILIAC FRACTURE IN A MILITARY CADET: A UNIQUE CASE

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**Objective:** To describe a unique case of a bilateral iliac fatigue fracture in a young male air force cadet during the routine military training program.

**Methods:** The clinical, radiologic and laboratory findings, as well as the clinical course of the patient are presented.

**Results**: A 18-year-old male Greek air force cadet presented to the Emergency Dept. of "251" Hellenic Air Force General Hospital due to persistent pain in both hip joints, 3 weeks after he started basic combat training in the academy. His medical history was unremarkable. Plain X-ray views revealed a radiolucent line at the right iliac bone, while MRI showed bilateral bone marrow edema. The biochemical markers and bone densitometry scan in lumbar spine and left hip were normal. Based on the radiological and biochemical findings the diagnosis of fatigue bilateral iliac fractures was established. The patient followed conservative treatment with partial weight bearing using crutches and the symptoms disappeared after a 3-month period.

**Conclusion:** Stress fractures are common in military population. Diagnosis is challenging, since the majority of them is asymptomatic and presenting with normal radiographic images (X-ray, CT). MRI is the method of choice for early diagnosis and precise assessment of regional osseous morphology and surrounding soft tissues. The appropriate treatment is based upon the distinction of a fatigue from an insufficiency fracture through the assessment of bone metabolism and patient's medical history. Furthermore, to the best of our knowledge, the present case is unique, since no other bilateral fatigue iliac fracture has been reported in the literature so far. It is of paramount importance to report such cases, in order to raise the awareness of physicians and to better understand this clinical entity.

## P305
### FATIGUE SACRAL FRACTURES: A CASE SERIES

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**Objective:** Fatigue sacral fractures (FSFs) are rare, since only a few reports have been described so far, and often misdiagnosed due to clinical entities with similar symptomatology. This study presents a case series of FSFs, regarding imaging and management, aiming to increase the awareness of physicians for these injuries in cases of low-back and/or pelvic pain in young active patients.

**Methods:** The present is an 9-y retrospective observational study of a prospectively maintained database. Patients' demographics, fracture site and type, type of sports activity, duration of symptomatology prior to diagnosis, imaging, management, duration of symptomatology after diagnosis, history of fatigue fractures and follow-up were evaluated from the medical records.

**Results:** Six cases (4 females), suffering from 8 fractures (since 2 patients suffered bilateral sacral fractures) with mean age=29.8 y were studied.

Two patients had suffered another fatigue fracture in the past. Mean symptoms' duration prior diagnosis was 7.5 weeks (SD=3.5), while mean symptoms' duration after diagnosis was 10.3 weeks (SD=10.2). In most cases (5), MRI revealed the fracture. According to the Kaeding-Miller classification; five fractures were type III, two IV and one II. All patients were treated conservatively, with rest and analgesics, while three received vitamin D and calcium.

**Conclusion:** FSFs are often misdiagnosed; therefore, detailed medical history, as well as clinical examination are of utmost importance and FSFs should be included in the differential diagnosis for chronic low back-or-hip pain in young patients engaging in sports, especially female runners. History of other fatigue injuries seems to be a predisposing factor. It is of paramount importance to obtain advanced imaging, including MRI, early in the workup for identifying a sacral fatigue fracture and preventing worsening of the injury.

## P306
## FUNGAL PROSTHETIC JOINT INFECTION IN REVISED ARTHROPLASTY

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**Objective:** To describe a case of a fungal prosthetic joint infection (PJI) in revised knee arthroplasty in 70-year-old female, two years following initial reconstruction surgery.

**Methods:** The clinical and laboratory findings, as well as the clinical course of the patient are presented.

**Results:** A 70-year-old female, with medical history remarkable for hypertension, diabetes mellitus and obesity, underwent 2-stage exchange knee arthroplasty due to PJI. The cultures from the first stage surgery yielded a methicillin resistant *S. aureus* (MRSA). Five days following the second stage of the reconstruction surgery the wound was purulent. The patient underwent surgical debridement, while new intraoperative cultures were obtained. Cultures revealed *Candida albicans* and MRSA, while blood cultures yielded the same *C. albicans.* The patient was commenced on iv fluconazole and vancomycin for 3 weeks. She refused further surgical treatment and continued life-long per os suppression with fluconazole. At follow-up 3 years after discharge, she has no symptoms or signs of an infection.

**Conclusion:** Fungal prosthetic joint infections are rare. They represent a challenging to treat clinical entity, requiring multidisciplinary approach. The combination of two-stage revision arthroplasty and prolonged period of antifungal treatment seems to be the optimal management. This report raises the question whether life-long fungal suppression is a feasible option is cases that further surgery may lead to failure, either due to technical difficulties (extensive bone loss, challenging reconstructive options) or to high patient's comorbidities. It is understood that definitive infection's eradication has not been achieved, however, the patient is mobile without signs of infection.

## P307
## PREGNANCY-ASSOCIATED OSTEOPOROTIC VERTEBRAL FRACTURES: A REPORT OF TWO CASES

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**Objective:** To describe two rare cases of pregnancy- associated osteoporosis (PAO) related vertebral compression fractures.

**Methods:** The clinical, radiologic and laboratory findings, as well as the clinical course and the treatment of the patients are presented.

**Results:** Two young females, in the early postpartum period, presented to the outpatient orthopaedic clinic due to acute back pain. Their medical history was unremarkable. MRI revealed vertebral compression fractures, in both cases. The fractures were localized in the thoracolumbar spine. According to the clinical symptoms, laboratory examinations and imaging characteristics, the diagnosis of pathologic fractures secondary to PAO was established. Both presented cases had vitamin D deficiency. Treatment included a spine- orthosis, cessation of breastfeeding, per os supplementation of vitamin D and calcium, while one case also received teriparatide. During the follow-up, both patients were free of symptoms and returned to their previous activities.

**Conclusion:** PAO is a rare disorder affecting women during the last trimester of pregnancy or during the early postpartum period. Pregnancy related osteoporotic vertebral compression fractures (OVCF) occur due to a combination of metabolic and mechanical factors. OVCF should be considered in the differential diagnosis in women at the last trimester of pregnancy or early postpartum period with acute back pain. The conservative treatment is considered successful for the cases presented in this report.

## P308
## BONE HEALTH TELEECHO MOSCOW: RESULTS OF TWO-YEAR ECHO PROJECT IMPLEMENTATION IN THE RUSSIAN FEDERATION

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**Objective:** Bone Health TeleECHO Moscow was launched on November 27, 2018. It is the first Russian speaking ECHO project that replicates the original Bone Health TeleECHO, with participation by healthcare professionals from across Russia and other Russian-speaking countries. This study aimed to evaluate the impact of 2-y Bone Health TeleECHO Moscow on physicians' knowledge in management of bone disease.

**Methods:** In order to assess Bone Health TeleECHO Moscow outcomes, we used a blinded self-efficacy questionnaire focusing on competence and skills in 20 domains of osteoporosis care before and after each year of participation in the Bone Health TeleECHO Moscow project with a scale of 1 to 7 (1 – no skills; 7 – expert level). Demographic data such as age, gender, specialization, degree and main employment were collected through the questionnaire. The questionnaire was sent at the end of 2019 and 2020 with a request to complete if at least three ECHO programmes were attended. The data are summarized for 2 y.

**Results:** Over the 2 y, 244 participants completed the questionnaire. Average attendance for each session increased from 64 in 2019 to 80 in 2020. Participation was from all regions of Russia and Russian-speaking countries such as Kazakhstan, Belarus, Moldova and Armenia. The mean age of our respondents was 43 y with the youngest being 23 and eldest 74. Participants' primary specialties were endocrinology (n=214, 87.7%), gynecology (n=19, 7.8%), nephrology (n=2, 0.8%), orthopedics (n=2, 0.8%) and other (n=7, 2.9%). All of our participants were MD, in addition

to this there were 56 MD, PhD. Most of the physicians were employed in state-owned outpatient clinics, however 57 participants were employed in private outpatient clinics and 23 participants worked in the National Medical Centers. According to the results of the questionnaire, statistically significant improvement was observed in all evaluated fields with an effect size of 0.82.

**Conclusion:** Bone Health TeleECHO replication in Russia has proven to be effective at improving clinicians' skills in the management of osteoporosis and other bone diseases.

## P309

**DENOSUMAB FOR THE TREATMENT OF OSTEOPOROSIS IN PATIENTS WITH RENAL INSUFFICIENCY WITH AND WITHOUT PRIMARY HYPERPARATHYROIDISM**

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**Objective:** To determine the safety and efficacy of denosumab in individuals with mild-to-moderate chronic kidney disease (CKD) (glomerular filtration rate (GFR) <60 ml/min/1.73 $m^2$) in patients with primary hyperparathyroidism (PHPT)-related osteoporosis and primary postmenopausal osteoporosis (PMO).

**Methods:** We enrolled patients over 50 y of age with mild to moderate kidney failure (GFR 30-60 ml/min/1.73 $m^2$) with and without PHPT and a control group with GFR >60 ml/min/1.73 $m^2$ with and without PHPT. All patients had verified osteoporosis (based on BMD T-score ≤ -2.5 SD and/or low-trauma fracture) and had at least 3 injections of denosumab. BMD, markers of bone turnover serum levels of calcium and adverse events (AEs) were evaluated from baseline to the final outcome.

**Results:** 145 patients, 69±9 years old were included in the study. Among them were patients with PHPT-related osteoporosis and CKD [(n=22); calcium – 2.63 (2.51-2.72) mmol/l; GFR – 43.7 (32.8-54.3) ml/min/1.73 $m^2$]; patients with PHPT-related osteoporosis without CKD [(n=38); calcium – 2.60 (2.5-2.75) mmol/l; GFR 77.5 (71.5-84.9) ml/min/1.73 m2]; postmenopausal women with osteoporosis (PMO) and CKD [(n=17); calcium – 2.36 (2.26-2.47) mmol/l; GFR – 50.4 (44.3-53.4) ml/min/1.73 $m^2$] and patients with PMO without CKD [(n= 64) calcium – 2.42 (2.3-2.47) mmol/l; GFR – 79.7 (71.8-86.3) ml/min/1.73 $m^2$]. Among all patients denosumab treatment significantly increased BMD and decreased serum levels of calcium and bone turnover markers compared to baseline evaluation. In patients with PHPT-related osteoporosis and CKD: the median increase in BMD according to the T-score was L1-L4 0.65 (p<0.001), femoral neck 0.3 (p=0.012); radius 33% 0.2 (p<0.05), serum calcium levels decreased -0.24 (p<0.001). PHPT-related osteoporosis without CKD: the median increase in BMD according to the T-score was L1-L4 0.65 (p<0.001), femoral neck 0.2 (p<0.001); radius 33% 0.3 (p=0.013), serum calcium levels declined -0.08 (p<0.001). In patients with PMO and CKD, denosumab increased BMD in the lumbar spine L1-L4 0.5 (p<0.001), femoral neck 0,02 (p=0.8); serum calcium decreased -0.04 (p=0.4). In subjects with PMO without CKD: the median increase in BMD according to the T-score was L1-L4 0.6 (p<0.001), femoral neck 0.2 (p<0.001), serum calcium decreased -0.04 (p=0,02). A marked decline in levels of serum calcium was noted among patients with PHPT and GFR less than 60 ml/min/1.73 $m^2$ (median Δ Ca serum= 0,24 p<0,001), compared to patients with PHPT without CKD (median Δ Ca serum=0.08, p<0.001) and all others subjects. Most participants with baseline CKD remained within the same CKD subgroup at study completion; less than 5% progressed to CKD stage 4. The percentage of participants reporting AEs was similar among participants without CKD.

**Conclusion:** Denosumab treatment is similarly effective at increasing BMD and decreasing bone turnover markers in patients with PMO and PHPT among postmenopausal women. Calcium lowering effects of denosumab are most significant in patients with PHPT and CKD. The safety of denosumab did not differ among participants with and without CKD.

## P310

**PRELIMINARY RESULTS OF A COMPLEX PROGRAM: CARE FOR METABOLIC STATE OF MUSCULOSKELETAL SYSTEM – A KEY TO LONG-LIFE INDEPENDENCE IN PATIENTS WITH OSTEOPOROSIS AND OSTEOPENIA**

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**Objective:** Ever since the times of ancient physicians and surgeons like Sushruta (600 BC) or Hippocrates (400 BC), it is clear that physical development of individuals with sedentary lifestyle is different from the one of the physically active individuals. Only after the year 2000, with the first discovery of causality of IL-6 and muscular movement, an intensive study of this problematics has begun. Currently, there are about 600 known operations (myokins) that are interrelated with muscle functions. Muscular tissue interrelates with others mechanistically, but it also forms humoral harmony in which the muscular tissue has a dominant and determining role. This phenomenon is relevant for pathophysiology of chronical low-grade inflammation, muscle loss, origin and development of noncommunicable diseases. These cause approx. 75% of deaths in population. Solution of this problem has been considerably affecting cost-effectivity in the health care system today and thus the state economy as well. Therapeutic recommendations together with the whole health care strategy need to be adjusted according to the above mentioned findings, including the patients with osteoporosis and osteopenia. There are, so far, no known suitable medicaments which would be used for solving problematics of muscular loss. This is a reason why more attention needs to be paid to the recommended physical regime (150 min/week, according to WHO) and dietary regime (basic diet + proteins). We have built a complex diagnostic and therapeutic program for our patients. Definition of pathological values follows EWGSOP and WHO.

**Methods:** Patient cohorts: Osteoporosis 60-70 y, 70-80 y, osteopenia 60-70 y and 70-80 y. Control group for osteopenia 60-80 y. We followed information about the control group during the COVID-19 time period, particularly their physical activity regime.

1) Instructions for patients used to be delivered in a form of lectures for different age groups. Now, during the COVID-19 time period, instructions are provided individually.

2) SarQol (Sarcopenia and Quality of Life) questionnaire (Beaudart 2015). Czech version used with agreement from sarqol.org. Assessment is now done individually only.

3) Measuring hand-grip is standardised according to Southampton protocol with a dynamometer Jamar. Values of 20 kg are found pathological (female values).

4) Determination of BMI, according to WHO, the border figure is 25 or 30 kg/$m^2$.

5) DXA method determination of selective muscle index as a measure for muscle mass. ALM/$Ht^2$ for age above 60 y, border value for sarcopenia is ≤5.45 kg/$m^2$.

6) From laboratory examinations we aimed at IL-6 and CRP(hs) - these are not a subject of this report.

**Results:**

| Osteoporosis | n | Age | BMI | ALT/$Ht^2$ | Hand grip | T-score |
|---|---|---|---|---|---|---|
| 60-70 | 16 | 68.6 | 22 | 5.56 | 23.4 | -2.5 |
| 70-80 | 22 | 73.7 | 22.6 | 5.79 | 17.0 | -2.9 |
| Osteopenia | n | Age | BMI | ALT/$Ht^2$ | Hand grip | T-score |

| | | | | | | |
|---|---|---|---|---|---|---|
| 60-70 | 28 | 67.4 | 25.2 | 6.06 | 21.2[+] | -1.1 |
| 70-80 | 36 | 73.8 | 27.3[+] | 6.2 | 21.5[+] | -1.6 |
| Control group | 17 | 71.9 | 25.4 | 6.55[+] | 24.6[++] | -1.2 |

Statistically relevant findings:0.05[+] 0.001[++]   DXA:LSC-1.5%

**Conclusion:** We have been running a physical activity and dietary program for our patients for more than 2 y. Physical activity is aimed at 150 min/week (WHO) and basic diet aims at the Mediterranean type + protein saturation, considerable stress is given to whey proteins enriched with Leucin. Patients have been instructed. Due to adherence to this regime we are able to report on statistically relevant changes in muscle power and also in complex muscle mass, even during the current pandemic situation.

## P311
### OSTEOPOROSIS AND UNDIAGNOSED VERTEBRAL FRACTURES IN PERI- AND POSTMENOPAUSAL WOMEN WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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**Objective:** Systemic lupus erythematosus (SLE) is a chronic autoimmune disease with unknown etiology and polymorphic clinical picture occurring mainly in women. Treat to target strategy has been proposed in order to control disease activity, improve health-related quality of life, and reduce morbidity and mortality. While autoimmune inflammation being continuously reduced, comorbidities and medicine toxicity become the focus of attention. By the 5th year the most common musculoskeletal complications in patients with SLE are osteoporosis (OP) and osteoporotic fractures. Our study aimed to investigate the prevalence of osteoporosis and vertebral fractures in pre- and postmenopausal women with SLE.

**Methods:** Cross-sectional study was performed among 197 consecutive pre- and postmenopausal women with SLE. The only exclusion criteria was chronic renal failure. The median [25%;75%] of age was 48 [44;56] years and the median [25%;75%] of SLE duration was 7 [4;12] years. 43.7% of all women included in our study were postmenopausal. BMD measurements of the hip and spine were performed using DXA. Vertebral fracture assessment (VFA) was done for vertebral fractures detection using a method described by Genant. Fracture risk was assessed using the Fracture Risk Assessment Tool (FRAX®).

**Results:** All 197 patients had different fracture risks. The most prevalent fracture rick was long therapy with glucocorticoids. By the moment of the study 93.4% (n=184) of all women with SLE were taking glucocorticoids and 53 (26.9%) women had osteoporotic fractures. The BMD (T-score) at the femoral neck were lower than at total hip (p=0.000001) or spine (p=0.000001). The median [25%; 75%] of 10-y probability of fracture (FRAX) for major osteoporotic fractures before and after DXA were 11% [8.4%; 20%] and 12% [8.4%; 20%], respectively. According to FRAX-based intervention threshold 96 (48.7%) women with SLE antiosteoporotic treatment had been considered. OP could be diagnosed at 108 (54.8%) patients according to National Osteoporosis Foundation guidelines. VFA have shown 87 vertebral fractures in 55 (27.9%) women with SLE. In 31 (56.4%) cases vertebral fracture was asymptomatic and had been diagnosed only at the study. After VFA the incidence of vertebral fractures has risen to 15.7% (from 12.2% to 27.9%). 10 (18.2%) patients with vertebral fractures had normal BMD (T-score) at spine and femur neck (BMD>-0.9 SD). Multivariate regression analysis had shown that vertebral fractures were associated with longer glucocorticoids intake (p=0.000001), the number of previous fractures (p=0.000001), lower BMD of the hip (p<0.05). Following VFA the number of patients with OP increased up to 61.4%.

**Conclusion:** Vertebral fractures are the most prevalent OP complication in SLE. Undiagnosed vertebral fractures in pre- and postmenopausal women with SLE are a challenging issue, underestimated by rheumatologists. Those fractures may be subclinical or asymptomatic thus providing diagnostic intricacies. The current method using DXA to predict the presence of vertebral fracture has limited value and there is a need for assessment of bone quality. VFA in pre- and postmenopausal women with SLE could be recommended as screening method for identification vertebral fractures.

## P312
### TEN CASES OF OSTEOGENESIS IMPERFECTA: CLINICAL FEATURES, OUTCOMES AND TREATMENT RESPONSE

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**Objective:** Osteogenesis imperfecta (OI) is a collagen related disorder with an autosomal inheritance that characterized by low bone density leading to recurrent fractures and deformities. We herein describe the clinical features and outcomes in 10 cases of OI via to examine bone turnover markers, bone mineral density measurements, and treatment responses in long term.

**Methods:** Ten cases were diagnosed OI that followed up in a tertiary endocrinology clinic were evaluated retrospectively. The data containing the following information as history of fracture and antiresorptive treatment, presence of deformities and blue sclera, BMD measurements, serum osteocalcin, c-telopeptide, intact PTH, calcium levels, height, body weight, and BMI during follow up recorded from patients files. Results of genetic analyses also recorded. Patients phenotypes were classified based on clinical and radiological criteria (Sillence classification).

**Results:** Median age of the cases was 34.5 (min: 23, max: 55) and the male:female ratio in the cases was 7:3. Eight patients had a family history of OI. According to Sillence classification; five patients were classified as type 1, three of them were type 4 and two of them were type 3. All patients experienced fractures, four of them had a history of ten or more fractures. Common fracture areas were radius, femur, and tibia. Life limiting deformities were observed in two patients. Hearing impairment was detected in four patients, and blue sclera finding was seen in six patients. Three patients did not receive any treatment for OI, these three patients were classified as type 1, two of these patients had radius fractures and one of them had phalanx fractures. Seven patients received treatment with oral and intravenous bisphosphonates, denosumab, and teriparatide, Three patients developed fractures after treatment, two of them were type 3, and one of them type 4 OI. After teriparatide treatment vertebra BMD increased, but femur neck BMD decreased and new fracture did not develop. After 3 doses of denosumab new fracture developed.

**Conclusion:** Clinical presentation and treatment responses were heterogeneous. Patients had a history of osteoblastic and osteoclastic treatments given consecutively.

## P313
### AN ESTIMATE OF THE INICIDENCE OF FRAGILITY FRACTURES IN THE REPUBLIC OF IRELAND

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**Objective:** There is a paucity of fragility fracture research on the Irish population, especially identifying vertebral fractures. Previous reports estimated that the annual incidence of fragility fractures in Ireland was 18,000. Our aim was to undertake the first national study estimating the fracture incidence using national data on hospitalised and non-hospitalised patients and estimating the incidence of subclinical fractures.

**Methods:** International clinical trials and observational studies were analysed that calculated fragility fracture incidence and the variability in fracture site. Previously published Irish literature on hospitalised fragility fractures using the Hospital in-patient enquiry system (HIPE) was analysed and compared to international figures. Cross sectional audits were carried out on orthopaedic outpatient clinics to determine frequency of fragility fracture presentation and the proportion of patients hospitalised. The incidence of subclinical fractures in Ireland was estimated by applying results from international epidemiological studies.

**Results:** Applying EU6 estimates to the Irish population, the fragility fracture incidence ranges from 24,000-51,000. Hip fracture incidence ranges from 6.2-28% and vertebral fractures ranged from 15-30% in observational studies. We estimate that the annual fracture incidence is 30,000-35,000 or 20 per 1000 over fifty in the Republic of Ireland. There are 15,000-20,000 patients hospitalised, 4000-8000 seen in out-patient clinics and a further 7000-21,000 subclinical fractures not formally diagnosed.

**Conclusion:** The estimated incidence of fragility fractures in Ireland is much higher than previously reported. Fragility fractures in Ireland are underreported and undertreated. Further studies are required to identify and treat all patients presenting with fragility fractures to decrease the incidence of secondary fractures.

## P314

### MEASURED RESECTION VS. COMPUTER- ASSISTED GAP BALANCING TECHNIQUE FOR COMPONENT ALIGNMENT AND FEMORO-TIBIAL ROTATIONAL MISMATCH IN POSTERIOR- STABILIZED TOTAL KNEE ARTHROPLASTY: A PROSPECTIVE STUDY

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**Objective:** To evaluate a difference in the femoral and tibial component rotational angle, femoro-tibial rotational mismatch, and the frequency of outlier relative with the surgical transepicondylar axis (sTEA) of the femur between measured resection technique and the computer-assisted gap balancing technique when combined with self-aligned technique for tibial component placement in posterior- stabilized total knee arthroplasty.

**Methods:** 100 patients with endstage osteoarthritis of the knee underwent primary total knee arthroplasty using the measured resection technique (n=50) or the computer-assisted gap balancing technique (n=50). The femoral and tibial component rotational angle, femoro-tibial rotational mismatch, and the frequency of outlier relative with the sTEA of the femur were evaluated 30 d after surgery using computed tomography.

**Results:** There were significant difference between the measured resection technique group and the computer- assisted gap balancing technique group in terms of the femoral component rotational angle $(0.28\pm1.16°$ vs. $1.52\pm1.31°$, p<0.001), but the tibial component rotational angle between both groups were without significant difference $(1.28\pm3.17°$ vs. $1.86\pm 2.81°$, p=0.22). The mean femoro-tibial rotational mismatch in the measured resection technique group and the computer-assisted gap balancing technique group were $1.00\pm 3.28°$ and $0.34\pm2.71°$, respectively, without significant difference (p=0.306). No patients had femoro-tibial mismatch over $10°$. The outliers were least frequent in the measured resection group than the computer-assisted gap balancing technique group.

**Conclusion:** Both techniques contributed to significant difference in femoral component rotation with a tendency to become more externally rotated in the computer-assisted gap balancing group after posterior-stabilized total knee arthroplasty. When combined with selfaligned technique for tibial component placement, there were no significant difference in tibial component rotation or femoro-tibial rotational mismatch between both groups. All cases had <10° femoro-tibial rotational mismatch.

## P315

### DYNAMICS OF SERUM β-CROSS LAPS LEVELS IN EARLY MONITORING OF OSTEOPOROSIS TREATMENT WITH DENOSUMAB

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**Objective:** Recent antiresorptive long-term treatment for osteoporosis increases BMD and reduces fracture risk. Due to the long duration, poor adherence to medications is a big challenge. Bone mineral density measurements are recommended in guidelines for monitoring of the treatment, but changes in bone density may take up to 2-3 y to detect and does not predict the reduction of fractures. Recent data suggest that biochemical markers of bone turnover may be useful for monitoring since they change rapidly in response to treatment. The variability of their measurement reduces their value in clinical practice and more data are needed. Our study aimed to assess whether the dynamics of marker for bone resorption β-CrossLaps have a real practical benefit in the early monitoring of the treatment of patients with postmenopausal osteoporosis.

**Methods:** 21 Bulgarian women in menopause with newly diagnosed by DXA osteoporosis were studied. All participants had not been under treatment for osteoporosis. Serum β-CrossLaps levels were measured before and 6 months after treatment with denosumab injection subcutaneously 60 mg once every 6 months.

**Results:** Serum concentrations before and 6 months after starting treatment are respectively 0.589±0.266 ng/ml /0.06 - 1.2/ and 0.166 ±0.139 ng/ml /0.05 - 0.59/. The β-CrossLaps serum levels of a pretreatment study are within the reference range for the commercial kit. After 6 months of treatment, there was a significant decrease in serum concentrations of about 72% from baseline. In Bulgaria, successful treatment is considered to a decrease in β-CrossLaps values >56%.

**Conclusion:** In our study although pretreatment levels were within the reference range, a significant decrease in concentrations was observed in all patients. Our results show that the dynamics of β-CrossLaps may be useful in the early monitoring of the therapeutic effect of treatment with denosumab.

## P316

### EVALUATION OF DISEASE BURDEN, UNMET TREATMENT AND MANAGEMENT NEEDS OF PATIENTS WITH HIP AND KNEE OSTEOARTHRITIS: CONSENSUS STATEMENTS FROM A DELPHI-METHOD PANEL IN TURKEY

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**Objective:** To get information-driven insights from expert physicians regarding multiple aspects of the patient journey in knee and hip OA and establish a consensus in order to set a stage for future studies and decision tree models in Turkey.

**Methods:** 157 questions were asked in total during this three-round modified Delphi-method panel to 10 physical medicine and rehabilitation specialists (2 have rheumatology and 3 have algology subspeciality), one orthopaedic surgeon and one algology specialist from anaesthesia specialty background. A consensus was achieved when 80% of the panel members agreed with an item. Contradictions between different disciplines were accepted as a nonconsensus factor.

**Results:** Panelists agreed that American College of Rheumatology classification criteria is mostly sufficient to provide an OA diagnosis in clinical practice (100%). WOMAC pain subscale score of at least 5 in the index hip or knee with Kellgren-Lawrence x-ray Grade of at least 2 was accepted as a moderate to severe OA definition (81%). A 30% of improvement from baseline in WOMAC pain or function subscales or in PGA score were accepted as moderate treatment response where 50% improvement from baseline in those scores as substantial responses with full consensus (100%). Panelists reached a consensus that arthroplasty procedures need to be delayed as long as possible, but this delay should not jeopardize a beneficial and successful operation (90%). They underlined that OA is an impairing and disabling disease (100%) which results in a dramatic impact on quality of life (100%) and leading to early retirement from active working life (81%). Panelists agreed that there is a significant unmet treatment need for patients with moderate-to-severe OA who are unable to take, tolerate or adequately respond to currently available therapies.

**Conclusion:** These findings show that there is a significant disease burden, unmet treatment needs for patients with moderate-to-severe OA in Turkey from experts' perspective. Therefore, an updated systematic approach and decision tree models are needed to be implemented.

## P317
### INDICATIONS FOR SURGICAL TREATMENT OF THORACOLUMBAR KYPHOSIS IN PATIENTS WITH MUCOPOLYSACCHARIDOSIS

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**Objective:** This retrospective multicenter study compares the long-term results of circumferential and posterior-only surgical treatment of thoracolumbar kyphosis in patients with MPS. Considering multiple concomitant organ disorders in MPS patients, anterior stabilization increases risks of complications. A posterior-only approach can provide stable fixation with lowered complication risks in MPS patients. Circumferential fusion of kyphosis in patients with MPS is currently accepted as the most effective surgical approach. However, long-term results remain debatable. This study assesses the effectiveness of posterior-only compared to circumferential fusion.

**Methods:** A retrospective multicenter study. Eleven patients (7 male, 4 female) with MPS and thoracolumbar kyphosis underwent surgical treatment. Hurler syndrome (type I) was diagnosed in 5 patients, Morquio syndrome (type IV) in 2, and Maroto-Lamy (type VI) in 4 patients. Indications for surgical treatment included more than 40° kyphosis, sagittal spinal imbalance, progressive neurological symptoms and severe pain. In 3 cases, patients underwent circumferential arthrodesis combining anterior and posterior approaches. In 8 cases, instrumentation included hooks and/or pedicular screws, placed two levels above and two levels below the deformity apex. The follow-up period ranged from 2-5 y.

**Results:** In 8 cases solid spinal fusion was achieved. Complications after surgical treatment were observed in 4 patients (36%). PJK developed in one case 2 y after surgery, pseudarthrosis was observed in one case, wound suppuration was observed in one case, and a broken metal rod in one case.

**Conclusion:** Surgical treatment of MPS patients with thoracolumbar kyphosis is accompanied by a high risk of complications when circumferential stabilization is performed. Most authors and our data show that the most optimal method of surgical treatment of thoracolumbar deformation is dorsal correction and fixation in combination with a wide laminectomy at the level of stenosis. The second stage includes the anterior decompression and interbody fusion. However, if the patient's lung function is dramatically compromised, and a high risk of respiratory complications exists, surgery may be limited to only posterior correction and fixation in conjunction with a wide laminectomy, which allows to achieve a comparable level of fixation with a lower risk of complications.

## P318
### RISK FACTORS AND SURGICAL TREATMENT OF CRANIOVERTEBRAL STENOSIS IN PATIENTS WITH MAROTEAUX-LAMY SYNDROME (MUCOPOLYSACCHARIDOSIS TYPE VI)

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**Objective:** The most common lesion of the spine with mucopolysaccharidosis type VI (Maroteaux-Lamy syndrome) is spinal stenosis at the atlantoaxial junction, which leads to neurological complications of varying degree, including tetraparesis or tetraplegia due to spinal cord compression at this level. This retrospective multicenter

study presents the long-term results of surgical treatment of patients with the Maroteaux-Lamy syndrome. Early decompression of the spinal canal with leads to atlantoaxial stabilization and regression of neurological symptoms in patients with Maroteaux-Lamy syndrome. Atlantoaxial instability with the outcome of myelopathy and spastic tetraparesis are commonly described in patients with MPS VI type. The accumulation of glycosaminoglycans behind the odontoid process leads to a gradual development of the spinal canal stenosis and compression of the spinal cord in the cervical spine. These lesions lead to neurological disorders and loss of quality of life.

**Methods:** A retrospective, multicenter study. Nine patients with MPS type VI. Of them 3 males and 6 females aged 14-35 y (mean age 20.8 y). All patients presented with craniovertebral stenosis of some degree and underwent posterior spinal canal decompression with cervical fusion. Neurological symptoms were observed in 7 of all cases preoperatively. Functional assessment and evaluation of neurological status was conducted in all cases. CT and MRI evaluation was performed at the atlantoaxial level before surgery and at follow-up.

**Results:** The average follow-up period was 2.9 y. Seven of the nine patients demonstrated regression of neurological symptoms. In two patients the neurological status was unchanged. Solid fusion was achieved in 6 cases. Complications from surgery we observed in 3 patients. One patient died one year after surgery due to unrelated causes, there was one case of pseudarthrosis one case of implant instability and one case of early postoperative wound suppuration.

**Conclusion:** The majority of patients with type VI MPS present with some degree of spinal stenosis at the atlantoaxial level. Based on our experience, these patients require close neurological and radiographic monitoring as early as possible. In our view, surgical treatment of patients with type VI MPS should be considered before the onset and progression of neurological symptoms.

### P319
### THE IMPACT OF MUSCULOSKELETAL CONDITIONS AND FRAILTY ON THE ABILITY TO SELF-CARE OR BE IN RECEIPT OF CARE: A STUDY OF COMMUNITY-DWELLING OLDER ADULTS FROM THE HERTFORDSHIRE COHORT STUDY

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**Objective:** Musculoskeletal conditions and frailty lead to a significant burden of disease in later life. However, living independently remains the aim of older adults. The ability to self-care and reliance on external, or access to care at home may hamper this. Musculoskeletal conditions (MSC) as well as frailty lead to significant morbidity in later life and may influence care needs. In this study, we consider whether MSC (osteoporosis, sarcopenia, osteoarthritis) and frailty are associated with ability to self-care, and influence access to formal/informal care among community-dwelling older adults.

**Methods:** Participants were recruited from the Hertfordshire Cohort Study, an established cohort study of community-dwelling adults in the UK. Osteoporosis was assessed using DXA. Sarcopenia was assessed using EWSGOP2 criteria. Osteoarthritis of the hand, hip or knee was defined by clinical examination. Frailty was assessed using Fried criteria. Ability to self-care and access to formal/informal care were self-reported.

**Results:** 443 men and women (median age 75.5 [IQR 73.5-77.9] y) participated. Osteoporosis affected (n=74) 21.4% of participants, (n=115) 26.8% had osteoarthritis, (n=30) 8.6% had sarcopenia, and (n=33) 7.6% were identified as frail. Most participants (n=402 [90.7%]) reported no problems with self-care. Identical proportions of participants received informal (n=53 [12%]) and formal (n=53 [12%]) care at home in the previous year. Reporting difficulties with self-care was associated with clinical osteoarthritis (OR 3.48, 95%CI 1.63-7.43, p=0.001) and

frailty (5.29, 2.12-13.2, p<0.001), but not with osteoporosis or sarcopenia. Receiving informal care at home in the past year was associated with osteoarthritis (2.56, 1.28-5.14, p=0.008), the coexistence of two or more MSC (6.50, 1.66-25.39, p=0.007), and frailty (6.25, 2.59-15.08, p<0.001), but not with osteoporosis or sarcopenia alone. None of the conditions were associated with receiving formal care.

**Conclusion:** MSC are associated with informal receipt of care. Presence of two or more MSC convey similar informal care requirements to those living with frailty. Early assessment and management of MSC and frailty in clinical practice may reduce need for care and preserve independence.

### P320
### PROSPECTIVE OBSERVATIONAL STUDY IN REAL LIFE TREATMENT IN LATINAMERICAN PATIENTS WITH DENOSUMB QUERY DATABASE (ROSELA DATABASE): PRELIMINARY REPORT IN 2285 PATIENTS

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**Objective:** Preliminary report of a real-life experience in treatment of postmenopausal osteoporosis (PMOp) with denosumab (Dmab).

**Methods:** A multicenter prospective, descriptive cohort study, conducted in 8 countries (Mexico, Argentina, Peru, Colombia, Ecuador, Uruguay, Chile, Brazil) with up to 8 y of clinical records of patients treated with Dmab. A online DB was used to collect data in 41 centers.

**Results:** 2285 patients age at baseline(BL) 66 ±9.8 y,75.1% with >60 y. The main reason for using Dmab: hip Op (36.8%) in DXA; lack of BMD

gain (31.9%). Dmab was used as the first anti-Op drug in 971(42.5%) patients and 57.5% had used prior anti-Op medication. The average BMD increase from BL up to 8th year was in LS 16.1%, in FN 7,3% and TF 7.9%. The comparison between diabetics and nondiabetics shows a decrease in BMD gain in TF from the 1st year and in LS from the 4th year ahead. The 10 y FRAX level was 9.1±6.3 for major OP fracture (Fx) at BL and for hip Fx 3.3±4.2. A total of 563 (24.6%) prevalent Fx were detected at BL; 201 patients(36.7%) with >1 Fx. Only 107 patients (4.6%) developed Fx during treatment with Dmab. Vertebral (VFx) and nonvertebral Fx (NVFx) increase during 2nd and 3rd years of treatment, related to a decrease in persistence. Adverse events (AE) were reported in 61 patients (2.6%) and SAE in 71(3.1%), including 2 eczema, 1 ONM and 2 AFF cases. Adherence to Dmab treatment is not optimal, mainly in years 2-4. Only 45% completed 2 y of treatment and only 11% used for at least 4 y with a patient loss of follow-up (50.2%). Most patients received no treatment after discontinuing DMAb, 10 cases of post-Dmab vertebral Fx, 3 with >1 fracture was reported.

**Conclusion:** Dmab improves BMD and reduces rate of VFx and NVFx in most patients with PMOp in a real-life environment in 8 LatAm countries. Patient follow-up loss is very high in LatAm countries. Dmab proved to be as safe as observed in clinical registry studies with a very low rate of AE and SAE.

## P321

### ASSESSMENT OF TREATMENT PRACTICES OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS AND THEIR ADEQUACY

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**Objective:** To assess the current treatment practices of glucocorticoid-induced osteoporosis (GIOP) in patients followed in Rheumatology outpatient clinic in a Portuguese secondary hospital.

**Methods:** A retrospective cohort study was conducted in patients followed in Rheumatology outpatient clinic in a Portuguese secondary hospital between 1 June 2019 and 31 December 2019. Patients with inflammatory rheumatic disease, under glucocorticoid (GC) treatment for ≥3 months, with a daily dosage of ≥2.5 mg were included in the study. Sociodemographic, clinical and GIOP management data were obtained from clinical records. Using the 2017 American College of Rheumatology (ACR) guidelines for the prevention and treatment of GIOP as reference, treatment adequacy was assessed and treatment prescription predictors were identified. Patients were grouped by age (<40 and ≥40) and analyzed separately. Descriptive and inferential analysis were conducted using 5 and 7.5 mg of daily GC as cutoffs. Mann-Whitney and chi-squared or exact Fisher tests were used, as well as a multivariable classification tree analysis.

**Results:** Of 676 patients followed in this Rheumatology outpatient clinic in that period, 103 were included in the study. Patients' mean age was 60.9 (±13.3) and 68% were female. Seven patients were <40 years old, one of which was considered undertreated according to ACR guidelines. Of the 96 patients ≥40 years old, 20.8% were adequately treated and 40.6% were undertreated. No patients were considered overtreated. Factors associated with GIOP treatment prescription were older age, higher major bone fracture or hip bone fracture risk obtained through Fracture Risk Assessment Tool (FRAX) and previous bone fragility fracture. A FRAX score for hip fracture ≥3% and a vertebral BMD T-score <-2.1 were identified as prescription determinants of pharmacological treatment.

**Conclusion:** Following the 2017 ACR guidelines, a large proportion of patients with inflammatory rheumatic disease chronically treated with GC were undertreated for GIOP. There are, however, limitations in these guidelines application to the Portuguese population which emphasize the need to develop national clinical recommendations for the prevention and treatment of GIOP.

## P322

### CLINICAL OUTCOME AND HEALTH-RELATED QUALITY OF LIFE OF FRAGILITY HIP FRACTURE PATIENTS: A FOLLOW UP STUDY IN TERTIARY CARE FACILITY IN SRI LANKA

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**Objective:** To assess the clinical outcome and health-related quality of life (HRQOL) of hip fracture patients admitted to a tertiary care facility in southern Sri Lanka for 12 months.

**Methods:** Hip fracture patients (n=180) admitted to Teaching Hospital, Karapitiya and age and sex matched controls from their neighborhood (n=348) were included in the case control study. The 180 fragility hip fracture patients were followed up for one year to assess morbidity, mortality and the HRQOL at regular intervals after the fracture. The HRQOL was assessed using the validated Sinhala versions of the SF 36, BI and MMSE scale. Results were presented as numbers (percentages), mean (SD) or median (IQR), appropriately. Chi-square test and independent t-test were used to compare groups. ROC analyses were done for selected variables considering the death/survival as the dependent variable.

**Results:** Of 180 patients (149 women), 107 had surgery while the rest were managed conservatively. Mean (SD) age of study subjects was 76.5 (9.2 y). Patients who underwent surgery had less complications compared to those managed conservatively (15% vs. 51% with one complication or more) (p<0.001). Thirty three patients who died within the first 12 months were older, had higher comorbidity and physical impairment before fracture and at discharge from the hospital, when compared with those survived. An initial sharp decline and a partial recovery was seen in the total SF 36 score and physical and psychological domains among patients with hip fractures. Furthermore, patients who had surgical treatment had significantly higher physical independence at 12 months compared to those managed nonsurgically (mean BI 81 vs. 10.5). In the ROC analysis, AUC for age, Charlson index, age-adjusted Charlson index, BI before fracture and BI at discharge were 0.77 (0.04), 0.79 (0.04), 0.70 (0.05), 0.67 (0.05) and 0.76 (0.04) (p<0.01 for all). The two groups were similar in mental status but control group had better HRQOL and ADL than hip fracture patients (p<0.01).

**Conclusion:** Hip fracture leads to higher mortality, physical dependence and poor QOL especially among those managed nonsurgically. This study found gaps in the current management of hip fracture patients.

## P323

### DOES ORTHOPEDISTS LEARN TO MANAGE OSTEOPOROTIC FRACTURES DURING ORTHOPAEDIC RESIDENCY PROGRAM?

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**Objective:** To evaluate whether residents (r1, r2 or r3, according to the year of formation) of orthopedics in a tertiary service investigate, treat and/or refer the patient with an osteoporotic fracture to treat osteoporosis (OP) and whether this management improved during residency program.

**Methods:** All residents answered diagnostic and therapeutic questions related to a clinical case of osteoporotic fracture (hip transtrochanteric fracture) in 4 scenarios: initial care in the emergency room, at the time of hospital discharge, during outpatient follow up at 3 and 6 months. Answers were compared between years of residence.

**Results:** Twenty r1, 21 r2 and 19 r3 answered the questions. One resident adequately treated osteoporosis in r1, two in r2 and four in r3. 75% of r1, 90.5% of r2 and 68% of r3 referred patients for OP treatment. There is an improvement in the prescription of laboratory tests for osteoporosis investigation over the years (p=0.028), with 52.6% of 3rd year residents prescribing adequate laboratory tests. In the same period 100% of r3 correctly prescribed prophylaxis for deep vein thrombosis (p=0.001).

**Conclusion:** Despite being below the ideal, residents treat and/or refer patients with osteoporotic fractures for secondary prevention. The orthopaedic residency program improves resident performance in osteoporotic fracture management, in spite of comparison with deep venous thrombosis management shows that there is a lot of room for improvement.

## P324
### A RETROSPECTIVE OBSERVATIONAL STUDY OF OSTEOPOROSIS MANAGEMENT AFTER A FRAGILITY FRACTURE IN PRIMARY CARE

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**Objective:** A fragility fracture is a clinical manifestation of osteoporosis and a major risk factor for subsequent fracture in adults aged 50+, yet adherence to secondary prevention strategies is lacking internationally. This retrospective observational study aimed to characterize post-fracture management, in the Canadian primary care setting.

**Methods:** Patients with an index fragility fracture occurring between January 1, 2014 and December 1, 2016 were identified, from medical records reviewed at 76 primary care centers in Canada, with follow-up until January 2018. Fragility fracture was defined as a fracture occurring without major trauma at any skeletal site other than the skull, face, cervical spine, hand, metatarsus, phalanges or patella. Patients with a history of fragility fracture in the five years prior to their index fracture were excluded.

**Results:** Of all 778 patients identified (80.5% female, median age [IQR] 73 [64-80]), 215 were on osteoporosis treatment and 269 had osteoporosis diagnosis recorded prior to their index fracture. The median follow-up after index fracture was 363 (IQR 91-808) days. Of patients not on osteoporosis treatment at their index fracture, 60.2% (n=339/563) remained untreated after their index fracture and 62.2% (n=23/37) continued untreated after their subsequent facture. After their index fracture, fracture risk assessment (FRAX or CAROC) was not performed in 83.2% (n=647/778) of patients, and 59.9% (n=466/778) of patients did not receive BMD testing. Of patients who did not have osteoporosis diagnosis recorded prior to their index date, 58.9% (n=300/509) remained undiagnosed over the interval from index fracture to the end of follow-up. At least one subsequent fracture occurred in 11.1% (n=86/778) of patients after their index fracture until the end of study follow-up.

**Conclusion:** In the primary care setting, fragility fracture infrequently resulted in osteoporosis treatment or fracture risk assessment. Even after experiencing multiple fragility fractures over a relatively short follow-up, the majority of patients remained untreated. These results suggest a fragility fracture is not recognized as a major risk factor for subsequent fracture and its occurrence does not prompt primary care physicians to intervene. These data should direct initiatives to overcome obstacles to primary care physicians' effective management of patients after initial fragility fractures.

## P325
### PHOTOBIOMODULATION: A NEW TOOL FOR POSTOPERATIVE PAIN IN TOTAL KNEE ARTHROPLASTY? A CASE SERIES

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**Objective:** To evaluate the effect of photobiomodulation (PBM, low level laser therapy) in postoperative pain control after total knee arthroplasty.

**Methods:** Nine patients with knee osteoarthritis were submitted to primary total knee arthroplasty under spinal anesthesia and sedation. Among postoperative analgesia, all patients received obturator and femoral blockage guided by ultrasound, dipyrone 30 mg/kg, intravenous, every 6 h, ketorolac 30g, intramuscular, every 12 h, for 3 d. If still with pain patients could receive morphine, 2 mg, intravenous, by a patient control analgesia device. PBM was applied with a light aid equipment from Bright Photomedicine, with LEDs of 850 nm. Patients received sessions of PBM in the operating room after wound closure and after 24 h in the topography of femoral nerve, for 4 min, and parallel to the surgical incision for 2 min. The total consumption of morphine from the immediate postoperative period until hospital discharge was recorded. Pain, at rest and at movement, was assessed using the visual analog scale from the immediate postoperative period until the second postoperative day.

**Results:** Patients received 16.7±15 mg of morphine until the third postoperative day. Pain at rest and at movement average 4.8±3.2 and 5.6±3.5 in the immediate postoperative period. In the first postoperative day, pain at rest and at movement were 3±3,1 and 4.2±2.9 at 6:00; 2.3 ±2.3 and 3.7±2.1 at 12:00; 1.6±1.2 and 2.4±1.6 at 18:00. On day two postoperative pain at rest and at movement average 1.2±1.6 and 3.5 ±1.8 at 6:00; 1.2±1.4 and 3.5±2.9 at 12:00; 0.4±1 and 2.2±1.8 at 18:00.

**Conclusion:** PBM may be a tool to assist in the control of postoperative pain in patients submitted to total knee arthroplasty.

## P326
### VITAMIN D DEFICIENCY IN RUSSIAN FEDERATION

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**Objective:** Most of the territory of Russian Federation, due to its geographical location, climatic and weather conditions, has all the prerequisites for the development of vitamin D deficiency and insufficiency in the population. This study aimed to estimate the incidence of vitamin D deficiency and insufficiency in the representative population sample from Russian Federation.

**Methods:** Russian multicenter noninterventional, cross-sectional study was conducted in two time periods: March-May(spring) and October-November (autumn) of 2020. Study population included 996 conditionally healthy volunteers from 10 regions of the Russian Federation (latitudes from 45° to 70°). The level of 25(OH) D was considered as adequate at a value of ≥30 ng/ml, insufficiency - ≥20 and <30 ng/ml, deficiency - <20 ng/ml. All patients were evaluated for 25(OH) serum by chemiluminescence immunoassay. The study was carried out with the financial support of the company JSC "AKRIKHIN", protocol # AQ-01/20, version 2.0 from February 25, 2020.

**Results:** Study results showed that deficient levels of 25(OH)D were registered in 39.36% of cases, insufficient in 32.83%. In total, 72.19% of the examined individuals had deficiency or insufficiency of vitamin D, and optimal level of the vitamin were showed in only 27.81%. The

prevalence of vitamin D deficiency/insufficiency depended on the time period with statistically significant difference (p<0.00001) - 84.27% in the spring vs. 62.43% in the autumn. The study also examined basic demographic characteristics such as gender and age. The data obtained indicate that the highest incidence of vitamin D deficiency and insufficiency in males vs. women (p=0.013, 79.05% and 70.36%, respectively), as well as the most pronounced vitamin D deficiency was observed in young people in the age subgroup of 18-25 years old (p<0.001) and constitute 79.15%.

**Conclusion:** The results of the study indicate a widespread significant prevalence of vitamin D deficiency and insufficiency in the Russian Federation, regardless of the region of residence and season. The main risk group for suboptimal levels of 25(OH)D in serum was young men.

## P327
### PREVALENCE OF CLINICAL RISK FACTORS OF OSTEOPOROTIC FRACTURES AMONG URBAN AND RURAL POPULATIONS OF THE RUSSIAN FEDERATION

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**Objective:** To study the prevalence of clinical risk factors (RFs) of fractures, which are components of the FRAX calculator, among urban and rural populations of the Russian Federation.

**Methods:** Representative samples of urban from 12 regions and rural populations from 4 regions of the Russian Federation were analyzed. In total 13,116 Russian residents aged 40-69 y participated in the study (8489 women, 4627 men). Groups of urban (n=11962) and rural (n=1154) populations were comparable by age. Participants were interviewed using a single standard modular questionnaire containing questions about clinical RFs of fractures included in FRAX.

**Results:** Among the studied RFs of fractures, the most common were the following: previous fractures (16.3%), causes of secondary osteoporosis (20.8%) and current smoking (17.9%). In men were more often registered previous fractures (20.3%), smoking (34.3%) and alcohol abuse (5.5%), while in women – causes of secondary osteoporosis (28.1%), rheumatoid arthritis (3.7%) and taking glucocorticoids (3.6%), regardless of the place of residence. With age, the frequency of all RFs in women and men increased, with the exception of smoking and alcohol abuse. In rural men, the frequency of previous fractures and alcohol abuse was higher than in urban ones (24.3% vs. 19.9%, p<0.05 and 7.6% vs. 5.3%, p<0.05). At the same time, women living in the city, compared to rural women, had more frequent RFs of fractures such as smoking (10.7% vs. 8.3%, p<0.05) and taking glucocorticoids (3.9% vs. 1.4%, p<0.001).

**Conclusion:** The prevalence of RFs of fractures varied in different regions of the Russian Federation depending on age and gender and the type of settlement. Previous fractures and alcohol abuse predominated in rural men compared to men living in the city. Smoking and taking glucocorticoids were more common in urban women compared to rural ones.

## P328
### ASSOCIATION BETWEEN THE OSTEOPOROTIC FRACTURES RISK AND THE TOTAL CARDIOVASCULAR RISK IN URBAN AND RURAL POPULATIONS

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**Objective:** To analyze the relationship between the absolute risk (AR) of osteoporotic fractures (OPF) and the total cardiovascular risk (CVR) among the urban and rural population of the Russian Federation.

**Methods:** A representative samples of urban (n=11,962) and rural (n=1154) population of men and women aged 40-69 y from 12 regions of the Russian Federation were analyzed. Over the next 10 y AR of OPF was calculated on the basis of the Russian FRAX model without taking into account BMD. Total CVR was evaluated in individuals <65 y on the basis of the Euro Heart SCORE scale for high-risk countries.

**Results:** Among all study participants, the frequency of high AR of major fractures was 7.0%. High and very high CVR was detected in 13.0% of 40-64 years old population with no history of atherosclerotic cardiovascular diseases and diabetes mellitus. Among the urban residents, moderate and strong positive correlations between AR of OPF and CVR were found: for AR of major fractures and CVR in women r=0.48, p<0.0001 and in men r=0.17, p<0.0001; for AR of hip fractures and CVR in women r=0.54, p<0.0001 and in men r=0.56, p<0.0001. Similar correlations were observed in rural residents: for AR of major fractures and CVR in women r=0.49, p<0.0001 and in men r=0.13, p<0.01; for AR of hip fractures and CVR in women r=0.53, p<0.0001 and in men r=0.47, p<0.0001. In the presence of high and very high CVR (≥5%), these relationships were confirmed by the logistic regression analysis: AR of hip fractures ≥1% was increased by 1.9 times (95%CI=1.5-2.4, p<0.001), AR of major fractures ≥10% – 1.5 times (95%CI=1.3-2.0, p<0.05), high AR of major fractures, according to the threshold of therapeutic intervention was increased by 1.3 times (95%CI=1.2-1.6, p<0.05).

**Conclusion:** In both urban and rural residents, a positive association was found between AR of OPF and CVR, regardless of gender. It is likely that a comprehensive approach aimed at early detection of comorbid pathology of osteoporosis and atherosclerosis may have equal value for the urban and rural populations.

## P329
### PREGNANCY-RELATED OSTEOPOROSIS: SINGLE-CENTER EXPERIENCE (SERIES OF CASES)

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**Objective:** Pregnancy-related osteoporosis is an extremely rare condition which leads to the development of severe complications and disability in young women. Deciding on a management strategy is particularly difficult due to the lack of evidence and clinical guidelines.

**Methods:** We present 17 cases of pregnancy-related osteoporosis in women aged between 25-43 y, who were referred to a tertiary osteoporosis care center during the period from 2009-2021. Nine patients were diagnosed between 1 month and 3 y postpartum, and eight patients were diagnosed in the 3rd trimester of pregnancy.

**Results:** Risk factors for osteoporosis in the anamnesis were identified only in 5 patients (29%) and included heparin treatment, chemotherapy, underweight, thyrotoxicosis and gestational diabetes mellitus. All patients had normocalcemia and normophosphatemia; three patients had mild secondary hyperparathyroidism due to vitamin D deficiency. One patient presented with hypercalciuria. 4/10 (40%) had low serum osteocalcin and 2/6 (33%) had elevated β-CrossLaps. Thirteen patients had multiple vertebral compression fractures at X-ray or MRI with a prominent decrease in BMD (median spinal Z-score -3.0 SD, range from -2.1 to -4.4 SD) and one patient had bilateral hip fracture. Treatment approaches included calcium (1000–2000 mg/d) and vitamin D (alfacalcidol 0.5–3 μg/d or cholecalciferol 10000–20000 IU/week) in all patients; 12 patients (71%) received specific treatment: 5 – bisphosphonates, 4 – teriparatide, 3 – denosumab, 3 – calcitonin spray, 2 – strontium ranelate. Three women underwent vertebroplasty and one woman had bilateral hip replacement. Follow-up DXA data were available in 10 patients with a median of 24 months, 8/10 (80%) had an improvement in lumbar spine BMD. Both patients with continuing loss of BMD and 5/8 (63%) of patients with improved BMD received no specific treatment.

**Conclusion:** Our data confirm the severity of pregnancy-related osteoporosis and the difficulty of its diagnosing and managing. There is still insufficient data to determine the optimal management of these patients.

## P330

### CHOLECALCIFEROL BOLUS TREATMENT IN MILD PRIMARY HYPERPARATHYROIDISM: EFFECTS ON VITAMIN D METABOLISM AND CALCIUM-PHOSPHORUS PARAMETERS

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**Objective:** To evaluate vitamin D metabolism in patients with primary hyperparathyroidism in the setting of cholecalciferol bolus dose treatment.

**Methods:** The study included 18 patients with mild primary hyperparathyroidism (defined as serum calcium <3.0 mmol/L), 3 males and 15 females, median age 55.6 [44.8; 59] years. All participants did not take any vitamin D containing supplements or drugs that interfere with vitamin D metabolism within 3 months prior to the participation in the study and were tested for serum vitamin D metabolites ($25(OH)D_3$, $25(OH)D_2$, $1,25(OH)_2D_3$, 3-epi-$25(OH)D_3$, $24,25(OH)_2D_3$ and $D_3$) by UPLC-MS/MS, PTH by electrochemiluminescence immunoassay, routine serum biochemical parameters (calcium, phosphorus, creatinine, albumin, magnesium) and calcium- and phosphorus-creatinine ratio in single void urine before oral administration of 150,000 IU of an aqueous solution of cholecalciferol and 7 d after administration.

**Results:** Median level of $25(OH)D_3$ at the baseline evaluation was 18.0 [10.2; 27.8] ng/mL, 10 patients (56%) had vitamin D deficiency ($25(OH)D$ <20 ng/mL) and 6 patients (33%) had vitamin D insufficiency ($25(OH)D$ 20-29 ng/mL). $25(OH)D_3$ levels increased significantly on the 7th day after cholecalciferol intake (35.4 [26.4; 41] vs. 18.0 [10.2; 27.8] ng/mL, p<0.05), median $\Delta 25(OH)D_3$ was 15.6 [12.7; 18.8] ng/mL and all patients reached $25(OH)D_3$ levels >20 ng/mL. We also observed concordant increase in 3-epi-$25(OH)D_3$ (2.9 [2.4; 3.4] vs. 0.8 [0.5; 1.1] ng/mL, p<0.05) and $24,25(OH)_2D_3$ (2.4 [1.4; 3.0] vs. 0.9 [0.4; 1.8] ng/mL, p<0.05), while baseline high normal or modestly elevated $1,25(OH)_2D_3$ levels had an upward trend not reaching a statistic significance (62 [52; 79] vs. 56 [48; 71] pg/mL, p=0.05). Albumin-adjusted calcium levels showed clinically insignificant elevation (2.69 [2.59; 2.78] vs. 2.65 [2.57; 2.76] mmol/L, p<0.05), however, total serum calcium remained stable (p>0.05) and PTH levels decreased (105 [79; 154] vs. 121 [102; 179] pg/mL, p<0.05). Magnesium levels slightly decreased (0.82 [0.78; 0.86] vs. 0.84 [0.81; 0.89] mmol/L, p<0.05), and phosphorus, creatinine and albumin serum levels as well as urine calcium- and phosphorus-creatinine ratio did not change over the follow-up period (p>0.05).

**Conclusion:** In patients with primary hyperparathyroidism in the absence of severe hypercalcemia, cholecalciferol bolus dose has a prompt favorable effect on vitamin D and PTH levels along with a proper safety profile of calcium- phosphorus parameters.

## P331

### IS KNEE MRI SCAN OVERUSED IN PRIMARY CARE SETTING?

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**Objective:** In Australia, the Medicare Benefits Scheme (MBS) from 2013 provides rebates for adult knee MRI organised by general practitioners (GPs) for suspected diagnosis of knee pain. This resulted in unexpected increase in knee MRI scan ordered prior to orthopaedic specialist referral. We investigate if access to MRI knee prior referral improves patient management and outcome of knee pain. This study aimed to determine investigations performed at primary care setting prior specialist referral for adult knee pain. outline initial treatment of adults with knee pain prior referral, explain why MRI may not contribute more than plain radiographs.

**Methods:** 99 consecutive adults (>40 y) referred for knee pain in 2016-7 to orthopaedic outpatient clinic at Redland Hospital (250 beds, in South Brisbane). Referral letters, clinical history, assessment (including imaging report) and management determined at outpatient clinic were recorded. We determined proportions of patients who had MRI knee scans; knee MRI with clinical history/findings that fulfil the 2013 MBS criteria; patients who underwent surgical intervention; knee MRI that affect patient management different from plain radiographs.

**Results:** 39% had knee MRI scan as sole imaging before orthopaedic referral; another 21% had both knee x-ray and MRI. Only 8% of patients with knee MRI scans fit 2013 MBS criteria, 25% did not provide enough information. 59% of knee pain were diagnosed as osteoarthritis (OA) by GP, orthopaedic specialists determined 82% OA as main diagnosis. 13% underwent surgical intervention, and only 17% knee MRI resulted in a change in treatment.

**Conclusion:** Our results were also reflected in other countries where access to MRI did not ultimately alter GP diagnoses or treatment and there is over-reliance on knee MRIs, underutilise x-rays. There is an urgent need to realign GP practice with prevailing guidelines in investigation modalities for adult knee pain.

## P332

### PRIMARY CARE MANAGEMENT OF KNEE OSTEOARTHRITIS PRIOR REFERRAL TO ORTHOPAEDIC CLINIC AND ITS CONCORDANCE WITH PUBLISHED NATIONAL GUIDELINES AND RECOMMENDATIONS

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**Objective:** Knee pain from osteoarthritis (OA) is a common musculoskeletal condition managed in primary care. Despite widely available national guidelines, there is significant variation in treatment prior to referral to orthopaedic clinic. This study aimed to determine prevalence of knee OA in adults referred to orthopaedic clinic for knee pain, define previous treatment prior referral and its concordance with national guidelines.

**Methods:** 99 consecutive adults (>40 y) referred for knee pain in 2016-7 to orthopaedic outpatient clinic at Redland Hospital (250 beds, in South Brisbane) were reviewed over a 12-month period. Referral letters, clinical history, assessment (including imaging report) and management determined at outpatient clinic were recorded. For those with referral diagnosis of OA, prereferral treatment was compared to then current NHMRC guideline (2009). We consider any management involving at least 80% of therapies listed by guideline as guideline compliant.

**Results:** 72% patients referred (51% female, mean 56.2 y) had OA diagnoses. Most common treatment recorded in referrals is oral analgesics (12%), 86% referral letters (RL) did not mention any treatment attempted prior referral. Previous treatment selfreported by patients (SR) revealed oral analgesic use in 91%, 49% attempted weight loss, 36% tried physiotherapy. Corroboration of history and treatment of knee OA between RL vs. SR shows only 24% concurrence. SR treatment is more likely to be compliant with NHMRC's recommendation as compared to those recorded by RL (39% vs. 6%) but neither achieve better than 39% in adherence to recommendation, hence none of prereferral management were guideline compliant.

**Conclusion:** Despite availability of NHMRC's guideline for knee OA management for a decade, few patients have adequate experience of recommended management before referral to specialist clinic. This

suggests potential success of conservative measures if instituted by general practitioners and orthopaedic surgeons, if majority of knee pain is correctly diagnosed as from OA.

**References:**
1. Handforth C, et al. Calcif Tissue Int 2018;102:251.
2. Yamada K, Kohno N. Clin Calcium 2008;18:507.

## P334

### BONE HEALTH EVALUATION ONE YEAR AFTER AROMATASE INHIBITORS COMPLETION IN OSTEOPOROTIC PATIENTS

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**Objective:** Anti aromatase inhibitors (AI) used for breast cancer increase bone loss during their treatment, few studies have assessed BMD after completing AI treatment. This study aimed to assess changes in BMD one year after AI completion therapy in postmenopausal patients followed for breast cancer and treated for secondary OP.

**Methods:** We conducted a cross-sectional, observational study, which studied the records of patients followed in the rheumatology department over 5 y (2016-2020). Inclusion criteria: postmenopausal patients treated with AI for breast cancer and followed in the rheumatology department at the specialist consultation for weakening osteopathies for OP and treated with bisphosphonates (BP). All disturbances in the phosphocalcic status were corrected before the ODM measurement. Exclusion criteria: premenopausal patients, or patients with another risk factor for OP, Patients treated with tamoxifen or other antiosteoporotic treatment. All of these patients had BMD measurement before starting BP and one year after AI therapy.

**Results:** 92 patients were included, the mean age was 54.3 y, all were postmenopausal and had received a 5-y course of AI for breast cancer. The mean time between the start of BP and the discovery of OP was 23.4 months and the mean duration of follow-up for OP was 38.9 months. One year after AI treatment completion, 67 patients had undergone bone status assessment. It was noted, in all participants, clear improvement in the mean values of BMD in all the sites: the lumbar spine L1-L4 (+2.85%), femoral neck (+2.77%) and at the level of the hip. total (+3.05%). The results of the study are summed up in the Table below.

**Conclusion:** BP markedly improve bone status in osteoporotic patients throughout AI treatment. The persistent effect of BP helps to overcome bone depletion after AI completion, which is a serious side effect of hormone therapy used for breast cancer (2).

Table. Characteristics of patients

|  | Results |
|---|---|
| 1. General characteristics |  |
| Total of patients | 92 |
| Mean age | 54.3 y |
| Menopause | 100% |
| Delay before OP diagnosis | 23,4 months |
| Mean duration of follow up for OP | 38.9 months |
| 2. BMD characteristics (mean values) |  |
| Before BP |  |
| Lumbar spine L1-L4 | T-score: -3.04  -  DMO: 0.702 |
| Femoral neck | T-score: -2.9  -  DMO: 0.586 |
| Total hip | T-score: -3.18  -  DMO: 0.483 |
| One year after AI completion |  |
| Lumbar spine | T-score: -2.01  -  DMO: 0.722 |
| Femoral neck | T-score: -1.7  -   DMO: 0.602 |
| Total hip | T-score: -1.06  -  DMO: 0.497 |

## P335

### PRIMARY HYPERPARATHYROIDISM IN RUSSIA ACCORDING TO THE ONLINE REGISTRY

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**Objective:** Primary hyperparathyroidism (PHPT) is a widespread endocrine disorder. The clinical presentation is heterogeneous, from mild asymptomatic hypercalcemia to the classical complications such as osteoporosis and low-trauma fractures, fractures, nephrolithiasis/nephrocalcinosis and hypercalciuria. Other clinical forms of PHPT, such as normocalcaemic PHPT, are less common. This study aimed to assess the main characteristics of PHPT patients and to conduct initial analysis of clinical presentations and management.

**Methods:** The present study explored retrospective data submitted to the Russian online PHPT registry (http://pgpt.clin-reg.ru/) between February 2017 and April 2021. The data in the text are presented by median (Me) and values of the 1st and 3rd quartiles [Q1; Q3], the significance levels in the range from critical to 0.05 were considered.

**Results:** The total number of patients in the registry is 4176 from 79 regions of Russian Federation. The average age at the time of diagnosis was 56.67±13 y. The active phase of the disease at the time of data submission was registered in 58.8% (2454/4176) and the majority of patients were symptomatic 71.7% (1760/2454). Among them, renal manifestations (nephrolithiasis/nephrocalcinosis) were found in 21%, bone involvement (decreased BMD and fractures) in 36.5%, 37.5% had the both complications, 5% - no data is available. Patients with the symptomatic PHPT had significantly higher serum PTH and calcium levels compared to mild course of disease: 150 pg/ml[103; 243], 2.74 mmol/l[2.62; 2.9] vs. 117 pg/ml [90.48; 164], 2.67 mmol/l [2.57; 2.77] respectively (p<0.05 for all). 669 patients meet the clinical criteria of MEN-1 and MEN-2A syndromes, the average age 43.62±15.9 y. Genetic testing in 114 people(2.7%) showed the mutation *MEN1* in 1.7% of cases (71/4176) and in the *CDC73* gene in 0.14% of cases (6/4176), 7 patients presented with a combination of PHPT and medullary thyroid cancer. The incidence of parathyroid cancer was 1.9% (78/4176) based on postsurgical morphological examination. Summary surgery has been performed in 57.97% of patients (2421/4176). Remission was achieved in 92.3% of cases (2234/2421). Recurrence after the first surgery occurred in 7.7% more often among hereditary form.

**Conclusion:** According to the Russian registry, the symptomatic course with severe renal and bone manifestations is dominant. At this stage, it is necessary to introduce routine calcium screening to detect PHPT on early stages.

## P336

### ASSESSMENT OF OSTEOPOROSIS RISK IN BREAST CANCER PATIENTS: ABOUT 200 CASES

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**Objective:** Breast cancer is the most common cancer affecting women both before and after the menopause. The therapeutic used (chemotherapy, radiotherapy and hormone therapy) can be responsible for deleterious effects on the bone leading to secondary osteoporosis (1). This study aimed to assess the bone status and the frequency of osteoporosis (OP) in patients followed for breast cancer.

**Methods:** We conducted a retrospective study in the rheumatology department over 5 y (2016-2020). Inclusion criteria: Patients followed

for breast cancer in the oncology department and referred to the rheumatology department for the weakening osteopathies consultation for bone evaluation. OP was considered when the T-score at the 3 sites (lumbar spine, femoral neck and total hip) is <-2. The phosphocalcic anomalies were corrected before the measurement of BMD. All these patients underwent BMD measurement and phosphocalcic assessment.

**Results:** 200 patients were included, the average age was 61.25 y (37-82 y) with an average age of discovery of the cancer was 58.12 y. 98% of patients were postmenopausal and 29% of them had menopause after treatment. The other risk factors for OP were: long-term corticosteroid therapy (13%) and dysthyroidism (9.6%). 98% of patients were treated by surgery, 84.6% by chemotherapy, 70% by radiotherapy and 94% by hormone therapy, of which 85% were treated with anti-aromatase and 15% with tamoxifen. The mean time from starting adjuvant therapy and diagnosing OP was 23.4 months. 136 patients (68%) had OP, lumbar spine was affected in 86% of cases with a mean T-score of -2.98 and mean BMD at 0.854. Osteoporotic patients were treated with bisphosphonates, 50% of which received alendronate, 19% risedronate and 17% zoledronate in addition to dietary measures and correction of phosphocalcic anomalies. Results are summed up in the Table below.

**Conclusion:** Breast cancer patients under treatment are at risk of OP, because of the age of onset of cancer, menopause secondary to chemotherapy, corticosteroid therapy and estrogen depletion induced by hormone therapy (1). The frequency of OP in patients followed for breast cancer is 27.5% (2), the frequency in our series is estimated at 68% this can be explained by the profile of patients treated in a hospital environment with several risk factors.

Whatever the antineoplasic therapy used, the evaluation of bone status is systematic during the course of and at the end of treatment and especially in the presence of other OP risk factors.

**References:**
1. Bjarnasonn H, et al. Acta Oncol 2008;47:747.
2. Lipton A, et al. SM Cancer 2017;123:2444.

Table. Characteristics of patients

|  | Results |
| --- | --- |
| Total patients | 200 |
| Mean age | 61.25 y |
| Mean age of breast cancer diagnosis | 58.12 y |
| Postmenopausal patients | 98% |
| Menopause secondary to treatment | 29% |
| Treatment |  |
| Surgery | 98% |
| Chemotherapy | 84.6% |
| Radiotherapy | 70% |
| Hormonotherapy | 94% |
| Mean delay before OP diagnosis | 23.4 months |
| Osteoporotic patients | 136 (68%) |
| Osteopenic patients | 7 (7.6%) |
| Sites of OP |  |
| Lumbar spine | 88% |
| Femoral neck | 17% |
| Total hip | 14% |
| Bisphosphonate therapy |  |
| Alendronate | 60% |
| Risedronate | 17% |
| Zoledronate | 12% |

**P337**

**BONE STATUS OF POSTMENOPAUSAL PATIENTS TREATED WITH HORMONETHERAPY FOR BREAST CANCER: ABOUT 200 CASES**

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**Objective:** Hormone therapy used to treat a breast cancer worsens bone depletion during treatment, especially in postmenopausal women (1). This study aimed to assess the bone status and the frequency of osteoporosis (OP) in postmenopausal patients followed for breast cancer and treated with hormone therapy (HTT).

**Methods:** We conducted a retrospective study in the rheumatology department over 5 y (2016-2020). Inclusion criteria: postmenopausal patients treated with HTT for breast neoplasm in the oncology department and referred to the rheumatology department for the specialist consultation for weakening osteopathies for bone evaluation. Exclusion criteria: premenopausal patients with another risk factor of OP. OP was considered when the T-score at the 3 sites (lumbar spine, femoral neck and total hip) was <-2 and osteopenia was considered when the T-score is between -1 and -2 at the different sites. All of these patients underwent a measurement of BMD, and all phosphocalcic disturbances were corrected before the BMD measurement.

**Results:** 200 patients were included, The average age was 54.3 y (39-75 y) with an average age of the discovery of breast cancer at 56.12 y, the average time between the start of adjuvant treatment and the first specialist consultation of bone was 23.4 months. 196 patients (98%) were postmenopausal, of which 29% had menopause secondary to treatment. 175 (89.3%) cases received HTT treatment of which 85% were treated with anti-aromatase and 15% with tamoxifen. 126 patients (76%) had OP and 42 participants (24%) had osteopenia, 7 (4%) patients had normal BMD. The lumbar spine was affected in 74% of cases with a mean T-score of -2.87 and mean BMD of 0.889. The neoplasm was metastatic in 15% of patients, 85% of whom had bone metastases and 15% had visceral ones. Osteoporotic patients were treated with bisphosphonates of which 60% received alendronate, 16% risedronate and 12% zoledronate. the results are summed up in the Table below.

**Conclusion:** Patients followed for breast neoplasm under HTT are exposed to the risk of OP (2). The frequency of OP in our series is estimated at 76% and osteopenia is estimated at 42%.

Management of osteoporotic and even osteopenic patients treated with HTT for breast cancer requires the identification of other risk factors of OP, the correction of calcium and vitamin D deficiencies, hygienic dietary measures, the prescription of treatment with BP as recommended and a long-term monitoring of bone status during and after therapy completion.

**References:**
1. Ramchand SK, et al. J Endocrinol 2019;241:R111.
2. Lipton A, et al. SM Cancer 2017;123:2444.

Table. Characteristics of patients

|  | Results |
| --- | --- |
| 1. General characteristics |  |
| Total patients | 200 |
| Average age | 54.3 y |
| Average age of breast cancer diagnosis | 56.12 ys |
| Average time before bone loss diagnosis | 23.4 months |
| Total postmenopausal patients | 196 (98%) |
| Cancer metastase | 15.18% |
| Bone | 85% |
| Visceral | 15% |

| | | |
|---|---|---|
| Patients treated with HTT | 175 (89.3%) | |
| Aramotase inhibitors | 148.75 (85%) | |
| Tamoxifen | 26.25 (15%) | |
| 2. BMD characteristics | | |
| Osteoporosis | 126 patients (76%) | |
| Osteopenia | 42 patients (24%) | |
| Normal | 7 patients (4%) | |
| Sites of OP | | |
| Lumbar spine | 74% | |
| Femoral neck | 23% | |
| Total hip | 17% | |
| 3. Bisphosphonate therapy | | |
| Alendronate | 60% | |
| Risedronate | 16% | |
| Zoledronate | 12% | |

## P338

### PAGET'S DISEASE: REAL-LIFE EXPERIENCE FROM AN INSTITUTION SPECIALIZED IN BONE METABOLISM IN LATIN AMERICA

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**Objective:** The epidemiology of Paget's disease of bone (PDB) has changed in the last years but there is no update data on its clinical presentation, diagnosis and management in Latin America. Our aim was to describe its clinical features, diagnostic evaluation and responses to treatment in a group of PDB patients treated in Argentina.

**Methods:** We assessed all patients attending our institution that specializes in bone diseases, from June 2012 to December 2019. We reviewed the clinical records and laboratory findings of all the patients diagnosed with PDB followed up for more than a year after diagnosis.

**Results:** The frequency of PDB was 1.68%. Median age was 67 y (range 39-97) and 59.5% were women. Most patients were asymptomatic (58.6%) and had monostotic disease (54.3%). Favorable biochemical responses were obtained in all patients who were treated with zoledronate (n=36), in 10 out of 14 treated with pamidronate (71.4%), in 9 out of 10 who received IV ibandronate (90%) and in 12 out of 13 who took oral bisphosphonates (92.3%). The response rates were not significantly different when we compared monostotic vs. polyostotic disease (Table 1). Among the biochemical parameters, mean values of bone specific and total ALP, and C-terminal crosslinked telopeptide of type I collagen decreased significantly after treatment with bisphosphonates. The following complications were reported: bone deformities, 2.6%; fractures, 3.4%; nerve root compression, 3.4%; arthrosis, 25.8%.

**Conclusion:** Our cohort of PDB patients was mostly asymptomatic, monostotic, with a discreet female predominance and low rate of orthopedic and neurologic complications. Our results reflect the change in PDB epidemiology towards a more indolent disease.

Table. Drug treatment and responses of treated patients.

| Treatment | Monostotic n=48 | Polyostotic n=25 | Total n=73 | p |
|---|---|---|---|---|
| | *% of patients under treatment* | | | |
| Zoledronate | 21 (43.7%) | 15 (60%) | 36 (49.3%) | 0.223 |
| Pamidronate | 10 (20.8%) | 4 (16%) | 14 (19.2%) | 0.759 |
| IV ibandronate | 7 (14.6%) | 3 (12%) | 10 (13.7%) | 1.000 |
| | 10 (20.8%) | 3 (12%) | | 0.522 |

| Oral bisphosphonates | | | 13 (17.8%) | |
|---|---|---|---|---|
| | *% of patients with favorable response* | | | |
| Zoledronate | 21 (100%) | 15 (100%) | 36 (100%) | 1.000 |
| Pamidronate | 7 (70%) | 3 (100%) | 10 (71.4%) | 1.000 |
| IV ibandronate | 6 (85%) | 3 (100%) | 9 (90%) | 1.000 |
| Oral bisphosphonates | 10 (100%) | 2 (66.7%) | 12 (92.3%) | 0.231 |

## P339

### ONSET OF PRIMARY HYPERPARATHYROIDISM 12 YEARS AFTER INITIAL DIAGNOSTIC OF GH-PRODUCING MESOADENOMA

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**Objective:** Syndromic primary hyperparathyroidism (PHP) includes, among other tumours, the association with growth hormone (GH) producing tumour causing acromegaly; this combination, namely multiple endocrine neoplasia (MEN1) syndrome underlines *MENIN* mutations that are not characterised by phenotype – genotype correlations, thus a particular constellation (in terms of type and timing) of pituitary and parathyroid adenomas in addition to pancreatic neuroendocrine neoplasia or other mases like breast tumours, etc. cannot be anticipated (1-5).

**Case report:** An adult female with a history of treated acromegaly that was confirmed with MEN1- related PHP after more than a decade from initial presentation. This is a 53-year-old who was admitted for acromegaly serial assessment. The personal medical family is irrelevant. Her medical background includes: in 2009 she was recognized as acromegalic based on facial features; the somatropinoma of 1.1 cm was referred to selective hypophysectomy with postoperative uncontrolled disease which required additional radiotherapy which was added to first line somatostatin analogue octreotide LAR 40 mg/month and dopamine agonist cabergoline 3 mg/week, and since last 5 y GH receptor blocker pegvisomant 70 mg/week. The acromegaly was complicated with mild arterial hypertension, and hypercholesterolemia, and 5 y ago a mammary tumour of 3 cm was diagnosed; she refused its biopsy/removal with stationary imaging aspect during follow-up. Recently, she had her annual evaluation done which showed controlled acromegaly in terms of mean GH profile of 1.2 ng/mL/24-h (normal<2.5 ng/mL); nadir GH during 75 g oral glucose tolerance test of 0.72 ng/mL (normal <1 ng/mL) and IGF-1=296 ng/mL (normal: 51-233), but, opposite to prior assays, PHP-related hypercalcemia was confirmed: total serum calcium of 10.4 mg/dL (normal: 8.5-10.2 mg/dL), PTH=88 pg/mL (normal: 15-65 pg/mL), 25OHD=25 ng/mL, normal bone turnover markers and BMD at DXA, no kidney stones. For the moment, hydration, daily 1000 UI cholecalciferol is added to acromegaly regime.

**Conclusion:** Acromegaly requires lifelong surveillance of MEN1 syndrome elements, especially in young adults.

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## P340

### ETHICAL JUSTIFICATION OF APPLYING DXA ANALYSIS IN CHILDREN WITH MUSCULOSKELETAL DISORDERS

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Pazar, [4]Radiology Dept., Faculty of Medical Sciences, Kragujevac, Serbia

**Objectives:** Performing DXA analysis is not a common part of the diagnostic process in children. However, it is known that reduced physical activity affects bone metabolism and antigravity muscles. This study aimed to evaluate BMD in children with musculoskeletal disorders (MD) and the ethical justification of applying DXA analysis in these children.

**Methods:** In this monocentric retrospective analysis, data were collected from children and adolescents with cerebral palsy, juvenile idiopathic arthritis, Legg-Calvé-Perthes disease, muscular dystrophy, spina bifida, and syringomyelia, who were treated for a primary illness for three years. A clinical examination, which included a DXA scan, recommended by the multidisciplinary team, was performed. After applying inclusion and exclusion criteria, 92 scans remained for statistical analysis. BMD and $Z$-scores for the lumbar spine (LS), and hip right and left femoral neck (RFN and LFN, respectively), and total hip (TH) were recorded.

**Results:** The average age of children with MD when DXA analysis was first performed was about 8 y. The BMD (mean±SD) at LS of all patients was 0.565±0.21, at RFN 0.602±0.26, at LFN 0.596±0.24, and at TH 0.578±0.22. The values of the $Z$-score (mean±SD) at LS of all patients were -2.4±0.3, at RFN -2.32±0.19, at LFN -2.25±0.3, and at TH -2.3 ±0.31. There was no statistical significance between gender; however, BMI, walking ability, fracture history, and regular physical treatment had a significant impact on BMD and $Z$-score values of these children.

**Conclusion:** The results of our study clearly indicate that children with MD have a higher risk of low BMD, osteoporosis, and bone fractures, which makes it ethically justifiable to perform the DXA analysis in these children.

## P341

### ADVANCED PRP PROCEDURE INCREASES KNEE CARTILAGE THICKNESS

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**Objective:** The successful assessment of osteoarthritis (OA) progression and the results of applied therapy can be determined by objective methods of damage monitoring, and one of them is an ultrasound measurement of cartilage thickness. The aim of the study was to determine whether and how the diameter cartilage of the knee changes after the advanced platelet-rich plasma (a-PRP) procedure.

**Methods:** The study included 150 patients who underwent the a-PRP procedure in 2018 and 2019 at the Center for Regeneration & Rehabilitation in Novi Pazar, Serbia. After explaining the procedure, adequate preparation, and consent, the a-PRP procedure was performed in patients with II and III degrees knee OA. The diameter cartilage of knees was measured with a linear probe of frequency 7-12 MHz in the position of flexion of the knee joints at 90°. Three values of cartilage thickness were recorded: on the medial condyle (MC), on the lateral condyle (LC), and the intercondylar part (ICP) before the a-PRP procedure and 3, 6, and 12 months after the a-PRP procedure.

**Results:** The cartilage thickness was significantly greater at all 3 measurement sites after 3, and 6 months from the a-PRP procedure in 76% of patients (p<0.05), and after 12 months the diameter increased and was maintained in a total of 112 subjects. The largest increase occurred in LC (p<0.01). No statistically significant increase in cartilage thickness was observed in 28 patients, and the diameter decreased in 10 patients. None of the patients had side effects.

**Conclusion:** The ultrasound measured cartilage knee diameter increases after 3, 6, and 12 months of the a-PRP procedure, making this procedure a therapeutic choice for the treatment of knee OA.

## P342

### COVID-19 IMPACT ON BONE MINERAL DENSITY

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**Objective:** COVID-19 pandemic, infection, and lockdown led to the impact on physical activity, regular training, and fitness of people around the globe. This phenomenon has led to short-term as well as long-term bone and muscle health implications. We performed a case-control study to evaluate the effect of COVID-19 infection on BMD in Novi Pazar city people.

**Methods:** The cases were hospitalized patients with confirmed COVID-19 with treatment longer than 2 weeks. Each patient was matched with healthy individuals for age, gender, and BMI. All our patients were without secondary causes or medications that might affect bone density. After 3 months of cure, BMD and Z-scores for the lumbar spine (LS), and hip right and left femoral neck (RFN and LFN, respectively), and total hip (TH) were recorded.

**Results:** 30 COVID-19 recovered patients (15 male, 15 female) and 30 (15 male, 15 female) controls were studied. The mean age of the cases and the controls was 43.5 (SD 12.2) years and the mean BMI was 25.1 (SD 8). The results of crude odds ratios analyses indicated that COVID-19 infection was associated with a high risk of reduction of BMD: OR 2.31 (95%CI, 1.32–3.43). Lockdown had also a significant effect on increasing the osteoporosis risk (ORs: 1.92 (95%CI, 1.11–3.38) and 2.12 (95%CI, 1.23–3.11)). After multiple regression analysis, COVID-19 infection and being quarantined due to infection or fear of infection remained both independent factors that increased the osteoporosis risk (ORs: 1.95 (95%CI, 1.26–3.76) and 2.08 (95%CI, 1.11–4.13) respectively).

**Conclusion:** Our study suggested that in Novi Pazar city people COVID-19 infection increased the risk of osteoporosis. Further studies are required to evaluate the clinical impact of the above findings and to clarify the status of vitamin D among people in Novi Pazar.

## P343

### ULTRASOUND-GUIDED INJECTION OF PLATELET-RICH PLASMA IN KNEE OSTEOARTHRITIS

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**Objective:** The efficacy of platelet-rich plasma (PRP) in the treatment and healing of knee osteoarthritis (KOA) through stimulation of cell proliferation and reducing inflammation has been demonstrated by both in vitro and in vivo studies. The aim of this study is to evaluate the effectiveness of ultrasound (US)-guided autologous advanced PRP injections in KAO with Kellgren-Lawrence grades 2–3.

**Methods:** Autologous PRP was isolated from peripheral arterial blood, previously stimulated by a low-level laser (LLL) and electromagnetic field (EMF), and was injected under US-guidance into the knee, by an anteromedial approach, under conditions of sterility (185 knees) in 100 prospectively selected patients (42 males, 58 females, mean age 48±16 y, range 29–69 y), during the first half of 2019. Patients were examined for range of motion, improvements in VAS scale, WOMAC score, Lequesne index (LI), ambulation speed, and medical outcomes study 36 short-form (SF-36) health survey 7, 3 days, 3 and 6 months after intra-articular application of PRP.

**Results:** 30 days after PRP injection the patients presented first minor improvements in clinical symptoms. At the 6-month follow-up VAS, WOMAC, and LI score significantly decreased, and ambulation speed and SF-36 increased. US evaluation revealed an increase in cartilage thickness, associated with a reduction in synovial hyperplasia, and reduced hypervascularity at power Doppler. There were no PRP-a-related adverse events during and after the interventions.

**Conclusion:** PRP injection in KAO results in a significant improvement of clinical symptoms and functionality, thereby slowing down the degenerative process of joint decay. US guidance allows PRP injection into the knee with great accuracy.

## P344
### CONGENITAL BILATERAL RADIOULNAR SYNOSTOSIS - CASE REPORT: GRANDFATHER, SON, AND GRANDSON

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**Objective:** Congenital bilateral radioulnar synostosis (CRUS) is a rare condition, characterized by an osseous or fibrous fusion of the radius and ulna present at birth, resulting in functional deficits of the elbow joints.
**Case report:** A 68-year-old retired salesman, his son, and grandson, all three of them with this rare condition, whose bilateral limited mobility of the elbow joints has been clinically proven, after which the radiographic and CT imaging was performed, confirming the presence of this bone condition. 3D reconstruction has provided a detailed spatial visualization of the existing malformations and the reciprocal anatomical relationships between the bone structures. The treatment can be conservative or surgical, depending on the elbow joint's degree and range of motion. When deciding the course of treatment, diagnostic imaging results, especially those of MDCT with 3D and multiplanar reconstruction are extremely valuable.





**Conclusion:** CRUS is a rare malformation treated conservatively or surgically, depending on the elbow joint's degree and range of motion. When deciding the course of treatment, imaging diagnostics is invaluable.

## P345
### FACTORS ASSOCIATED WITH SPONTANEOUS FALLING IN OLDER ADULTS: RESULTS OF THE BUSHEHR ELDERLY HEALTH PROGRAM

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**Objective:** Spontaneous fall is one of the causes of fractures in people with osteoporosis. This study aimed to investigate the factors associated with spontaneous fall among people ≥60 y in southern Iran.
**Methods:** The baseline data of 2424 samples from the second stage of the first phase of a prospective cohort, the Bushehr Elderly Health (BEH) program [1, 2] was included in the analysis. A history of spontaneous fall in the year before the recruitment was measured by selfreport using a standardized questionnaire. Demographic characteristics, as well as the history of osteoarthritis, rheumatoid arthritis, low back pain, Alzheimer's disease, epilepsy, depression, and cancer, were measured using standardized questionnaires. Tandem gait (heel-to-toe) exam, as well as laboratory tests, was performed under standard conditions. A logistic regression model was used in the analysis and the multiple model was fitted backwardly using Hosmer and Lemeshow strategy [3].
**Results:** Mean (standard deviation) of the participants' age was 69.34 (6.4) y (range: 60-96 y), and 48.06% of the participants were men. 260 subjects of the 2,424 participants reported a spontaneous fall in the year before the recruitment (10.7%, 95%CI (9.5-12.0)%). The result of the bivariate and multiple analysis of the association between potential risk factors and spontaneous fall were presented in Table.
**Conclusion:** Adjusted for potential confounders, having epilepsy, cancer, depression, low back pain, and osteoarthritis increase the risk of spontaneous fall in older adults. Ability to stand ≥10 s in the tandem gait exam, being men, and having physical activity and high serum triglyceride reduce the risk of fall.

**References:**

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Table. Factors associated with last year spontaneous falling in older adults; results from simple and multiple logistic regression analysis.

| Risk factor | Crude OR[a] (95%CI) | P value | Adjusted OR[a] (95%CI) | P value |
|---|---|---|---|---|
| Age (y) | | | | |
| 60-64 | 1 | - | 1 | - |
| 65-69 | 0.69 (0.49-0.96) | 0.03 | 0.62 (0.44-0.88) | 0.01 |
| 70-74 | 0.70 (0.45-1.08) | 0.10 | 0.59 (0.38-0.93) | 0.02 |
| 75-79 | 1.28 (0.85-1.93) | 0.24 | 1.00 (0.64-1.55) | 0.99 |
| 80-84 | 1.09 (0.64-1.88) | 0.75 | 0.84 (0.47-1.51) | 0.56 |
| >85 | 1.54 (0.79-3.00) | 0.21 | 1.08 (0.53-2.23) | 0.83 |
| Sex (Male) | 0.44 (0.33-0.58) | <0.001 | 0.60 (0.44-0.81) | 0.001 |
| Education | | | | |
| No education | 1 | - | - | - |
| Primary school | 0.97 (0.73- 1.31) | 0.86 | - | - |
| Guidance school | 0.53 (0.30-0.93) | 0.03 | - | - |
| High school | 0.66 (0.42-1.02) | 0.06 | - | - |
| Academic | 0.53 (0.29-0.97) | 0.04 | - | - |
| High cholesterol[b] | 1.25 (0.96-1.63) | 0.10 | - | - |
| High LDL[c] | 1.22 (0.95-1.58) | 0.12 | - | - |
| High triglyceride[d] | 0.81 (0.61-1.07) | 0.14 | 0.72 (0.53-0.97) | 0.03 |
| Osteoporosis[e] | 1.57 (1.21-2.03) | 0.001 | - | - |
| Osteoarthritis | 1.83 (1.31-2.55) | <0.001 | 1.49 (1.05-2.11) | 0.02 |
| Rheumatoid arthritis | 2.86 (1.47-5.56) | 0.002 | - | - |
| Low back pain | 2.17 (1.65-2.86) | <0.001 | 1.79 (1.33-2.40) | <0.001 |
| Alzheimer's | 2.10 (0.78-5.65) | 0.14 | - | - |
| Epilepsy | 3.91 (1.47-10.37) | 0.006 | 4.31 (1.54-12.07) | 0.005 |

| | | | | |
|---|---|---|---|---|
| Depression | 2.20 (1.34-3.62) | 0.002 | 1.81 (1.08-3.06) | 0.02 |
| Cancer | 3.12 (1.30-7.50) | 0.01 | 2.73 (1.09-6.84) | 0.03 |
| Physical activity[f] | 0.60 (0.42-0.85) | 0.004 | 0.69 (0.48-0.99) | 0.046 |
| Tandem gait exam | | | | |
| No standing | 1 | - | 1 | - |
| Standing <10 s | 0.74 (0.47-1.15) | 0.18 | 0.86 (0.54-1.37) | 0.54 |
| Standing ≥10 s | 0.37 (.27 – 0.50) | <0.001 | 0.49 (0.35-0.69) | <0.001 |

a: Prevalence odds ratio

b: Total cholesterol ≥200 mg/d.

c: Low-density lipoprotein cholesterol ≥110 mg/dL

d: Serum triglyceride ≥150 mg/dL

e: Measured by BMD using the DXA method by a Hologic Discovery machine. It was defined as a T-score ≤ -2.5 (in any sex compared to the ideal BMD of a young healthy white person of the same sex) at any site (total hip, spine, or neck of femur).

f: Measured using Aadahl et al. physical activity questionnaire [4].

## P346

### IMPACT OF CYSTIC FIBROSIS ON THE EVOLUTION OF BONE MINERAL DENSITY

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**Objective:** Cystic fibrosis (CF) can induce osteoporosis, and increases the risk of fractures. The objective of this study was to determine the prevalence of osteoporosis in a cohort of patients followed at the Lille University Hospital, and its evolution over time. We also analyzed the risk factors influencing bone loss, as well as the impact of an antiosteoporosis therapy or a chloride channel modulator (lumacaftor/ivacaftor).

**Methods:** Single-center, descriptive study carried out on adult patients with CF, followed between 2010-2020. The evaluation comprised bone assessment including BMD measurement, biological assessment focused on calcium, phosphorus, vitamin D, PTH and pneumologic assessment. Also collection of clinical and laboratory parameters were evaluated at two different stages, spaced on average 7±3 y.

**Results:** 119 patients were included and among them 10% were treated with antiosteoporotic drugs, whereas 25.2% were treated with lumacaftor/ivacaftor. The prevalence of osteoporosis by DXA at baseline was 8.4%, and 12.6% at the end of the study period respectively. BMD significantly decreased over time at the femoral neck (-6%, p<0.001), and at the total hip (-2%, p<0.001) but not at the lumbar spine. BMD changes at the femoral neck were significantly associated with the decrease of forced vital capacity, and also the presence of diabetes at baseline (p<0.05 and p<0.01, respectively). BMD changes were not different for patients who were receiving antiosteoporotic drugs and those who were not. The figures were the same for lumacaftor/ivacaftor.

**Conclusion:** Our data demonstrate a decrease in BMD at the femoral neck and at the hip in CF related to the severity of respiratory involvement and the presence of diabetes. Other studies are required for explaining the absence of efficacy of antiosteoporotic drugs in this cohort of patients with CF.

## P347

### ULTRASOUND CHARACTERIZATION OF THE PLANTAR FASCIA: A COMPARATIVE STUDY BETWEEN PATIENTS WITH SPONDYLOARTHRITIS, HIGH-IMPACT ATHLETES AND HEELED SHOE WEARERS

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**Objective:** The plantar fascia is one of the most frequently affected enthesal territories in patients with spondyloarthritis. Plantar fasciitis, not related to these diseases, is also a frequent pathology linked to alterations in the biomechanics of plantar bearing. The plantar fascia, moreover, is one of the most relevant structures in the plantar flexion of the foot and, therefore, must support the load of body weight in high-impact sports. Although plantar fasciitis is defined clinically, it is noted by demonstrating an increase in its thickness. The purpose of the present study is to determine whether there are differences between the plantar fasciae of healthy subjects, high-impact athletes, heel wearers, and patients with spondyloarthritis (with plantar fascia involvement).

**Methods:** Between December 2019 and January 2020, sedentary healthy volunteers (medical students and relatives), basketball and volleyball players, female workers in a department store and heel wearers (> 4cm, >5 h/wk, >1 y) and patients with known diagnosis of spondyloarthritis and plantar fascia involvement were recruited. An ultrasound examination of the plantar fascia of the dominant foot was performed in the longitudinal axis at the edge of the calcaneus and 10mm distal to it. To exclude changes attributable to age, volunteers under 35 years of age were included. The ultrastructure of the fascia was dichotomously assessed as normal or altered. All scans were performed by an expert sonographer unrelated to the type of volunteer being scanned.

**Results:** 46 sedentary volunteers (<2 h of weekly exercise), 42 federated basketball and volleyball players, 58 female heel wearers and 26 patients diagnosed with spondyloarthritis and plantar fasciitis were included. Table 1 summarizes the demographic and anthropometric characteristics of the included subjects. Plantar fascia thicknesses in the longitudinal axis at the edge of the calcaneus are shown in Table 2. No statistically significant differences were identified between the tendon thickness of patients and high-impact athletes. Statistically significant differences were identified in the comparisons between the remaining three height means, depicted in Figure 1. The proportion detecting altered echostructure occurred in 76.9% of patients, 38% of high-impact athletes, and 10.3% of heel wearers and 8.6% of sedentary people. Statistical comparison of these proportions is shown in Figure 1.

**Conclusion:** The ultrasound changes observed in the plantar fascia in patients with spondyloarthritis and plantar fasciitis are similar to those presented by high-impact athletes both in terms of altered ultrastructure and fascial thickness. According to these results, it is advisable to know the sports history of patients with suspected spondyloarthritis or under follow-up for this diagnosis when evaluating the plantar fascia ultrasonographically.

Table 1.

| | Asymptomatic volunteers | | | SpA patients N=26 |
|---|---|---|---|---|
| | Sedentarian N=46 | High impact athletes N=42 | High-heels users N=58 | |
| Age (years) | 23.8 DE 3.1 | 25.5 DE 3.9 | 26.8 DE 2.3 | 36.9 DE 3.9 |
| Female sex, % | 29, 63% | 33, 78.5% | 58, 100% | 8, 30.7% |
| BMI g/cm² | 25.7 DE 2.6 | 23.4 DE 2.8 | 23.8 DE 3.8 | 25.6 DE 3.4 |
| % lean mass | | | | |
| Men | 36.3 DE 5.4% | 47.3 DE 4.3% | - | 34.9 DE 5.2% |
| Women | 32.7 DE 6.2% | 43.7 DE 3.9% | 33.7 DE 5.3% | 31.3 DE 5.9% |

Table 2.

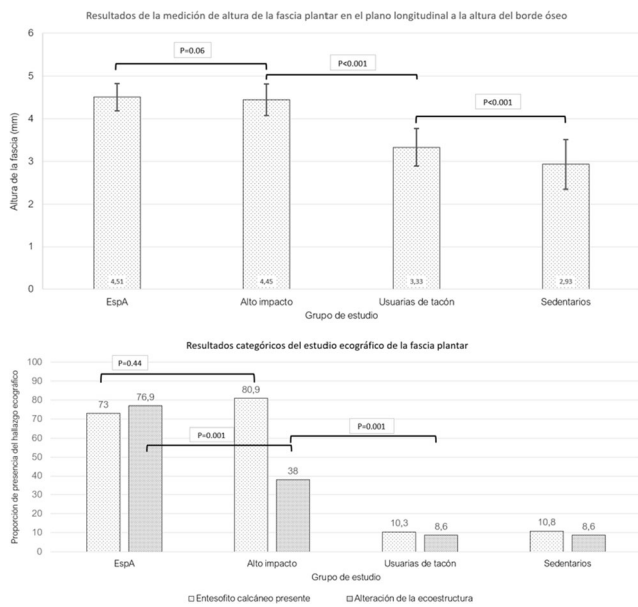| | Asymptomatic volunteers | | | SpA patients N=26 |
|---|---|---|---|---|
| | Sedentarian N=46 | High impact athletes N=42 | High-heel users N=58 | |
| Fascia height at the talocalcaneal border (mm) | 2.93 DE 0.58 | 4.45 DE 0.37 | 3.33 DE 0.44 | 4.51 DE 0.32 |
| Height of the fascia 10 mm distal to the talocalcaneal edge | 2.77 DE 0.53 | 4.19 DE 0.32 | 3.19 DE 0.37 | 4.43 DE 0.39 |
| Presence of calcaneal enthesophyte | 5 (10.8%) | 34 (80.9%) | 6 (10.3%) | 19 (73%) |
| Echostructure alteration | 4 (8.6%) | 16 (38%) | 6 (8.6%) | 20 (76.9%) |

Figure 1.

## P348

### STRUCTURAL CHANGES IN THE ACHILLES TENDON AND RETRO ACHILLES BURSA INDUCED BY EXERCISE IN HEALTHY SUBJECTS

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**Objective:** The Achilles tendon (AT) is the largest and most traction-resistant tendon in the body. These anatomical characteristics and its ease of exploration make this tendon a structure of interest in the study of patients with suspected spondyloarthritis. Like other load-bearing tendons, devoid of its own synovium, the Achilles tendon requires the cushioning of a bursa. The retro Achilles bursa (ARB) is a paratendinous structure lined with synovial tissue.

Both the AT and the ARB are structures with the ability to adapt to biomechanical demand. Knowing the behavior of these structural modifications would allow us to understand to what extent changes in tendon architecture and bursa size can be considered physiological. The aim of the present study was to determine, in terms of ultrasonographically assessable structural changes, the physiological response of the AT and ARB to regular and controlled physical exertion.

**Methods:** An observational, longitudinal-retrospective study was performed using data obtained in a previous study. For this study, 116 young volunteers (20-30 years old) were enrolled throughout 2019 by means of posters placed in three sports centers in the northeastern area of Madrid (Alcobendas, San Sebastián de Los Reyes), who previously did not exercise more than 1 d/wk with the lower body. Subjects were excluded if they declared having a diagnosis of immune-mediated rheumatologic diseases or first-degree relatives with these diagnoses. Volunteers were instructed a training regimen (running) of 60'/d, 5d/wk. The research team encouraged the participants interweekly to perform the routine aiming to reach 140% of basal HR. At the beginning and end of the exercise period, an ultrasound examination of AT and ARB was performed. The outcome variables were the gradient of the longitudinal and transverse thickness of the AT and the height of the ARB. The independent variables were the gradients of the subjects' anthropometric measurements. The working hypothesis was that the greater the

anthropometric change of the individual, the greater the structural changes that should be expected in the AT and the ARB.

**Results:** Of the 116 volunteers studied, 72 (62.1%) were male. Median age 24 RIC [4.50]. Basal BMI 21.8±2.88 g/m$^2$. Basal muscle mass percentage (% lean mass) was 33.06±6.48%. Table 1 summarizes the anthropometric characteristics of the volunteers and the results of the ultrasound examinations before and after the exercise routine. Table 2 presents the results of the bivariate correlation tests between the anthropometric changes: percentage muscle mass gain and increase in the circumference of the dominant calf, with the structural variations of AT and ARB. In all correlations, statistically significant differences were demonstrated in both sexes.
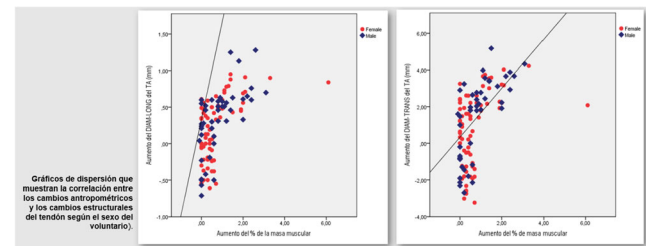
**Conclusion:** Regulated physical exercise produces detectable morphological changes in AT and ARB architecture. The anthropometric modifications induced by exercise in the individual correlate with the magnitude of these changes.

| | Variable | Antes | Después | P-valor |
|---|---|---|---|---|
| | IMC (g/m$^2$) | 22.83 ± 3.15 | 21.80 ± 2.88 | .03 |
| | Masa muscular (%) | 33.06 ± 6.48 | 33.80 ± 6.47 | <.01 |
| | Circunferencia pantorrilla (cm) | 37.71 ± 2.89 | 38.83 ± 3.52 | <.01 |
| | Diam-Long TA (mm) | 4.10 ± 0.74 | 4.35 ± 0.94 | <.01 |
| | Diam-Trans TA (mm) | 20.00 ± 3.41 | 20.19 ± 3.47 | <.01 |
| | Altura BRA (mm) | 2.50 ± 1.12 | 2.63 ± 1.22 | <.01 |

Tabla 1. Resumen de los resultados del estudio antropométrico y ecográfico antes y después de la rutina de ejercicios. El p-valor ha sido calculado mediante el estadístico T-Student para muestras relacionadas.

| | Variable | Ganancia de masa muscular | | Incremento de la circunferencia de la pantorrilla | |
|---|---|---|---|---|---|
| | | Coef. Pearson | P-valor | Coef. Pearson | P-valor |
| | Incremento de altura de la BRA | 0,499 | <.001 | 0,446 | <.001 |
| | Incremento de DIAM-LONG | 0,569 | <.001 | 0,447 | <.001 |
| | Incremento de DIAM-TRANS | 0,525 | <.001 | 0,465 | <.001 |

Tabla 2. Resultados de la prueba de correlación bivariada entre los cambios antropométricos experimentados por los voluntarios y los cambios observados en los estudios ecográficos (Después-Antes).



Gráficos de dispersión que muestran la correlación entre los cambios antropométricos y los cambios estructurales del tendón según el sexo del voluntario).

## P349

### A NEW PROPOSAL TO REDUCE ATYPICAL FEMORAL FRACTURES

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**Objective:** Atypical femur fracture (AFF), which is a rare type of fracture that has been associated with the long-term use of potent antiresorptive bone medications, is a potentially devastating consequence of osteoporosis treatment. AFF pathogenesis is associated with mechanical and biological mechanisms of cortical bone. This study highlights the patient group that is at high risk for development of this complication from the biomechanical point of view.

**Methods:** We retrospectively studied cases with atypical femoral fractures in the last 5 y. We retrieved 7 cases, 5 female and 2 male patients. 4/7 patients had diaphyseal AFF, while the rest had subtrochanteric AFF. All of them were treated with alendronate for osteoporosis. Mean age of these patients was 69.7 years old. We examined the radiographs and evaluated the diaphyseal lateral femoral bowing angle and femoral neck-shaft angle to clarify if increased femoral lateral bowing (>5.25°) or decreased femoral neck-shaft angle (<125°), are associated with increased risk for diaphyseal and subtrochanteric AFFs respectively.

**Results:** All patients with diaphyseal AFFs had increased lateral femoral bowing angle and subsequently all patients with subtrochanteric AFFs

had decreased neck-shaft angle. Mean lateral femoral bowing was 12.9° (SD=5.5°), while mean neck-shaft angle was 120.3° (SD= 1.24°). It is worth-noting that in two cases with excessive lateral femoral bowing (>15°), surgical procedure was very challenging due to the design of the intramedullary nail.

**Conclusion:** Based on current evidence and our results about AFFs, we conclude that both femoral bowing angle and femoral neck-shaft angle should be evaluated before bisphosphonates (BPs) administration. In cases with excessive lateral femoral shaft bowing or decreased femoral neck-shaft angle, prescription of another antiosteoporotic treatment should be recommended. If, however, BPs cannot be avoided, clinicians should be aware of the fact that long-term administration may be implicated with AFFs occurrence. Short term BPs administration with timely drug holiday between three and five years may be reasonable. Roentgenographic evaluation of both femurs every six months and medical reference in case of any emerging thigh pain can prevent AFFs. Larger studies are urgently needed to confirm or contradict this statement.

**P350**

## IS DIABETES MELLITUS TYPE 2 A RISK FACTOR FOR FRAGILITY HIP FRACTURES?

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**Objective:** Current evidence supports that individuals with diabetes mellitus type 2 (T2DM) are more vulnerable to fragility fractures, although elderly patients with osteoporotic and especially hip fractures haven't receive the appropriate proportion of the publishing data.

**Methods:** We retrospectively studied elderly patients (>60 years old) with low energy hip fractures, which were treated in our department during the last year between January 2020 and January 2021 to determine if T2DM consists a worth noting risk factor for fragility hip fractures in this specific age group. Furthermore, we conducted a systematic review of the literature concerning elderly with fragility fractures (especially hip fractures) and the possible impact of T2DM. Finally, we identified 17 records which met our inclusion criteria (elderly patients over 60 years old accompanied with T2DM and fragility fractures) based on literature research in PubMed and google scholar.

**Results:** We retrieved 141 patients over 65 years old with fragility hip fractures treated in our department, 73 with extracapsular and 68 intracapsular, while mean age was 73.66. Among them 41 patients had T2DM, so a total 29.07% of the elderly with fragility hip fracture were also diabetic. This finding confirms the fact that diabetic elderly individuals are at increased risk for hip fractures. The results from our systematic review concludes that there is almost consensus about the increased prevalence of all kinds of fragility fractures and especially low-energy hip fractures among elderly patients with T2DM compared with their counterparts without T2DM, while there is relative controversy concerning the nonvertebral fractures. Insulin usage can even double the risk for fragility fracture.

**Conclusion:** Bone fragility should be recognized as a new complication of T2DM, especially in elderly patients. The elderly patients are even more vulnerable to T2DM-induced bone fragility due to several additional aggravating factors, which include senile osteoporosis, severe vitamin D deficiency, presence of many comorbidities, increased possibility of insulin usage, presence of diabetes-related complications and especially diabetic neuropathy and retinopathy, predisposing to falls. Clinicians who treat these patients should be also aware of the special diagnostic and therapeutic approaches concerning these patients.

**P351**

## IMPLICATIONS OF DEFFICIENT VITAMIN D LEVELS IN DIABETIC ELDERLY

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**Objective:** During the last two decades there has been expanding evidence describing the implications of vitamin D deficiency (VDD) in patients with type 2 diabetes mellitus (T2DM), although until now elderly have not received the required proportion of the published studies. The aim of this study is to fill this gap in current literature concerning this patient group.

**Methods:** Literature in PubMed and Google Scholar was searched for relevant articles published up to October 2020. The keywords used were: VDD, elderly and T2DM. Among 556 articles retrieved, 90 full texts were eligible and only 34 studies (12 retrospective studies, 2 prospective cohorts, 3 meta-analyses, 7 cross-sectional studies, 9 randomized control trials- RCTs, and one observational study) met the inclusion criteria for the review.

**Results:** According to this study there is adequate evidence to support the correlation between VDD and T2DM in elderly. Results from RCTs are more conflicting, so further studies are necessary to confirm the impact of VDD supplementation on metabolic, lipid profile, oxidative stress and complications of T2DM in elderly. VDD is clearly related with severe retinopathy, diabetic peripheral neuropathy and poor cognition performance, while there is consensus about the beneficial effect of vitamin D (VD) on peripheral artery disease, foot ulceration prevention and wound healing. However, there is controversy about the effect of VD supplementation on cardiovascular adverse events, endothelial function and estimated glomerular filtration rate. Finally, the association of VDD with fragility fractures and depression in the elderly with T2DM is currently insufficiently studied and remains controversial.

**Conclusion:** Undoubtedly, there is definite correlation of VDD with T2DM in elderly. However, the effect of VD supplementation on metabolic and lipid profile, oxidative stress and complications of T2DM in older patients require larger randomized controlled trials. Definition of the exact threshold of VD levels and the regimen of VD supplementation is important, although very difficult to be determined. Based on the small number of studies of this patient group and the conflicting results in specific points of this topic, there is emerging need for new well designed studies for elderly with T2DM and VDD.

**P352**

## CAN VITAMIN D AND/OR PTH PREDICT A NEW LOW ENERGY HIP FRACTURE IN ELDERLY?

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**Objective:** Vitamin D (VD) deficiency seems to be underestimated, especially in countries with significant duration of sunlight throughout the year. This study was conducted to highlight two easily measurable prognostic factors to identify low energy hip fractures in elderly. These factors are VD and PTH.

**Methods:** This study included 63 patients with mean age of 83 y who sustained hip fracture (Group A) within a year. 64 patients, with average age of 73 y, who suffered from degenerative hip/knee osteoarthritis or lumbar spondylosis, were subsequently selected as control group (Group B). PTH and VD blood levels were measured.

**Results:** Statistical analysis was performed using SPSS statistics. P-value <0.05 was set as level of statistically significant difference. 93.6% (59/63) of individuals with hip fracture and 76.5% (49/64) in controls were found with abnormal VD values (<30 ng/ml). Comparison of vitamin D values between the total samples of group A and B revealed statistically significant difference, while both male (p=0.0049) and female (p<0.0001) patients of group A showed statistically significant lower VD levels than their counterparts. In addition, increased levels of PTH were observed in women of group A (p=0.0016), while no statistical significance was found in males (p=0.7712). Age was an independent risk factor for VD deficiency in both groups (Group A p=0.04, Group B p=0.043). Four patients only from group B (6.25%) and none from group A had undergone blood tests for VD and PTH before hospital admission.

**Conclusion**: Our study confirmed that elderly patients with hip fractures in Greece have less VD adequacy and increased PTH levels comparing with elderly people with osteoarthritis. Moreover, the study demonstrated that age constitutes an independent aggravating factor for hypovitaminosis D among elderly either with hip fracture or osteoarthritis and this finding should be taken also under consideration by physicians. As hypovitaminosis D concerns the majority of elderly living in this south-western Mediterranean region, authors suggest VD and PTH measurements, regardless of annual insolation, to identify and counsel elderly with increased risk of hip fracture and avoid perioperative complications in patients who undergo elective orthopedic surgeries.

### P353
### CAN VITAMIN D AND/OR PTH LEVELS PREDICT HIP FRACTURE SEVERITY IN ELDERLY?

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**Objective:** Many studies support that lower vitamin D (VD) and/or increased PTH levels are associated with hip fracture severity.

**Methods:** We retrospectively evaluated 137 elderly patients with low energy hip fractures, treated in our department from January 2020 to January 2021. PTH and 25-hydroxyVD blood levels were measured, recording type of fracture and fracture severity. We defined severe subcapital fractures those with grade 3 or 4 according to Garden classification, while severe intertrochanteric those with grade A2.2, A2.3 and all A3 fractures according to AO/OTA classification.

**Results:** 72.26% (99/137) were female, 27.74 (38/137) male. Majority of men had intertrochanteric fracture (25/38), while 32.32% of women subcapital (32/99). Mean VD levels were 10.15 (SD 6.63) ng/ml, mean PTH levels 64.36 (53.38) pg/ml, 30.65% had secondary hyperparathyroidism and 2 (1.45%) patients efficient VD levels (>30 ng/ml). Mean VD and PTH levels were 10.54±5.949 ng/ml and 47.68 ±41.203 pg/ml respectively for male. Values for female were 10.0±6.901 ng/ml and 70.77±56.252 pg/ml. 60.59% had severe VD deficiency (<10 ng/ml), 30.66% VD deficiency (10-20 ng/ml) and 7.30% VD inadequacy. So, intracapsular fractures are associated with more severe VD deficiency (9.17±4.962 ng/ml) compared to extracapsular (10.63±7.290 ng/ml). 70.8% (97/137) had severe or comminuted hip fractures, while stable fractures were 29.2% (40/137). In group with severe hip fracture (97 patients), mean VD was 9.76±6.717 ng/ml and PTH 65.18±56.631 pg/ml. Furthermore, in this group 63.91% (62/97) had severe VD deficiency, 27.83% (27/97) VD deficiency, 6.18% (6/97) VD inadequacy and 2.08% (2/97) adequate VD. Conversely, in group with stable hip fractures (40 patients) mean VD was 11.09±6.409 ng/ml and PTH 62.38±45.134 pg/ml. In this group, 52.50% (21/40) had severe VD deficiency, 37.5% (15/40) VD deficiency, 10% (4/40) VD inadequacy and no patient with adequate VD levels. Correlation between PTH and VD with fracture severity did not reveal statistical significance.

**Conclusion:** Clinicians should have in mind that severe VD deficiency is associated with comminuted fracture pattern, intracapsular hip fracture and female gender.

### P354
### PHYCHOTRPIC DRUGS, POLYPHARMACY AND HIP FRACTURES IN ELDERLY: A RETROSPECTIVE STUDY

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**Objective:** Polypharmacy and use of psychotropic agents are established risk factors for falls and hip fractures. This retrospective study evaluates the impact of these factors to PTH, 25-hydroxyvitamin D (VD) blood levels and fracture severity.

**Methods:** We retrospectively evaluated 76 elderly with fragility hip fractures. PTH and VD blood levels were measured. Polypharmacy and intake of psychotropic drugs were recorded. Polypharmacy was defined the intake of 4 or more drugs, while we included typical and atypical antipsychotics, tricyclics antidepressants, selective serotonin reuptake inhibitors and benzodiazepines in the group with psychotropic drugs uptake. We defined severe subcapital fractures those with grade 3 or 4 according to Garden classification, while severe intertrochanteric those with grade A2.2, A2.3 and all A3 fractures according to AO/OTA classification.

**Results:** Mean age of 76 participants was 83.08±7.203. 63.2% (48/76) sustained extracapsular fractures, while 36.8% (28/76) intracapsular. Based on our records, 39/76 patients (51.3%) received psychotropic drugs. Polypharmacy was identified in 77.6% of patients (59/76), 37 females and 22 males. 22.4% of patients (17/76) received 3 or less drugs per day. In 59 cases associated with polypharmacy, we found 46 (77.9%) with comminuted fractures and 13 (22.1) with stable fracture pattern, while in 17 without polypharmacy the incidence of unstable fractures was 64.7% (11/17). Mean VD levels were 10.35 ng/ml with 4.78 SD and PTH levels 73.77 pg/ml with SD 64.59 in cases with psychotropic drugs intake, while values of their counterparts were 11.75±6.27 ng/ml and 54.11±44.36 pg/ml respectively. Finally, mean VD levels were 9.27 ng/ml with 4.77 SD and PTH levels 65.61 pg/ml with SD 55.22 in cases associated with polypharmacy, while the values of their counterparts were 11.56±5.71 ng/ml and 59.29±60.83 pg/ml respectively.

**Conclusion:** Clinicians should be aware that polypharmacy and psychotropic drugs intake are associated with more unstable hip fractures, severe VD deficiency and increased levels of PTH. Probably, VD deficiency and secondary hyperparathyroidism consist adverse effects of polypharmacy and psychotropic drugs intake. More studies are necessary to evaluate this thesis.

### P355
### BONE LOSS AND OSTEOPOROSIS IN OLDER MEN AND WOMEN FROM THE GAMBIA, WEST AFRICA

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**Objective:** Due to an increase in longevity and rapid urbanization in sub-Saharan Africa (SSA), it is predicted that the incidence of hip fracture will increase 6-fold in Africa and Asia by 2050. The aims were to describe and characterize changes in bone mass of older adults and to determine

prevalence of osteoporosis and osteopenia in a population accustomed to low habitual calcium intakes.

**Methods:** The Gambian Bone and Muscle Ageing Study (GamBAS; ISRCTN17900679) is a prospective observational study in women and men from rural Gambia. The primary outcome was change in total hip aBMD over a 1.5-2 y period (follow-up was randomized to account for seasonality). A GE-Lunar Prodigy scanner was used to obtain proximal femur scans for assessment of aBMD. Annualized percentage change in aBMD was calculated. Total hip BMD T-scores were calculated using NHANES data and Z-scores were calculated using manufacturer reference data as per ISCD recommendations. Results are presented as mean (standard deviation) change.

**Results:** A total of 383 (54.6% women) had repeat DXA scans (median follow-up 1.72 y); median age 59, range 40-92 y; BMI men 20.9(3.0) kg/m$^2$; women 21.9(3.5) kg/m$^2$. At baseline, the mean total hip Z-score was -0.23(0.98) in men and -0.55(1.06) in women. The mean total hip T-score in men was 0.05(1.20) and -1.25(1.42) in women. Forty-two (20.6%) women, and 2 (1.2%) men have osteoporosis, and n=82 (40.2%) women and 32(18.6%) men osteopenia. Figure shows the mean annualized percentage change in total hip aBMD.

In men, total hip aBMD changed most after the age of 70 y; -1.10(1.20) 70-74 y; -1.24(0.98) 75+ years. In women, the change in total hip aBMD change was -0.17(1.19) in 40-44 y; -1.09(1.46) in 45-49 y; -1.22(1.23) 50-54 y; -1.22(1.27) 55-59 y; -0.73(1.31) 60–64 y; -1.22(1.04) 65-69 y; -1.00(1.36) 70-74 y; -1.50 (1.35) 75+ years.

**Conclusion:** These are the first longitudinal musculoskeletal DXA data in an older adult population from SSA. The change at the hip was comparative to that in higher income countries where fracture risk is high. Over 40% of women were osteopenic and osteoporotic. These data provide important insights into musculoskeletal health in the Gambian population, previously thought to be at low risk of fracture.
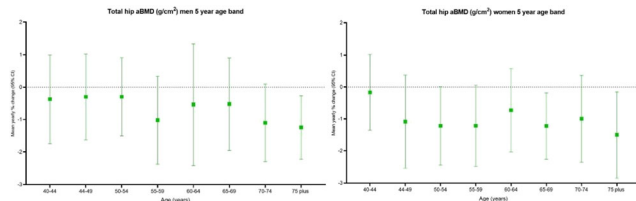


Figure. Mean annualized percentage change in total hip aBMD.

## P356
### PRIMARY HYPERPARATHYROIDISM DUE TO ECTOPIC PARATHYROID ADENOMA

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**Objective:** Primary hyperparathyroidism (PHPT) results from intrinsic hyperfunction of parathyroid glands; either sporadic or familial. When due to an ectopic parathyroid tissue, localization and removal are challenging (1-5).

**Case report:** We present a 43-year-old female who was referred to the Endocrinology for symptomatic hypercalcemia. She was diagnosed 4 y ago with chronic kidney disease, chronic interstitial nephropathy, multiple episodes of urinary infection and recurrent lithotripsies. While investigating the etiology of recurrent nephrolithiasis, the diagnosis of PHPT emerged. The laboratory investigations showed: elevated corrected serum calcium (13.2 mg/dl) with an intact PTH serum of 620 pg/ml. The serum phosphate was decreased (2.1 mg/dl) and urinary calcium of 0.25 g/24-h. The assessment of renal function showed serum creatinine of 1.7 mg/dl (GFR=37 ml/min) and serum urea of 57 mg/dl. Bone markers

(osteocalcin, CrossLaps, P1NP) were increased; low 25-hydroxyvitaminD-14 ng/ml. DXA revealed lumbar T-score of T-3.53SD, hip (T-3.13 SD), and distal radius (T-4.1 SD). $^{99}$mTc Sestamibi scintigraphy showed: focus of radioactivity in mediastinum (thymic box), suggesting an ectopic hyperfunctioning parathyroid gland. Its excision was attempted, but the calcium values increased progressively and the PTH serum levels remained unchanged. Therefore, the patient was operated once again one year later. The histological report confirmed parathyroid ectopic tissue. The patient's evolution was favorable (increase in BMD and no more nephrolithiasis).

**Conclusion:** We reported a case with persistent hyperparathyroidism after surgery due to an ectopic parathyroid adenoma. This study should warn on the delayed diagnosis and difficult treatment of an abnormal localization of the parathyroid adenoma in order to improve the management of the disorder and the outcome of the patient.

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## P357
### EXTRASPINAL OSTEOARTICULAR MANIFESTATIONS OF DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS: ABOUT 54 STUDY PATIENTS

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**Objective:** Diffuse idiopathic skeletal hyperostosis (DISH) or Jacques Forestier and Jaume Rotés-Quèrol disease, is a non-inflammatory ossification of entheses. The term hyperostosis is defined by an enlarged bone, or abnormally thick bones. It takes two (according to Forestier) or three (according to Resnick) contiguous intervertebral bridges to affirm hyperostosis, as well as correct discs and the absence of fusion of the sacroiliac or posterior joints. The diagnosis of DISH is radiological (frontal views). The peripheral locations, reported by Forestier himself, are frequent and have some peculiarities that distinguish them from osteophytes of osteoarthritis, they are observed around joints rarely affected by osteoarthritis: shoulder, elbow, metacarpophalangeal, enthesophytes. They are bulky, different from osteophytes. They are clearly implanted on the bone, away from the bone-cartilage junction, site of the osteophyte, these enthesophytes are seen at a distance from a joint, on other enthesic sites (heel spur, quadriceps tendon). We conducted a study to determine the frequency of extraspinal forms of DISH and their clinical presentations.

**Methods:** We conducted a prospective study in the Dept. of Rheumatology, University Hospital of Ibn Rochd, Casablanca, from February 2020 to February 2021 (12 months). The inclusion criteria were all patients in whom the diagnosis of DISH was made according to the definition criteria of Risnick. The exclusion criteria were the patients who did not meet the definition criteria according to Risnick.

**Results:** 54 patients corresponding to the definition of Risnick were included, with an average age of 67.21 y (54-87 y), a male predominance of 61.11%. The most frequent antecedents were diabetes mellitus (55.55%), followed by dyslipidemia (42.59%) and arterial hypertension (29.82%). In our series, 6 patients (11.11%) of the patient presented in addition to the spinal involvement an extraspinal osteoarticular expression of DISH. The localizations were: the elbows (annular ligaments and radial collateral), bilaterally, with irreducible painful

limitations of the elbows; the left ankle (calcaneofubular ligament) in one patient; the forefoot in the 2 patients (talonavicular ligaments), presenting with mechanical pain when walking, with limitation of lateral movements. The inflammatory assessment was negative in the patients. These patients were put on analgesics and joint rehabilitation to reduce joint pain and prevent limitations in terms of mobility and function.

**Conclusion:** The extraspinal forms of DISH are relatively frequent and, depending on their location, lead to clinical manifestations that may affect the functional prognosis of the joints. Their management consists in treating pain while ensuring joint mobility.



Figure 2. Standard x-ray of the left forefoot, frontal view showing an ossification of the calcaneofubular ligament in the setting of DISH.



Figure 1. Standard x-ray of the right elbow, frontal view: ossification of the annular and radial collateral ligaments with preservation of the joint spaces in the context of a DISH.



Figure 3. Standard X-ray of the right forefoot, lateral view showing an ossification of the ligament with preservation of the joint space.

## P358

### CAVITIES IN BONE TISSUE, DIAGNOSTICS, TREATMENT AND PROPHYLAXIS OF RECURRENT FRACTURES IN CHILDREN

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**Objective:** To study the role of detection of bone cavities (BC) in trabecular bone with low BMD during diagnostics, treatment and prevention of recurrent fractures (RF) in bones of forearm.

**Methods:** 67 children and adolescents aged 9-17 with RF of the forearm bones and the presence of BC in them (boys 38, girls 29) were examined. Laboratory work included serum total Ca, phosphorus, alkaline phosphatase, 25(OH)D, PTH. BMD and BC in bone were assessed with DXA. Children were divided into 2 groups. Group I - 32 patients received vitamin complex containing D3 150 IU, vitamin B6 0.5 mg and drone homogenate (HDBA). HDBA contains entomological hormones of bees and organic vitamin D. Group II - 35 children received similar vitamin complex without HDBA. Both groups received 3-month courses, 3 times a year, with 1 month breaks.

**Results:** 43 children had BMD below - 2.0 SD, 24 had BMD between - 2.0 to +1.0 SD. The number and size of cavities on the DXA correlated with the frequency of repeated fractures. Vitamin D deficiency was observed in 43 children (64±10%), the content of 25(OH)D <20 ng/ml. 24 children (36±8%) had insufficient level of 25(OH)D (from 21-29 ng/ml). The level of PTH was high in 78±9% of children. After 1 y of treatment we detected increase BMD in group I - 3.7% and 3.1% in group II. Closure and reduction of bone cavities were 68±5% in group 1 vs. 43 ±6% in group II (p<0.05); increase of 25(OH)D to 47±3.1 in group 1 and up to 30±2.9 ng/ml (p<0.05) in group II. No side effects were observed. We believe that better results in group I were achieved due to HDBA.

**Conclusion:** 1. Detection of BC in trabecular bone is important for diagnosis, prognosis and treatment of RF. 2. Drone homogenate HDBA can be safely and effectively used in children with recurrent factures of forearm bones.

## P359

### A BUNDLED CARE PROTOCOL IMPROVES CLINICAL OUTCOMES AND ACCESS TO CARE FOR PATIENTS WITH SURGICALLY MANAGED HIP FRACTURES DESPITE POORER COMORBIDITIES

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**Objective:** Current literature has displayed the economic and clinical benefits of standardised hip fracture programs.[1] Our institution implemented a hip fracture bundled care protocol in 2017, integrating multidisciplinary teams to manage hip fracture patients requiring surgery. Our study aims to analyze the impact of a bundled care protocol on performance indicators and short-term outcomes of these patients.

**Methods:** "Post-Bundle" group included surgically managed hip fracture patients admitted under a bundled care protocol. "Pre-Bundle" group included patients admitted 2 y before implementation of this protocol. Demographic data and key performance indicators such as time to admission, time to surgery, inpatient mortality rates, length of stay and discharge disposition were collected.

**Results:** There were 701 Pre-Bundle patients and 935 Post-Bundle patients. Post-Bundle patients were older (78.0±8.5 vs. 79.6±8.6; mean difference, -1.6; 95%CI -2.4 to -0.7; p<0.001), with a greater proportion in American Society of Anesthesiologists (ASA) classification III and IV (III, 22.8 vs. 27.7%; IV, 0.7 vs. 1.0%; p=0.026). Post-Bundle patients had shorter time to surgery (86.2±94.1 vs. 63.3±59.9; mean difference, 22.9; 95%CI 14.9-30.8; p<0.001), and a greater proportion (86.0 vs. 97.2%; p<0.001) were admitted within 4 h and operated within 48 h (36.8 vs. 56.4%; p<0.001). There was no difference in mortality rates. Post-Bundle patients had shorter length of stay (14.8±13.0 vs. 11.2±9.0; mean difference, 3.6; 95%CI 2.5-4.7; p<0.001), with more discharged within 9 d (43.2 vs. 55.6%; p<0.001) and to a step-down care facility (47.8 vs. 68.0%; p<0.001).

**Conclusion:** Our study shows the clinical incentives following a bundled care protocol in surgically managed hip fractures. Inpatient mortality rates remain statistically similar in older hip fracture patients with higher ASA scores. We conclude that a multidisciplinary approach to orthogeriatric care leads to a more streamlined admission process, ensuring optimal access to care for older and sicker patients, proper rehabilitation protocols and resultant shorter hospital stays.

**Reference:** 1. Arshi A, et al. J Orthop Trauma 2019;33:e223.

## P360

### LOWER SOCIOECONOMIC STATUS IS ASSOCIATED WITH HIGHER CHARLSON COMORBIDITY INDEX AND INDEPENDENTLY PREDICTIVE OF POORER OUTCOMES FOLLOWING HIP FRACTURE SURGERY

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**Objective:** Lower socioeconomic status (SES) has been associated with incidence of hip fractures[1] and postoperative mortality.[2] We aim to examine the relationship between SES and Charlson comorbidity index (CCI), length of hospitalization, time to surgery and 90-d readmission rates in hip fracture patients.

**Methods:** Patients who underwent hip fracture surgery between 2013-2016 were included. They were divided into Group PRIV (private) consisting of patients with higher SES, and group SUB (subsidised) consisting of patients with lower SES. We collected patient demographic data and also analysed time to surgery, length of hospitalization and 90-d readmission rates.

**Results:** There were 145 PRIV patients and 1146 SUB patients. SUB patients had higher mean CCI (5.3 vs. 4.8, p=0.01), longer length of hospitalization (19.2 vs. 14.9 d; p=0.001), increased delay in surgery (96.3 vs. 70.1 h; p=0.005) and higher 90-d readmission rates (19.5 vs. 11.0%; p=0.013). Lower SES (OR, 2.5; 95%CI 4.72-40.65; p=0.01), older age (OR, 3.20; 95%CI, 0.47-1.94; p=0.01), higher CCI (OR, 8.00; 95%CI 10.13-16.7; p<0.01) and higher American Society of Anaesthesiologists score (OR, 2.94; 95%CI 6.13-30.64; p=0.03) was predictive of time to surgery. Lower SES (OR, 3.88; 95%CI 1.43-6.32; p=0.02) and higher CCI (OR, 1.21; 95%CI 0.76-1.66; p<0.001) was predictive of length of hospitalization. Lower SES (OR, 1.79; 95%CI 1.03-3.10; p=0.04) and higher CCI (OR, 1.24; 95% CI 1.15-1.33; p<0.001) was predictive of 90-d readmission rates.

**Conclusion:** Despite current literature establishing the relationship between low SES and higher CCI, our study proves low SES to be an independent predictor of time to surgery, length of stay and readmission rate. Existing infrastructure should focus on home care delivery, health education, and chronic disease management in order to reduce disparity and healthcare burden, minimising the effect of socioeconomic factors on patient outcomes.

**References:**

1. Reyes C, et al. Bone 2015;73:127.

2. Petrelli A, et al. J Health Qual 2018;40:209.

## P361
### EFFECTS OF PTH(1-84) ON CAMP LEVELS IN AN IN VITRO MODEL OF HUMAN SATELLITE CELLS FROM SKELETAL MUSCLE TISSUE

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**Objective:** PTH is a single-chain peptide hormone consisting of 84 amino acids, secreted by the parathyroids, 4 endocrine glands located on the back of the thyroid. Its main role is to maintain a constant concentration of calcium ($Ca^{2+}$) in the bloodstream. Since PTH increases $Ca^{2+}$ mobilization from bone, it is a key effector in bone metabolism, balancing the process of bone regeneration and remodeling. However, very few studies evaluate the effect of PTH on skeletal muscle, both clinically and experimentally. Therefore, the aim of our work was to investigate the in vitro effect of several PTH(1-84) concentrations in human satellite cells (hSCs) in order to elucidate, at a cellular and molecular levels, the mechanism of action of this hormone on skeletal muscle tissue.

**Methods:** hSCs were isolated by enzymatic digestion and mechanical dispersion of skeletal muscle tissue biopsies and a protocol for in vitro myogenesis was established, as previously reported [1]. Cells were exposed for 30' to different concentrations of PTH(1-84), from $10^{-6}$ to $10^{-12}$ M, and cAMP levels were assayed by ELISA, in order to evaluate the responsive concentrations of the hormone, in proliferating and differentiated hSCs. Statistical analysis was performed by ANOVA followed by Bonferroni's test.

**Results:** The ELISA assay has shown no significant variation in cAMP levels in hSCs in proliferation treated with several PTH(1-84) concentrations. On the other hand, treatment in differentiated myotubes with different PTH(1-84) concentrations has shown a significant increase (+107%) in cAMP levels in cells treated with $10^{-7}$ M PTH(1-84) vs. control group (*p<0.01).

**Conclusion:** This work has shown preliminary data on the in vitro effects of PTH(1-84) on cAMP levels in proliferating and differentiated hSCs, identifying the PTH(1-84) concentration $10^{-7}$ M as the responsive one in myotubes. Studies are in progress in order to evaluate the effects of PTH(1-84) on the hSCs proliferation and the myogenic processes.

**Reference:** 1. Romagnoli C, et al. Calcif Tissue Int 2020; 107:18.

## P362
### RELATIONSHIP OF HAND GRIP STRENGTH, PHYSICAL ACTIVITY AND ANTHROPOMETRIC CHARACTERISTICS IN A SAMPLE OF GREEK PHYSIOTHERAPY STUDENTS

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**Objective:** To investigate the association of hand grip strength (HGS), physical activity and anthropometric characteristics in physiotherapy students living in Greece.

**Methods:** This cross-sectional study was done at Dept. of Physiotherapy, University of Patras, Greece. A convenient sample of 276 physiotherapy students of both sexes participated in this study. Body composition was determined by bioelectrical impedance analysis (TANITA BC 601), calf, midarm and waist circumferences were measured in centimeters with non-elastic tape and HGS via a hand-held grip strength dynamometer (Saehan, Seoul, Korea). Physical activity was assessed with the modified Baecke Questionnaire for Habitual Physical Activity (mBQHPA).The association between variables was calculated using Pearson r-correlation coefficients. Effects of factors associated with HGS were evaluated using regressions analysis. The study protocol was approved by the ethics committee of Technological Education of Western Greece (17-1-2018). All participants provided a written informed consent approved by the ethics committee.

**Results:** 276 participants (21.5±4.11 y) were included in this study. Out of 276 students, 154 (55.8%) were women, and 122 (44.2%) were men. The mean of HGS was 37.15±11.2 kg. Men had significantly (p<0.001) greater HGS than women (30.7±7.39 vs. 45.23±10.02). Statistically significant strong correlation was detected between HGS and muscle mass (r=0.73; p≤0.001), gender (r=0.6; p≤0.001); midarm (r-0.74; p≤0.001) and calf circumference (r=0.69; p≤0.001). Results show that fat mass were risk factor associated with HGS using regression analyses in both genders. However physical activity was significant associated factors only for women participants (OR 0.77, CI 0.17-1.38; p≤0.05).

**Conclusion:** This study identified that HGS is associated with muscle mass in young men and women. These findings suggest that muscle mass may be protective against lower HGS values for both genders. These results may have significant impact in both prevention and treatment techniques for people of different population and age groups. Future studies in different age groups should investigate more factors that could influence the strength of the grip.

## P363
### IN VITRO EFFECTS OF THE MYOKINE IRISIN ON HUMAN ADIPOSE TISSUE-DERIVED MESENCHYMAL STEM CELLS DURING PROLIFERATION AND OSTEOGENIC DIFFERENTIATION

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**Objective:** Irisin is a protein cleaved from fibronectin type III domain containing protein 5 (FNDC5), first reported in 2012 by Bostrom et al. It is a hormone-like molecule secreted from skeletal muscle in response to exercise both in mice and humans and identified as an important effector in the crosstalk between muscle and bone. Although a number of studies reports that irisin increases osteoblast differentiation in vitro and cortical bone mass in vivo, the models used are exclusively from rodent. Due to the lack of reports on human models, the aim of our work was to investigate the in vitro effects of this myokine on the proliferation and the osteogenic differentiation processes in human adipose tissue-derived mesenchymal stem cells.

**Methods:** hADMSCs were obtained by enzymatic digestion and mechanical dispersion, and cultured in growth medium. Cells were exposed to 10 and 100 ng/ml irisin, for the entire experimental period and refreshed every 2 d. The proliferation process was performed in growth medium containing 2.5% FBS by cell counting at 24-48-72 h. Statistical analysis was made by linearity test and parallelism test of the linear regressions of the obtained growth curves. The differentiation process was assayed quantifying the ALP activity and $Ca^{2+}$ depositions by fluorometric assays up to 35 d of osteogenic induction. Statistical analysis was performed by ANOVA followed by Bonferroni's test.

**Results:** hADMSCs proliferation analysis has shown that 100 ng/ml irisin significantly increases proliferation process (p<0.01) vs. control, with a decrease of cell doubling time from 88 h to 63 h. Osteodifferentiation with 10 and 100 ng/ml Irisin showed, after 14 d, significant increases in ALP activity vs. control (+26%, p<0.01). Moreover, both tested concentrations of Irisin anticipate the deposition of mineralized matrix, resulting in significant increments in the production $Ca^{2+}$ nodules vs control after 35 d (+45%, p<0.01).

**Conclusion:** The work has shown the in vitro effects of irisin on a human model of ADMSCs. Preliminary results have highlighted this myokine as an important effector on cell proliferation and during osteodifferentiation of hADMSCs, supporting the hypothesis that Irisin could represent a new potent anabolic treatment to gain bone mass.

## P364

### THE EFFECT OF CHOLECALCIFEROL SUPPLEMENTATION ON ARTERIAL STIFFNESS IN PATIENTS WITH HYPOTHYROIDISM

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**Objective:** Recent epidemiological studies revealed a striking inverse relationship between vitamin D levels, insulin resistance (IR), and cardiovascular disease. However, few interventional studies have evaluated the effect of vitamin D supplementation on cardiovascular risk, such as IR and arterial stiffness in hypothyroidism. The aim of the study is to investigate the role of vitamin D supplementation on cardiovascular risk in patients with hypothyroidism, including metabolic parameters, IR, and arterial stiffness.

**Methods:** We enrolled patients with hypothyroidism who were taking levothyroxine medications. We excluded patients who were taking vitamin D or calcium supplements. Participants were randomized into the vitamin D group (cholecalciferol 4000 IU/d, n=40) or the control group (only levothyroxine, n=35). We compared their IR (homeostasis model of assessment [HOMA]-IR) and arterial stiffness (brachial-ankle pulse wave velocity) before and after 26 weeks of intervention.

**Results:** The baseline characteristics of the two groups were similar. A total of 75 participants completed the study protocol. At the end of the study period, the 25-hydroxyvitamin D [25(OH)D] levels were significantly higher in the vitamin D group than in the control group (32.3±7.1 ng/ml vs. 17.2±6.4 ng/ml, p< 0.05). There were significant differences in HOMA-IR and changes in arterial stiffness between the groups.

**Conclusion:** Our data suggest that vitamin D supplementation might be effective in terms of elevating 25(OH)D levels. We identified beneficial effects on cardiovascular risk in hypothyroidism, including IR and arterial stiffness.

## P365

### DRONE BROOD HOMOGENATE ABSORBED IN POSTMENOPAUSAL OSTEOPOROSIS TREATMENT

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**Objective:** To study the effect of drone brood homogenate absorbed (HDBA) on postmenopausal osteoporosis (OP).

**Methods:** 79 women with postmenopausal osteoporosis (OP) at the age of 49-77 with androgen deficiency were examined. Diagnostics of OP was conducted by means of clinical, laboratory, biochemical, and X-ray methods. BMD was assessed by X-ray absorption. Hormonal status was checked by enzyme immunoassay. Severity of OP was assessed according to WHO classification. The study included only women with menopause and presence of cavities in trabecular bones. Patients were divided into 2 comparable groups. Group 1: 38 women received a composition containing in 1 tablet: Ca citrate 250 mg, HDBA 50 mg, vitamin D3 150 IU, vitamin B6 0.5 mg as follows: 2 tablets in the morning and 2 tablets at night, 3 months courses, 3 times a year, with a break of 1 month. Group 2: 41 women received a similar composition, but without HDBA. BMD and the size of cavities were assessed before the beginning of treatment and every 3 months during the treatment.

**Results:** Majority of patients demonstrated less complaints. More pronounced clinical effect was noted in group1. 75% of patients demonstrated a reduction of cavities size or closure of cavities. In group 2, cavity closure occurred 4 times rare. In group 1, concentration of total testosterone increased from 1.1±0.4 nmol/l to 2.3±0.7 nmol/l (p<0.05) in comparison with concentration before treatment. DHEA-S exceeded the upper limit of the reference age value. In group 2, there were no significant changes in the androgen level.

**Conclusion:** The combined usage of HDBA, Ca citrate, vitamins D3, B6 influences the OP therapy effectiveness. BMD increases, cavities decrease in size or are being closed, hormonal status is being normalized. The effect is due to unique entomological prohormones in HDBA and other substrates promoting synthesis of own hormones in the body.

## P366

### APPLICATION OF AGE DEPENDENT INTERVENTION THRESHOLDS TO OPTIMIZE DXA USAGE IN A RESOURCE CONSTRAINED COUNTRY

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**Objective:** Age dependent intervention thresholds (ITs) are used for the judicious use of DXA facility in resource poor settings and this study evaluated such application in Sri Lanka.

**Methods:** Age dependent ITs were developed based on Sri Lankan FRAX model adhering to the National Osteoporosis Guideline Group (NOGG) guidelines published in the UK. Low ITs were calculated for a woman of 25 kg/m$^2$ BMI with no clinical risk factors for age range of 45-80 y (5-y intervals). ITs were calculated in the same manner considering that she had a previous fracture and high ITs were set at 1.2 times higher. These values were applied to a group of postmenopausal women referred to a DXA Unit in a tertiary care center in the southern province of Sri Lanka, for the estimation of BMD and fracture risk. Fracture risks (major osteoporotic fracture: MOF) and hip fracture (HF) of these women were calculated using Sri Lankan FRAX model considering clinical risk factors sans BMD input. Women were categorized to three groups: high risk requiring treatment, low risk not requiring treatment and intermediate risk where estimation of BMD is required for further evaluation.

**Results:** Low ITs of MOF and HF ranged from 0.9-11% and 0.1-4.6%, respectively. High ITs for MOF and HF ranged from 2.5-21.6% and 0.24-8.4%, respectively. Mean (SD) age of the study sample (n=384) was 64.7 (8.5) y and all had been referred to DXA unit for clinical indications. Based on above thresholds, 40% women were at high risk while 6% were at the low risk categories. The proportion of women in the intermediate category who require BMD for further assessment was 54%.

**Conclusion**: Application of age dependent ITs can potentially halve the number of referrals for DXA evaluation and this would help streamlining the DXA facility in the country.

## P367

### FRACTURE PREVALENCE IN MEXICAN CHILDREN AND ADOLESCENTS: A 10-YEAR ANALYSIS DATA

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**Objective:** Due to changes in recent years of lifestyle, and enforcement of laws that protect children within motor vehicles, fracture prevalence could be changing in children and adolescents. However, in Mexico, such variation has not been explored. Hence, we obtained information regarding fractures in children and adolescents from the population affiliated to the Mexican Institute of Social Security (IMSS) to answer this question. This study aimed to describe fracture rates in the children and adolescent population of Mexico in 10 y (2007-2017) and to detect whether the patterns of fractures have changed over time, between sexes, and among different anatomical sites.

**Methods:** The information on fractures from children and adolescents 0-19 years old was gathered from the Emergency Departments or hospital wards at IMSS. The ICD-10 codes harvested were: S02, S12, S22, S32, S42, S52, S62, S72, S82, S92, T02, T10, and T12. We harvest additional information regarding sex and age. Rates of fractures stratified by sex per 10,000 were presented. Finally, we compared our results with a standard population by direct method rate adjustment (1).

**Results:** In 10 y, 1,202,035 fractures were reported, 51.5% of fractures were notified in adolescents between 10-19 years old. The most common fracture site was the forearm (37%), followed by the shoulder (18%). Boys had the highest frequency of fractures in both age groups (68.4%). We observed a decrease in the prevalence rates of fractures in boys and girls aged 0-9 y of: -1.9% (AAPC -1.9, 95%CI -2.6 to -1.2) and -1.4% (AAPC -1.4, 95%CI -2.2 to -0.6), respectively. This same trend was observed in the group of boys aged 10-19 y (AAPC -1.6, 95%CI -3 to -0.2). In girls aged 10-19 y, no significant changes were observed in fracture trends. When our rates were compared with the ones reported in the population of Australian children, all groups of Australians, boys, and girls, reported higher rates of fractures than the Mexicans of the same age.

**Conclusion:** Rates of fractures in Mexican children/adolescents have not shown considerable variations over the years. However, we notice in all cases, except in the group of girls aged 10-19, a slight diminution of fracture rates. One hypothesis to explain this difference could be associated with lifestyle changes.

**Reference:** 1. Pasco JA, et al. Calcif Tissue Int 2015;97:568.

## P368
## ASSOCIATION BETWEEN KNEE MRI MARKERS AND KNEE SYMPTOMS OVER 7 YEARS IN YOUNG ADULTS

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**Objective:** Knee MRI-based morphological markers (quantitative biomarkers) and structural abnormalities (semiquantitative biomarkers) are known to be associated with the progression of knee osteoarthritis (OA). However, there is conflicting evidence on the association between knee MRI-based morphological markers and knee symptoms (pain, stiffness, and dysfunction). Besides, there is a lack of evidence on the clinical significance of MRI markers in general population-based young adults. Hence, our aim was to investigate the associations between MRI biomarkers and knee symptoms in middle-aged adults followed over 7 y. We aim to describe the associations of cartilage volume, cartilage thickness, subchondral bone area, cartilage defects, and bone marrow lesions (BML) with knee symptoms in young adults followed up over 6-9 y.

**Methods:** Knee symptoms were assessed using the WOMAC scale during the Childhood Determinants of Adult Health (CDAH)-knee study at baseline (year: 2008-10, age: 30-40 y) and 6-9 y follow-up (CDAH-3; year: 2014–2019, age: 36-49 y). Knee MRI scans were obtained at baseline and were assessed quantitatively for morphological markers such as cartilage volume, cartilage thickness, subchondral bone area using semi-automated segmentation (Chondrometrics, Germany). Cartilage defects and BMLs were assessed using semi-quantitative scoring systems. Univariable and multivariable (adjusted for age, sex, BMI) zero-inflated Poisson (ZIP) regression models with random effects were used to describe the cross-sectional and longitudinal associations.

**Results:** The prevalence of knee pain at baseline (mean age (SD): 34 (2.7); female 49%) was 34%, and the prevalence increased to 50% over 6-9 years' follow-up (mean age (SD): 43 (3.2)). There were significant negative associations between medial femorotibial compartment (MFTC) and patellar cartilage volume with WOMAC symptoms at baseline and after seven years, and lateral femorotibial compartment (LFTC) and WOMAC symptoms at baseline in the multivariable model. Similarly, there was a significant negative association between MFTC cartilage thickness and WOMAC symptoms assessed after seven years. The bone area at patella was consistently negatively associated with WOMAC symptoms at baseline and over seven years; no association was observed for femorotibial bone area and WOMAC symptoms. Presence of any cartilage defect or BML was associated with higher WOMAC symptoms at baseline and after seven years.

**Conclusion:** In this middle-aged adult population, BML and cartilage defects were positively associated with knee symptoms, whereas cartilage volume and thickness at MFTC were negatively associated with knee symptoms. These results suggest that the quantitative and semiquantitative MR imaging biomarkers can be used as a marker of the clinical progression of OA in a young adult population.

## P369
## VERTEBRAL FRACTURE ASSESSMENT USING DXA EQUIPMENT HAS MODERATE INTEROBSERVER AGREEMENT AND AFFECTS READER FATIGUE

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**Objective:** To investigate the time and effort needed to perform vertebral morphometry, as well as interobserver agreement for identification of vertebral fractures on vertebral fracture assessment (VFA) images, and to evaluate the potential benefit for automated VFA.

**Methods:** 96 images were retrospectively selected and three radiographers independently performed semi-automatic 6-point morphometry in reading sessions of 6 images. Fractures were identified and graded using the Genant classification. Time needed to annotate each image was recorded and reader fatigue was assessed using a modified Simulator Sickness Questionnaire (SSQ). Interobserver agreement was assessed per-patient and per-vertebra for detecting fractures of all grades (grade 1-3) and for grade 2 and 3 fractures using the kappa statistic. Variability in measured vertebral height was evaluated using the intraclass correlation coefficient (ICC).

**Results:** Per-patient agreement was 0.59 for grade 1-3 fracture detection, and 0.65 for grade 2-3 only. Agreement for per-vertebra fracture classification was 0.92. Vertebral height measurements showed a mean absolute difference from the average across radiographers of 1.38 mm (95%CI: 1.36-1.41), with an ICC of 0.96. Time needed to annotate VFA images ranged between 91-540 s, with a mean annotation time of 259 s. Mean SSQ scores were significantly lower at the start of a reading session (1.29; 95%CI: 0.81-1.77) compared to the end of a session (3.25; 95%CI: 2.60-3.90; p<0.001).

**Conclusion:** Although excellent ICC for vertebral height measurement was achieved, agreement for detection of patients with vertebral fractures

was only moderate. In addition, vertebral morphometry requires substantial time investment and significantly affects reader fatigue. There is a potential benefit for automation tools for detection of vertebral fractures on VFA, both in improving interobserver agreement and in decreasing reading time and burden on readers.

## P370
### THE LEVEL OF 25-HYDROXYVITAMIN D FOR OPTIMUM PTH SUPPRESSION

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**Objective:** To determine 25-hydroxyvitamin D (Vit D) level at which optimum PTH suppression can be achieved.

**Methods:** Serum levels of Vit D, corrected calcium (C.Ca), creatinine, alkaline phosphatase (Alk-P), and PTH were extracted from Hamad Medical Corporation laboratory database from June 2017 to June 2020 and analyzed retrospectively. Only simultaneously processed tests from the same blood extraction were included. We excluded patients with chronic kidney disease, primary parathyroid diseases, metastatic bone malignancies, Vit D toxicosis and pregnancy by identifying patients with creatinine >100 umol/L, C.Ca >2.5 and <2.15 mmol/L, Vit D >80 ng/ml, and Alk-P >105 U/L. Mean difference of PTH level at Vit D ≥50 ng/ml and at different Vit D level intervals (showed in Table) will be will be calculated with corresponding p value and 95%CI.

**Results:** A total of 54,828 sets of tests were extracted from laboratory data base. (29,428 sets) with serum creatinine >100, (52 sets) with Vit D >80, (3665 sets) with Alk-P >105, (2125 sets) with C.Ca >2.5 and (421 sets) with C.Ca <2.15 were subsequently excluded. The remaining 19,137 sets of tests were included in the analysis. Mean age was 45.0 y (Std 14.0), 56.1% were females. 80%, 17.9% and 2.9% were Arab, Asian, and other ethnicities, respectively. There was no significant difference in PTH suppression at Vit D intervals starting from (30-34.9), (35-39.9), (40-44.9) and (45-49.9).

**Conclusion:** The optimum PTH suppression is observed at Vit D of 30 ng/ml and above. PTH level will not be suppressed significantly more beyond Vit D level of 30 ng/ml.

Table. Mean difference of PTH level at Vit D ≥50 ng/ml and at different Vit D level intervals (ANOVA analysis) with corresponding p value and 95%CI.

| Vit D level intervals | Mean difference | P Value (Ref. Vit D ≥50) | 95%CI | |
|---|---|---|---|---|
| <10 | 19.86 | 0.000 | 14.566 | 25.166 |
| 10 – 14.9 | 13.68 | 0.000 | 8.577 | 18.797 |
| 15 – 19.9 | 10.24 | 0.000 | 5.181 | 15.317 |
| 20 – 24.9 | 8.32 | 0.000 | 3.177 | 13.468 |
| 25 – 29.9 | 6.39 | 0.005 | 1.109 | 11.674 |
| 30 – 34.9 | 4.24 | 0.322 | -1.335 | 9.817 |
| 35 – 39.9 | 4.69 | 0.263 | -1.226 | 10.612 |
| 40 – 44.9 | 0.15 | 1.000 | -6.732 | 6.429 |
| 45 – 49.9 | 0.85 | 1.000 | -6.662 | 8.381 |
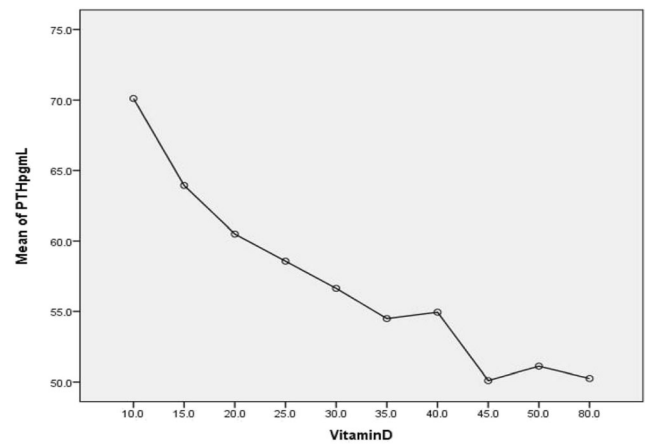


## P371
### WHICH BEST COMBINATION OF THE LUMBAR SPINE VERTEBRAE FOR THE FRACTURE PREDICTIVE ABILITY OF LUMBAR SPINE BMD AND TBS: THE OSTEOLAUS STUDY

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**Objective:** BMD and TBS are two bone parameters assessed in the same region (L1-L4) of lumbar spine DXA scans, which predict fracture risk independently. In this study, we compare the fracture predictive ability of BMD and TBS as calculated based on different adjacent vertebrae combinations within L1-L4. We hypothesized that the L4 vertebra would be more affected by the erroneous positioning (e.g., lordosis) and their exclusion from the TBS and BMD calculations would present a more optimal estimation of TBS and BMD. Further, we aimed to see if some combinations perform better at osteoporotic fractures prediction than the traditional L1-L4 combination.

**Methods:** 1362 postmenopausal women (64.4±7.5 y old) from the OsteoLaus cohort in Lausanne, Switzerland were included in this study. LS DXA scans were performed using Discovery A System (Hologic). Major osteoporotic fractures (MOF) occurring during the 5-y follow-up, were assessed using Genant's method (vertebral, VF) and questionnaires (nonvertebral). Binary logistic regressions were used to obtain the risk estimates for VFs or MOFs (shown here) per SD decrease in LS BMD or TBS as calculated for L1, L2, L3, L4, L1L2, L2L3, L1-L3, L2-L4, L3L4 and L1-L4. The area under the receiver-operating-characteristic curve (AUC) for each model.

**Results:** As shown in the Table, we see a tendency of the L4 TBS and BMD to be more poorly associated with the risk of fragility fracture than the other upper vertebrae. Further, one SD decrease in LS TBS and BMD calculated from the combinations of upper lumbar vertebrae (L1, L2) was more highly associated with the odds ratio for having a fracture than of lower vertebrae (L3, L4). In the models of the LS TBS calculated based on three or four vertebrae, the weakest association with fracture risk was found with TBS L2-L4 and the strongest with TBS L1-L3, moderate with TBS L1-L4.

**Conclusion:** The exclusion of L4 from LS TBS and BMD calculations would improve their performance in fracture risk prediction; the inclusion

of L1 is strongly suggested. The latter applies particularly for the countries using L2-L4 for LS BMD or TBS calculation as a standard in clinical practice. L1-L3 is indicated as an optimal combination for the TBS or LS BMD calculation. However, relying on less than four vertebrae for the TBS and BMD calculations is uncertain given the vertebrae exclusion rules. These findings need to be replicated in larger studies to give assertive clinical recommendations.

Table.

|  | SD decrease in TBS MOF | | SD decrease in BMD MOF | |
|  | OR (95%CI) | AUC (95%CI) | OR (95%CI) | AUC (95%CI) |
| --- | --- | --- | --- | --- |
| L1 | 1.46 (1.15-1.87) | 0.76 (0.72-0.81) | 1.30 (1.11-1.52) | 0.75 (0.71-0.80) |
| L2 | 1.37 (1.07-1.75) | 0.76 (0.71-0.80) | 1.20 (1.05-1.37) | 0.75 (0.70-0.80) |
| L3 | 1.17 (0.92-1.49) | 0.75 (0.70-0.80) | 1.18 (1.05-1.33) | 0.75 (0.70-0.79) |
| L4 | 1.12 (0.88-1.41) | 0.74 (0.69-0.79) | 1.15 (1.03-1.28) | 0.75 (0.70-0.79) |
| L1L2 | 1.61 (1.18-2.18) | 0.78 (0.73-0.83) | 1.33 (1.10-1.60) | 0.76 (0.70-0.81) |
| L2L3 | 1.34 (0.98-1.82) | 0.77 (0.71-0.82) | 1.31 (1.09-1.57) | 0.75 (0.69-0.81) |
| L1-L3 | 1.46 (1.11-1.93) | 0.76 (0.71-0.81) | 1.24 (1.07-1.44) | 0.75 (0.70-0.80) |
| L2-L4 | 1.27 (0.97-1.67) | 0.75 (0.70-0.80) | 1.17 (1.02-1.34) | 0.75 (0.70-0.80) |
| L3L4 | 1.17 (0.87-1.57) | 0.740 (0.684-0.797) | 1.17 (1.00-1.37) | 0.74 (0.69-0.80) |
| L1-L4 | 1.38 (1.05-1.82) | 0.75 (0.71-0.80) | 1.23 (1.07-1.41) | 0.75 (0.70-0.80) |

SD standard deviation, MOF major osteoporotic fracture, VF vertebral fracture, OR odds ratio, AUC area under the curve, TBS models adjusted for age, LS BMD and VF level, BMD models adjusted for age and VF level. Results were similar for VF and non-VF MOF.

## P372

### INCIDENCE RATE OF OSTEOPOROTIC HIP FRACTURE IN QATAR

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**Objective:** To estimate the annual incidence rate of osteoporotic hip fracture in Qatar from January 2017 to December 2019.

**Methods:** Hamad Medical Corp. (HMC) is a governmental based tertiary medical institute that provides medical care for the whole Qatar population. International Classification of Diseases (ICD-10) is used in HMC for disease coding. Hip fractures were captured by identifying ICD-10 hip fracture codes (S72.0, S72.1 and S72.2) from first of January 2017 till end of December 2019. Records of these patients were reviewed retrospectively to identify patient demographic data, mechanism of fracture and pathological fractures. Patients who were nonresident in Qatar were excluded. The observed census of Qatar population in 2017 and the estimated census of 2018 and 2019 were obtained from the book (Qatar Population and Employment Projections 2017-2024 - a framework for national planning). These censuses were used to calculate the age-gender specific annual incidence rate of osteoporotic hip fracture for population aged ≥40 y. World population 2010 was used to calculate the age standardized incidence rate per 100,000 for population aged ≥50 to enable comparison with other country figure rates.

**Results:** During the study period, 458 hip fractures were identified. 75 (16.4%) hip fracture events were due to high energy trauma and 9 (2%) were pathological hip fractures. The total number of osteoporotic hip fractures was 374 (81.7%). Fractures were slightly more in males; 215 (57.5%). Mean age was 70.2 y (std±12.6). 141 (37.7%) osteoporotic hip fractures were in Qatari citizens. In 2017, 2018 and 2019, the annual standardized incidence rate of osteoporotic hip fracture for whole Qatar population was 141.7, 140.8 and 162.7, for Qataris 154.2, 105.2 and 176.6, for non-Qataris 134.8, 183.9 and 160.4, respectively.

**Conclusion:** The standardized incidence rate of osteoporotic hip fracture was quite close to the regional countries and lower than European and north America countries.

Table. The annual standardized incidence rate of osteoporotic hip fracture per 100,000 for population aged ≥50 y.

| Year | 2017 Males Females Total | 2018 Males Females Total | 2019 Males Females Total |
| --- | --- | --- | --- |
| Qataris | 143.7 157.0 154.2 | 67.0 139.5 105.2 | 145.6 220.0 176.6 |
| Non-Qataris | 87.2 213.8 134.8 | 169.8 191.0 183.9 | 256.8 195.4 160.4 |
| Qatar population | 112.7 183.0 141.7 | 126.3 155.1 140.8 | 129.3 207.9 162.7 |

## P373

### VITAMIN D DEFICIENCY DURING PREGNANCY IS AN ADDITIONAL FACTOR IN THE DEVELOPMENT OF DIABETES

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**Objective:** During pregnancy, physiologically develops progressively increasing during this period of a woman's life insulin resistance and as a result hyperinsulinemia. In diabetics, a beneficial effect of vitamin D on glucose tolerance has been found. The aim of the present study was to examine pregnant women with different levels of vitamin D and to evaluate its effect on the characteristics of their β-cell function.

**Methods:** We investigated 547 pregnant Bulgarian women, mean age 30 ±5 y; with 79 hyperglycemia and 468 normoglycemia women. Two categories of vitamin D levels were adopted: <30 ng/ml (deficiency), n-401 and >30 ng/ml (sufficiency), n-146. The peripheral levels of 25(OH)D were investigated using a standard electrochemiluminescence immunoassay in a central laboratory on the day of sampling.

**Results:** The whole group of pregnant women studied (n-547) had a mean value of 25(OH)D 25.86±9.46 ng/ml, without significant difference between groups with hyperglycemia and normoglycemia (25.69±8.67 vs. 25.89±57 ng/ml, NS). When comparing the two groups with 25(OH)D >30 ng/ml (n-146) vs. 25(OH)D <30 ng/ml (n-401) with respect to plasma glycemia during oGTT, a significant difference was found for 120 min - 5.58±1.45 vs. 6.04±1.59 mmol/l, P<0.001, but insignificant for 0 min - 4.72±0.45 vs. 4.85±0.50 mmol/l, NS. These facts unequivocally emphasize the direct link between sufficient levels of vitamin D and the secretory capacity of β-cells. Correlation analysis showed a negative significant correlation between 25(OH)D with the level of fasting plasma glycemia - P<0.004 and on 120 min at oGTT - P<0.003.

**Conclusion:** We believe that vitamin D normalizes beta-cell function by counteracting peripheral insulin resistance, thus overcoming basal hyperinsulinemia. It further improves the functional capacity of β-cells, judging by its effect on plasma glycemia at the 120th minute of the oGTT performed in pregnant women.

## P374

### DETERMINANTS OF MUSCLE DENSITY IN LATE ADULTHOOD: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

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**Objective:** In a recent meta-analysis, lower calf muscle density (indicating greater muscle adiposity and lower muscle quality) as assessed by pQCT was associated with greater hip fracture risk, independent of FRAX, falls and bone mineral density. To date, muscle density has been little studied, and its determinants are unknown. In this study, we used a well characterised cohort of older adults (Hertfordshire Cohort Study) to identify lifestyle and anthropometric determinants of muscle density some 11 y later.

**Methods:** At baseline, 197 men and 178 women, aged 59-70 y, were recruited to a longitudinal study of musculoskeletal health. A lifestyle questionnaire was administered to collect information on physical activity, smoking, alcohol consumption and dietary patterns; height and weight were measured. pQCT of the radius and tibia was performed a median of 11.5 (IQR 10.9, 12.3) y later, and muscle density was measured at the 66% site using standard methodology. Baseline characteristics in relation to muscle density at follow-up were examined separately using linear regression with sex, baseline age and follow-up time included as covariates in all models.

**Results:** Mean (SD) age at baseline was 64.7 (2.7) y; mean (SD) muscle density values (mg/cm$^3$) were as follows: forearm [men 79.9 (3.1), women 77.2 (3.2)], calf [men 80.7 (2.6), women 78.5 (2.6)]. Baseline correlates (p<0.05) of both lower forearm and calf muscle density included female sex, lower weight, and lower BMI; SD difference in calf muscle density for women compared to men, and per SD lower weight and BMI were -0.84 [95%CI: -1.13, -0.54]), -0.37 [-0.46, -0.27] and -0.31 [-0.40, -0.23] respectively. Additional correlates of lower calf muscle density included older age and shorter stature. Relationships between muscle density and age were stronger at the calf (p<0.001) than the forearm (p=0.08). Lifestyle measures were not associated with muscle density.

**Conclusion:** Female sex, older age, and lower adiposity, rather than lifestyle, were associated with lower muscle density in older community-dwelling adults. Age was more strongly associated with calf than forearm muscle density. Further studies in larger cohorts are required.

## P375

### A STUDY OF ANTI-MULLERIAN HORMONE AND 25-HYDROXYVITAMIN D LEVELS IN POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY

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**Objective:** Osteoporosis is a bone disorder that increases a person's risk of fracture due to low BMD. Anti-Müllerian hormone (AMH) is an ovarian biomarker that plays an important role in folliculogenesis. AMH is widely used clinically in reproductive medicine and is known to decrease with age. Vitamin D is a steroid hormone that is mainly synthesized in the skin after exposure to ultraviolet sunlight. It is debated whether vitamin D has the capacity to influence the AMH level. This study evaluates the role of decreased AMH and vitamin D linked to increased risks of osteoporosis in postmenopausal women. This study aimed to evaluate the association of AMH and 25-hydroxyvitamin D serum levels with BMD test results in postmenopausal women.

**Methodd:** This study was conducted in a tertiary care hospital and included 100 postmenopausal females, with ages ranging from 45-75 y. These patients attended the Bone Clinic and were classified in the osteoporosis group and control group on the basis of BMD study. AMH and vitamin D were measured by chemiluminescence assay (CLIA), and BMD was measured by DXA for all the participants.

**Results:** Among the study participants, 56 % reported normal results of BMD measurement (control group), and the incidence of osteoporosis was 43% (osteoporosis group). AMH levels in the osteoporosis group were 0.19±0.06 ng/mL and the control group was 0.44±0.05 ng/mL. Vitamin D levels in the osteoporosis group was 37.65±3.26 ng/mL and the control group was 9.84±2.48 ng/mL. A significant positive correlation (r= 0.86, p<0.05 ) was observed between lower serum levels of AMH and lower levels of vitamin D in the participants with decreased BMD results (osteoporosis patients).

**Conclusion:** Lower vitamin D and AMH levels correlate significantly with decreased BMD in postmenopausal females. These results suggest that AMH is a potential biomarker of osteoporosis in postmenopausal women.

## P376

### THE VALUES OF BONE RESORPTION MARKER β-CTX FOR EARLY DETECTION OF POSTMENOPAUSAL OSTEOPOROSIS

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**Objective:** 30-40% of healthy women develop postmenopausal osteoporosis after the last menstruation due to a loss of estrogenic hormones. Until recently, the measure of bone density was the most commonly used method for osteoporosis detection. The disease was diagnosed very late, often after voluminous osteoresorption. For timely intervention it is necessary to detect the extent of the bone resorption what has been enabled by usage of biochemical markers for assessment of osteoresorption and osteoformation. This study aimed to determine the values of serum β-CTx in perimenopausal and postmenopausal women.

**Methods:** A total of 350 women were included in this study. 45 of them were in the control group of healthy women with regular menstrual cycles.

The other 305 women were divided in 6 subgroups:
PeriM: 51 women in perimenopausal period
M1: 52 women with duration of postmenopause <2 y
M2: 52 women with duration of postmenopause 2-6 y
M3: 50 women with duration of postmenopause 6-10 y
M4: 52 women with duration of postmenopause > 10 y
Mt: 48 women with postmenopausal osteoporosis, treated with antiresorptive therapy
β-CTx was determined in serum, with ECLIA method and measured in ng/ml.

**Results:** In the control group all of the respondents had normal values of beta CTx. In perimenopausal group (PeriM), the values of β-CTx were above the upper limit (0.299 ng/ml) in 39.22% of women. In postmenopausal groups, the values of β-CTx were above the upper limit for postmenopausal women (0.556 ng/ml) in 39.22% of women in PeriM group; in 38.46% of women in M1 group; in 51.92% of women in M2 group, in 61.54% of women in M3 group and in 59.62% of women in M4 group. Patients treated with antiresorption therapy had normal values of serum β-CTx.

**Conclusion:** β-Ctx derived from collagen type 1 is an important biochemical marker that reflects the intensity of bone resorption, determines the individual risk of bone loss and fractures, especially in postmenopausal women. The percentage of women with increased markers for bone resorption, and thus an increased risk of postmenopausal osteoporosis, increases with age and duration of postmenopause.

## P377

### MOTOR CONTROL AND ERGONOMIC INTERVENTION HOME BASED PROGRAMME DURING COVID-19 PANDEMIC: PRELIMINARY RESULTS OF THE MCHEELP STUDY

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**Objective:** To investigate the effects of a 12 week "Motor Control Home Ergonomics Elderlies' Prevention of Falls" (McHeELP) on functionality and fear of falling among Greek older adults.

**Methods:** 52 older adults (aged ≥65 y) who had experienced at least one fall incident in the past 12 months were randomly assigned into two groups. The first group (n=26) received motor control exercises combined with ergonomic arrangements of the home environment and the second group served as control (n=26). The McHeELP programme includes motor control exercises, divided into six domains: "Warm up," "Serial skills," "Cognitive skills," "Balance," "Sensory strategy," and "Dynamic control." Regarding home modification, a booklet that contained basic advice and tips on the modification for their home environment was provided to all participants. Functional assessments included 4-m, timed-up and go (TUG) and chair stand (CS) tests. Fear of falling was assessed via the Falls Efficacy Scale (FES-*I*) questionnaire. All participants were assessed at baseline and immediately post intervention (week 12). The Ethics Committee of the University of Patras, Greece, approved the study protocol.

**Results:** A total of 52 participants (20 men; 32 women) with a mean age of 76.26±6.33 y participated in this study. Comparison between pre- and post-intervention changes in functional measures and fear of falling showed significant interaction between "intervention" and "time" in 4-m test (p=0.014), TUG (p<0.005), CS test (p=0.011) and fear of falling (p=0.041). Pairwise comparisons presented statistically significant difference between baseline and 3 months for all variables. No statistically significant differences between time measurements were found for the control group.

**Conclusion:** Results suggest that the McHeELP programme is feasible and beneficial for older adults. This novel home-based exercise programme is low cost and may help to increase functionality and decrease falls in older adults. Further research is needed to understand the effects of this targeted exercise program on older adults' motor control.

## P378

### SUSTAINING SHORT TERM OUTCOMES OF HIP FRACTURE PATIENTS DURING THE COVID-19 GLOBAL PANDEMIC UNDER A BUNDLED CARE PROTOCOL

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**Objective:** To investigate how the COVID-19 pandemic affects early outcomes of an established hip fracture bundled care protocol within a tertiary institute operating within its capacity.

**Methods:** We reviewed patients admitted for fragility hip fractures that were surgically managed under a bundled care protocol between October 2019 to May 2020. "Pre-COVID" and "COVID" groups included patients admitted in a 4-month period before and after the nationwide lockdown measures were implemented on 7 February 2021 respectively. Demographic data, key performance indicators and outcome measures were collected. Statistical analysis was performed and significance was defined as p<0.05.

**Results:** Of the 245 patients studied, none of whom were COVID-19 positive, 143 were included in Pre-COVID arm and 101 patients in the COVID arm. There was no significant difference in demographic data, fracture pattern, type of surgery, time to admission and operation, discharge disposition and mean postoperative length of stay. More patients were discharged within 9 d postoperatively in the COVID group, and fewer patients in the COVID group were reviewed by a physiotherapist on postoperation day one. There was no significant difference in inpatient mortality, 30-d readmission and revision surgery rates (Table 1).

**Conclusion:** No significant differences in key performance indicators despite the various disruptions to hospital workflow during the COVID-19 pandemic demonstrates that despite the effects of a pandemic on public healthcare system, a robust bundled care protocol allows the continuity of essential services whilst maintaining standards of care, sustaining short term postoperative outcomes for hip fracture patients.

| | PRE-COVID (n=143) | COVID (n=101) | p-value |
|---|---|---|---|
| Mean Time to Admission (hours) | 1.86 ± 1.09 | 1.95 ± 1.17 | 0.566 |
| Admitted within 4 Hours (%) | 94.4 | 89.1 | 0.282 |
| Mean Time to Operation (hours) | 63.9 ± 62.9 | 62.6 ± 50.3 | 0.867 |
| Operation performed within 48 Hours (%) | 51.7 | 48.5 | 0.833 |
| Physiotherapy on POD1 (%) | 95.1 | 85.1 | 0.007 |
| Inpatient Mortality (%) | 1.4 | 1.0 | 0.231 |
| Mean Post-op LOS (Days) | 11.4 ± 9.2 | 9.8 ± 13.0 | 0.289 |
| Discharge within 9 days post-operatively (%) | 53.8 | 71.3 | 0.008 |
| 30 Day Readmission (%) | 10.5 | 6.9 | 0.339 |
| Revision surgery (%) | 0 | 3.0 | 0.059 |
| Discharge Disposition (%) | | | 0.087 |
|     Step down care facility | 72.7 | 62.4 | |
|     Home | 27.3 | 37.6 | |

## P379

### ASSOCIATION BETWEEN TRYPTOPHAN METABOLITES AND PHYSICAL PERFORMANCE AND FRAILTY IN OLDER PERSONS

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Frailty is defined as a syndrome of physiological decline in late life, characterized by marked vulnerability to adverse health outcomes. A robust biomarker for frailty is still lacking. Tryptophan (TRP) metabolism through the kynurenine pathway (KP) plays essential roles in aging, the musculoskeletal system and physical performance. In this study, we quantified eight KP metabolites, including kynurenine (KYN), kynurenine acid (KYNA), quinolinic acid (QUIN), picolinic acid (PIC), 3-hydroxykynurenine (3-HK), 3-hydroxyanthranilic acid (3-HAA) and anthranilic acid (AA) using ultra-high-performance liquid chromatography and gas chromatography-mass spectrometry in the serum of 85 participants (median age 75; 65% female; 28 non-frail, 29 pre-frail, and 28 frail) at the Nepean Osteoporosis and Frailty (NOF) Study. We looked at the association between TRP metabolites and physical performance, disability, frailty and percentage of circulating osteogenic precursor (COP) cells, another potential biomarker of frailty. After adjusting for age and sex, we found that frailty was associated with lower KYNA (OR 0.93 (0.88, 0.98), p=0.009) and higher QUIN (OR 1.11 (1.01, 1.21) for 500 nM increase in QUIN, p=0.029). Similarly, when using the Rockwood index, there was a weak association with KYNA (r=-0.241, p=0.028) and TRP (r=-0.220, p=0.045). Lower KYNA was also associated with sarcopenia (OR 0.88 (0.78, 1.00), p=0.049). In addition, serum IL-6 was positively associated with KYN (r=0.324, p=0.003), 3-HK (r=0.293, p=0.008) and QUIN (r=-0.293, p=0.008). Furthermore, COP cells were associated with higher levels of serum TRP (r=0.296, p=0.008). No association was found between TRP metabolites and grip strength or gait speed. In conclusion, different TRP metabolites have various associations with physical performance and frailty. Defining the underlying mechanisms may permit the development and validation of new biomarkers and

therapeutics for frailty and musculoskeletal conditions targeting specific metabolites of the TRP catabolic pathway. As seen in this study, lower KYNA is associated with Fried, Rockwood and sarcopenia.

## P380

### RURAL-URBAN DIFFERENCES IN FRACTURE LIAISON SERVICES

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**Objective:** Geographic variations may exist for fracture liaison service (FLS) and medication management service (MMS) programs because of different health resources and patients' characteristics. We reported that the medication uses patterns, 1-y medication adherence, and outcome for FLS and MMS programs in the urban and rural areas.
**Methods:** The cohort included older adults with vertebral fractures under antiosteoporosis medications treatment in the outpatient clinic. (N=237 in Taipei City (urban) and N=141 in Chu-Tung Township (rural)). Care coordinators followed similar protocols adapted from the 13 best practice framework standards by the International Osteoporosis Foundation to provide baseline assessments, and telephone follow-up every 4 months for one year. The comparisons were made between rural and urban regions. Regression analyses were performed to identify baseline correlates of selected outcomes.
**Results:** The mean age of the overall cohort was 76.1±9.6 y and 76.7% of them were women. Patients in the rural region were less likely to adhere to their medications for osteoporosis at one year (78.0 vs. 92.1%, $p<0.001$). Regression analysis revealed that older age (odds ratio [OR] 1.098, $p<0.05$), lower serum albumin level (g/dL) (OR 0.091, $p<0.05$), having heart disease (OR 5.667, $p<0.05$) were the factors associated with mortality in one year in the urban region. Being older (OR 1.134, $p<0.05$), higher serum Ca level (mmol/L) (OR 1.089, $p<0.05$), lower serum albumin level (g/dL) (OR 0.296, $p<0.05$), lower adherence to antiosteoporosis medications (OR 0.974, $p<0.05$) were the factors associated with mortality in one year in the rural region.
**Conclusion:** Patients in the rural region had lower medication adherence rates during 1-y follow-up than those in the urban region. The older age and lower serum albumin level were the important factors associated with mortality in both regions.

## P381

### EFFECT OF A SINGLE-SHOT INJECTION OF A HIGH-DENSITY HYALURONIC ACID GEL IN PATIENTS WITH SYMPTOMATIC PRIMARY KNEE OSTEOARTHRITIS: RESULTS OF NO-DOLOR STUDY

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**Objective:** The main aim of NO-DOLOR study is to evaluate the evolution of pain in patients with primary knee osteoarthritis (OA), after a single injection of a high-density viscoelastic gel, which contains a high concentration of hyaluronic acid (HA) (Pronolis® HD mono 2.5%: 120 mg HA in 4.8 ml)
**Methods:** Patients with symptomatic primary knee OA (according to ACR criteria and with pain at inclusion equal or superior to 4 out of 10 measured by visual analog scale) were included in an observational, multicenter (70 specialized care centers), prospective one-cohort study. After a single dose of Pronolis HD mono 2.5%, patients were followed for 6 months. Final results of the primary endpoint (3-months pain evolution

measured by domain "A" of the WOMAC scale) and secondary endpoints (6-months pain, stiffness, physical function, and pain on movement evolution, measured by WOMAC-A, WOMAC-B, WOMAC-C and 1st question of WOMAC-A respectively, safety and product tolerability throughout the study were reported). The study was approved by the Ethics Committee of the Hospital del Mar in Barcelona (CEIC-Parc de Salut Mar).
**Results:** 189 patients were recruited. Data from 166 patients at 3 months and 150 patients at 6 months were available for efficacy analyses. A statistically significant reduction ($p<0.0001$) of the WOMAC-A score was observed at 3-month visit vs. baseline visit: 4.25±3.36 vs. 9.03±3.49, with a relative reduction of 42.5% (Figure 1). At 6 months, the pain level continued to decrease significantly throughout the study (Figure 1). Pain on movement score was also significantly reduced at 6-month vs baseline: 0.80 vs. 1.69 (52.66% of improvement; $p<0.0001$). The degree of joint stiffness and the functional capacity significantly improved at 6 months vs. baseline: 1.69 vs. 3.69 in WOMAC B (54.20% of improvement; $p<0.0001$) and 15.05 vs. 31.01 in WOMAC-C (51.60% of improvement; $p<0.0001$), respectively. A significant percentage of patients improved WOMAC indexes vs. baseline (Figure 2); 1.6% of patients reported local adverse events (joint swelling) of mild intensity.
**Conclusion:** After 3 and 6 months of a single intra-articular injection of Pronolis HD mono 2.5%, patients with symptomatic knee OA reported significant pain improvement. The results were similar for pain on movement, joint stiffness, and functional capacity. In addition, good tolerability was observed.
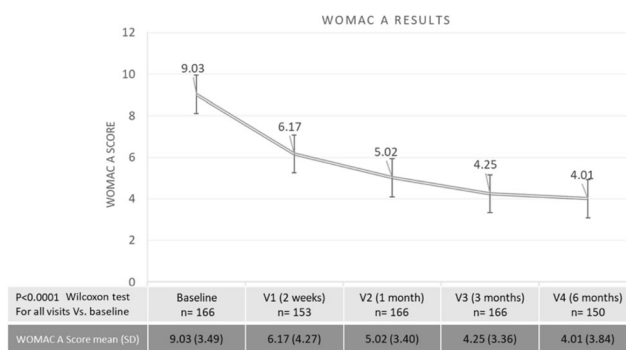


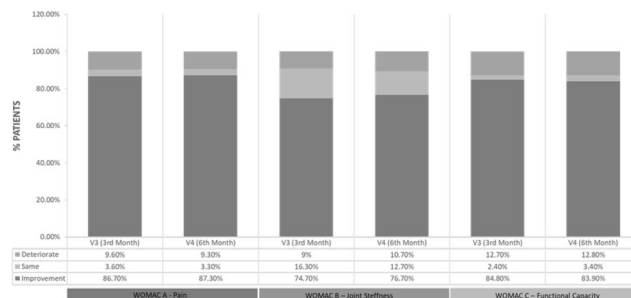Figure 1. Pain reduction along with the study.



Figure 2. Percentage of patients with improvement, no change, and deterioration in WOMAC indexes at 3 and 6 months.

## P382

### PREVALENCE AND INCIDENCE OF VERTEBRAL FRACTURES IN A RURAL GAMBIA, WEST AFRICA

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**Objective:** Despite vertebral fractures (VF) being the commonest osteoporotic fracture, causing pain, disability, increased mortality, and being a risk factor for future fracture, there are few to no data from resource-poor settings where healthcare is limited. The aim of this study was to determine fracture prevalence and incidence in a population from rural Gambia, West Africa, in a subcohort of the longitudinal Gambian Bone Ageing study (GamBAS).

**Methods:** GamBAS is a prospective observational study in women and men aged >40 y. Participants had baseline measurements in 2011-12 and were followed-up 6-8 y later. DXA scans of the lateral and AP spine, and proximal femur were obtained for VF assessment (LVA) and measurement of BMD. The Genant semiquantitative method was used to define VF. Prevalence and incidence were calculated; differences between fracture and nonfracture groups compared using t-tests.

**Results:** 98 individuals (60 women[W]) had usable scans at both visits. Median follow-up time was 7.2 y (range 6.6-8.6 y). Prevalence was 23.5% (n=23; 15W) at baseline with 46 total fractures (40 mild, 5 moderate; 1 severe). There were 11 incident (7W) VF fractures during the 7 y follow-up (715 person years); giving an incidence per 1000 person years of 15.4%. Spine and hip BMD, T- and Z-scores were lower in the prevalent fracture vs. no fracture group; lumbar spine T-score [mean(SD)] was -3.22(1.09) vs. -1.87(1.32); femoral neck -1.62(0.93) vs. -0.97(1.03). In those with incident fracture, spine and total hip baseline BMD, T- and Z-scores were lower (T-score lumbar spine -3.00(0.66) vs. -1.92(1.47); total hip -2.03(1.25); -1.12(1.26)).

**Conclusion:** These are the first data to present VF prevalence and incidence from West Africa. Population prevalence was similar to that from the EVOS and SOF studies. There are few data in which to compare incidence, though it is much lower than rest of the globe. As well as prevalent fractures, significant amounts of degenerative change were detected. Given the rising ageing population the burden of fracture in these populations requires further and extended study, determining risk factors and practical solutions within the limited resource healthcare settings.

## P383

### BIFIDOBACTERIUM LONGUM ATTENUATES BONE LOSS AND MAINTAINS BONE HEALTH BY MODULATING BREGS-TREGS-TH17 CELL AXIS IN OVX MICE

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**Objective:** Probiotics are known to be involved in management of various inflammatory diseases including osteoporosis. Several studies along with ours reported that probiotics showed its health promoting effects by regulating Treg-Th17 immune cell balance in host. Furthermore, various studies demonstrated that Tregs-Th17 immune cell balance can be further regulated by regulatory B cells (Bregs) in host. But no study till date had delineated the Bregs-Tregs-Th17 cell axis in case of osteoporosis i.e., "immunoporosis". Moreover, no study investigated the immunomodulatory potential of *Bifidobacterium longum* (BL) in regulating bone health. This study aims to examine the effect of probiotic BL on bone health via modulation of host Bregs-Tregs-Th17 cell axis in Ovx mice.

**Methods:** 18 female C57BL/6 mice of 8-10 weeks were divided equally in three groups as sham/control group, Ovx group and Ovx+BL group (received $10^9$ CFU/ml/d BL orally) for a period of 45 d. At the end of experiment mice were sacrificed and tissues analysed for various parameters to access the role of BL administration on bone-health by using several cutting edge technologies such as SEM, AFM, µCT, FACS and ELISA/CBA.

**Results:** We observed that administration of BL attenuated bone loss in Ovx mice. Both the cortical and trabecular bone content of Ovx+BL treated group was significantly higher than Ovx group. Remarkably, the percentage of osteoclastogenic Th17 ($CD4^+Ror\gamma t^+$) cells at distinct immunological sites such as BM and spleen were significantly reduced (p<0.01), whereas the percentage of anti-osteoclastogenic regulatory T cells (Tregs); $CD4^+Foxp3^+$ and $CD8^+Foxp3^+$ were significantly enhanced (p<0.01) in BL treated group, thus resulting in inhibition of bone loss. Interestingly, we for the first time observed that the population of Bregs ($CD19^+CD1d^{hi}CD5^{hi}IL-10^{hi}$) was significantly reduced in OVx mice with respect to sham group. Moreover, BL administration significantly (p<0.01) enhanced population of these Bregs in Ovx+BL group. The immunomodulatory role of BL was further supported by serum cytokine data with a significant reduction in proinflammatory cytokines (IL-6, IL-17 and TNF$\alpha$) along with enhancement of anti-inflammatory cytokines (IL-10, IFN$\gamma$) in BL treated group.

**Conclusion:** We propose for the first time that osteoprotective role of BL on bone health is mediated via its effects on the Bregs-Treg-Th17 cell axis which further regulates osteoclastogenesis. The present study thus highlights the potential of probiotic BL as a novel osteoprotective agent in the treatment and management of bone related diseases including osteoporosis.

## P384

### DEPENDENCE OF THE ANTIDESTRUCTIVE EFFECT OF RITUXIMAB ON THE COMBINATION WITH VARIOUS DMARDS OR GLUCOCORTICOIDS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** To evaluate antidestructive effect of rituximab (RTM) in various combinations (RTM-mono, RTM+disease-modifying antirheumatic drugs (DMARDs) and RTM+glucocorticoids (GK) in patients with rheumatoid arthritis in real clinical practice.

**Methods:** Clinical and radiological evaluation on 0 and 48 weeks 110 patients with rheumatoid arthritis treated with rituximab: as monotherapy RTM - group 1, RTM in combination with methotrexate (MTX) - group 2, RTM in combination with leflunomide (LEF) - group 3, and RTM + other DMARDs - group 4. The same 110 patients were divided into 2 groups depending on the presence of concomitant GC therapy. Clinical effect was scored by EULAR criteria, radiographic progression was assessed using Sharp/van der Heijde (SvH) modified scoring method.

**Results:** When assessed after 48 weeks in the general group, remission and a low degree of disease activity were noted in 22.36% of patients and radiological progression was absent in 60.9% of patients. In the group of RTM monotherapy, inhibition of destruction was noted in 76.92%, in the RTM+MT group - in 54.29%, in the RTM+LEF group - 65.0%, and in the group of other DMARDs - in 50% of patients (p>0.05). When assessing the radiological progression it was shown that in the group of patients who did not receive concomitant GC therapy, inhibition of bone destruction according to the total Sharp score was noted in 54.55%, in the group receiving concomitant GC therapy in 61.54% of patients, also without statistically significant differences (p>0.05).

**Conclusion:** This work has demonstrated the good therapeutic and radiological effect of RTM in real clinical practice. There were no significant differences in the degree of progression depending on the concomitant therapy of DMARDs or GK. In the treatment of RTM, inhibition of articular destruction is possible against the background of clinical deterioration.

## P385

### BMD AND BONE TURNOVER MARKERS ALTERATIONS IN WOMEN WITH ENDOMETRIOSIS DURING MENSTRUAL CESSATION DUE TO GNRH THERAPY AND AFTER MENSTRUAL RESTORATION

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**Objective:** In this prospective, controlled, open label study among women with endometriosis we aimed to investigate the acute skeletal effects of a short treatment period with a GnRH analog.

**Methods.** Premenopausal women (n=21, age 35.4±7.6 y) with surgically verified endometriosis received once monthly goserelin s.c. for 6 months. Following goserelin discontinuation patients were monitored for another 6 months after menstrual restoration. Age- and BMI-matched premenopausal, healthy, untreated women served as controls (n=19, age 37.1±3.6 y). BMD at the lumbar spine (LS) and the femoral neck (FN), and bone turnover markers (BTMs; P1NP and CTx) were measured before treatment (baseline), at 6 months of treatment (6mo), and 6 months after menstrual restoration (12mo).

**Results:** Baseline LS- and FN-BMD values did not differ between patients and controls ($1.217\pm0.036$ vs. $1.225\pm0.041$, $p=0.925$ and $1.000\pm0.038$ vs. $0.986\pm0.036$, $p=0.807$, respectively). In controls, LS- and FN-BMD did not change during the study. Among patients both LS- and FN-BMD decreased from baseline to 6mo ($1.217\pm0.036$ vs. $1.145\pm0.035$ g/cm$^2$, $p<0.001$ and $1.000\pm0.038$ vs. $0.975\pm0.039$ g/cm$^2$, $p=0.001$, respectively), while LS-BMD increased again from 6 to 12mo ($1.145\pm0.035$ vs. $1.193\pm0.038$ g/cm$^2$, $p<0.001$) but FN-BMD remained stable ($0.975\pm0.039$ vs. $0.966\pm0.035$ g/cm$^2$, $p=0.69$); both LS- and FN-BMD at 12mo remained below the baseline values ($p=0.004$ and $p=0.006$, respectively). CTx and P1NP increased from baseline to 6mo ($349.4\pm47.3$ vs. $629.1\pm65.5$ pg/ml, $p<0.001$ and $40.4\pm4.4$ vs. $81.2\pm7.7$ ng/ml, $p<0.001$, respectively) and decreased from 6 to 12mo ($629.1\pm65.5$ vs. $324.6\pm46.7$ pg/ml, $p<0.001$ and $81.2\pm7.7$ vs. $60.6\pm9.7$ ng/ml, $p=0.004$, respectively), returning to baseline levels.

**Conclusion:** In premenopausal women treated with goserelin menstrual cessation results in rapid increases of BTMs and decreases of BMD values. These changes are partially reversed 6 months after menstrual restoration.

## P386

### LOW BACK PAIN IN MEN AND WOMEN WITHOUT SPONDYLOARTHRITIS

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**Objective:** To determine the lower back pain (LBP) and inflammatory back pain (IBP) prevalence, characteristics, gender differences among patients (pts) without spondyloarthritis (SpA).

**Methods:** 1799 pts, including 736 men and 1063 women, with general therapeutic, urological, and neurological pathologies completed the questionnaire developed in the Internal Medicine Department #3 of Bogomolets National Medical University. The presence or history of LBP, its cause, localization, onset, signs of IBP determined by Calin criteria [1] were analyzed depending on sex.

**Results:** 1567 of 1799 pts (84.9% of men and 87.6% of women) with mean age 41.4±17.1 reported the presence or history of LBP. 95.4% (1717 pts, 696 men and 1021 women, mean age 41.4±17.1) were patients without SpA. In this group, 50.4% of men vs. 44.1% of women had decreased pain after exercise (p<0.05). Also, in men, LBP was preceded by trauma 1.5 times more often than women (p<0.05). The age distribution of the onset of LBP had no significant difference between gender groups. Gradual onset of pain characterized both sexes. 19.3% of men and 18.3% of women had morning stiffness for >30 min (p>0.05). Four of the five signs of IBP had 16.5% (17.8% of men and 15.7% of women). The most common combination (7.7%) of IBP signs was: the onset of back pain up to 40 y, the gradual onset of back pain, morning stiffness, relief of back pain during exercise.

**Conclusion:** The prevalence of LBP in patients without SpA is high for both sexes. In men, in comparison with women, LBP is more often related to previous trauma and decreases after physical activity. The prevalence of IBP is high among the patients without SpA, which indicates the need for additional procedures to exclude SpA in this pts group and may indicate the low specificity of the Calin criteria.

**Reference:** 1. Akgul O, Ozgocmen S. World J Orthop 2011;2:107.

## P387

### SCORING PROPOSAL FOR THE UNDERLYING DIAGNOSIS OF SYSTEMIC MASTOCYTOSIS IN PATIENTS WITH UNEXPLAINED SEVERE OSTEOPOROSIS

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**Objective:** Fragility fracture and osteoporosis have a high prevalence and clinical burden in systemic mastocytosis (SM). As distinct from patients with other mediator-related symptoms, a predictive score to diagnose SM in these patients is lacking. moreover, normal serum basal tryptase (sbT) levels do not exclude SM diagnosis, whereas high sbT levels might be due to familial hypertryptasemia. The aims describing the clinical features of a large series of adult patients referred for unexplained osteoporosis and suspected SM. Also we wanted to identify criteria useful to predict SM diagnosis and strengthen the indication for bone marrow biopsy (BM).

**Methods:** We included 110 ten patients with unexplained osteoporosis who underwent BM evaluation. The design is retrospectical. Diagnosis of SM was based on the 2016 WHO criteria. We excluded patients with osteoporosis explained otherwise.

**Results:** With BM, 48 patients (43.6%) received the diagnosis of SM, of whom 44 (91.7%) had bone marrow mastocytosis and 4 (8.3%) had indolent SM, with previously unrecognized skin lesions. Other mediator-related symptoms were reported in 31 patients (64.6%). 62 patients (56.4%) were negative for mastocytosis and used as a control group. SM patients were younger than controls (median age 55 vs. 63 y, respectively; p=0.005), had higher median sbT level (31.7 vs. 15.8 ng/mL, p<0.001) and presented more frequently fragility fractures (93.7 vs.

74%, respectively; p=0.009). No significant differences according to gender and mediator-related symptoms were found between the two groups. Based on multivariate analysis, a model to predict the diagnosis of SM before BM study was built, including age <50 y (p≤0.001) or not >70 y (p=0.010), sbT level ≥19.4 ng/mL (p<0.001) and the presence of fragility fractures (p=0.02) as independent predictive factors. Patients with a score <2 had a lower probability to have mastocytosis (p<0.001).

**Conclusion:** The diagnosis of SM should be excluded in cases of unexplained osteoporosis. Since BM evaluation counts a large number of negative cases, this score could avoid unuseful BM studies. In cases with a score <2, searching for the D816V KIT mutation on peripheral blood and testing for familial hypertryptasemia could lower the risk of losing cases of mastocytosis.

## P388

### INFLUENCE OF VITAMIN D AND IODINE DEFICIENCY ON THYROID FUNCTION AND AUTOIMMUNITY MARKERS IN HYPOTHYROIDISM

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**Objective:** Data on the effects of vitamin D and iodine supplementation on thyroid function in hypothyroid patients are scarce. There are controversies in this regard. The aim of this double-blind randomized placebo-controlled clinical trial was to investigate the effect of vitamin D and iodine deficiency treatment on thyroid function and autoimmunity marker (thyroid peroxidase antibody [TPO-Ab]) in patients with hypothyroidism.

**Methods:** 76 patients with hypothyroidism, iodine and vitamin D deficiency (25-hydroxyvitamin D level ≤20 ng/ml) were randomly allocated into two groups to receive vitamin D (30000 IU/week, orally) or placebo for 12 weeks, as vitamin D-treated (n=50) and control (n=26) groups, respectively. Serum TPO-Ab, thyroid stimulating hormone (TSH), PTH, calcium, and urinary iodine concentrations were compared before and after trial between and within groups. The data were presented as mean (standard error [SE]) and analyzed by appropriate tests.

**Results:** Mean of vitamin D was increased in vitamin D-treated group (43.2 [1.9] vs. 12.9 [0.8] ng/ml, P=0.02). Mean of TPO-Ab significantly changed in both groups (837 [104.89] vs. 411.35 [92.41] IU/ml, P=0.04 in vitamin D-treated and did not significantly change 770.08 [106.3] vs. 827.14 [97.2] IU/ml in placebo-treated group, P=0.25). Mean of TSH was not changed in both groups after trial, P=0.3 and P=0.35 for vitamin D-treated and control groups, respectively.

**Conclusion:** Vitamin D treatment in iodine and vitamin D deficient patients with hypothyroidism has significant effect on thyroid function and autoimmunity.

## P389

### SELF-INJECTION OF DENOSUMAB IN CLINICAL PRACTICE IN THE FRENCH PILOTE STUDY

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**Objective:** Describe characteristics of patients who self-inject denosumab and patterns of self-injection in France.

**Methods:** PILOTE was a prospective observational study that evaluated persistence to denosumab over 24 months in France in postmenopausal women. Clinical information obtained through routine practice was recorded onto an eCRF, including the individual who injected subcutaneous denosumab (physician, nurse, patient, other). We conducted an ad hoc analysis of the patients in the study who self-injected denosumab.

**Results:** In total, 478 patients were enrolled between June 2105 and February 2016. 27 patients self-injected denosumab at least once, with

these patients distributed across multiple sites. Those who self-injected appeared slightly younger with longer duration of osteoporosis, and a higher proportion had a prior fracture and previous glucocorticoid and teriparatide treatment than the overall population (Table). Self-injected patients were also more likely to be living at home with family, have a University education, and be seen by a rheumatologist than a GP. Twelve patients self-injected from the beginning of the study, 15 self-injected after receiving injection from an HCP and 8 switched back to HCP injections after self-injection. Eleven of the 12 patients who self-injected from the beginning were persistent at 24 months. Six ADRs occurred in three self-injecting patients: one vertebral fracture, bone pain, muscle fatigue, myalgia, asthenia, pyelonephritis.

**Conclusion:** Although numbers were small, self-administration of denosumab appeared feasible for women with postmenopausal osteoporosis and may be a valuable option, particularly in the context of the COVID-19 pandemic when office visits are restricted.

Table. Characteristics of patients who self-administered denosumab and overall.

| | Patients who self-injected at least once N=27 | All patients N=478 |
|---|---|---|
| Age (Mean±SD), years | 69.81±10.29 | 72.48±9.73 |
| Number of comorbidities – n (%) | | |
| <3 | 19 (70.4%) | 349 (73.0%) |
| ≥3 | 8 (29.6%) | 129 (27.0%) |
| Prior treatment with osteoporosis therapies – n (%) | 25 (92.6%) | 434 (90.8%) |
| BP | 22 (81.5%) | 416 (87.0%) |
| Teriparatide | 7 (25.9%) | 44 (9.2%) |
| Glucocorticoids >3 months 5 mg or more – n (%) | 4 (14.8%) | 42 (8.8%) |
| History of osteoporosis related fracture – n (%) | 20 (74.1%) | 291 (60.9%) |
| Parent history of hip fracture – n (%) | 2 (8.7%) | 61 (15.5%) |
| Rheumatoid arthritis | 1 (3.7%) | 19 (4.0%) |
| Visual impairment | 5 (18.5%) | 100 (20.9%) |
| Year since PMO diagnosis (Mean±SD) | 8.74±6.36 | 7.82±6.00 |
| Diabetes type 1 | 0 (0.0%) | 3 (0.6%) |
| Diabetes type 2 | 0 (0.0%) | 23 (4.8%) |
| Patient's living situation | | |
| At home with spouse/family | 20 (74.1%) | 267 (55.9%) |
| At home with care/support | 0 (0.0%) | 38 (7.9%) |
| At home alone | 7 (25.9%) | 164 (34.3%) |
| Nursing home | 0 (0.0%) | 4 (0.8%) |
| Unknown | 0 (0.0%) | 5 (1.0%) |
| Formal education of the patient | | |
| No formal education | 0 (0.0%) | 9 (1.9%) |
| Elementary education | 3 (11.1%) | 186 (38.9%) |
| Secondary education | 12 (44.4%) | 185 (38.7%) |
| University | 10 (37.0%) | 64 (13.4%) |
| Unknown | 2 (7.4%) | 34 (7.1%) |
| Physician primary specialty | | |

| | | |
|---|---|---|
| Rheumatologist | 24 (88.9%) | 326 (68.2%) |
| General practitioner | 3 (11.1%) | 152 (31.8%) |
| Physician type of practice | | |
| Private practice | 9 (33.3%) | 247 (51.7%) |
| Hospital practice | 7 (25.9%) | 118 (24.7%) |
| Mixed practice | 11 (40.7%) | 113 (23.6%) |

## P390

### EVALUATION OF TOPICAL THERAPY OF PATIENTS WITH OSTEOARTHRITIS OF SMALL JOINTS OF THE HANDS

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**Objective:** More and more attention is paid to the problem of osteoarthritis (OA) of small joints of the hands. To date, there is evidence of the efficacy of diclofenac diethylamine 2% in the treatment of OA of large joints, but there is no data on it effect on OA of small joints of the hands. This study aimed to evaluate the efficacy and safety of using the diclofenac diethylamine 2% for 14 d in patients with osteoarthritis of small joints of the hands.

**Methods:** 62 patients of both sexes with hands OA were included in the study, 31 of whom (main group) used diclofenac diethylamine 2% topically, and the remaining 31 (comparison group) – diclofenac diethylamine 2% + oral nonsteroidal anti-inflammatory drugs. The effectiveness of therapy was assessed by using a visual analogue scale in dynamics: joint pain and stiffness at rest, during movement and palpation, by functional indices AUSCAN, FIHOA, by assessment of the effect of therapy by the doctor and the patient on a weekly basis.

**Results:** Joint pain decreased after 2 weeks of therapy in all patients during treatment with diclofenac diethylamine 2% in both groups. Significant reduction in stiffness and improvement in hand joint function was achieved after 7 days and lasted until the end of treatment. By the end of treatment, 100% of patients assessed their condition as improvement.

**Conclusion:** Diclofenac diethylamine 2% demonstrates efficacy in patients with OA of the hand joints (reduced pain, stiffness and improved joint function) both in monotherapy and as part of complex therapy, while being well tolerated.

## P391

### RISK OF REVISION AFTER TOTAL HIP ARTHROPLASTY: WHAT IS THE ROLE OF PHYSICALLY DEMANDING WORK?

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**Objective:** To investigate the role of occupational exposure post total hip arthroplasty (THA) in increasing the risk of future revision.

**Methods:** People in the Geneva Hip Arthroplasty registry aged 18-64 y who underwent an elective THA between March 1996-December 2012 were eligible for this study. A postal questionnaire was sent to collect postoperative: leisure time physical activities and physically demanding work exposures. Preoperative health status and relevant surgical factors were extracted from the GAR records. People were excluded if they had undergone revision surgery for postoperative complications or infection. Proportional Cox regression hazard models were fitted to calculate crude and adjusted hazard ratios (HR) for the risk of revision surgery and their 95% confidence intervals (CI).

**Results:** Amongst 557 respondents (57% response rate) who underwent THA at a median of 58 years (IQR: 51-61), 329 worked post-THA. Of these, 241 provided information on job title, physical occupational activities and duration of work. There were 17 revision THAs amongst those who worked post-THA. We found no increased risk of revision THA amongst people who reported: standing >4 h/d; walking >2 miles/d; carrying/lifting weights; climbing ladders; or climbing >30 flights of stairs/d. However, after adjusting for age at THA, sex, BMI and time to reach best function, people who knelt/squatted at work post-THA showed a HR of 2.79 (95%CI 1.00-7.81) for risk of revision compared with those who did not.

**Conclusion:** There were few revision procedures even despite the long period of follow-up, thus diminishing our statistical power. Although no occupational activity reached significance, the estimated risk of revision surgery after kneeling/squatting is doubled. This result requires replication but may be of importance in advising THA patients preoperatively.

## P392

### ASSESSMENT OF THE RESPONSE PROFILE TO HYALURONIC ACID PLUS SORBITOL INJECTION IN PATIENTS WITH KNEE OSTEOARTHRITIS: POST HOC ANALYSIS OF A 6-MONTH RANDOMIZED CONTROLLED TRIAL

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**Objective**: Independent risk factors for osteoarthritis (OA) progression have been identified but little is known whether they might also alter the response to treatments. In a previous randomized trial, the noninferiority of two hyaluronic acid injections (Synolis VA vs. Synvisc-One) was assessed in patients with knee OA, with an OMREACT-OARSI response rate of 79% for Synolis VA. The objective of the present study was to assess whether a responder profile could be established for this treatment modality.

**Methods:** Post hoc analysis using the Synolis VA arm of a 6-month prospective, multicentre, comparative, randomized, double-blinded trial. At baseline and during the study, pain and function were assessed using the WOMAC questionnaire. Patient response to treatment at after 6 months was also assessed according to the OMERACT/OARSI criteria. Data were collected, at baseline, on variables that could potentially impact the response to treatment (e.g., age, sex, BMI, Kellgren-Lawrence grade, duration of OA since diagnosis, and baseline WOMAC scores).

**Results:** 91 subjects with complete data were included in the analyses. The probability of improving the WOMAC Pain with Synolis VA was independent of any baseline clinical data. However, the chance to improve the WOMAC Function was significantly associated with its baseline level, even after adjustment for potential confounding variables (p=0.046). In addition, the WOMAC total score at baseline was independently associated with treatment response using the OMERACT/OARSI criteria (OR: 1.05; 95%CI: 1.02-1.09) in multivariate logistic regression analysis adjusted for age, sex, and baseline BMI. Only baseline WOMAC pain (p=0.005) and WOMAC function (p=0.01) specific subscales play a significant role as predictor of response to treatment according to the OMRERACT/OARSI criteria, while baseline WOMAC stiffness had no significant effect (p=0.08).

**Conclusion:** In addition to the high absolute response rate to Synolis VA, the probability of success is even increased if administered in patients with more intense pain and more limited physical function at baseline. Further research with other potential confounding clinical variables is warranted in order to better applicate the concept of personalized medicine.

## P393

### DISSECTING THE MOLECULAR MECHANISMS BEHIND THE BIOSYNTHESIS AND TRAFFICKING OF THE CALCIUM-SENSING RECEPTOR

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The calcium-sensing receptor (CaSR) is a GPCR receptor that controls calcium level in the blood by regulating the synthesis and the secretion of PTH. Defects on CaSR activity, due to its downregulation or to inherited mutations, lead to hyperparathyroidism disorders and to calcium/PTH imbalance. It appears, despite some contradictory reports, that pharmacological stimulation of the CaSR *via* its specific FDA-approved modulator cinacalcet increases CaSR expression and its membrane recruitment. However, the mechanisms behind CaSR biosynthesis and its anterograde trafficking are still unclear and require further proofs.

The aim of the present study is to dissect how CaSR activation triggers its own biosynthesis and whether this can be further enhanced by pharmacological stimulation.

Using either bovine parathyroid and human adenoma parathyroid cells, either HEK cells stably transfected with a CaSR-expressing vector (HEK_CaSR), we are investigating the changes of CaSR expression and signaling via RT-qPCR, western blot, IP-one and intracellular calcium mobilization assays. We are further double transfecting the parathyroid cell line (PTHC1), generated in our laboratory, with vectors expressing CFP-tag CaSR and DKK-tag PTH. With this model we will be able to i) monitor CaSR biosynthesis and membrane trafficking through live cell imaging; ii) CaSR activity by assessing PTH production and secretion; iii) assess the interaction of the CaSR with down-stream signaling factors via immunoprecipitation and further unveil novel interacting proteins through mass spectrometry and FRET assays.

Our preliminary data show that in HEK_CaSR cells, 24 h stimulation with 1μM of cinacalcet increases CaSR mRNA and protein levels by 2-fold compared to untreated control, while inhibiting the CaSR with 1μM of NPS 2143 reduces CaSR expression.

Based on our early results, we suggest the existence of a positive feedback mechanism that promotes CaSR biosynthesis upon its stimulation. Commonly GPCRs internalize once activated causing desensitization, while the CaSR seems to guarantee a sustained signaling upon continuous stimulus. Exploiting this mechanism will allow us to improve current pharmacological treatments for hyperparathyroidism disorders.

## P394

### AN ASSESSMENT OF THE TOULOUSE SAINT LOUIS UNIVERSITY MINI FALLS ASSESSMENT TOOL TO PREDICT INCIDENT FALLS AMONG OLDER ADULTS RESIDING IN NURSING HOMES: A 6-MONTH PROSPECTIVE STUDY

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**Objectives:** Toulouse Saint Louis University Mini Falls Assessment (TSLUMFA) tool has been designed to predict falls. It was initially validated in a geriatric clinic in 2018. The primary objective was to evaluate the predictive capacity of the TSLUMFA for incident falls in older adults residing in nursing homes. The secondary objective was to determine the TSLUMFA optimal cut-off value identifying those older adults with a high-risk of falling.

**Methods:** Settings: A longitudinal study was carried out over a period of 6 months. Participants: 93 older adults residing in nursing homes were evaluated for the present study. Measurements: The TSLUMFA (made up of 7 criteria) was administered at baseline, and incident falls were recorded based on a registry of falls. Comparisons of TSLUMFA scores between fallers and non-fallers were performed using the U Mann-Whitney test or $\chi^2$. Correlation between the total TSLUMFA score (/30 points) and incident fall(s) was explored using the Cox proportional hazard model. ROC analysis enabled an optimal cutoff value to be established to identify those adults at the highest risk of falling.

**Results:** In the study, 93 older adults (61.3% women) with a median age of 80 (69-87) y were included. The median total TSLUMFA score was 21 (19-24.5) points. During the 6-month study period, 38 subjects (40.9%) experienced at least one fall. The total TSLUMFA score in older adults with incident fall(s) was significantly lower than in those who did not fall (20 (15.75-22.25) points vs. 23 (20-25) points and a p-value of <0.001). For each 1-point higher score at the total TSLUMFA a 9% less chance of falling was observed during the study period (p-value=0.006). The AUC was 0.736 (95%CI: 0.617-0.822) and p-value<0.001, clearly demonstrating its interesting performance as a screening tool. A score of ≤21 points was identified as the optimal cutoff to identify those older adults at a higher risk of falling.

**Conclusion:** The TSLUMFA performed well and successfully identified older adults with a high risk of falling in a nursing home setting. Further comparisons with existing tools are warranted.

## P395

### EMPLOYMENT RETENTION AMONGST HIP ARTHROPLASTY RECIPIENTS WHO RETURN TO WORK

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**Objective:** To explore associations between exposure to physically demanding work performed after total hip arthroplasty (THA) and job loss due to the replaced hip.

**Methods:** A postal survey was mailed to THA recipients from the Geneva Hip Arthroplasty Registry and the Clinical Outcomes in Arthroplasty study. To be eligible, patients needed to have received their arthroplasty at least 5 y before and to have been aged 18-64 y at the time. Data collection included: demographics, time to reach best function and postoperative recreational activities. For each job held postoperatively, participants self-reported exposure to a range of physically demanding activities (standing, walking, kneeling/squatting, climbing ladders, digging). Cox proportional hazard models were used to estimate the effect of occupational activities on the risk of job loss.

**Results:** Of the 817 respondents (57% response rate), 514 returned to work (RTW) postoperatively. The median follow-up post-THA was 7.5 y (IQR 6.2 -12.1). Occupational exposure information was available for 411 of the 514 who RTW (206 men, 205 women). Adjusted models (age at operation, sex, BMI, time to reach best postoperative function, cohort and follow-up) showed an increased risk of stopping work post-THA in workers who needed to stand >4 h/d (HR:3.81, 95%CI 1.62-8.96); kneel/squat (HR:95%CI 3.32, 1.46-7.55) and carry/lift >0 kg (HR:5.43, 95%CI 2.29-12.88) compared with those who did not. Mutually adjusted models showed that the effect of lifting/carrying weights in excess of 10 kg remained statistically significant (p<0.01).

**Conclusion:** Jobs that entail standing, kneeling/squatting or lifting heavy weights are more difficult to retain amongst THA recipients. These findings need to be confirmed in other cohorts, but clinicians may need to

discuss pre-operatively potential limitations of arthroplasty on work outcomes and/or specialised rehabilitation may be required.

## P396

### HIGH ADHERENCE TO SECONDARY PREVENTION TREATMENTS, LOW REHOSPITALIZATION AND MORTALITY RATES AMONG OLDER ADULTS WITH HIP FRACTURES ENTERED THE ORTHOGERIATRIC OUTPATIENT SERVICE

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**Objective:** To compare the outcomes of hip fracture patients who entered the interdisciplinary fracture liaison services (FLS) with those who followed the usual orthopedic care (UOC).
**Methods:** A prospective observational study including subjects aged ≥65 y hospitalized because of hip fracture. At the time of discharge, participants who underwent surgery were invited to enter FLS, received a schedule of lab and x-ray exams and outpatient orthogeriatric assessment within 30 d from surgery.
**Results:** Among 762 patients eligible within 1 y, 540 (71.0%) attended the 30-d outpatient visit: 268 (49.6%) opted for FLS while 272 (50.3%) for UOC. The patients who entered the FLS compared to those in the UOC had higher 1-y adherence to vitamin D supplementation, plus calcium if needed, as well as adherence to the specific antiosteoporosis drug (75.1 vs. 8.0%; p<0.0001), and complete antifracture treatments (defined as a combination of the specific antiosteoporosis drug plus vitamin D, and calcium if needed) (72.3 vs. 5.7%; p<0.0001). The older adults who entered the FLS experienced a long time of hospitalization-free survival (176.4 vs. 88.7 d; p=0.0152) compared to those in UOC. Compared with participants in the UOC, a tendency to a lower annual mortality rate (19.7/100 vs. 25.5/100 person-years; HR=0.62; 95%CI 0.35; 1.09) was found in those who entered the FLS group independent of confounders.
**Conclusion:** The FLS may increase initiation and adherence to antifracture treatments over time. Compared with UOC, FLS may positively impact on health-related outcomes, such as time free from rehospitalization and mortality rates.

## P397

### LEONIE STUDY: POOR COMPLIANCE WITH PATIENT INSTRUCTIONS FOR TAKING ORAL BISPHOSPHONATES (ORAL BPS)

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**Objective:** To assess compliance with patient instructions with oral BPs in osteoporotic women, especially the 4 cardinal points for an appropriate intake (taken on an empty stomach, at least 30 min before the first food, with a glass of plain water, staying in an upright position).
**Methods:** A nationally representative sample of 152 pharmacies was constituted. A 37 questions questionnaire established by the scientific study committee was proposed to women aged 60 and over visiting the pharmacist for an oral BP drug delivery between January-June 2020. The computer assisted telephone interview methodology was used. 254 patients (mean age 68.6±6.46 y) were interviewed. Diagnosis of osteoporosis was defined either by BMD <-2.5 SD or a fragility fracture event (respectively 57% and 43% of women). The treatment was prescribed by GPs (63%) or Rheumatologist (31%), with a mean duration of 7.6

±7.3 . Alendronate accounted for 48% of prescriptions, risedronate 43% and gastroresistant risedronate 9%.
**Results:** A high rate of poor compliance was observed: of all 230 patients on non-gastroresistant oral BPs, 56% did not follow all the patient instructions. Of these, 19% ate food before taking the treatment and for those who did not, 14% did not meet the 30-min fasting time. In total, the fasting conditions were not followed by 30% of the patients. In addition, 28% of the patients took the treatment with mineral water (rich in calcium for more than 50%) and 32% of them took the treatment with or after other medications. 84% of the patients perceived their treatment positively, considering it as essential (57%) and easy to take (54%). The constraints linked to drug intake were spontaneously mentioned by 26% of patients. In 41% of cases, the 4 cardinal points were mentioned on the prescription.
**Conclusion:** The results of the LEONIE study show a high rate of poor compliance with the patient instructions which are essential for a good absorption of oral BPs, with the risk of poor bioavailability of drugs and therefore reduced therapeutic efficacy. They strongly suggest that education of physicians, pharmacists and patients to this issue is mandatory. The use of gastro-resistant oral forms may also be of interest with the objective of circumvent poor compliance to appropriate drug intake conditions.

## P398

### CAPILLAROSCOPIC PROFILE IN UNDIFFERENTIATED CONNECTIVE TISSUE DISEASES

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**Objective:** To describe microvascular damage in patients with undifferentiated connective tissue disease (UCTD).
**Methods:** It is an observational and descriptive study. We enrolled 70 patients who have clinical and serological manifestations of systemic autoimmune disease without fulfilling any of the existing classification criteria, which defines UCTD. Nailfold capillaroscopy was performed to all the patients. We identified demographic data, Raynaud phenomenon (RP) and microvascular abnormalities.
**Results:** Among the 70 patients with UCTD, 54 (77%) were female and the average age was 44 years old (range:16-70 y). 43 (61.4%) patients had RP. A scleroderma pattern was found in 11.4% (8/70) of patients. Non-specific capillaroscopic findings were observed in 86.04% of patients who have RP vs. 48% without RP (P=0.0006). There was significantly higher major capillary abnormalities in subjects with RP (72%) than in those without this latter (18.51%), (P=$10^{-5}$). However, there was no association between RP and minor capillary abnormalities.
**Conclusion:** Our study showed that RP is very common in the UCTD. In addition, RP seems to be related to nonspecific capillary abnormalities.

## P399

### OUR EXPERIENCE WITH TERIPARATIDE (FORSTEO) IN PATIENTS WITH SEVERE OSTEOPOROSIS

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**Objective:** Teriparatide is a recombinant human PTH containing 1-34 amino acid sequences of the natural PTH molecule. It is a unique anabolic drug indicated for the treatment of severe postmenopausal osteoporosis in women - initially untreated, as well as with an insufficient response from

the current treatment, as well as in men with idiopathic osteoporosis and androgen deficiency. It is also indicated for the treatment of glucocorticoid induced osteoporosis (GCS) induced osteoporosis for both sexes.

**Methods:** There were 12 female patients aged 65-82 y, of which 8 with 2-4 vertebral fractures, in which the treatment with teriparatide is primary and 4 patients with severe osteoporosis with insufficient response to the current treatment - worsened indicators, in whom treatment is after 2 previous preparations. Mean baseline BMD T-score in the group with vertebral fractures BMD T-score - 3.91 SD, and in the group without fractures - BMD T-score - 3.89 SD. Patient observation period 36 months, including 18 months of treatment with teriparatide and investigating period of 18 months.

**Results**: No deterioration was observed in any patient - BMD T-score - 2.16 SD in the group with vertebral fractures, and BMD T-score - 1.92 SD in the group without vertebral fractures, in addition, in the control DXA after another 18 months was there was a mean improvement in scores of 0.3 in the first group and 0.24 in the second group of patients, respectively. Pain assessment with the VAS index was significantly affected after the end of teriparatide treatment - baseline levels of 92 and 85 mm, respectively, in both groups, and 36 and 32 mm, respectively, at the end of treatment with permanent retention and thereafter.

**Conclusion:** Treatment with teriparatide is the tool of choice for severe osteoporosis in the absence of contraindications for it with a powerful anabolic effect that lasts permanently over time, ensuring a high quality of life for our patients and indirectly reducing mortality in them.

## P400
### MANAGEMENT OF BISPHOSPHONATE (BP) RELATED ATYPICAL FEMORAL FRACTURE (AFF)

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Case report: A 72 years old female had a fall resulting in left neck of femur fracture. She had alendronic acid 70 mg once weekly for 6 y and was on a drug holiday for a year when she broke her left hip. The fracture had radiological features suggestive of BP related AFF (Fig 1), and It was repaired with intramedullary nail (IMN). DXA scan showed that the overall lumbar spine T-score was -2.8, and at L3, T-score was - 4.2. Having fractured in a drug holiday, and with DXA evidence of osteoporosis she was restarted on alendronic acid after a total of 20 months of drug holiday. Four years later, while on alendronic acid, she sustained a twisting injury to her right leg and experienced right hip pain for 3 months. X-ray was suggestive of healing bisphosphonate related right femur AFF (Fig 2). The BP was stopped and she was treated conservatively.

Discussion: AFF is a rare side effect of BP. An AFF is often complicated by delayed or nonunion. Patients with unilateral AFF are likely to have a contralateral AFF within a year.

To prevent AFF, patients should be calcium and vit D replete and the therapy duration should be regularly reassessed. Patients should have drug holidays when indicated. If patients develop thigh or groin pain they should have an XR of the femur. And patients who sustain an AFF should have an XR of the other femur.

Treatment: Discontinuation of the BP is essential. For complete AFF, an orthopaedic intervention is needed. For incomplete AFF, conservative management is the first step. Prophylactic nailing can be considered for patients with pain or those who did not respond to 3 months of conservative management. Teriparatide can be considered for AFF which do not heal however more evidence is needed. There is no place for denosumab in management of osteoporosis after BP related AFF. Also there is no clear evidence to whether antiresorptive measures can be retried after a certain period. There is a need for research to develop evidence based recommendations for treatment of bisphosphonate related AFF.
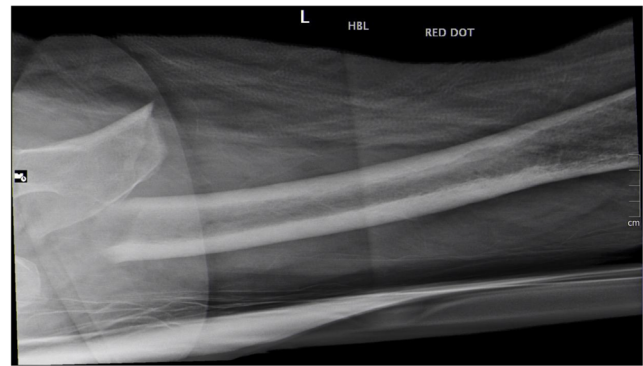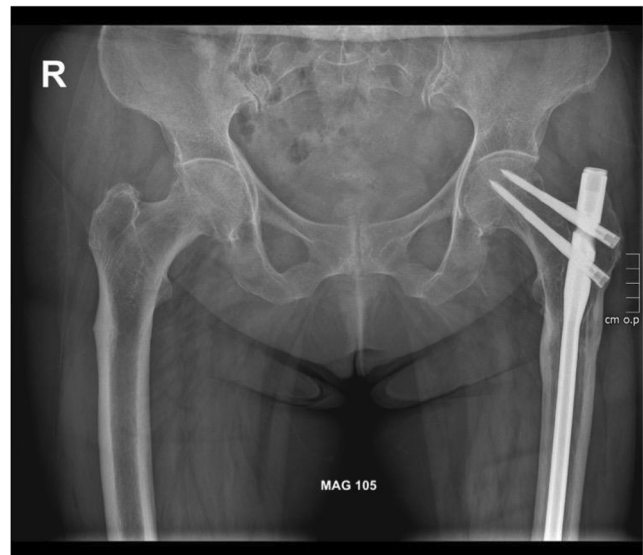


Figure 1.



Figure 2.

## P401
### EXPLORING SHARED PATHOGENESIS OF OSTEOARTHRITIS AND METABOLIC SYNDROME BY BIOINFORMATIC APPROACH

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**Objective:** Although increasing evidence has supported the close linkage between osteoarthritis (OA) and metabolic syndrome (MS), the interrelational mechanisms remain to be fully elucidated [1]. The aim of this study is to explore the shared pathological processes of OA and MS.

**Methods:** The gene expression profiles of OA and MS were retrieved from the Gene Expression Omnibus (GEO) database. The genes in the key module of MS were identified by weighted gene coexpression network analysis (WGCNA). The differentially expressed genes (DEGs) in MS were then intersected with genes in the key modules to obtain hub genes for MS. Next, the potential functions and pathways of hub genes were detected through the Gene Ontology (GO) and Kyoto Encyclopedia of Gene and Genome (KEGG) pathway enrichment analyses. Finally, single sample gene set enrichment analysis (ssGSEA) was operated to calculate the enrichment score of the harvested KEGG pathways in the control and OA patient samples.

**Results:** 51 modules were detected through the dynamic tree cutting method, among which the skyblue module (R=0.48, P=0.007) and indianred4 module (R=0.4, P=0.03) were positively correlated with clinical traits of MS. Besides, 372 DEGs were screened between the control and MS patient samples with 195 upregulated and 177 downregulated genes. The result of Venn analysis suggested that 61 hub genes related to MS were identified as hub genes by overlapping the 372 DEGs and 212 genes in the key module (Figure 2). The KEGG result highlighted that the hub genes were mainly concentrated on platelet activation, complement and coagulation cascades, and hematopoietic cell lineage. According to the selected enriched pathways analyzed by the KEGG algorithm, we uncovered that the pathways of arachidonic acid metabolism, fatty acid metabolism and platelet activation play a vital role in the pathogenesis of OA (Figure 3).

**Conclusion:** Our work identified potential common pathogenesis of OA and MS. These shared pathways might provide a novel idea for further mechanistic studies in comorbidity between OA and MS. Further studies will focus on identifying and validating hub genes as potential target for both diagnosis and treatment of OA and MS.

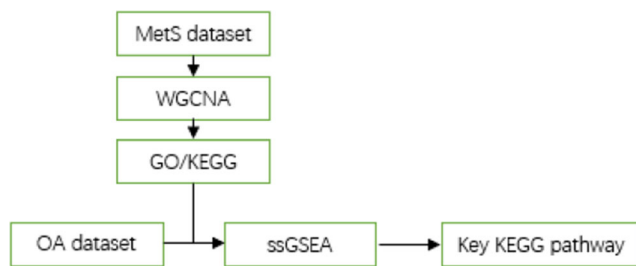**Reference:** 1. Valdes, AM. Osteoarthritis Cartilage 2020;28:7.
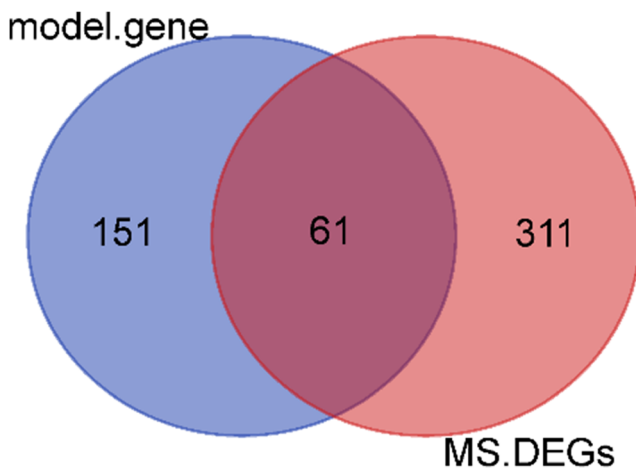


Figure 1. Workflow of this study.



Figure 2. Venn diagram of the overlap between DEGs (right circle) and key module genes (left circle).
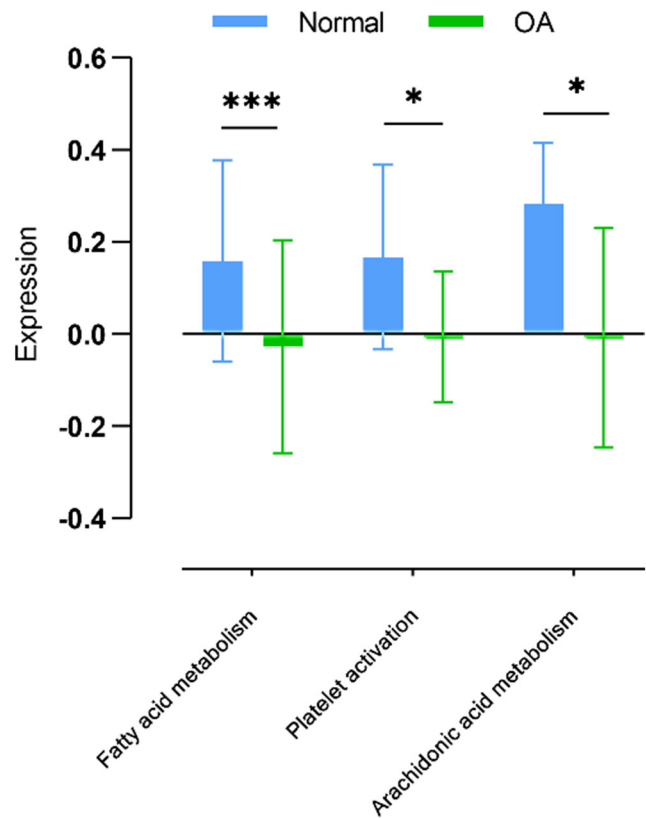


Figure 3. Differentiated expression of KEGG pathways in normal and OA samples.

**P402**

**MONTHLY CALCIFEDIOL 0.266 MG SOFT CAPSULES ARE MORE EFFICCIENT AND PREDICTABLE THAN MONTHLY CHOLECALCIFEROL 25000 IU: RESULTS FROM A 12-MONTH RANDOMISED CLINICAL TRIAL**

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**Objective:** To assess the efficacy and safety of long-term treatment with monthly calcifediol 0.266 mg soft capsules compared to monthly cholecalciferol 25000 IU in vitamin D deficient postmenopausal women.

**Methods:** This was a phase III-IV, double blind, randomised, controlled, multicentre superiority clinical trial. Postmenopausal women (25(OH)D<20 ng/mL) were randomised to three arms: Group A1) monthly calcifediol 0.266 mg for 12 months; Group A2) monthly calcifediol 0.266 mg for 4 months followed by placebo for 8 months; and Group B) monthly cholecalciferol 25000 IU for 12 months.

**Results:** 170 postmenopausal women were included in the PP population, with mean basal 25(OH)D levels of 12.9±3.9 ng/mL. The primary endpoint (at month 4) was previously reported. At month 12, the increments of 25(OH)D levels per microgram of drug administered represented an approximately 3.2 higher potency of calcifediol over cholecalciferol (p<0.0001). When patients were divided into two groups according to basal levels, the potency of calcifediol was 2.3 and 3.5 times higher than cholecalciferol in subjects with basal 25(OH)D levels <10 ng/mL and between 10-20 ng/mL, respectively. This difference in potency was due

to fairly stable increments in calcifediol group, regardless of baseline levels, but a different increment depending on basal 25(OH)D levels in cholecalciferol group. After 4 months, a steady state was observed in 25(OH)D levels in both calcifediol (Group A1) and cholecalciferol groups. 25(OH)D levels of Group A2 reverted to baseline by month 12.
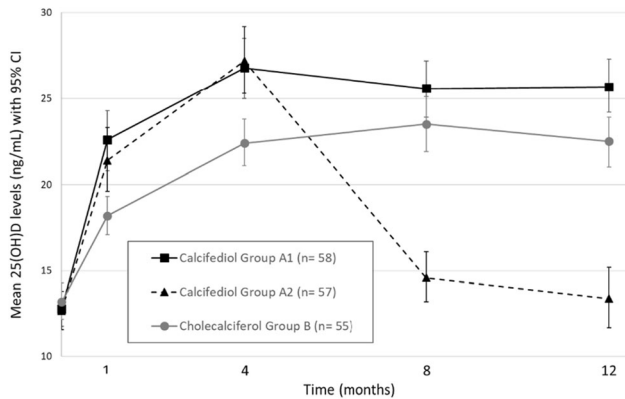


Figure 1. Mean 25(OH)D levels (ng/mL) per treatment group (PP population)

After 12 months, the maximum 25(OH)D levels reached in any of the study groups were far from the levels considered pathologic.

**Conclusion:** Monthly calcifediol is more potent and raises 25(OH)D levels faster and in a more predictable way than cholecalciferol. Maintained treatment with calcifediol has proven to be effective and safe, reaching a steady state. Its maintenance is necessary to avoid returning to basal levels.

## P403

### RELATIONSHIP BETWEEN THE FUNCTIONALITY OF WOMEN'S KNEES WITH OSTEOARTHROSIS SUBMITTED TO A PHYSICAL EXERCISE PROGRAM AND THE VARIATION OF THE CTX-II BIOMARKER FOR DEGRADATION OF ARTICULAR CARTILAGE

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**Objective:** To evaluate the serum levels of the CTX-II biomarker for cartilage degradation and joint function in women with knee OA undergoing a planned practice of resisted physical exercises to strengthen the knee muscles.

**Methods:** 29 women with knee OA, older than 50 y, were included in the study. They underwent an intervention in the form of a program of a planned exercise practice for strengthening the knee extensor and flexor muscles for a period of 8 weeks. Before and after the end of the program, the blood serum level of the CTX-II biomarker was analyzed, as well as the WOMAC questionnaire and a sociodemographic and health questionnaire.

**Results:** There was a reduction in pain, stiffness and pre-intervention physical function (p<0.001), with a mean magnitude of -5.52±2.59 points (43%), -2.03±1.12 points (41%) and -18.21±8.64 points (43%), respectively. Regarding the CTX-II outcome, the mean magnitude of 0.005 ±0.180 ng/mL (2%) increase from pre-post-intervention was not sufficient to be considered statistically significant (p=0.991) maintenance of their concentrations. In order to verify the existence of associations between the WOMAC domains and the CTX-II concentrations, Spearman's correlation tests were performed, where no significant correlations were observed when compared to the pain score (p=0.724), stiffness (p=0.107) and the physical function (p=0.296) at the pre-intervention with the CTX-II concentration at the same time.

**Conclusion:** Although there was an improvement in pain, stiffness and functionality after the intervention to strengthen knee flexors and extensors, the same did not occur with CTX-II concentrations that remained unchanged. Thus, there is not always an increase in joint degradation in women with knee OA when submitted to resisted exercises for quadriceps and hamstrings.

## P404

### THE SUPERIORITY OF DANCE IN IMPROVING JOINT FUNCTION IN LADIES WITH KNEE OSTEOARTHRITIS

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**Objective:** To compare joint function among women with knee OA who participate in a monitored physical activity program of stretches and resistance exercises for senior citizens and among participants of a recreational dance group.

**Methods:** The study included 47 women with knee OA, older than 50 y. One group, containing 25 participants, was from women participating in a recreational dance group for the elderly; the other, a total of 22 women performed a program of physical activity monitored stretching and resistance exercises for the elderly. All were interviewed and answered a sociodemographic and health questionnaire; in the same way, the joint function was evaluated by the WOMAC questionnaire.

**Results:** The participants had similar sample characteristics regarding sociodemographic and health characteristics. The participants in the physical activity group had a higher score in the WOMAC questionnaire in relation to the dimensions of pain (p<0.001), as well as in stiffness (p<0.001) and physical function (p<0.001), when compared to those in the dance group.

**Conclusion:** These results demonstrate that women with knee OA who participate in a recreational dance group, when compared with groups, practice monitored physical activity of stretching and resistance exercises for the elderly, have less pain, less rigidity and better physical function knee.

## P405

### EFFECTS OF A 12-MONTH SUPERVISED EXERCISE INTERVENTION ON VERTEBRAL FRACTURE INCIDENCE IN PATIENTS WITH VERTEBRAL FRAGILITY FRACTURE AND PATIENTS WITH A HIGH RISK OF FRACTURE

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**Objective:** Vertebral fractures are a significant independent risk for vertebral and non-vertebral fragility fractures. Subjects with an incident vertebral fragility fracture remain at imminent risk for further fragility fractures within the next twelve months. Since factors such as impaired mobility, previous falls, spinal curve deformity, and back extensor weakness contribute to this risk, therapeutic exercise is a non-pharmacological intervention that potentially reduces the risk of new onset fractures. This study aimed to assess the effects of 12-month supervised spinal exercises of proprioceptive extension and postural strengthening on vertebral fracture rates in patients at high risk and incident vertebral fragility fractures.

**Methods:** We evaluated women aged 50 y or older with osteoporosis, at least one incident vertebral fracture, and at high fracture risk. Clinical history, physical capabilities, BMD, and vertebral morphology were assessed at baseline, the 6th and 12th month. All participants conducted a 30-min supervised program of physical exercises twice a week for 3 weeks. After that, they were instructed to perform the exercises 5 d/week at home with periodic monthly supervision. The program consisted of static and dynamic movements to strengthen the spinal extensor muscles, increase mobility, and improve static and dynamic posture. Loads and volumes were calculated individually. Resistance bands and body weight were used. All patients received specific medical treatment for osteoporosis.

**Results:** 51 women 50-85 years old (mean 65.2, SD 6.6) with osteoporosis (T-score mean -2.9, SD 0.98) and at least one incident vertebral fracture or with a very high risk of fracture were evaluated, 48 participants completed the follow-up. At baseline, 62.7% of the patients presented some postural alteration, 47% a limited range of motion of joints (ROM), and 35% at least one fall in the last year. By the end of the follow-up, there were no new vertebral fractures nor worsening of existing ones. All patients showed improvements in posture, ROM, and fall frequency.

**Conclusion:** Our observations suggest that a twelve-month supervised exercise program is safe in populations at high risk for fracture when standard osteoporosis treatment is given. In addition to that, it can provide other benefits, such as better back mobility, and perhaps help reduce the risk of fractures. Controlled clinical trials designed to assess the contribution of an exercise-based intervention on fracture risk are foreseen.

## P406
### FRACTURE LIAISON SERVICE (FLS) IN MANAGING OSTEOPOROTIC FRACTURE IN TERTIARY HOSPITAL CENTRE, MALAYSIA

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**Objective:** Osteoporosis management following a fragility fracture has been poor across the globe. Leong JF et al (2018) demonstrated that only 19% of patients have been given antiosteoporotic medication following a fragility fracture at UKM Medical Centre (UKMMC). FLS is a multidisciplinary systemic approach to reduce subsequent fracture risk in patients with a recent fragility fracture which include appropriate medication treatments with monitoring of compliance and adherence. The aim of the study is to evaluate the effectiveness of FLS in improving management following fragility fracture in UKMMC.

**Methods:** It is a prospective study of patients with recent fragility fracture from January 2019 to December 2019. Data collected included demographic and drug prescriptions related to osteoporosis treatment. The data was then compared with previous study from January 2016 to December 2016 before implementation of FLS.

**Results:** 242 patients were identified with a mean age of 76 years old. Majority were females (78.9%) and highest incidence were the Chinese (63.2%) followed by Malays (25.6%) and Indians (11.2%). Fractures sustained were hip (38.2%), wrist (23.9%), spine (16.9%), other lower limbs (11.1%), other upper limbs (4.1%) and more than one fractures (5.4%). There was a significant increase in patients getting antiosteoporotic treatment from 19% to 72%. Supplement prescription have also improved from 54.6% to 91.3% for calcium and 43% to 90.1% for vitamin D. With FLS, the percentage of patients having BMD assessment have also improve from 18.6% to 54.5%. Patients adherence to antiosteoporotic medication was 83% for 6 months and 82.3% for 12 months.

**Conclusion:** FLS has proven to be effective in improving drug prescription and adherence among patients with recent fragility fractures. As a result, our hospital was the first hospital in Malaysia to be awarded the Silver Award by the International Osteoporosis Foundation for 'Capture the Fracture Best Practice'.

## P407
### BONE MINERAL DENSITY AND ITS RELATIONSHIP TO MUSCLE STRENGTH IN POSTMENOPAUSAL WOMEN WITH KNEE OSTEOARTHRITIS

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**Objective:** To evaluate the relationship between the state of BMD and muscle strength of the hand and in postmenopausal women with osteoarthritis (OA) of the knee joint.

**Methods:** The study included 50 female patients (mean age 64 (58.3; 66) y) with a diagnosis of knee joint OA established according to the ACR criteria (1991). The control group consisted of 50 women without clinical signs of OA (mean age 64 (60.3; 68) y).

**Results:** Osteopenic syndrome (OPS) in the study cohort was detected in 95 (95%) women. In the group of women with OA of the knee joint OPe in 24 (48%), OP in 23 (46%). In patients with OA of the knee joint, OPe was recorded significantly more often (p=0.029) than in the control group. OP, on the contrary, was more common in women without OA of the knee joint (p=0.024). The median index of carpal dynamometry in the group of patients with OA of the knee joint was 17.4 (16.8;18.4) kg, which was significantly lower than the same indicator in the control group-18.9 (17.6; 21.7) kg (p<0.001). It was found that in women with OA of the knee joint, the absolute value of muscle strength decreased in direct proportion to the decrease in BMD (p<0.001). Thus, in patients with normal BMD, this indicator was 20.0 (20.0; 20.1) kg, in women with OPe-18.2 (17.3;18.6) kg, in patients with OP-16.9 (16.4; 17.3) kg. According to the results of the correlation analysis, it was found that the indicators of carpal dynamometry significantly positively correlated with the T-criterion of the femoral neck and lumbar spine (r=0.450, p=0.001 and r=0.664, p<0.001, respectively). A similar relationship of muscle strength was established with the BMD of the femoral neck and lumbar spine (r=0.484, p<0.001 and r=0.678, p<0.001, respectively).

**Conclusion:** A decrease in BMD in women with OA was significantly associated with a significant decrease in muscle strength.

## P408
### INCIDENCE OF SUBSEQUENT FRACTURE FOLLOWING OSTEOPOROTIC FRACTURE IN A FRACTURE LIAISON SERVICE HOSPITAL: A PROSPECTIVE STUDY

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**Objective:** Patients who sustained an osteoporotic fracture are at increased risk of sustaining another fracture hence efforts are directed towards secondary fracture prevention. The aim of this study was to determine the incidence of subsequent fractures in patients with fragility fracture and to look at their general health outcomes in a tertiary hospital center with the availability of Fracture Liaison Service (FLS).

**Methods:** We analyzed our FLS registry and a prospective observational cohort study was performed from August 2018 to February 2019. These patients with osteoporotic fractures were identified the first 6 months and a minimum follow-up of one year to determine the risk of secondary fracture. The demographic data, quality of life and physical activities, and prevalence of antiosteoporotic medication were also identified.

**Results:** A total of 124 patients (31 males, 93 females) were identified. Majority sustained hip fractures (n=72, 58.1%), followed by wrist fracture (n=16, 12.9%), spine (n=14, 11.3%), other lower limb fracture (n=13, 10.4%) and other upper limb fractures (n=9, 7.3%). The incidence of subsequent fracture was 3.2% (n=4) within one year. The mortality rate was 18.2% (n=31). During the study period, Patients were prescribed with calcium (n=114, 91.9%), vitamin D (n=115, 91.9%) and antiosteoporotic drugs (n=100, 80.6%). Katz ADL score showed that patients with conservative treatment were not be able to get full functional status after one year compared with those with surgical treatment (P<0.05).

**Conclusion:** Incidence of subsequent fracture following fragility fracture within one-year in our study was 3.2% which is comparative with other studies in a hospital with FLS. The mortality rate in fragility fracture patients was 18.2% and majority were hip fracture patients.

## P409

### BONE MINERAL DENSITY AND RISK FACTORS FOR OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN WITH KNEE OSTEOARTHRITIS

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**Objective:** To evaluate BMD and risk factors for osteoporosis (OP) in postmenopausal women with knee OA.

**Methods:** The study included 100 female patients aged 44-75 y, including 50 patients with OA of the knee joints and 50 comparable age women without OA. The survey established the presence of the following main risk factors for the development of OP: age 65 y and older, the presence of previous low-energy fractures, family history of OP, low weight (<57 kg) or low BMI (<20 kg/m$^2$), smoking.

**Results:** The value of the BMD and T-test in the femoral neck in patients without OA was significantly lower both in comparison with the indicators of patients with stage I–II and stage III–IV OA. Thus, the BMD in the femoral neck in women without OA was 0.712 (0.632; 0.764) g/cm$^2$, which corresponded to -2.40 (-2.70; -2.00) CO according to the T-criterion (p<0.001). The BMD of the indicated localization in patients with stage I–II OA was 0.889 (0.824; 0.943) g/cm$^2$ and corresponded to -1.75 (-2.27; -1.13) CO according to the T-criterion (p<0.001), in patients with stage III–IV – 0.913 (0.813; 1.02) g/cm$^2$ and -1.60 (-1.72; -1.3) CO according to the T-criterion (p=0.001). When comparing the BMD and T-test in the lumbar spine, no significant differences were found between the study groups (p>0.050). When analyzing the occurrence of a family history of osteoporosis, it was noted that this risk factor was registered with a higher frequency in women without OA and with OA of stage I–II (58.0 and 68.4%, respectively) compared to the same indicator in the group of patients with OA of stage III–IV (25.5%) (p=0.049 and p=0.345, respectively). The remaining risk factors for OP were found with a comparable frequency in all three groups of patients.

**Conclusion:** The presence of OA in postmenopausal women is associated with higher rates of BMD in the femoral neck.

## P410

### CERULOPLASMIN: A SURROGATE MARKER OF OSTEOPOROSIS

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**Objective:** Osteoporosis is a bone disorder and is currently a major global health issue. Ceruloplasmin (CP) is an acute phase reactant and antioxidant, characterized by ferroxidase activity and increases in inflammation. C-reactive protein (CRP), an acute phase protein belonging to pentraxin family of proteins. This study was designed to investigate the role of acute phase reactants CP and CRP in the screening of osteoporosis. This study aimed to evaluate the role of serum CP and CRP as biomarkers of osteoporosis.

**Method:** This study was conducted in the Bone Clinic and the biochemistry department of a tertiary care hospital. 120 participants were included in the study belonging to the age group of 50-80 y. Participants in the group were divided into two groups, group I comprising of patients with osteoporosis, and group II consisted of patients without osteoporosis (n=56) (control group) (n=64). Patients were classified into the two groups on the basis of BMD measurements using DXA scanning. CRP and serum CP levels were analyzed in blood samples by immunoturbidimetry.

**Results:** Serum CP levels were significantly higher in osteoporosis patients as compared to the control group. A significant positive correlation (r=0.92, p<0.05) was observed between higher serum levels of CP and higher levels of CRP in the osteoporosis patients. There was a significant difference in the CP levels of the osteoporosis group (68.4±7.2 mg/dl ) and the control group (37.3±4.9 mg/dl) (p<0.05). CRP levels also differed significantly among the osteoporosis patients (2.23±0.68 mg/dl) and the control participants (1.07±0.42 mg/dl) (p<0.05).

**Conclusion:** Our study demonstrates that measurement of serum CP levels has potential as a surrogate marker for patients with osteoporosis

## P411

### MORTALITY OUTCOME OF OSTEOPOROTIC HIP FRACTURE: OPERATIVE VS. NONOPERATIVE INTERVENTION

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**Objective:** Hip fractures are common in the elderly and the mortality rate of these patients have been well documented with a rate of approximately 10% and 30% at one month and one year respectively. The aim of this study is to compare the outcomes following hip fracture between those treated operatively and nonoperative management.

**Methods:** Demographic and clinical data of patients admitted to Hospital Canselor Tuanku Muhriz aged 60 and above with osteoporotic hip fractures from January-December 2019 were reviewed. The data on mortality and cause of death were collected retrospectively through the hospital electronic medical record and telephone interviews.

**Results:** A total of 112 patients were included in the study with a mean age of 76.9±8.9 (68.2% female, 31.8% male). The majority of patients were Chinese (68.2%) followed by Malays (21.8%) and Indians (9.2%). 50 patients were treated surgically and 62 were treated conservatively. The overall 1-y mortality rate following an osteoporotic hip fracture in 2019 was 17.0%. The 6-month and 1-y mortality were higher (15 and 25% respectively) in the nonoperative group. There were no deaths reported at month six while two patients (4%) died by the end of the first year in the operative group. The majority of patients treated conservatively were cited as unfit for surgery (66.2%). Other reasons for nonoperative treatment include personal choice (21.5%) and cost (10.8%). The most

common causes of death recorded in the nonoperative group were sepsis (33.3%), old age (20.0%) and renal failure (13.3%).

**Conclusion:** The overall mortality outcomes of hip fractures were lower in the operative group. The 1-y mortality rate in conservatively treated patients were similar to published data. Therefore, osteoporotic hip fracture patients should be advised to undergo surgical management to prevent further complications and patient should be counselled the risk if treated conservatively.

## P412

### OSTEOPOROSIS KNOWLEDGE AND AWARENESS AMONG MEDICAL STUDENTS IN MALAYSIA

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**Objective:** Osteoporosis is a prevalent health problem in an ageing population like Malaysia. Increasing the knowledge and awareness of osteoporosis is essential in efforts to decrease the incidence of osteoporosis. Hence, emphasis on this topic in the undergraduate medical curriculum is essential as medical students are the future frontliners in our healthcare system. Our aim is to assess osteoporosis knowledge and awareness among medical students in our institution.

**Methods:** A cross-sectional study was conducted among Year 4 medical students undergoing Orthopaedic rotation at Faculty of Medicine, Universiti Kebangsaan Malaysia. The students were divided into two groups. One group was assessed at the beginning of the rotation and the second group was assessed at the end of the rotation where an osteoporosis module was delivered. Assessment of knowledge and awareness of osteoporosis was completed using validated Osteoporosis Questionnaire(OPQ).

**Results:** A total of 72 Year 4 medical students were enrolled in our study. The mean total OPQ score was (14.4±4.6) Students who attended osteoporosis module were found to have significantly higher (p≤0.001) mean OPQ scores (16.7±3.4); as compared to the group of students at the start of rotation with mean score (10.7±3.9). Mean score was also analysed based on each component of OPQ. Students who completed the module performed better with mean score of general information (4.1±1.1), risk factors (6.2±1.1), consequences (3.3±1.2) and treatment of osteoporosis (3.2±1.2) compared to the other group with mean score of general information (3.2±1.2), risk factors (4.8±1.9), consequences (1.4±1.4) and treatment of osteoporosis (1.4±2.0). They were also able to provide more detailed description of osteoporosis, wider range of treatment options and more aware of disease complication than the other group.

**Conclusion:** The OPQ mean score of Year 4 medical students who had gone through the module was higher than those who had not. Osteoporosis modules can improve knowledge and awareness among medical students. The gap in osteoporosis knowledge was more pronounced in the domain of risk factors and consequences compared to general information and treatment of osteoporosis.

## P413

### IS PLASMA PARATHYROİD HORMONE RELATED PEPTIDE REALLY RELATED WİTH BONE MINERAL DENSITY IN EUGONADAL PROLACTINOMA PATIENTS?

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**Objective:** There are various hypotheses for the aetiology of osteoporosis in patients with prolactinoma, and the increased level of the parathyroid hormone-related peptide (PTHrP) is one of them.[1] This study aims to investigate the presence of increased PTHrP and its possible effects on BMD in premenopausal women and men with normal gonadal function by excluding the negative effect of prolactin on the gonadal system.

**Methods:** We enrolled in 29 eugonadal prolactinoma patients and 31 healthy individuals. Serum prolactin, gonadal steroids, TSH, fT3, fT4, calcium, phosphorus, albumin, PTH, alkaline phosphatase, 25OHvitaminD, 24-h urine calcium, PTHrP and BMD (lumbar spine, femur, radius) were measured from participants.

**Results:** Between the prolactinoma patients and the control group, there was no statistically significant difference in PTHrP levels (p=0.288). Both in the control group and the study group, the PTHrP levels were higher in men than in women (p<0.05). The relationship between the serum levels of PTHrP and BMD in g/cm$^2$ was evaluated, and no statistically significant relationship was observed (p=0.330 for the femur, p=0.389 for the lumbar vertebrae, for the radius: 0.938).

**Conclusion:** Contrary to studies in which the elevated level of PTHrP has been reported as one of the factors that play a role in the development of osteoporosis in patients with prolactinoma, no significant relationship found in this study. As this study is the first study claiming physiological PTHrP level differences between genders, further large-sampled studies needed to confirm this finding.

**Reference:** 1. Stiegler C, et al. J Bone Miner Res 1995;10:751.

## P414

### CLUSTER ANALYSIS OF PATIENT-REPORTED OUTCOME MEASURES OF ADULTS WITH X-LINKED HYPOPHOSPHATAEMIA

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**Objective:** To identify distinct subgroups of adults with X-linked hypophosphataemia (XLH) based on their patient-reported outcomes.

**Methods:** We used data from adults with XLH registered in RUDY, a UK rare diseases cohort study. We applied cluster analysis using the K-means method to 7 patient-reported outcome measures (PROMs): EQ5D-5L and SF-36 physical and mental component scores (PCS and MCS) as measures of quality of life (QoL), FACIT-F of fatigue, PainDETECT and SF-MPQ-2 of pain, PSQI of sleep quality, and HADS of anxiety and depression. Instruments' scores were standardised so that all variables would be comparable. The average silhouette and elbow method were used to determine the optimal number of clusters.

**Results:** 17 participants (76.5% females, median age 41 y) completed all seven PROMs at their first submission. Optimal number of clusters was two. The "higher-score" cluster included 11 participants reporting higher (better) mean QoL scores compared to the "lower-score" group (EQ5D-5L=0.817, PCS=45.40 and MCS=51.31, compared to 0.288, 19.54, and 43.44, respectively). They also reported better sleep quality (PSQI=7.64 compared to 12.67), less fatigue (FACIT-F=125.32 vs. 78.00), less pain (SF-MPQ-2=1.03 compared to 3.58), and lower likelihood of being categorised with neuropathic pain (PainDETECT=5.64 vs. 14.17) and depression (HADS=3.18 vs. 8.17). Anxiety was found to be similar between clusters (HADS=6.73 vs. 6.50).

**Conclusion:** This analysis shows that adults diagnosed with XLH report broadly heterogenous PROMs which, even with a limited sample size, allow them to be split into two very distinct subgroups, one with consistently better pain, sleep, fatigue, and depression than the other. Comparisons with other rare disease groups, other musculoskeletal conditions, and the general population would provide an important benchmark.

## P415

### RISK OF FRACTURES IN PATIENTS WITH OPPORTUNISTICALLY IDENTIFIED VERTEBRAL FRACTURES: AN OBSERVATIONAL COHORT STUDY

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**Objective:** To assess the risk of subsequent fractures in subjects with opportunistically identified vertebral fractures (VF) vs. subjects with no VF on CT scans performed as part of daily clinical practice.

**Methods:** This is an observational cohort study in 2000 men and women ≥50 y, undergoing a CT scan of the chest and/or abdomen in 2010-2011 at Holbæk Hospital, Denmark. The CT scans were reevaluated to identify prevalent VF in a process blinded to clinical information. Subjects were excluded if they had no or less than 1 year registry data available, if migrated before baseline (date of CT), or if treated with anti-osteoporosis medications in the year prior to baseline. Subjects with VF on the CT were matched on age and gender against those with no VF in a 1:2 ratio, to form the exposed (VF on CT) and comparator (no VF) cohorts. The cohorts were followed for up to 7 y in the Danish health registers. The primary outcome was the risk of any fracture (excluding face, skull and digits) from baseline until censored in the exposed vs the comparator cohort, evaluated by Cox proportional hazards regression analysis.

**Results:** Of the 2000 CT scans, 423 had at least one prevalent VF (21.2%), while 1577 had no visible VF. After exclusion and matching, 325 subjects were included in the exposed cohort (VF on CT) and 605 in the comparator cohort (no VF). Median age was 72 y in both cohorts and 54% were men. Mean follow-up was 2.3 and 3.48 y in the exposed and the comparator cohort, respectively, during which a total of 31 and 49 fractures were accrued. Incidence rates were 41.47 and 23.27 fractures per 1000 patient-years. The crude hazard ratio was 1.74 (1.11-2.73; p<0.05).

**Conclusion:** Subjects with opportunistically identified VF on CT scans performed as part of daily clinical practice and not treated with anti-osteoporosis medications face a significantly increased risk of subsequent fractures as compared to subjects with no VF. Identifying these individuals offers an opportunity to improve secondary fracture prevention.

## P417

### FAMILIAL ASSOCIATIONS IN BONE AS MEASURED BY PQCT, HR-PQCT AND DXA

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**Objective:** Bone microarchitecture, as well as BMD, contributes to fracture risk. Previous studies have reported familial associations in areal BMD (aBMD), but none have studied a combination of pQCT and DXA measures. The aim of this study was to explore parent-to-child associations in bone size, geometry, and microarchitecture using data collected from the Hertfordshire Cohort Study (HCS).

**Methods:** Data from three generations of community- dwelling HCS study participants were collapsed into parent-to-child pairs to maximise statistical power. All participants underwent pQCT (Stratec XCT2000L), HR-pQCT (XTreme I, Scanco), and DXA (iDXA, GE-Lunar) (hip, spine) scans. Images of the non-dominant tibia were obtained from pQCT and HR-pQCT. Due to lack of clustering within family lines, linear regression was used to explore associations between parent-to-child bone parameters, adjusting for age and sex of parent and child, and child's social class and height. Results are presented as β (95% confidence interval).

**Results:** Parents (n=61) had a mean age of 69 (range 49-88) years and 74% (n=45) were women. Children (n=64) had a mean age of 42 (range 18-65) years and 72% (n=46) were women. Positive parent-to-child associations were found between tibial total volumetric BMD (vBMD, mg/cm$^3$) at the 4% slice (0.47 (0.15,0.79)), and tibial cortical area (mm$^2$), cortical thickness (mm) and total area (mm$^2$) at the 38% slice ((0.52 (0.24,0.81), (0.37 (0.10,0.64) and (0.30 (0.01,0.60) respectively) obtained from pQCT scans. Positive parent-to-child associations were also observed for tibial trabecular vBMD (mg/cm$^3$), tibial trabecular number (mm$^{-1}$) and tibial trabecular thickness (mm) ((0.49 (0.11,0.88), (0.28 (0.01,0.54) and (0.32 (0.01, 0.63) respectively) obtained from HR-pQCT scans. These findings are consistent with iDXA-measured aBMD, with positive parent-to-child associations in BMD (g/cm$^2$) observed at the total hip and lumbar spine ((0.41 (0.13,0.70)) and (0.47 (0.26,0.69), respectively).

**Conclusion:** This is the first study using pQCT, HR-pQCT, and iDXA imaging in parents and children. Our results demonstrated a familial association in vBMD, likely due to associations in trabecular microarchitecture and cortical bone parameters. These results provide further evidence of familial associations in bone size, strength, and geometry.

## P418

### PREVALENCE OF FRAGILITY FRACTURES IN PRIMARY CARE IN SPAIN: FINAL RESULTS OF THE PREFRAOS STUDY

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**Objective:** Some studies suggest underdiagnosis and inadequate treatment of osteoporosis (OP) among elderly subjects. Recent data on the prevalence of fragility fractures (FF) in this population is lacking. The objectives of this study were 1) to estimate the prevalence of FF among subjects ≥70 years old seen in Spanish primary care (PC) and 2) to describe the main OP characteristics and management of subjects with at least one FF.

**Methods**: This retrospective, observational study was conducted in Spanish PC centers and comprised two phases (A and B). Phase A included all women and men ≥70 years old listed in the investigator´s medical records from November 2018-March 2020. Phase B included subjects with a recorded FF and prior consultation at the center for any reason. The main outcomes were the prevalence of FF and the prevalence by geographic regions. Only the results of Phase A are presented.

**Results:** 30 PC centers across 14 Spanish Regions participated. In Phase A, 44,062 medical records were reviewed, 20.2% (8,904) were subjects ≥70 years old. The majority of these eligible subjects were women (5,350/

8,904 [60.1%]). The prevalence of FF is summarized in Table 1. Between regions, Murcia had the highest and Galicia the lowest prevalence.

**Conclusion:** This study showed the high prevalence of FF in subjects ≥70 years old, especially in women (2-3-fold more prevalent in relation to men), in the Spanish PC setting and vertebral fracture as the most common fracture. These results highlight the need to improve the risk assessment in elderly subjects.

**Disclosures:** DML: personal fees from Amgen, Lilly, Novartis, Ferrer, Rubió and Italfarmaco. JCB: personal fees from AstraZeneca, Esteve, Boehringer Ingelheim, Bayer, Abbott, Almirall, Amgen, Chiessi, FAES, Grunenthal, GSK, Lilly, Menarini, MSD, Pfizer, Recordatti, Rovi, Servier; MG: personal fees from Amgen, Stada, Rubió, Grünenthal; RMP: fees from Amgen, UCB, Stada, Angelini, Gebro; FV: personal fees from Pfizer, Grünenthal, MSD, Amgen, GSK, Lilly, Bristol-Myers Squibb, Servier, P&G Pharmaceuticals, Novartis, Almirall, Sanofi, Mundipharma; MB and LC: Amgen employees.

Table 1. Prevalence of fragility fractures in subjects aged ≥ 70 years.

| | Women (N=5,350) | Men (N=3,554) | Overall (N=8,904) |
|---|---|---|---|
| **Any fragility fracture, n (%)** | 1,291 (24.1) | 285 (8.0) | 1,576 (17.7) |
| Vertebral | 367 (6.9) | 90 (2.5) | 457 (5.1) |
| Wrist/forearm | 284 (5.3) | 56 (1.6) | 340 (3.8) |
| Hip/femur | 266 (5.0) | 68 (1.9) | 334 (3.8) |
| Humerus | 185 (3.5) | 32 (0.9) | 217 (2.4) |

## P419

### A STUDY TO EVALUATE THE ASSOCIATION OF MAGNESIUM LEVELS WITH HAND GRIP STRENGTH IN GERIATRIC PATIENTS WITH HIP FRACTURE

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**Objective:** Magnesium, is a macronutrient that plays a key role in several cellular processes. It is an essential mineral for bone metabolism. Not much is known about the association of magnesium and the risk of hip fractures in the Asian population. In this case-control study, we evaluate the relationship between serum magnesium level and the risk of incident hip fracture. The purpose of this study was to investigate the association between magnesium and hand grip strength in hip fracture risk in the geriatric population (age >65 y) residing in north India.

**Methods:** 75 patients with hip fracture (Group I) and a similar number of controls (Group II) were enrolled in the study. Samples were analyzed for serum levels of magnesium, 25 hydroxyvitamin D, alkaline phosphatase, calcium, and phosphate by immunoassay. The hand grip strength of study subjects was measured using a dynamometer. Correlation between magnesium levels and hand grip strength was analyzed in the study population.

**Results:** Among the 75 subjects, 36 were men and 39 were women. The mean age of hip fracture cases was 63.7±8.4 y which was comparable in men and women. Hypomagnesemia was observed in the hip fracture group (1.43±2.36 mg/dl) whereas magnesium level in the control group was normal (2.35±3.86 mg/dl) ($p<0.05$). 25 hydroxyvitamin D levels were significantly lower in cases (9.63±4.53 ng/ml) as compared to controls (24.38±5.27 ng/ml). The mean hand grip strength among the hip fracture group (18.31±4.69 kg) was significantly lower compared to that of the control group (31.54±6.12 kg). There was a significant positive correlation between magnesium levels and hand grip strength (r=0.74, $p<0.05$) in the hip fracture population.

**Conclusion:** Hand grip strength as measured by handheld dynamometer was significantly lower in geriatric hip fracture patients, and there is a

significant positive correlation between magnesium and hand grip strength.

## P420

### LACTOSE MALABORSORPTION AS AN ADDITIONAL RISK FACTOR OF OSTEOPOROSIS AND OSTEOPOROTIC FRACTURES IN PATIENTS WITH TYPE 1 DIABETES MELLITUS

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**Objective:** To assess the probability of osteoporotic fractures (POPF) and the degree of osteodeficiency in patients with type 1 diabetes mellitus (DM) with lactase malabsorption (LM).

**Methods:** The study included 34 patients with DM type 1, which were divided into 2 groups depending on the presence or absence of LM (16 patients were group I and 18 patients group II). To diagnose LM, we used a glycemic load test with lactose, a test for hydrogen content in exhaled air, and an analysis of stool acidity. BMD was assessed by DXA, and the POPF was calculated by the FRAX and QFracture tools. The statistical significance of differences in the studied parameters was evaluated by the nonparametric method (by $\chi^2$ criterion).

**Results:** The DXA results revealed a significant difference in the frequency of osteoporosis between the groups. In the first group 81.3% of patients had osteoporosis, while in the second group - 55.6% ($\chi^2$=4.864, df=1, p=0.027). POPF was equally high in both groups of patients when evaluated with FRAX, while there was a significant difference in POPF among both groups using QFracture - in 87,5% patients of the first group and 61.1% of patients of the second group had high or medium values of POPF ($\chi^2$=9.01, df=1, p=0.003). According to the QFracture algorithm, the cutoff values for the beginning of antiosteoporotic treatment were noted in 31.3% of the respondents of the first group, and the indicators that require BMD evaluation (the result is in the so-called "yellow zone") in 56.3%.

**Conclusion:** Patients with DM type 1 and LM are more likely to have osteoporosis and a significantly higher POPF compared to patients with isolated DM type 1. POPF does not always correspond to low BMD, indicating deterioration in bone quality. When deciding on the need for antiosteoporotic therapy of patients with DM type 1 and LM, it is necessary to take into account not only the results of DXA, but also the POPF assessed by the QFracture tool.

## P421

### PRE-OPERATIVE COGNITION IS INVERSELY CORRELATED WITH POST-OPERATIVE DELIRIUM IN ELDERLY PATIENTS WITH ACUTE HIP FRACTURE

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Objective: Delirium is common in post-operative hip fracture patients. It is associated with increased mortality, morbidity, length of stay and greater likelihood of institutionalization. Risk factors that predict greater likelihood of post-operative delirium include pre-operative dementia and cognitive impairment, presence of multiple co-morbidities, use of psychoactive medications. This study aimed: 1. To determine the relationship between pre-operative level of cognition and post-operative delirium in hip fracture patients; 2. To explore whether gender affects this relationship.

**Methods:** A retrospective, cross-sectional analysis was carried out on sequential patients with acute hip fracture attending a district general hospital between January 2019 and December 2019. Data was manually extracted from anonymized electronic health records. The 10 point Abbreviated mental test score (AMTS) was used to measure pre-operative cognitive function and the 4-point abbreviated test looking

at cognition, attention span, alertness and acute fluctuation in mental function (4-AT) delirium screening tool was used to screen for post-operative delirium. SPSS 27 software package was used for statistical analysis. Descriptive statistics were used to analyse baseline patient characteristics and spearman correlation co-efficient and linear regression analysis were used to measure correlation between pre-operative AMTS and post-operative levels of 4-AT.

**Results:** 310 patients 60 years and over were analysed - 83 males and 227 females. Mean age was 82.2 y ±8.48. There was a statistically significant negative correlation between pre-operative AMTS and post-operative 4-AT (r=-0.510; p<0.001). This effect persisted when gender was taken into account but was stronger in females than in males (r=-0.687; p<0.001) and (r=-0.260; p=0.02) respectively.

**Conclusion:** Pre-operative cognitive functioning negatively predicts post-operative delirium in elderly hip fracture patients. This effect is more marked in elderly hip fracture women than in the men.

## P422
## ESTABLISHMENT AND CHARACTERIZATION OF A PARATHYROID STEM CELL LINE

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**Objective:** To establish of an in vitro model of parathyroid stem cell line.
**Methods:** Sporadic parathyroid adenoma (PA) samples were collected at the Azienda Ospedaliera Università di Careggi, Florence, with informed consent approved by the local Ethical Committee. The subpopulations of parathyroid stem cells (PT-SCs) have been isolated from PA samples with the sphere-formation assay[1]. The stem cell phenotype was assessed by cellular assays/staining, by immunofluorescence analysis, and by analyzing the expression of embryonic stem cell (ESC) and parathyroid (PT) marker genes.
**Results:** From each sample collected, we have isolated and established three PT-SCs lines, called as PT351-/PT355- and PT374-SCs. The stem cell phenotype of PT-SCs lines was confirmed by evaluating the cells capacity to differentiate into osteoblasts and into adipocytes. We have also detected the expression of ESCs marker genes (i.e., POU5F1, Nanog, KLF4 and SOX2), of PT stem cell marker genes (i.e., CD117, GCM2, SALL4 and PPAR ), and we have detected the expression of CaSR and PTH, which are both recognized as PT marker genes. We have observed the protein expression of mesenchymal stem cell markers, and of FIL-A, PTH and CaSR by immunofluorescence assays. Our analyses have confirmed the parathyroid stem cell genotype of PT-SCs lines.
**Conclusion:** We have completely characterized and studied three PT-SCs lines at cellular and molecular level. Nowadays, we are also evaluating the expression levels of genes which are involved into parathyroid glands organogenesis (i.e., PAX1, Tbx1, Sox3, BMP4) and we are performing several analyses to investigate how these established cell lines respond to different calcium concentrations in terms of PTH release.
**Reference:** 1. Palmini G, et al. J Vis Exp 2016;116:58334.

## P423
## EXTRACORPOREAL SHOCK WAVE THERAPY FOR PAIN CAUSED BY ARTHROSIS OF THE HIP JOINT

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**Objective:** Extracorporeal shockwave therapy (ESWT) plays an irreplaceable role in pain relief due to the hyperstimulation of nerve endings. The signals generated by the shock wave are sent to the gray matter of the spinal cord and help to reduce the feeling of pain by increasing impulses in the thick myelin fibers, which causes a decrease in the sensitivity of nerve endings. This study aimed to study the efficacy of ESWT for pain in hip arthrosis.
**Methods:** The study involved 69 patients aged 45-71 y (mean age 49.6 ±6.8 y) with arthrosis of the hip joint, stages 3-4 (confirmed radiographically for at least 3 months), and with the severity of pain according to the visual analogue scale (VAS) 6.1±0.6. All individuals received 10 ESWT procedures every other day for 20 d on the hip joint, as well as trigger zones in the quadriceps femoris muscle, gluteal muscles. For the procedure, we used KIMATUR 500 (Germany) with a frequency of up to 22 Hz, an effective pressure of up to 5 bar, an energy flux density of up to $0.68$ mJ/mm$^2$, for one session up to 5000 strokes. The patients' assessments of the intensity of their pain syndrome were determined by the VAS at the beginning and at the end of the treatment and one month after its completion. The Roland-Morris scale was used to determine the degree of impairment.
**Results:** ESWT leads to a decrease in pain, according to the VAS, already in the second week of treatment. After 5 ESWT sessions, pain decreases according to the VAS by more than 1 point. Further ESWT sessions led to a decrease in the intensity of the pain syndrome on average to 3.1±0.4 points. One month after completion of treatment, the intensity of pain did not differ from the VAS parameters immediately after completion of the ESWT course (according to the Roland-Morris scale after treatment - 3.2 ±1.4; p<0.05). There was a decrease in joint pain on palpation (from 3.56 ±0.21 to 2.24±0.33 points, p<0.05) and joint circumference (from 41.11 ±3.38 to 40.05±3, 21 cm, p<0.05).
**Conclusion:** ESWT is a significant alternative in the treatment of hip arthrosis pain. It is important to note the typically high tolerance of the procedure and its general level of safety, which is its significant advantage over the traditionally used non-steroidal anti-inflammatory drugs. In the presence of contraindications to non-steroidal anti-inflammatory drugs, the role of ESWT in the conservative treatment of pain syndrome is irreplaceable.

## P424
## BACK PAIN AFTER SUFFERING FROM COVID-19 PNEUMONIA

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**Objective:** To study the effect of rubbing and kneading techniques for their differentiated use in the massage procedure in patients with various manifestations of dorsalgia in patients who have had pneumonia caused by COVID-19.
**Methods:** The study included 40 patients aged 50-60 y (23 women, 17 men) with dorsalgia syndrome with muscular-tonic, neurodystrophic and neurovascular manifestations. Patients were admitted for treatment no earlier than 2 months after pneumonia. The patients were randomized into 2 groups. Group 1 received massage procedures for the neck area and chest with the predominant use of rubbing techniques of classical massage. Group 2 received massage sessions of the same zones with the predominant use of kneading and vibration techniques. The duration of one procedure is 25-30 min, for a course of treatment 10 procedures. Patients underwent an assessment of hemodynamic parameters (heart rate, blood pressure), rheovasography (RVG). The severity of pain was assessed by the VAS. The studies were carried out before and after the course of treatment and once during the second or third massage procedure. In the statistical analysis of the results obtained, the nonparametric Wilcoxon test was used (the differences are significant at p≤0.05).
**Results:** At admission, the patients had complaints of chest pain of varying intensity and character (according to VAS 4.3±0.4 points), dyspnea

according to the MRS scale averaged 1.9±0.2. The patients showed limited movement in the thoracic spine. Examination revealed the smoothness of the cervical lordosis, tension of the paravertebral muscles, tenderness on palpation of the sternum. In 10% of patients, neurovascular disorders were observed in the form of pastiness, pallor, cyanosis of the skin in the chest area. Rheographic studies revealed changes in peripheral circulation in the form of a decrease in blood flow intensity, a pathological shape of the curve, indicating a decrease in blood filling, an increase in tone and a decrease in the elasticity of peripheral vessels in the upper extremities. All patients tolerated massage procedures well, noting a decrease in pain intensity (according to VAS from 4 to 3 points) even after one session. Patients subjectively perceived the techniques from the rubbing group as an energetic effect, while the appearance of a more pronounced sensation of warmth and a surge of strength was noted than when using kneading techniques. Both methods had no significant effect on heart rate. It was revealed that the techniques of the group of rubbing, in contrast to the techniques of kneading, significantly increased the value of blood pressure (p≤0.01). According to RVG data, massage with kneading techniques in combination with vibration caused a significant increase in the intensity of blood circulation in the limb according to the rheographic index. In the group of patients who underwent kneading and massage, the intensity of back pain according to the VAS decreased to 2.4 ±0.3, dyspnea according to the MRS scale was 0.8±0.09.

**Conclusion:** Massage with kneading and vibration techniques had a predominant effect on the neuromuscular apparatus and peripheral circulation.

## P425

### PROTECTING JOINTS AND BONE DURING INFLAMMATION: THE ROLE OF THE CALCITONIN RECEPTOR IN COLLAGEN ANTIBODY-INDUCED ARTHRITIS

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**Objective**: Calcitonin (CT) has been characterized as a chondroprotective and bone sparing hormone. While pharmacological CT derived from salmon or eel has been used to treat compromised bone mass in osteoporosis, osteoarthritis, and rheumatoid arthritis (RA), data on endogenous CT signalling in RA is scarce. As CT exerts its physiological effects through the calcitonin receptor (CTR), we exposed CTR-deficient (Calcr$^{-/-}$) and wildtype (WT) mice to antibody-mediated arthritis and assessed joint inflammation and chondro-osseus remodeling.

**Methods:** Collagen II-antibody-induced arthritis (CAIA) was induced and boosted with lipopolysaccharide in WT and Calcr$^{-/-}$ mice, while control (CTRL) animals received phosphate-buffered saline. Animals were monitored daily over the course of 10 and 48 d employing the semiquantitative arthritis score. Joint inflammation, cartilage degradation, and bone integrity were assessed by histology, immunohistochemistry, gene expression analysis, and µCT.

**Results:** Arthritis was accompanied by systemic CT release and the CTR was abundantly expressed in the articular cartilage surface of WT CTRL and WT CAIA animals. Calcr$^{-/-}$ CAIA and WT CAIA mice developed severe arthritic phenotypes. Compared to WT CAIA animals, Calcr$^{-/-}$ CAIA mice demonstrated higher histological inflammation and cartilage degradation scores, accompanied by radiologically evident systemic bone loss and increased expression of markers for inflammation (Sphk, Il1b, Tgfb, Ccl2), immunomodulation (Cd14, Cd68), bone resorption (Acp5, Ctsk) and cartilage degradation (Mmp13), as well as suppressed collagen formation markers (Col1a1, Col2a1).

**Conclusion:** While pharmacological CT has been used to treat osteoporosis and bone erosions in RA, we hereby demonstrate for the first time the pivotal role of endogenous CTR signalling in experimental RA, to contain inflammation and maintain and restore bone integrity.

## P426

### BONE HEALTH IN PATIENTS WITH MULTIPLE SCLEROSIS: ANALYSIS OF BONE MINERAL DENSITY AND 3D-RECONSTRUCTION OF PROXIMAL FEMUR BY DXA

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**Objective:** Relapsing-remitting multiple sclerosis (RRMS) is an autoimmune demyelinating disease affecting 17-18/100000 Argentinians. Corticosteroid treatment increase bone-damaging and the rate of falls and fractures. The aim of our study was to evaluate bone health through bone mineral metabolism and BMD in RRMS-patients compared to healthy controls.

**Methods**: Observational, prospective and open study in 40 RRMS-patients aged 16-59 y and 40 matched controls (C). Serum levels of calcium, ionic calcium, phosphorus, magnesium, alkaline phosphatase, PTH, osteocalcin, β-CrossLaps and 25(OH)vitamin D were evaluated. BMD (g/cm$^2$) was measured by DXA on lumbar spine (LS), femoral neck (FN) and total hip (TH). 3D analysis was performed with 3D-Shaper software (Galgo Medical, Spain). A survey of physical activity, sun exposure and daily consumption was carried out. Shapiro-Wilk test and parametric or nonparametric tests were used. Data were expressed as mean±SD; p<0.05 was considered significant.

**Results:** No differences in BMD was observed between RRMS and C in all areas analyzed (LS: C 0.998±0.141 vs. RRMS 0.986±0.119, p>0.05; FN: C 0.817±0.123 vs. RRMS 0.794±0.140, p>0.05; TH: C 0.926±0.127 vs. RRMS 0.908±0.131, p>0.05). In addition, the 3D analysis of the hip showed no differences: sDens (mg/cm$^2$): C 161.8±22.2 vs. RRMS 161.0 ±24.3 p>0.05; trab vBMD (mg/cm$^3$): C 206.7±42.3 vs. RRMS 203.5 ±44.5 p>0.05). Patients with RRMS had lower serum levels of 25(OH)vitamin D and alkaline phosphatase (21.1±7.8 vs. 38.3±14.8 ng/ml and 84.6±36.9 vs. 136.3±51.7 U/L, p<0.001, respectively). RRMS-patients performed more physical activity (1.50±0.04 vs. 0.81 ±0.05 h/d, p<0.05). Daily consumption was low in both groups (500 mg Ca/d) and 70% of RRMS patients had inadequate sun exposure.

**Conclusion:** Lower vitamin D and alkaline phosphatase did not translate into lower BMD, partially due to greater physical activity in RRMS-patients.

## P427

### VERTEBRAL FRACTURES AND OSTEOPOROSIS FOLLOW-UP IN PATIENTS THAT UNDERWENT HIP FRAGILITY FRACTURE AT THE MEXICO NATIONAL INSTITUTE OF REHABILITATION IN 2018

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**Objective:** To determine the presence of vertebral fractures and osteoporosis follow-up in patients that underwent surgery for a hip fragility fracture in 2018 at Mexico National Institute of Rehabilitation.

**Methods:** A descriptive observational cross-sectional study was carried out, from registers of patients that underwent surgery for a hip fracture during 2018. Patients over 65 y of age were included if hip fracture was considered as a fragility fracture. Hospital registries were looked up to

identify spine radiographs. A telephone survey was done to update clinical information. Descriptive statistics were performed for all quantitative variables; statistical inferences were done through chi-squared test, and correlations through Pearson´s R. Statistical package SPSS 17 was used.

**Results:** A total of 205 patients were included, 80% female. The average age was 79.18 (±4.7) y; 184 patients were alive after a year of the incident fracture; 63.5% started on a pharmacologic treatment for osteoporosis. The most prevalent comorbidities were systemic arterial hypertension in 43%, diabetes in 30.24%. Mortality at 6 months after surgical treatment was 10.24% (only renal chronic insufficiency correlated p=0.003). Only 45.83% of patients had spine radiographs, from which vertebral fractures were present in 46%. The most frequent levels of involvement were T12 and L1.

**Conclusion:** Vertebral fractures had been previously reported in hip fracture patients with high prevalence. The lack of intentional search for this fractures condition undiagnosis, which delay the comprehensive and timely treatment of osteoporosis. In our context, only 45.83% of hip fractures were assessed for vertebral fractures. This results might show a lack of knowledge or adherence to clinical practice guidelines recommendations, and suggest the need to establish a secondary prevention program.

## P428

### FREQUENCY OF OSTEOPOROTIC HIP FRACTURE IN AN ALGERIAN HOSPITAL

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**Objective:** The hip fracture is the most serious complication of osteoporosis. It is a public health issue in elderly because of its frequency, severity and economic impact. We report the result of an 24 months investigation (May 2019-April2021). The aim of this study was to determine the frequency of osteoporotic hip fractures and identify the risk factors of osteoporosis and falls leading to these fractures.

**Methods:** Cross-sectional, prospective, descriptive study. Patients with spontaneous or secondary low trauma hip fractures during 24 months were included. Have been collected: patient characteristics, risk factors for osteoporosis and falls, type of treatment and length of hospital stay.

**Results:** 115 cases of hip fractures were recorded. We noted a female predominance (60%) with a sex ratio of 0.60, the average age is 78.65 ±11.71 y. The associated comorbidities are cardiovascular (56%), diabetes (32%), dysthyroidism (12%), and chronic renal failure (6%). The fracture mechanism is dominated by the fall (93%), it is most often a domestic accident: slipping (30%), stumbling (26%), ablution (11%), falling on the stairs (7%). The risk factors for osteoporosis identified are: age >70 y (80%), female sex (60%), low BMI (18%), sedentary lifestyle (17%), corticosteroid therapy 7%, and smoking (6.3%). The risk factors of fracture: visual disturbances (40%) neuromuscular disorders in 11, 9%, poor health (more than 3 chronic diseases) in 9% of patients. The average duration of hospitalization is 5.2±2.5 d. The treatment is surgical in 81.6%.

**Conclusion:** Through this study, we found that osteoporotic hip fracture is frequent. The osteoporosis risk factors identified were female sex, advanced age, corticosteroid therapy and sedentary lifestyle. Fall risk factors were dominated by visual disturbances and neuromuscular disorders.

## P429

### A CASE STUDY ON PREGNANCY ASSOCIATED OSTEOPOROSIS (PAO)

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Objective: To share my personal experience of PAO in order to raise awareness of this rare condition and prevent nondiagnosis.

Aims: To give a brief outline of the trauma of PAO, from initial problems to eventual diagnosis and treatment; To discuss the emotional and physical difficulties of caring for a baby while having PAO; To flag up specific symptoms of PAO as possible indicators.

As evidence, I will include my DXA scans which show 4 vertebral wedge fractures and my bone density measurements, which charts improvements and changes over 29 years, since the original diagnosis.

This presentation will be relevant not just for anyone interested in this rare form of osteoporosis, but also professionals involved in working with postnatal women.

Conclusion: I hope by shining a light on this rare condition, professionals will be able to identify symptoms of PAO, leading to an early diagnosis and prompt treatment.

## P430

### POST-MARKETING SAFETY SURVEILLANCE OF ANTI-OSTEOARTHRITIS DRUGS: A PROTOCOL FOR A SYSTEMATIC REVIEW OF PUBLISHED LITERATURE

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Recently, the safety of various anti-osteoarthritis medications was reassessed through systematic reviews and meta-analyses of phase III randomized placebo-controlled clinical trials (RCT). Despite the importance of such type of evidence, it remains limited and needs to be complemented by post-marketing safety surveillance data. The objective of this systematic literature review is to identify all the published post-marketing safety surveillance studies on pharmacological treatments in osteoarthritis (OA) patients, and to describe the characteristics and the main findings of these studies. The purpose is to provide insights on the state of post-marketing drug safety surveillance in OA, and to identify potential challenges in this setting.

This systematic review will be performed according to the methodological guidelines provided in the Cochrane handbook for systematic literature reviews, and will be reported following the PRISMA guidelines. The following bibliographic databases will be comprehensively searched, using detailed and highly sensitive search strategies: Medline (via Ovid), Cochrane Central Register of Controlled Trials (Ovid CENTRAL), Scopus and TOXLINE (via ProQuest). The main outcome of this research is any adverse event/effect or any safety issue reported in the included studies. As a systematic review not involving quantitative synthesis, the retrieved data will only be qualitatively synthetized.

This systematic review is expected to provide an overview of the number and characteristics (design, number of patients included, duration of follow-up, etc.) of post-marketing safety surveillance studies in OA patients, as well as on outcomes of these studies. Data from the current study will help better establishing the safety profile of currently used anti-OA medications.

The dissemination plan for this systematic literature review includes:
- A publication in first-line Journal in the field.
- A presentation during a dedicated session at the WCO 2022 in Berlin.
- A wide distribution to the IOF/ESCEO database.
- A post on the ESCEO website.

- A dissemination to the network of 260+ scientific and patients societies affiliated to the Committee of National Societies of the International Osteoporosis Foundation (IOF).
- An endorsement and a dissemination through the WHO Collaborating Center for Public Health Aspects of Musculoskeletal Health and Aging network.

PROSPERO Registration number: CRD42021227872

## P431

### SCREENING SARCOPENIA THROUGH SARC-F IN POSTMENOPAUSAL WOMEN: A STUDY FROM A GREEK SEMI-MOUNTAINOUS MUNICIPALITY

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**Objective:** Sarcopenia is a frequent, age-related muscle wasting, which requires proper screening and diagnosis. SARC-F has been proposed by EWGSOP2 as a screening tool to identify patients at risk of sarcopenia. Patients with sarcopenia are associated with several adverse outcomes and careful planning of the intervention strategies is important. The aim of this study is to explore the presence of sarcopenia through the use of the SARC-F in a Greek sample of postmenopausal women living in a broad semi-mountainous municipality across Greek mainland.
**Methods:** Consecutive women (154) visiting the Primary Healthcare Centers of Dirfies – Messapies, Evia, Greece between May and July 2020 were invited to participate in this cross-sectional study. Eligible women had to be over 60 years old and sign an informed consent form for the study. The risk of sarcopenia was determined through the Greek SARC-F questionnaire; where a score ≥4 is considered of high risk for having sarcopenia. A self-administered questionnaire, containing medical history and demographic data was also given to all participants. In addition, T-scores were obtained from heel scans using a Sahara Bone Sonometer. A logistic regression analysis was used in order to test its associated factors.
**Results:** The sample comprised 154 postmenopausal women with an average age of 69.4±7 y. The prevalence of women at high risk of sarcopenia was 22.1% (n=34). The findings of this study demonstrated that postmenopausal women with high risk of sarcopenia was positively associated with age (0.01-0.04; p<0.001), T-score (0.04-0.08; p=0.02), number of falls (0.00-0.18; p=0.04), BMI (0.00-0.25; p=0.02) and number of births (0.00-0.25; p=0.05).
**Conclusion:** The percentage rate of postmenopausal women at high risk of sarcopenia was 22.1%. More research is needed in order to clarify the precise association of specific characteristics of postmenopausal women with high risk of sarcopenia and other factors. The results highlight the importance of early detection of sarcopenia in postmenopausal women in order to develop effective preventive and intervention programmes.

## P432

### USING SOCIAL MEDIA AS A PATIENT EDUCATION TOOL: IS THERE A ROOM FOR BONE HEALTH EDUCATIONAL HUB?

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**Objective:** Social media not only has applications for teaching and learning, but also has the potential to allow the patients to communicate, collaborate and share information. Over the past year, and as a consequence to the COVID-19 pandemic, social media has become an integral communication method for the majority of our digitally connected society These offer tips, strategies and health services benefits for people concerned about or living with variable medical conditions. The information can also be of value for people who are caring for others or just looking into symptoms. This study aimed to assess the value of social media as social osteoporosis hub to support people and patient communities, provide updates on osteoporosis management and fracture prevention, available services, as well as combat misconceptions.
**Methods:** The Egyptian Academy of bone health and metabolic bone disease launched a social hub for bone health and fracture prevention patient education through online patient communication. This included different forms: video presentations, Wikis (online public forum featuring text and multimedia content that can be edited by users), microblogs (format which allows users to post a large number of brief messages or updates over a short period). The people perception toward the use of social media in bone health patient education was evaluated by analyzing the people interaction and their responses reflecting their attitude toward its benefits and risks involved.
**Results:** Two education videos and 3 educational posts were published in 2 community groups. Two Wikis and 12 microblogs were also launched on 2 Facebook pages. These sites have wide range of accessibility with 34,230 persons having access to pages. The osteoporosis microblogs and Wikis were liked by 3491 (10.2% of the community group population). The video recorded educational material were viewed by 1672 persons (4.88% of the accessible persons), 484 persons reacted to the educational work (28.95% of viewed persons), 27 positive comments or queries were received (1.61% of viewed persons), the posts and videos were shared by 55 persons (3.29% of viewed persons). One post was shared internationally by 3 international osteoporosis societies in other countries.
**Conclusion:** The results of this work indicate that social media can be a useful tool for patient education in bone health and fracture prevention. It is important to leverage social healthcare marketing platforms to educate the people, answer their queries and update them on matters related to their health conditions. People communities are likely using one or more social media tools to share information and discuss their health. Asserting the society's expertise has helped to protect people from faulty information. Interactive digital communication has a role in optimizing patients' health.

## P433

### HOW TO INITIATE AND DEVELOP FRACTURE LIAISON SERVICES: EXPERIENCE FROM BRAZIL RECOMMENDATIONS FROM THE IOF CAPTURE THE FRACTURE® FLS MENTORS IN BRAZIL

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**Objective:** IOF has developed a mentorship program to enable the implementation of Post-Fracture Care (PFC) coordination programs, such as Fracture Liaison Services (FLSs) worldwide. The program exchanges knowledge and skills by connecting experienced PFC program champions with any institutions willing to establish new FLS and improve the qualification of existing ones. The aim is to demonstrate the results obtained after one year of program and some recommendations on how to implement and improve the qualification of FLSs in Brazil.
**Methods:** The mentorship learning objectives included general principles of FLS, Quality Improvement and adult learning. A multidisciplinary team of mentors were selected from orthopedics and geriatrics by their experience in FLS. Before the online sessions, each mentor completed a needs assessment. Five online interactive webinars covered the learning

objectives and allowed the mentors to improve their training skills. Simultaneous translation was provided for the sessions with presentation in Portuguese. This was followed by monthly action meetings to support the mentors to create new FLS and improve others already existing in one year of the IOF Capture the Fracture® FLS Mentors in Brazil work.

**Results:** The premeeting assessment identified gaps including how many patients an FLS should expect to identify as well as variability in disciplines involved in the FLS. The ability to network was a high priority. The content, interactivity, technical support and communication were highly rated by the mentors. All the mentors completed the training with 100% attendance. After one year of operation the IOF Capture the Fracture FLS Mentors in Brazil helped to create and to implement 8 new FLS and actively participated in the improvement of 12 FLSs in their position on the Capture the Fracture Best Practices Map. Currently, Brazil has 40 FLSs on the Map of Best Practices, 6 gold, 8 silver, 7 bronze, 12 blue and 7 green stars.

**Conclusion:** The IOF Capture the Fracture FLS Mentorship program has been successfully implemented in Brazil and already led to FLSs getting started and becoming more effective. Future work is focused on improving the policy environment for FLS and providing resources and tools in local languages.

## P434
### EVALUATION OF BONE MINERAL DENSITY AND BONE TURNOVER MARKERS IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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**Objective:** Ankylosing spondylitis (AS) is a complex, potentially debilitating disease that is insidious in onset, progressing to deformity in spine over several years. Men are more often affected than women. Osteoporosis and vertebral fractures are now well recognized features in patients with advanced AS. The aim of this study was to compare BMD of lateral lumbar spine and hip in male patients with AS and control group.

**Methods:** 27 consecutive AS patients with a mean disease duration of 9.9 y and 23 age, height and weight-matched healthy controls were recruited for the study. The mean age of the AS patients was 39.31±12.13 and the mean age of the control group was 40.90±8.41. In both patients and control groups, BMD was evaluated for the lumbar spine and hip. Serum osteocalcin and urinary N-telopeptide (NTx) were measured as bone turnover markers in both patient and control groups.

**Results:** Osteoporosis was detected 1(4.3%) of control group and in 5(18.5%) of AS patients. The femoral neck and femur total T-scores, lateral lumbar 3 T-score values were significantly lower in AS patients compared with the control group (p=0.035 and p=0.03, p=0.001, successively). Osteocalcin and NTx levels were significantly higher in patients with AS compared with the control group (p<0.05).

**Conclusion:** The incidence of osteoporosis is high in AS patients compare control group. The monitoring of bone turnover markers may help to prognostic of development osteoporosis in AS patients. The risk of vertebral fractures can increase in AS patients with osteoporosis. The fractures of AS patients are atypic that may be caused morbidity and in some case mortality. The patients with AS must be assessed for osteoporosis and must be treated for osteoporosis, so severe complications such as fractures can be prevented in AS.

## P435
### QUALITY OF LIFE FOLLOWING ONE YEAR OF SUSTAINING HIP FRACTURE

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**Objective:** Living in an ageing country like Malaysia, higher incidence of elderly with osteoporosis are prone to sustaining hip fractures. The ability to be mobile and selfcare is important to them so as to ensure a good quality of living towards the final decades of life. Hip fractures may lead to detrimental effects to physical health of elderly patients which in turn results in disability and death. Hence, we aim to study health-related quality of life (HRQoL) and ambulatory status following hip fractures.

**Methods:** A cross-sectional study conducted among patients aged 60 years and older with osteoporotic hip fracture from 2018-2020 in Hospital Canselor Tuanku Muhriz, Malaysia. Patient reported HRQoL (5Q-5D-5L) was collected from patients upon discharge at 6 months and 12 months. Demographics, clinical data and ambulatory status was followed up and recorded.

**Results:** A total of 139 patients (99 females, 40 males) with mean age of 77.8 y (±8.0) were identified. Majority was of Chinese ethnicity (64.0%) and 46% of patients underwent hip surgery. The EQDL index increased from 0.19±0.37 to 0.48±0.32 at 6 months follow up and 0.57±0.35 at 12 months follow up. The mean EQ VAS score (perception of overall health) increased from 46.4±13.8 to 59.4±13.3 at 6 months and 65.5±15.7 at 12 months. Factors potentially associated with HRQoL at 12 months are the prefracture ambulatory status and surgery performed. Patients who received surgery reported to have lesser problems at all follow-ups, p<0.001 and p=0.001, respectively. 79.7% patients who underwent surgery were able to ambulate without requiring wheelchair at 6 months, while in nonoperative group there were only 37.3%. 29.7% of patients were ambulating independently at 12 months after surgery as compared to only 12.0% in those without surgery. 82% of the patients who had surgery returned to their prefracture ambulatory status at 12 months while 55.0% returned to their prefracture ambulation in nonoperative group.

**Conclusion:** Hip fracture has incurred a tremendous impact to one's life. Despite HRQoL improved over a period of 12 months, it did not fully return to prefracture state. Our study has shown that surgery may play a major role in returning a better quality of life following a hip fracture.

## P436
### PSYCHOLOGICAL STATUS OF PATIENTS SUFFERING FROM SYSTEMIC SCLEROSIS DEPENDING ON ACTIVITY, DURATION OF THE DISEASE AND AGE OF THE PATIENTS

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**Objective:** To study the correlations between some features of psychological status of systemic sclerosis (SS) patients and clinical variants of the disease.

**Methods:** There were 70 patients suffered from SS according to 2013 ACR/EULAR classification criteria. The patients were represented by women (94%) of average age=38±3.3 y with average disease duration=14±2.6 y. To carry out the psychological examination we used the method for the formalized assessment of neurotic manifestations (L.L. Dmitrieva, 1990) [1], developed on the basis of the MMPI questions bank in the Bekhterev's Psychoneurological Institute. The questionnaire consists of 39 statements that contain such signs of neurotic conditions as fatigue, sleep disturbances, hypochondriac fixation on unpleasant somatic

sensations, decreased mood, increased irritability, fears, anxiety, and selfdoubt. There are four scales: anxiety, depression, asthenia, and hypochondria, which are ranked according to a 10-point scale.

**Results:** The presence of neurotic disturbances was revealed in SS patients: the increase of anxiety (6.63±0.25 points), hypochondria (6.31±0.26) and asthenia (6.36±0.28 points) scales. Depression variated in the subclinical range (4.98±0.2). The main clinical manifestations of neurotic disorders were fatigue, emotional instability, anxiety and depressed mood.Particular attention was paid to the following clinical features of SS: degree of activity of the pathological process, duration of the disease, and age of the patients. In patients with 2nd degree of activity, there was a significant increase of the depression scores. In patients with the 3rd degree of disease activity, depression, asthenia and hypochondria come to be increased (p<0.05). Correlation analysis showed the direct moderate relationship between SS activity and the severity of asthenia, depression and anxiety. In patients with a disease duration of 5-10 y, a significant increase (p<0.01) of asthenia and depression scores was noted. A subsequent increase in the duration of the disease was accompanied by a significant increase in the average values of the scales of depression, anxiety and hypochondria (p<0.05). The correlation analysis indicates direct moderate relationship between the neurotic symptoms and SS duration. Also, the increase of hypochondria score showed direct correlation with age of SS patients. Thus, according the results of correlation analysis, one of the factors predisposing to the development of neurotic disorders in SS are the activity of the disease itself, the duration of the disease, and the age of the patients.

**Conclusion:** The data we obtained indicate that some features of the clinical condition are directly related to the development of neurotic symptoms of the disease, which can lead to the appearance of negative psychosocial consequences of the disease and, therefore, complicate the process of patient adaptation and making the coping process more difficult. The importance of assessment of the SS patients' emotional state should be recognized, it is necessary to take into account the patients' beliefs, their perception of the existing disease and related problems. If the psychosocial problems of patients are not adequately solved, this can lead to a decrease in compliance and to a decrease in the effectiveness of the therapy.

**Reference:** 1. Dmitrieva LL. Zh Nevropatol Psikhiatr Im S S Korsakova 1990;90:77.

## P437
### ADHERENCE TO ANTIOSTEOPOROTIC MEDICATION AFTER ONE YEAR FOLLOW-UP WITH FRACTURE LIAISON SERVICE IN TERTIARY UNIVERSITY HOSPITAL, MALAYSIA

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**Objective:** Adherence to medication for osteoporotic patients and those who are high risk of refracture has become a challenge as patients are required to take for long term. Fracture Liaison Service (FLS) which is a multidisciplinary approach has been implemented to ensure osteoporotic patients are on treatment and comply to their medications. Our objective is to investigate the compliance of antiosteoporosis medication, calcium and vitamin D supplementation among patients who are under our FLS.

**Methods:** Patients under the follow-up of Fracture Liaison Service from May 2019 to May 2020 taking their anti-osteoporotic medication such as bisphosphonate, denosumab, teriparatide and supplement of calcium and vitamin D were identified. Compliance on medication were evaluated after one year starting medication.

**Results:** A total of 139 patients were identified. After a year initiating antiosteoporotic treatment, 121 (87%) patients still comply taking their antiosteoporotic medication and 18 (13%) stopped taking the medication. Meanwhile, 127 (91%) patients continued taking both calcium supplement and vitamin D. Patients taking denosumab (85%) have shown better compliance of continuing their medication compared with those taking bisphosphonate (71%) and teriparatide (80%) after one year. The common reason for not continuing the medication was attributed to financial difficulties buying their medication, not necessary to take it because they feel well, transportation problem to collect medicine, loss to follow-up, doctor's decision to stop medication and too many medications to take everyday.

**Conclusion:** Patient education is the most important factor to make sure they comply with their treatment. Financial support and reduction in price of anti-osteoporotic mediation to make it affordable for patients will also increase the likelihood of patients to continue with their medication.

## P438
### INVESTIGATING THE RELATIONSHIP BETWEEN BMI AND BMD AS A POTENTIAL MEDIATOR TOWARDS FRACTURE RISK PREDICTION

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**Objective:** Decreased BMD and low BMI have long been known as significant predictors for fractures. In fact, the WHO-developed fracture risk assessment tool (FRAX) uses femoral neck BMD and BMI as input values to assess a person's 10-year probability of having a fracture. However, BMD and BMI are usually seen as independent predictors of a person's fracture risk, but several studies have indicated potential correlation between BMD and BMI. There have been speculations of a variety of factors such as fatty tissue deposition and bone adaptive remodeling, that cause persons with higher BMI to benefit from higher BMD and hence reduced fracture risk, although the exact mechanisms are not fully understood. Conversely, persons with lower BMI may suffer from the cascading effects of having lower BMD, and having less fatty deposits to protect from external impact. Hence, it is important to determine the possible relationship between BMI and BMD given the mutually reinforcing effects between these 2 variables.

**Methods:** For the purpose of this study, BMI and BMD data from 52 patients who were admitted to our Orthopedic department was collected. These patients had an average age of 74.5 y, and 50% of them were admitted due to hip-related fractures. Comprehensive BMD scans were performed, with the associated t-scores (measured in SD) being collected across hip and spine regions.

**Results:** Spearman rank-order correlation between BMI and BMD across different BMD components showed significant positive linear relationship between BMI and BMD components such as in the femur region [neck (r=0.339, p=0.013), trochanteric (r=0.381, p=0.005), intertrochanteric (r=0.358, p=0.009), total hip (r=0.367, p=0.007) and ward (r=0.344, p=0.012) and in the spine region L2 (r=0.321, p=0.019) and L3 (r=0.286, p=0.038)].

**Conclusion:** These results indicate strongly that persons with higher BMI are likely to have higher BMD values, thereby receiving additional protection from potential fractures.

## P439
### APPLICATION OF FRAX SCORE AND COMORBID HISTORY IN PREDICTING FRACTURES

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**Objective:** The FRAX is a tool that's used to evaluate the risk of fracture in patients. FRAX takes into consideration certain patients' history to calculate the score. However, FRAX does not take into consideration common diseases such as type 2 diabetes mellitus, hypertension, and dyslipidemia which have been found to be associated with fractures. In addition to that, medications associated with the diseases stated above have been associated with both an increase and decrease in fracture risk.

**Methods:** 82 patients aged above 50 years old who were admitted to the Orthopedic wards in Hospital Universiti Kebangsaan Malaysia for either osteoporotic or low-trauma fractures, or admitted for other diagnoses were taken for this study. Those admitted for other diagnoses must not have had a previous osteoporotic or low trauma fracture. The patient's age, gender, race, FRAX scores (without BMD), comorbid history and history of medications were recorded.

**Results:** There was a significant correlation between the major osteoporotic (rs=-0.393, n=66, p<0.05) and hip (rs=-0.374, n=66, p<0.05) FRAX score, and the fracture status of the patient. The mean of the FRAX score for both major osteoporotic and hip fracture were higher in those with fractures (20.80; 10.99) compared to those without (10.80; 4.36). However, there was no significant correlation between comorbid history and medication history, and fracture status.

**Conclusion:** The FRAX score can be used to predict the risk of secondary fracture. Contrary to researches that state type 2 diabetes mellitus, hypertension, dyslipidemia, and associated medicines are associated with fractures; this study discovered that there was no significant relationship between them and fracture status. This could be due to the fact that this study did not capture the duration of the comorbid and medications taken by the patients.

## P440
### RISK FACTORS ASSESSMENT OF PATIENTS OPERATED FOR OSTEOPOROTIC HIP FRACTURE
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**Objective:** To evaluate patients with osteoporotic hip fractures regarding the relationship among ambulation, risk factors for osteoporosis, mortality frequency and new fracture rates in the 6-month postoperative period

**Methods:** We have included in this study, a total of 105 patients, who were operated at Ege University Faculty of Medicine for osteoporotic hip fractures. Demographic data as well as presence of previous and accompanying fractures, ambulation status, comorbidities, menopause age, family history for osteoporosis and fractures, BMD, osteoporosis treatment and blood vitamin D levels were recorded. At the 6th month after the hip fracture, the patients were evaluated again in terms of mortality, new fractures and ambulation status.

**Results:** 25 of 105 patients had died in the first 6 months. 4% of deaths occurred during hospitalization, 24% in the first month after discharge, and 72% between 2-6 months. Control vertebral x-rays were obtained in 49 patients and osteoporotic vertebral fractures were detected in 89.8% of those. Ratio of immobile patients increased from 1.9% to 31.4%. According to single regression analysis, the relationships between age, smoking history, FRAX hip fracture risk and modified Charlson comorbidity index and mortality were found to be statistically significant. In the multiple regression analysis, the relationship between BMI and smoking history and mortality was found to be statistically significant.

**Conclusion:** Osteoporosis is a common disease that does not manifest itself until complications develop. Functional loss and mortality risk are high in patients with fractures. Therefore, patients should be identified and treated before fractures develop. In addition, if individuals with osteoporotic hip fractures are followed up in fracture liaison services, which

are becoming widespread worldwide, mortality and morbidity can be reduced.

## P441
### DEMOGRAPHIC AND DISESASE CHARACTERISTICS OF PATIENTS WITH OSTEOPOROTIC HIP FRACTURES
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**Objective:** Patients with hip fractures often have one or more risk factors for osteoporosis. This study aimed to assess the relationship of these risk factors as well as patient characteristics with patient outcomes after osteoporotic hip fractures.

**Methods:** Patient records of our university hospital were searched to identify cases of osteoporotic hip fractures that were admitted between 1 January-31 December 2017. Those subjects who could be reached by phone were include. Demographics, risk factors and ambulation status were questioned via phone calls. Clinical data were recorded from the patient files.

**Results:** 206 patients were reached by phone. Results are shown in Table. Of these patients, 75.7% were functionally independent before fracturing their hips and this ratio was found to decrease after the fracture to 53.8%.

**Conclusion:** Nearly half of our patients (46.2%) still need assistance or are wheelchair bound one year after the fracture. Elderly patients with femoral fractures have an increased risk for recurring falls and fractures which may increase their mortality and morbidity.

Table. Characteristics of patients with hip fracture (n:206)

| | |
|---|---|
| Female sex, n (%) | 146 (70.9%) |
| Age (mean±SD) | 79.3±11 |
| BMI, kg/m$^2$ (mean±SD) | 24.9±4.1 |
| Age at menopause (mean±SD) | 42.7±5.6 |
| Smoking, n (%) | 33 (16) |
| Drinks alcohol, n (%) | 13 (6.3) |
| Number of births (mean±SD) | 3.06±3.01 |
| Currently alive n (%) | 149 (72.3) |
| Right side femoral fracture, n (%) | 107 (51.9) |
| Right hand dominant, n (%) | 178 (86.4) |
| Surgically treated n (%) | 202 (98) |
| Days spent in hospital (mean±SD) | 6,4±3.2 |
| Previous known fragility fracture n (%) | 44 (21.3) |
| New fracture after hip fracture n (%) | 20 (9.7) |
| Concomitant fracture n (%) | 13 (6.3) |
| Parent with fracture n (%) | 5 (3) |
| Independent ambulation before fracture, n (%) | 166 (80.5) |
| Independent ambulation after fracture, n (%) | 111 (53.8) |

## P442
### DOES OSTEOPOROSIS TREATMENT AFFECT THE COURSE OF COVID-19 IN THE ELDERLY?
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**Objective:** In late 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) caused COVID-19 (coronavirus disease 2019) pandemic worldwide and still keeps spreading. Atypical course of COVID-19 could be seen in elderly. Osteoporosis, as a public health problem, reflects reduced BMD and increased risk of fracture. The probable effect of antiosteoporotic drugs on the immune system may lead to consider treatment changes for osteoporosis in elderly during COVID-19 pandemic. The aim of this study was to show the correlation between osteoporosis treatments and the prevalence and clinical course of COVID-19 [1-5].

**Methods:** A total of 828 individuals who were admitted to geriatric outpatient clinics in the last 2 y and receiving osteoporosis treatment were included in the study. Patients' age, sex, comorbidities, treatments for osteoporosis, treatment durations and COVID-19 evaluations were obtained from electronic file records. Symptomatology, diagnostic methods, PCR results, and radiological findings of CT scans of the patients who had COVID-19 were noted.

**Results:** In total, 141 (17.1%) of 828 patients were male and 687 (82.9%) were female. Median age was 78 (IQR: 10). Totally 52 (6.2%) of the patients had diagnosed with COVID-19. When patients were divided into 4 groups according to the osteoporosis treatment they received (alendronate, denosumab, teriparatide, iv (intravenous) zoledronic acid), there was no difference in terms of COVID-19 symptoms, PCR results, radiological findings and COVID-19 evaluations. Treatment durations are for alendronate 15 (10) months, for denosumab 14 (12) months, for teriparatide 15 (7.25) months, for iv zoledronic acid 17 (11) months. In zoledronic acid group, a significant difference was found between treatment durations and COVID-19 evaluation (p=0.024). Treatment changes were made in 56 (6.8%) patients during the COVID-19 pandemic, 3 (0.4%) patients were switched to alendronate, 41 (5%) patients to denosumab, 6 (0.7%) to teriparatide and 6 (0.7%) to iv zoledronic acid. There was no significant difference between treatment change and the presence of COVID-19 (p=0.559).

**Conclusion:** To the best of our knowledge, there is no clear evidence that osteoporosis treatment affects the course of COVID-19. In our study we could not find a relationship between the actual treatments used for osteoporosis and prevalence or course of COVID-19. So during COVID-19 outbreak, it is more crucial to emphasize the importance of the treatment continuity than changing modality for bone metabolism. Considering the burden of osteoporosis in the older population, the management of osteoporosis needs to be prioritized during COVID-19 pandemic.

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## P443
## BEWARE OF THE TOXIC POTENTIAL OF PHARMACEUTICAL VITAMIN D SUPPLEMENTS: A CROSS-SECTIONAL SURVEY FROM A TERTIARY CARE CENTRE

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**Objective:** The increased awareness about vitamin D deficiency provoked significant increase in supplementation. This study aims to determine the frequency, clinical features, and pharmacological factors of hypervitaminosis D in children.

**Methods:** A retrospective cross-sectional study was conducted. All children <18 y with 25-hydroxyvitamin D (25OHD) levels performed between January 1 to December 31, 2018 at AKUH Clinical Laboratory were evaluated. Medical records of children at AKUH with vitamin D level >50 ng/ml were reviewed for clinical features and pharmacological risk factors.

**Results:** A total of 118,149 subjects were tested for serum 25OHD level in 2018, out of which 16,316 (13.8%) were children. Of these, 16.6% (n=2720) were registered at AKUH for consultation. 22% (n=602) had serum 25OHD levels >50 ng/ml. The median age and 25OHD levels were 3.1 (17.93) y and 70.1(100) ng/ml with 57.3% (n=345) boys. Use of vitamin D supplementation was reported in 33.1% (n=197) and of these 97.9% (n=193) were prescribed by physicians. Megadoses were utilized by 34.17% (n=68) while rest had taken different combination in tablets/syrups form. In megadoses, 600,000 (44.1%, n=30) and 200,000 units (45.5%, n=31) vitamin D injections were commonly prescribed. The main indications for prescribing were aches/pains (25.8%, n=51), developmental delay (25.3%, n=50), and vitamin D deficiency (24.8%, n=49). The main symptoms of hypervitaminosis D or toxicity were abdominal pain (13.7%), and constipation (15.7%).

**Conclusion:** Vitamin D supplementation should be done cautiously in children as toxicity though rare but may happen and cause serious effects specially with frequent mega doses and prolonged supplementation.

## P444
## EFFECT OF DALCROZE EURHYTHMICS EXERCISE ON PHYSICAL FUNCTION AND MUSCLE IN SARCOPENIC OLDER ADULTS: THE SARCARE RANDOMIZED CONTROLLED TRIAL

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**Objective:** Most therapeutic interventions for sarcopenia currently under development focus on increasing muscle mass. Given the growing evidence pointing towards the key role of the central nervous system in sarcopenia, it can be hypothesized that specific interventions influencing this system may also exert a significant effect on physical function in sarcopenic elders. Dalcroze eurhythmics (DE) exercise has previously been shown to increase physical performances and reduce falls in older adults at high risk for falls [1], but also to modify central nervous system activity. The SARCARE trial was mainly designed to determine i) the effectiveness of a DE exercise intervention in improving physical function and reducing falls among sarcopenic older adults, and ii) whether exercise-related benefits are associated with changes at central level. Here we report the effects on physical function and muscle.

**Methods:** The SARCARE study (ISRCTN39600964) is a single-centre, single-blind, two-arm, randomized controlled trial, in which community-dwelling sarcopenic adults aged ≥65 y were randomized (1:1) to i) a DE exercise group (2x/week 1-h supervised group-based) or ii) a CONtrol group (no exercise), and assessed at baseline, 6- and 12-month. Both groups received also regular educational lectures on relevant topics for older adults. The primary outcome was change in Short Physical Performance Battery (SPPB) score at 12 months. Secondary outcomes included, among others, changes in muscle strength and mass (assessed by DXA), falls, cognition, and quality of life.

**Results:** Among 196 randomized participants (mean age, 75.2 y; 89% women), 171 (87%) completed the study. The adherence rate to the DE exercise intervention was 81%. At 12 months, physical function improved in the DE group compared to CON group (group*time interaction for SPPB score: 1.48, 95%CI 0.98 to 1.98; p<0.001). Significant

improvements were also found in the DE group on muscle strength (5x chair stand time and hand grip strength, p<0.01 for both) compared to CON group, while no effect was found on muscle mass (appendicular lean mass/height$^2$: -0.01, 95%CI -0.09 to 0.09; p=0.95).

**Conclusion:** A 12-month DE exercise program was effective in improving physical function and muscle strength in sarcopenic older adults, without change in muscle mass. Further analysis should help to clarify the mechanisms underlying the muscular benefits of DE training.

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## P445
### CROSS-CULTURAL ADAPTATION OF THE GREEK VERSION OF THE EXERCISE ADHERENCE RATING SCALE

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**Objective:** To adapt the Exercise Adherence Rating Scale (EARS) into Greek and evaluate its measurement properties, in community-dwelling older adults.

**Methods:** 23 older adults between 60-86 y, 14 women, 9 men; mean age of 71.2±6.98 y) were enrolled in this study. Permission for the cross-cultural adaptation was received from the developer of the EARS. Cross-cultural adaptation of the EARS was done based on Beaton guidelines (forward translation, synthesis, back translation, expert committee review, and pretesting). Participants were oriented on undertaking the prescribed home-based exercise program in the first session, and adherence behavior was assessed after 1 week, and finally reassessed after 2 weeks (test-retest reliability). Six weeks after the first assessment, they were invited again to full fill the EARS (responsiveness). The intraclass correlation coefficient (ICC2,1) and Cronbach's α were used to assess test-retest reliability and internal consistency. Receiver operating characteristic (ROC) curve was analyzed to identify cutoff score, sensitivity and specificity of EARS. Ethical approval was obtained from the University of Patras and written informed consent was obtained from each participant.

**Results:** The Greek version of the EARS questionnaire (EARS-GR) was translated without major difficulties. The forward and back translation revealed no content or language-related issues. Results show high internal consistency (Cronbach's α of 0.92) and excellent test-retest reliability (ICC=0.93, 95%CI=0.93-0.95) for 6-item adherence behavior. The area under the curve was 0.89 with 95%CI 0.77-1.00 at p=0.003. The cutoff score was found 17.5 with 87% sensitivity and 79% specificity.

**Conclusion:** The EARS has been cross-culturally adapted to the Greek language. The EARS-GR was comprehensible and reliable and may thus, be used across in clinical settings and research. Further studies are recommended to investigate other psychometric properties of the EARS-GR with a larger sample including various diseases.

## P446
### INFLUENCE OF INDIVIDUAL CHARACTERISTICS ON THE CONCENTRATION OF METHOTREXATE POLYGLUTAMATES IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Individual characteristics of patients with rheumatoid arthritis (RA) (such as age, gender, BMI, red blood cell volume) can influence the results of treatment with methotrexate (MTX). It has been established that in order to obtain a good and moderate therapeutic effect of MTX, it is necessary that the achieved level of polyglutamates (MTXPGs), measured in erythrocytes. This study aimed to evaluate the effect on the concentration of polyglutamates of methotrexate (MTXPGs) of individual characteristics of patients with RA.

**Methods:** The study included 60 patients with RA (26 men and 44 women) in accordance with ACR/EULAR 2010 criteria who have received at least 20 mg of MTX subcutaneously per week for at least 12 weeks. Older patients included 24 women over 55 years old and 7 men over 60 years old (group 1, n=31), the rest made up group 2 (n=29). Polyglutamates MTX with 2,3 and glutamic acid residues were measured in erythrocytes (RBCs) using tandem chromatography mass spectrometry.

**Results:** In group 1 patients, the concentration of MTXPG2, MTXPG3 and MTXPG4 was 9.0 [4.0; 8.3], 16.1 [9.0; 16.6], 24.7 [20.8; 30.2] nmol/l, in group 2, respectively 7.5 [4.1; 9.0], 16.0 [9.9; 20.0], 23.8 [17.5; 29.2] nmol/L. The differences were not statistically significant. The groups did not differ in the duration of MTX, single and cumulative doses of MTX, and the number of RBCs; in group 1, a good and moderate response to therapy was noted in 9 (29%), in group 2 - 19 (65%) responded to therapy, p=0.01. BMI in group 1 was 29±6 kg/m$^2$, in group 2 - 25±2 kg/m$^2$ (p=0.0064).The response to therapy did not differ between the groups. The average weekly dose of MTX per 1 m$^2$ of body surface was higher in group 2 (12.6±2.2 mg vs. 11.3±2 mg, p=0.02). A correlation was found between the level of MTXPG2 and BMI (Spearman's correlation coefficient 0.268).

**Conclusion:** The concentration of MTXPGs in groups of patients of different ages did not differ. The concentration of MTXPGs did not correlate with the total volume of erythrocytes. MTXPG2 level correlates with BMI.

## P447
### RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS) FOR THE DIAGNOSIS OF OSTEOPOROSIS IN PATIENTS WITH DIFFERENT BODY MASS INDEX

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**Objective:** To assess the diagnostic performance of radiofrequency echographic multispectrometry (REMS) at the femoral neck in women with different BMI against DXA as the reference, following previous studies at the lumbar spine that suggested strong diagnostic agreement for all BMI categories [1].

**Methods:** Six European centers participated in this study. Caucasian women aged 30-90 y, without walking impairment, referred for femoral DXA were enrolled. Informed consent was obtained. The patients underwent femoral neck DXA and REMS scans of the femoral neck using standard methodology. Reports were checked and cleaned according to the usual protocol [2]. Results were analysed grouping patients by BMI, as underweight (UW), normal weight (NW), and overweight/obese (OW). DXA and REMS T-score values were used to classify patients

as osteoporotic, osteopenic or healthy. The degree of correlation between DXA and REMS BMD values was quantified by calculating Pearson's correlation coefficient (r). The diagnostic concordance between both exams was assessed by Cohen's $K$ considering the diagnostic classification based on T-score values [2].

**Results:** 3608 patients were included in the analyses: 97 (2.7%) corresponded to UW patients, 1905 (52.8%) NW patients, 1606 (44.5%) OW patients. The correlation between REMS and DXA BMD values was high, with r=0.93, 0.94 and 0.91 for UW, NW and OW patients, respectively. Sensitivity and specificity of REMS against a DXA gold standard were 98.0% and 88.0% for UW patients, 93.6% and 92.7% for NW patients, 88.2% and 98.6% for OW patients, respectively. Cohen's $K$ was 0.86, 0.81 and 0.87 for UW, NW and OW patients, respectively.

**Conclusion:** Strong diagnostic agreement between REMS and DXA was observed for each BMI category at the femoral neck.

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## P446

### DIFFERENTIAL EFFECTS OF TERIPARATIDE, ZOLEDRONATE AND DENOSUMAB ON HIP STRUCTURAL AND MECHANICAL PARAMETERS IN OSTEOPOROSIS (OP): A REAL-LIFE STUDY

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**Objective:** To evaluate and compare changes in hip geometry following treatment with different OP medications in a metabolic bone clinic.

**Methods:** We studied 244 patients with OP with mean [SD] age of 71.4[11.1] y. They were divided into 3 groups; Group A received teriparatide; n=50, F: 50, age: 72.9[7.9] y, Group B were on denosumab; n=116, F: 105, M: 11, age 72.7[10.8] y, and Group C were on intravenous zoledronate; n=78, F: 67, M: 11, age 68.5[12.8] y. BMD was measured by DXA at the lumbar spine (LS), total hip (TH) and femoral neck (FN) prior to treatment and after 2 y (Group A), after a mean treatment duration of 3.3[1.3] y (Group B) and after 3 y (Group C). Hip structural analysis (HSA) was carried out retrospectively from DXA-acquired femur images at the narrow neck (NN), the intertrochanter (IT) and femoral shaft (FS).

**Results:** BMD increased significantly at the LS (% change from baseline: mean [SEM] Group A: 9.9[1.14]%, Group B: 5.7 [0.62]%, Group C: 5.2[0.8]% p<0.001). Increases in hip BMD were seen in Group B only (TH: 1.9[0.61]%, p=0.002). We saw a significant increase in cross-sectional area (CSA) at the NN: 3.5[1.4]% p=0.016 in Group A and in several HSA parameters at the NN in Group C (subperiosteal width or outer diameter (OD); 2.8[0.88%] p=0.005, the cortical width (CW); 3.0[1.0]% p=0.01, CSA: 3.7[1/1]% p=0.003, cross-sectional moment of inertia (CSMI); 6.1[2.3]% p=0.021). In contrast, improvement in the HSA parameters at the IT were seen in group B (IT CSA: 3.3[0.67]%, CSMI: 5.9[1.3]%. section modulus (Z): 6.2[1.1]%, cortical thickness (Co Th): 2.6[0.78]%, buckling ratio (BR):-3.0[0.86]%, p< 0.001) with small changes at the FS (CSA: 1.2[0.4]% p=0.005, Z:1.6 [0.76]%, p=0.04).

**Conclusion:** Analysis of the effect of OP therapies on hip geometry is useful in understanding the mechanisms of their antifracture effect and may provide additional information on their efficacy.

## P449

### MEASUREMENT PROPERTIES OF THE SHORT FORM SARCOPENIA QUALITY OF LIFE (SF-SARQOL®) QUESTIONNAIRE IN AN INTERNATIONAL DATASET

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**Objective:** A shorter, 14-item, version of the SarQoL® questionnaire was recently developed, and has demonstrated good clinimetric properties in a sample of 214 older people from Belgium. This study aimed to further investigate the measurement properties of the SF-SarQoL® in an international sample.

**Methods:** A secondary analysis of data collected from older, community-dwelling people in Brazil, Lithuania, Poland, Spain, and Turkey was performed. The 14 items of the SF-SarQoL were extracted from the original 55-item SarQoL questionnaire and used to calculate the SF-SarQoL score. Sarcopenia and probable sarcopenia was diagnosed with the EWGSOP1 or EWGSOP2 criteria. Discriminative power between sarcopenic and nonsarcopenic groups was evaluated for each country separately because of the heterogeneity between diagnostic criteria. Internal consistency was evaluated with the Cronbach's alpha and the McDonald's omega values. Correspondence between the overall quality of life (QoL) score of the short and long form of the SarQoL questionnaire was determined using the intraclass correlation coefficient (ICC). We performed a confirmatory factor analysis to investigate the structural validity of the SF-SarQoL.

**Results:** The 775 included participants had an average age of 75.8±7.8 years old, and most were women (70.6%). Sarcopenic participants had significantly (p<0.05) worse QoL scores compared to nonsarcopenic people in 4 out of the 5 included studies, confirming discriminative power. Internal consistency was high with an alpha value of 0.872 (95%CI: 0.858-0.885) and an omega value of 0.875 (95%CI: 0.862-0.888). We found a very high level of correspondence between the SarQoL and the SF-SarQoL score with an ICC of 0.907 (95%CI: 0.894-0.919). Robust fit indicators did not demonstrate good fit for a 1-factor model (CFI=0.931; TLI=0.918; RMSEA=0.169; SRMR=0.085) but improved for a 2-factor model (CFI=0.952; TLI=0.942; RMSEA=0.142; SRMR=0.076) which previously showed good fit in a Belgian sample.

**Conclusion:** The SF-SarQoL measures sarcopenia-related quality of life with less response burden than the SarQoL questionnaire and demonstrates adequate measurement properties. Its structural validity should be further investigated.

**Disclosures:** CB, JYR and OB are shareholders of SarQoL SPRL

## P450

### COMPARISON OF BODY COPOSITION BETWEEN HEALTHY SUBJECTS AND POST-COVID PATIENTS EVALUATED THROUGH DUAL FULL-BODY X-RAY ABSORPTIOMETRY

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**Objective:** To evaluate the body composition in subjects after infection by the SARS-CoV-2 virus, compared with a group of healthy controls.

**Methods:** Full-body DXA (with the 2018 generation Hologic Discovery W equipment) was performed on post-COVID-19 patients three weeks after diagnosis of the infection. They were compared with a group of healthy controls of both genders, older than 18 years old, with no history of SARS-CoV-2 virus infection. The variables of the body composition were divided into: associated with visceral adipose tissue (VAT),

distribution in the body fat proportion and indices of fat mass and muscle mass. Statistical analysis: measures of central tendency and dispersion were calculated for the quantitative variables, normality distribution was evaluated with the KS test. For the parametric variables, a comparison of means was performed with the Student's T-test and Pearson's correlation. For nonparametric variables, medians were compared using the Mann-Whitney U and correlated with Spearman's Rho. Registration at the Research and Ethics Committee 43/20.

**Results:** 25 controls (mean age 36.7; SD±10.5 yo) and 59 cases (mean age 42.3; SD±12.3 yo) (p=0.054) were included. Statistically significant differences were found in the variables BMI, VAT mass, VAT volume and VAT area, fat mass index, trunk/leg fat and trunk/limb fat mass ratio. A statistically significant correlation was observed between BMI, VAT variables, fat mass index, trunk/leg fat and trunk/limb fat mass ratio.

**Conclusion:** Our results suggest that patients with COVID presented an alteration in the distribution of body mass, concentrating on the visceral area.

## P451
### INFECTIOUS COMPLICATIONS AS A REASON FOR THE CANCELLATION OF BIOLOGIC DISEASE-MODIFYING ANTI-RHEUMATIC DRUGS

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**Objective:** To study infectious complications of therapy with biologics, analyze the frequency of withdrawal of bDMARDs due to infectious complications.

**Methods:** The ambispective analysis included data on 512 cases of prescribing biologics with different mechanism of action in 190 patients with rheumatoid arthritis (162 women, 28 men).

**Results:** Patients in the study group received from 2-6 bDMARDs, median (25-75%) 3 (2-3). Biologics were discontinued 331 times, of which due to the development of serious adverse reactions - 70 times, of which due to the development of infectious complications - 16 times (3% of all cases of discontinuations, 22.8% of all serious adverse reactions). During treatment with the first bDMARD, infectious complications that required discontinuation of the drug developed in 5.2% of cases (N=10), with the second bDMARD - in 5.1% of cases (N=4), no statistical differences were found between these groups. On the background of treatment with the third bDMARD, infectious complications led to the withdrawal of treatment in 2.6% of cases (N=1), in the fourth - 0%, in the fifth - 14.3% of cases (N=1) and in sixth - 0%. There was no correlation between the number of sequentially prescribed biologics and the incidence of infectious complications. 68.8% (11 cases) of serious infections occurred during the first year of therapy. Most often, serious infections developed during treatment with drugs of the TNFα inhibitor group (infliximab, etanercept, adalimumab, golimumab, certolizumab pegol) and tofacitinib. Out of 16 cases of infectious complications, 5 were associated with tuberculosis infection.

**Conclusion:** Infectious complications make up a significant proportion (22.8%) of all serious adverse reactions leading to the discontinuations of biologics in patients with rheumatoid arthritis. The frequency of discontinuation of bDMARDs due to infectious complications was about 5% and did not change during treatment with both the first and second biologics. It is necessary to remain alert about tuberculosis infection and examine patients before prescribing and during treatment with bDMARDs.

## P452
### PHARMACY DISPENSING RECORDS FOR TOPICAL DICLOFENAC IN SWEDEN: A RETROSPECTIVE ANALYSIS OF REAL-WORLD DATA

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**Objective:** To describe prescription patterns of topical diclofenac alone or with other medications in the real world.

**Methods:** This retrospective cross-sectional study, characterizes the journey of patients prescribed topical diclofenac (Anatomical Therapeutic Chemical (ATC) code level 7) over a 12-month period (March 2019 – February 2020) in Sweden. The Swedish eHealth Agency (E-hälsomyndigheten) database of national electronic prescriptions was used as a data source. The data was assessed to measure the percentage of prescriptions filled, and the number of treatment switches as the primary outcome. Percentage of patients who filled prescriptions for co-medications such as for cardiovascular (CV), Gastrointestinal (GI), CV+ GI and other Nonsteroidal anti-inflammatory drugs (NSAIDS) taken with topical diclofenac were measured as secondary outcome.

**Results**: In Sweden, out of 14,569 patients 12,145 (83.4%) patients were identified with at least one prescription for topical diclofenac and met the study inclusion/exclusion criteria. The mean age of patients who received topical diclofenac prescription was 73 years, of which females were predominant (73.9%). However, the largest age group for topical diclofenac prescription was 85+ years (23.8%). Most of the patients 79.5% filled in 1 prescription of topical diclofenac, 12.3% patients had 2, 3.7% patients had 3, and 4.5% had >3 prescriptions of topical diclofenac during the 12-month period. For the year analysed 96.7% of the patients did not switch treatment before Month 4 and 98.1% before Month 7, irrespective of when topical diclofenac was first prescribed. No patient had more than 1 switch to topical alternatives to diclofenac. Physicians who prescribed topical diclofenac also prescribed it in combination with CV drugs (49.0%), GI drugs (30.0%), CV+GI drugs (19.3%) during the same 12-month period. At the same time, prescription of topical diclofenac with other NSAIDS (9.1%) was least observed.

**Conclusion:** This study shows that topical diclofenac was mainly prescribed to older patients above 70 years and most predominantly to females. Data suggests adherence among patients to their topical diclofenac prescription. A high proportion of patients prescribed topical diclofenac were also prescribed with drugs either for CV or/and GI conditions.

## P453
### CLINICAL AND DEMOGRAPHIC ASSESSMENT OF PATIENTS WITH REFRACTORY RHEUMATOID ARTHRITIS RECEIVED BIOLOGICS

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**Objective:** Refractory rheumatoid arthritis (RRA) refers to rheumatoid arthritis (RA) that is resistant (due to ineffectiveness or toxicity) to several drugs, including methotrexate and at least 2 bDMARDs with different mechanisms of action. Treatment of patients with RRA remains an urgent problem due to the difficulties arising in the choice of drug therapy. This study aimed to study the clinical and demographic characteristics of patients with RRA.

**Methods:** The anamnestic data of 40 adult patients with RRA, observed at the V.A. Nasonova RIR from 2010-2018. The study did not include

patients who were sequentially treated with bDMARDs from the TNFα inhibitor group as the first and second drugs. Statistica software (version 12) was used for statistical processing.

**Results:** The studied group was represented mainly by women (N=32, 80%), who received from 3 to 6 bDMARDs, median 3 [3-4]. Clinical forms of RA were presented as seropositive for rheumatoid factor (RF) RA in 17 patients (42.5%), RA with extra-articular manifestations in 6 (15.0%), RA seronegative for RF in 16 (40.0%)), Still's disease in adults in 1 (2.5%). The average age at the time of RA debut in the study group was 31.1±17.0 y. The onset of RA in juvenile age was observed in 10 patients (25.0%). At the time of bDMARD initiation, the average age of patients was 39.8±15.1 y, and the prescription of RA was 8.7±6.3 y. 17 patients (42.5%) received 4 bDMARDs, 5 (12.5%) - 5 bDMARDs, 2 (5%) - 6 bDMARDs. As the first biologic in the study group, the following were prescribed: TNF inhibitors - 23 patients (57.5%), abatacept - 10 (25.5%), rituximab - 4 (10.0%), tocilizumab - 3 (7, 5%). As the second bDMARD: TNF inhibitors - 15 patients (37.5%), rituximab - 10 (25%), tocilizumab - 8 (20%) and abatacept -7 (17.5%). The first bDMARD was discontinued due to ineffectiveness in 29 patients (72.5%), due to the development of serious adverse events in 11 patients (27.5%). Second bDMARD in 31 (77.5%) and 9 (22.5%), respectively.

**Conclusion:** In the study group, patients with RRA were represented mainly by women with seronegative RA in the RF, onset of the disease at a young age and late addition of the first bDMARD (after 8.7±6.3 y from the onset of the disease).

## P454

### PREVALENCE OF HYPOPHOSPHATASIA AND LOW SERUM ALKALINE PHOSPHATASE IN ADULTS WITH ATYPICAL FEMUR FRACTURES

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Hypophosphatasia (HPP) is a rare genetic disorder of alkaline phosphatase (ALP) deficiency which manifestations in adults include atypical femoral fractures (AFF). However, the prevalence of low serum ALP and HPP in AFF patients remains unknown. The aims of this study were to analyze the prevalence of low ALP and eventually identify HPP mutations in patients with AFF. For this purpose we retrospectively analyzed hospital records for serum ALP values and symptoms/signs of HPP among 80 adults admitted to the Geneva University Hospital between 2007 and 2017 with radiologically confirmed AFF. 18 (22.5%) of 80 AFF patients had at least one serum ALP value ≤40 IU/L. ALP values of AFF patients were further compared with a control group (N=23) of bisphosphonate-treated patients with prior proximal hip fracture. Lowest mean ALP values in AFF patients was not lower than in control group. However most low ALP values were associated with concomitant antiresorptive (AR) treatment and virtually all AFF patients also presented ALP values >40 IU/L at other time points (i.e., without AR). Nevertheless, low ALP in AFF subjects was associated with higher percentage of bilateral AFF (44.4%), metatarsal fractures (22.2%), chronic fatigue and pain (16.6%), glucocorticoid (22.2%) and proton pump inhibitor (61.1%) medication. Eventually, 3 AFF subjects with consistently low serum ALP were tested for TNSALP mutations and one with a clinical suspicion of HPP was found to carry a rare pathogenic heterozygous variant (c.787T>C, p.Tyr263His). In conclusion, low ALP values are common among subjects with AFF, although mainly related to AR therapy. Despite the poor specificity of low ALP values in this context, persistently low values in absence of AR together with associated clinical signs of HPP may orient towards a genetic diagnosis of this rare disorder among AFF patients.

## P455

### CORRELATION BETWEEN HIGHER DOSES OF VITAMIN D SUPPLEMENTS AND TOTAL CANCER INCIDENCE AND MORTALITY

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**Objective:** Previous meta-analyses of randomized controlled trials of vitamin D supplementation and total cancer incidence and mortality found inconsistent results. Vitamin D supplement has been widely marketed for its claimed anticancer properties (1).

**Methods:** Low vitamin D status as a risk factor for cancer has been widely evaluated in cohort and case-control studies (2,3). The mechanisms underlying the observed significant association between vitamin D supplement and cancer mortality have not yet been fully elucidated.

**Results:** Evidence from animal and in vitro studies suggests that vitamin D plays an important role in carcinogenesis and angiogenesis, and further affects cancer mortality via several ways, such as reducing cell proliferation, stimulating apoptosis and suppressing cell differentiation of cancer cells, as well as anti-inflammatory and immunomodulatory properties (4). Observational epidemiologic studies, however, suggest divergent patterns, with evidence for a broad benefit of vitamin D weakening for cancer incidence but strengthening for cancer mortality. Studies of circulating 25(OH)D, measured either during the prediagnostic period or shortly after diagnosis of cancer, have demonstrated superior survival in cancer patients with higher circulating 25(OH)D levels (5,6).

**Conclusion:** Taking in account the synthesis of different data, efforts to achieve circulating levels of 25(OH)D around 55-135 nmol/l may contribute to reducing cancer mortality. To consistently raise the level above 75 nmol/l, at least 1500-2000 IU/d intake of vitamin D may be required for adults.

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## P456

### THE RISK FACTORS AND FREQUENCY OF OSTEOPOROTIC FRACTURES OVER 10 YEARS OF FOLLOW-UP IN THE SIBERIAN POPULATION

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**Objective:** To study the frequency of osteoporotic fractures (OF) over 10 y of follow-up and risk factors for OF in people aged over 50 y (Novosibirsk).

**Methods:** In 2003-2005, a screening examination of persons aged 45-69 (n=9360) was carried out within the framework of the international project HAPIEE (Novosibirsk). The information was collected on OF during the last 12 months and risk factors for OF, registration of sociodemographic data, anthropometry, and a study of biochemical blood parameters. In 2017-2018 on the second examination (n=828), data on the frequency of OF that occurred over 10 years of observation were retrospectively collected. The analysis included 574 people who were 50-69 years old at the 1st screening (2003-2005) of the project (postmenopausal women). Statistical analysis was carried out by SPSS package (v.13.0).

**Results:** Among studied 574 subjects (mean age 59.0±5.2) there were 234 men and 340 women. During the 10-y follow-up, OF occurred in

9.6% subjects, women had OF 3 times more often than men (13.2% and 4.3%, respectively, p=0.001). Among 55 persons with fractures, 14.6% had a second re-fracture within 10 y of follow-up. Women with a history of OF during 10 y of follow-up had lower weight (p=0.021), BMI (p=0.018), waist circumference (p=0.037), hip circumference (p=0.050) compared with women without OF. Women with OF were more likely to be overweight (BMI 25-30 kg/m$^2$) (p=0.029), while women without OF were more likely to have BMIs characteristic of obesity (p=0.004), as well as women with OF smoked more often (p=0.032) and had falls in the last 12 months (p=0.023) than women without OF. There is not a significant difference in the studied parameters in men with and without OF. According to the results of a multivariate analysis in women, the risk of OF associated with a smoking (OR=4.003 (95%Cl=1.29-12.46), Ca consumption <1000 mg/d (OR=2.320 (95%Cl=1.01-5.34), falls (OR=2.834 (95%Cl=1.07-7.53) while BMI is negatively associated with OF (OR=0.914 (95%Cl=0.85-0.99) independent of other factors. In men, we did not reveal other factors associated with OF.

**Conclusion:** In studied Siberian population sample aged 50–69 the frequency of OF during 10 y of follow-up was high and amounted to 9.6%. Women had OF 3 times more often than men p=0.001. In women, the risk of OF increased 4 times with smoking, 2 times with Ca consumption <1000 mg/d and a falls, and decreased with an increase in BMI.

**P457**

## EFFECT OF PREVIOUS HOSPITALIZATION IN PATIENTS WITH HIP FRACTURE ON 12-MONTH MORTALITY

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**Objective:** Assess mortality at 12 months post-fracture associated with previous hospitalization. Assess overall mortality and at 6 and 24 months postfacture associated with previous hospitalization. Assess postfracture mortality associated with each specialty of previous hospitalization. Assess postfracture mortality associated with the duration of previous hospitalization. Assess the impact of prefracture hospitalization on fracture-related indicators (type of fracture and treatment, duration of postfracture hospital stay, time to surgery). Assess factors that influence 12-month mortality.

**Methods:** A retrospective cohort study of all consecutive patients admitted in the Orthopedic ward of a tertiary hospital with frailty hip fracture between 1 January 2017 and 30 June 2018 (18 months). All data were collected through revision of patients' charts and included socio-demographic data, type of fracture, fracture treatment, overall mortality and at 6, 12, and 24 months postfracture, hospitalization in the 3 months before fracture, comorbidities, and chronic medication. The sample was divided into 2 groups (with and without prefracture hospitalization), and all variables under study were compared. Mortality was evaluated concerning the existence of prefracture hospitalization and each ward in which it occurred.

**Results:** Of 538 patients with hip fracture, 501 were identified with frailty fractures, of which 75.25% were female, with a mean age of 83.88±8.53 y; of these, 71.66% with no prior fractures. Mortality at 12 months was 23.15%, with no significant association with prefracture hospitalization (23.68%, p=0.936). A classification tree identified age, sex, and fall-associated medication as determinant factors in 12-month mortality. Through a logistic regression (controlled for age, sex, and fall-associated medication), a significant association was found between prefracture hospitalization in the Orthopedic ward and 12-month mortality (p=0.042), with a 5.145 odds ratio (CI 95% 1.061-24.948).

**Conclusion:** Patients admitted to the Orthopedic ward in the 3 months before a hip fracture are at about 5 times greater risk for mortality at 12 months after fracture.

**P458**

## SEASONAL ANALYSIS OF VITAMIN D LEVELS IN MUSCULOSKELETAL DISEASES OUTPATIENT CLINIC IN TURKEY

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**Objective:** Turkey is a vitamin D deficient country despite its sunny location (1). Patients with musculoskeletal diseases seen in Physical Medicine and Rehabilitation Outpatient Units might be potential candidates for vitamin D screening and replacement treatment.

**Methods:** We evaluated adult patients (age >18y) with musculoskeletal problems referring to outpatient unit in our Physical & Rehabilitation Medicine Dept. between July 2017- January 2019. Data was collected retrospectively from patients' hospital medical records. Patients with a serum 25-hydroxyvitamin D (25-OH vitD) laboratory result were included in the analysis. Data regarding age, gender and date were also extracted.

**Results:** We have revealed 1289 patients' records. Of these; 1125 (87.3%) were female and 164 (12.7%) were male. Mean age was 53.2±13.6 (for women; 54.27±13.17 and men: 45.83±13.96, p<0.001). Mean level of 25-OH vitD was 26.5±113.8. Mean serum level of 25-OH vitD was significantly lower in women compared to men (23.63±15.27 vs. 46.43±31.74; p:0.017). Level of 25-OH vitD differed among seasons and lowest levels were observed in spring and winter (Table1). When analyses were carried among different age groups, patients over 65 had lowest 25-OH vitD level (16.61 ±14.29, p<0.001).

**Conclusion:** Level of vitamin D can be low in patients with musculoskeletal conditions. Geriatric patients are more likely to be vitamin D deficient, so screening for vitamin D seems rational for elderly. Vitamin D levels tend to be lowest in winter and spring consistent with published literature (2).

Table. Serum 25-OH vitamin D levels of patients among seasons.

| Season | n (%) | Serum 25-OH VitD level | Seasonal comparison | P value |
|---|---|---|---|---|
| Winter | 161 (12.4) | 21.25±12.15 | winter vs. spring | 0,793 |
| Spring | 314 (24.4) | 21.48±16.6 | winter vs. summer | 0,049 |
| Summer | 363 (28.2) | 23.40±14.06 | winter vs. autumn | <0,001 |
| Autumn | 451 (35) | 34.40±19.11 | spring vs. summer | 0,004 |
| Total | 1289 | 26.52±113.75 | spring vs. autumn | <0,001 |
| Post hoc analysis | | | summer vs. autumn | 0,002 |

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**P459**

## TERIPARATIDE RETENTION RATE ASSESSMENT (TERRA) STUDY: COMPARISON BETWEEN ORIGINATOR AND BIOSIMILAR DRUG

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**Objective:** Osteoporosis (OP) is a metabolic bone disease that lead to high risk of fractures, especially of vertebrae and femur. In severe OP, antiresorptive treatment may not be sufficient; therefore, a bone forming therapeutic strategy is essential. In Europe, the only anabolic drug since now is teriparatide (TPH), a PTH analogue. As far as we know, there are no efficacy comparisons in clinical practice between originator TPH (oTPH) and biosimilar TPH (bsTPH). The aim of this study is to verify whether the retention rate of oTPH and bsTPH are similar.

**Methods:** All patients with OP who received a TPH treatment between 1 January 2013 and 30 April 2021 were enrolled. For each of them were recorded anamnestic data, the number of vertebral and femoral fractures, lumbar and femoral DXA scores, the duration of TPH treatment and the possible reason of TPH interruption. Patients were clustered in two groups, O and BS, according to the received treatment (respectively oTPH and bsTPH). The retention rate was tested with Kaplan-Meier estimator, while differences between groups were verified with Fisher's exact test or Mann-Whitney test, as appropriate. $p < 0.05$ was considered statistically significant.

**Results:** 262 patients (median age 76 IQR 71-81 , M: F 23:239) were enrolled; 4125 patients-months were observed. The majority of them (184/262) received oTPH while the other (78/262) started bsTPH treatment. The median period of observation was 18 (IQR 6-18) months. The only differences between groups O and BS were female prevalence (162/184 vs. 77/78; p=0.003) and median number of fractures (2 vs. 3; p=0.0007). The overall retention rate at 12 months was 94%. In the group BS we observed a slight higher retention rate than in group O (97% vs. 93%) but the difference was not statistically significant (p=0.15). In both groups the main reason of discontinuation was fatigue and myalgia (prevalence of 4.3% vs. 2.6% respectively in group O and BS p=0.7).

**Conclusion:** In this cohort of severe OP patients, TPH 1 year retention rate was higher to those reported in trials and clinical studies. There were no differences in terms of retention rate between oTPH and bsTPH. The availability of bsTPH will make the cost-benefit ratio of this treatment even more advantageous by allowing more and more patients to access bone forming strategy.

## P460

### IDENTIFICATION OF SUGGESTIVE CHANGES OF INFLAMMATORY MYOPATHY IN MILD TO MODERATE SUBACUTE POST-COVID-19 PATIENTS THROUGH ECHOGENICITY OF THE RECTUS FEMORIS MUSCLE

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**Objective:** To identify suggestive changes of inflammatory myopathy in mild to modCerate subacute post-COVID-19 patients, through echogenicity of the rectus femuris muscle

**Methods:** We considered patients with subacute (3 weeks of diagnosis) post-COVID-19 disease, detected and treated through outpatient consultation. Musculoskeletal ultrasound was performed in rectus femoris with a standardized technique, deep was established at 6 cm and general gain at 65. We obtained, extract and analyzed transverse image of the rectus femoris muscle with Image J software. Preprocessing of the B-mode ultrasound images consisted in image decompression in DICOM format, anonymization, and semi-automatic selection of the region of interest (ROI). The distribution of the values of each pixel mapped in grayscale is obtained from the frequency histogram for the selected ROI with 8 bits resolution (256 gray levels). Cutoff point for increased echogenicity was considered with the mean gray scale of 130. Statistics: quantitative and qualitative variables were analyzed with central tendency and dispersion, frequencies and percentages respectively. Inferences were done with chi-

square test. Authorization and registration of research and ethics committee.

**Results:** We included 57 patients (29 women, 28 men) with mean age of 45.5 y (SD 12.28; range from 18-68), of which 7 patients presented suggestive changes of myopathy (12.5%), and 9 (16.1%) with suspicion. Women were more affected with 6 cases and 6 suspects (p=0.046). Only 17 patients referred myalgia, of which only 2 patients presented suggestive changes and 2 suspected.

**Conclusion:** We observed that 12.5% of patients with post-COVID-19 disease presented changes in echogenicity suggestive of myopathy and 16.1% with suspicion, with greater affection in women. Patients who report myalgia, fatigue, and weakness after COVID-19 disease may be experiencing a muscular inflammatory process that could lead to fibrosis and later degeneration. Ultrasound is a useful tool to assist timely diagnosis.

## P461

### CROWNED TOOTH SYNDROME: A CASE REPORT

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**Objective:** Crowned tooth syndrome is related to microcrystalline involvement (hydroxyapatite or calcium pyrophosphate) of the retro-odontoid ligament of the atlas, the manifestations of which often lead to the erroneous diagnosis of meningitis or spondylodiscitis. We report a new sighting.

**Case report:** A 36-year-old young woman, with no pathological history, presented for a rheumatology consultation complaining of acute neck pain with right scapulalgia of inflammatory schedule, the sudden onset of which dates back to about 1 month, without a triggering factor or associated signs: fever and headache. The clinical examination found a patient in general preserved condition, afebrile. Straightness of the cervical spine with limitation of its mobility in all directions. Neurological examination is normal. Biology: VS: 45 H1, CRP: negative; the rest of the assessment, in particular the FNS, hepatic, renal, phosphocalcic assessment is normal. Radiology: standard radiographs are not included. The cervical tomodensitometry makes the diagnosis by objectifying a calcification of the transverse ligament of the atlas affirming the syndrome of the crowned tooth.

Crowned tooth syndrome is a clinical, biological, and radiological syndrome characterized by inflammatory neck pain, biological inflammatory syndrome, and calcium deposits in odontoid abarticular structures (a crown-like calcification around the odontoid process). Note, this syndrome is sometimes accompanied by fever and stiffness of the neck which can make you think of meningitis. The inflammatory indices are high, as in most cases of microcrystalline arthritis. The CT scan of the cervical spine centered on C1/C2 is the gold standard for positive diagnosis. The differential diagnosis of transverse ligament calcification includes deposits of hydroxyapatite and pseudogout. The treatment is based on NSAIDs, ±associated with a low dose and short duration corticosteroid therapy; colchicine if NSAIDs and corticosteroids fail, inducing a dramatic improvement in symptoms within 48 h and resorption of calcification within 2 weeks. It is not yet clear what the exact prevalence of this syndrome is.

**Conclusion:** This entity remains little known after its description in 1974 by Dirheimer and Wackenheim. It deserves to be because it represents a frequent cause of febrile neck pain.

## P462

### ENTHESIC RESPONSE OF THE ACHILEAN AND PATELLAR TENDON TO PHYSICAL EXERCISE IN PATIENTS WITH SPONDYLOARTHRITIS IN CLINICAL REMISSION COMPARED TO HEALTHY CONTROLS

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**Objective:** Entheses are the most important histopathological targets of spondyloarthritis (EspA). Recent studies have shown that in healthy volunteers, the enthesal fibrocartilage is able to adapt to mechanical stimuli. This adaptation can lead to increased thickness of the enthesis, increased calcium deposits or even neovascularization. In periods of remission, the entheses of patients with SpAs should not show inflammatory changes; however, under mechanical stress, they may behave differently from healthy subjects, which could translate into persistent latent inflammatory activity. The aim of the present study was to determine the differences in the enthesis and peri-aesthetic response to physical exercise of the patellar and Achilles tendons between patients with SpAs and healthy subjects. **Methods:** Consecutive patients with a diagnosis of EspAs in clinical remission (ASDAS <1.3 or DAPSA <4.0) were recruited from four rheumatology clinics and healthy volunteer controls from the Faculty of Medicine (CEU San Pablo) and relatives matched for sex, age±4 y and BMI category. An anthropometric study was performed on all subjects. All were invited to perform a physical exercise consisting of 100 steps and 50 squats over 60 min. Before and after the physical exercise, the maximum height of the infrarotulian bursa (aBIR), height of the distal patellar enthesis (aRD), height of the retro Achilles bursa (aBRA), height of the effusion of the ARB (aeBRA), thickness of the Achilles enthesis (aA) and the presence of PD signal in the Achilles and patellar enthesis were measured. Variations in bursal heights and prevalence of PD signal before and after were compared between patients and controls.

**Results:** 24 patients and 24 healthy controls were enrolled (age 43.2±5.43 y, 8 females per group; time since diagnosis 8.02±2.16 y). Controls had greater lean mass (43.38±6.40 vs. 37.25±5.58, P=0.008) and patients, greater Achilles enthesis thickness (8.46±1.21 vs. 7.42±0.45, P=0.001). Table 1 summarizes the characteristics of the groups. In all cases, the height of the aRD and aBRA and the BRA occupation index increased significantly, as shown in Table 2. The change in aBRA was significantly greater in patients than in controls (+1.17±0.25 vs. +0.25±0.17, P<0.001), as well as in the ARB occupancy index (28.17±7.47 vs. 16.08±5.71, P=0.037). Table 3 exposes all the changes in the measurements, observed in the two groups. The proportion of post-exercise PD signal in patients and controls in the patellar tendon was 11/28 (39.3%) vs. 3/28 (12.5%), P=0.086 and in the Achilles tendon was 12 (50%) vs. 2 (8.3%), P=0.009.

**Conclusion:** Physical activity of the lower body leads to distension of the peri-aortic bursae of high-load tendons. This distension is more pronounced in patients than in controls. Patients, even in remission, present a hyperemic response to physical exercise that denotes persistence of inflammatory activity not detectable at rest.

| Variable | Grupo | Momento | Media | DE | p |
|---|---|---|---|---|---|
| Altura bursa rotuliana (mm) | ESPA | Antes | 1,97 | 0,40 | <0,001 |
| | | Después | 2,20 | 0,39 | |
| | Control | Antes | 1,89 | 0,44 | <0,001 |
| | | Después | 2,06 | 0,48 | |
| Altura bursa Aquiles (mm) | ESPA | Antes | 4,32 | 1,04 | <0,001 |
| | | Después | 5,49 | 1,53 | |
| | Control | Antes | 4,27 | 0,68 | <0,001 |
| | | Después | 4,51 | 0,72 | |
| Altura derrame bursa Aquiles (mm) | ESPA | Antes | 0,31 | 0,24 | <0,001 |
| | | Después | 1,91 | 0,90 | |
| | Control | Antes | 0,27 | 0,16 | <0,001 |
| | | Después | 1,00 | 0,19 | |
| Índice ocupación de la bursa Aquiles (%) | ESPA | Antes | 7,00 | 5,31 | <0,001 |
| | | Después | 35,17 | 13,80 | |
| | Control | Antes | 6,29 | 3,22 | <0,001 |
| | | Después | 22,38 | 4,45 | |

Tabla 2. Medidas ecográficas realizadas antes y después del ejercicio físico en los dos grupos.

| Diferencias Después-Antes | Grupo | Media | DS | p |
|---|---|---|---|---|
| Altura bursa rotuliana (mm) | EspA | 0,23 | 0,14 | 0,204 |
| | Control | 0,17 | 0,09 | |
| Altura bursa Aquiles (mm) | EspA | 1,17 | 0,65 | <0,001 |
| | Control | 0,25 | 0,17 | |
| Altura derrame bursa Aquiles (mm) | EspA | 1,60 | 1,00 | 0,011 |
| | Control | 0,73 | 0,22 | |
| Índice Ocupación de la bursa Aquiles (%) | EspA | 28,17 | 17,47 | 0,037 |
| | Control | 16,08 | 5,71 | |

Tabla 3. Magnitud comparativa de los cambios observados entre pacientes y controles en las medidas después y antes del ejercicio.

## P463
### DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS AND METABOLIC DISORDERS: ABOUT 57 PATIENTS

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**Objective:** Diffuse idiopathic skeletal hyperostosis (DISH) is a noninflammatory enthesopathy responsible for a musculoskeletal disorder. It involves two (according to Forestier) or three (according to Resnick) contiguous intervertebral bridges to affirm hyperostosis, with correct discs (unlike spinal osteoarthritis), and the absence of fusion of the sacroiliacs or posterior joints (unlike spondylitis). The diagnosis of DISH is radiological and presents with ossification of the entheses along the spine. For some reason, the cells responsible for building bones are depositing calcium in places where they shouldn't. No etiology has yet been determined; genetic, local, environmental and even endocrine (metabolic) factors may play a role in the development of this condition. The purpose of this work was to study the metabolic profile of patients with DISH.

**Methods:** We conducted a descriptive study in the Dept. of Rheumatology of the University Hospital of Ibn Rochd, Casablanca, from February 2020 to March 2021 (13 months). The inclusion criteria were all patients diagnosed with DISH according to Risnick's criteria. The exclusion criteria were the patients not meeting Risnick's criteria and those followed for a spondyloarthropathy included.

**Results:** 57 patients were included in this study. The average age was 64.36 (57-81), with a male predominance of 59.65%. 57.89% of the patients (n=33) had diabetes mellitus with a mean duration of 7.12 y (4-15), 49,12% of the cases had dyslipidemia, of whom 13 were under medical treatment. 36.84% of the patients were hypertensive and 50.88% had an average BMI of 33.13 kg/m² (30.49-41.26). Hyperuricemia was found in 8.77% of the patients. 56.14% of the patients had at least two metabolic disorders, dominated by the association of diabetes mellitus with obesity and dyslipidemia (45,61%). 11 patients had no metabolic disorder (19.30%). The discovery of DISH was fortuitous in 75.44% of the cases, either following routine workup or for other reasons. It was symptomatic in 24.66% of patients, revealed by stiffness

| Variable | Grupo | Media | DE | p |
|---|---|---|---|---|
| Edad (años) | ESPA | 46,25 | 6,06 | 0,951 |
| | Control | 46,38 | 5,46 | |
| Talla (cm) | ESPA | 168,92 | 5,78 | 0,755 |
| | Control | 169,75 | 8,21 | |
| Peso (kg) | ESPA | 76,00 | 10,27 | 0,221 |
| | Control | 81,58 | 13,68 | |
| Masa magra (%) | ESPA | 37,25 | 5,58 | 0,008** |
| | Control | 43,38 | 6,40 | |
| Fuerza flexora de mano (kg) | ESPA | 33,25 | 10,09 | 0,715 |
| | Control | 34,42 | 8,38 | |
| Grosor tendón rotuliano (mm) | ESPA | 359,42 | 62,46 | 0,169 |
| | Control | 391,54 | 65,71 | |
| Grosor tendón de Aquiles (mm) | ESPA | 7,42 | 0,45 | 0,001** |
| | Control | 8,46 | 1,21 | |

Tabla 1. Características demográficas y antropométricas de los grupos estudiados.

of the spine. Mechanical back pain was present in 4 patients, and 7 patients had associated peripheral presentations of DISH.

**Conclusion:** The risk of occurrence of DISH seems to increase in patients with associated metabolic disorders. It is a disease that progresses slowly due to its asymptomatic feature, as noted in the vast majority of our patients. The prevention of metabolic disorders and their control can reduce the risk of DISH.

## P464
## GOUT AND PSORIASIC ARTHRITIS: A FORTUITOUS ASSOCIATION OR A RELATED DISEASE?

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**Objective:** Gout is an arthropathy related to an abnormality in uric acid metabolism that causes hyperuricaemia. It is said to be "microcrystalline" because it is due to deposits of uric acid microcrystals in tissues, especially in the joints. Gout is a chronic condition, which can lead to systemic manifestations and severe polyarticular disease, and often responsible for significant disability over the long term. Psoriatic arthritis (PsA) is a polymorphic disease belonging to the group of spondyloarthropathies (SpA), which is present in up to 42% of people with psoriasis and is estimated to be prevalent at 0.1-1.0% in the general population. While the association of gout secondary to PsA with the presence of cutaneous psoriasis is not rare, cases of PsA without cutaneous psoriasis associated with gouty arthropathy are less frequent and little described in the literature. We report a case of these two pathologies.

**Case report:** Mr S.I.K, aged 27, followed since the age of 14 for juvenile idiopathic arthritis, treated with corticosteroids and non-steroidal anti-inflammatory drugs. The diagnosis of PsA was made at the age of 23 according to CASPAR criteria: a chronic destructive polyarthritis that began in the lower limbs, a biological inflammatory syndrome, negative rheumatoid factor with predominant bone constructions in the distal interphalangeal joints (IPD) (Figure 1). He was put on methotrexate with an initial dose of 15 mg/week, which was replaced by salazopyrine 2 g/d due of a gastrointestinal intolerance. After 15 months, he presented with tophi over all of the proximal interphalangeal joints (PIP) bilaterally. The diagnosis of gouty arthropathy was made in the presence of tophi, arthritis of the first metatarsophalangeal joints (MTP), blood uric acid at 112 mg/L, urinary uric acid at 891 mg/24-h. In the absence of neurological and digestive signs, the clinical profile was an enzyme drop related to a partial deficiency in hypoxanthine-guanine phosphoribosyltransferase (HGPRT), however enzyme assay was not performed due to unavailability. The evolution was marked by the onset of radiological destruction of all PIPs compared to previous radiographs taken 15 months before his admission (Figure 2). The gout attack was treated with colchicine 1 mg/d with a good response after 7 d. The erythrocyte sedimentation rate increased to 21mm/1st hour vs. 73mm/1st hour, and CRP decreased from 109.34 mg/L to 13 mg/L. Then the patient was put on febuxostat 80 mg/d, and the uric acid decreased from 112 mg/L to 96 mg/L after 5 d of treatment. Regarding PsA, the patient was prescribed secukinumab.

The term of "psout" was defined by the association of PsA and gout, it is corroborated by a common ground, pathophysiology, clinical-bio-radiological presentation, and specific management, deserving the description of this new nosological concept. From a pathophysiological point of view, these two diseases share autoinflammatory aspects. The prevalence of gout is 0.9% in the French population, that of PsA is 2 to 6%, but evaluated at 18% in rheumatology consultation, making this association a common situation. Gout is rarely due to enzymopathy, and the best known is HGPRT deficiency. This deficit, when partial, results in severe, early gout, tophaceae and complicated by renal lithiasis by major hyperuricaemia. The presence of hyper uricemia is usual in psoriasis. However, its presence before the installation of the cutaneous and articular manifestations raises the suspicion of a fortuitous association or infra-clinical cell turnover. Colchicine, traditionally used in the treatment of gout, limits the proliferation of inflammatory cells, thus shortening the gout attack. Studies have shown that febuxostat decreases uric acid levels to physiological levels in a higher proportion of patients than with allopurinol with an excellent safety profile. However, the association of PsA without associated skin psoriasis with enzymatic gout is not described in the literature and the responsibility of gout in PsA most likely influences the clinical and radiological outcome in patients, as suggested by this patient. The combination of these two pathologies, as in the case of our patient, requires specific management, leading us to consider the management protocols for each of the entities.

**Conclusion:** The association of an enzymatic gout with PsA is clinically redoubtable because they are two inflammatory rheumatisms acting jointly on the joints. Thus, this association might accelerate bone destruction following an amplification of the inflammatory phenomenon by strongly affecting the functional prognosis of the joints. The management of this association consists in respecting the therapeutic protocols of each pathology, imposing rigorous monitoring, both clinically and biologically.
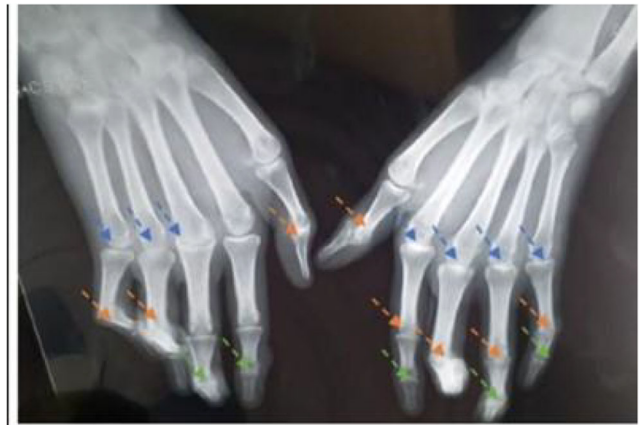


Figure 1. Standard x-ray of the hands, showing joint space narrowing in the metacarpophalangeal joints (3rd,4th,5th right and 2nd,3rd,4th,5th left), joint space narrowing in all the PIP joints (1st, 4th, 5th right and 1st, 2nd, 3rd, 4th, 5th left) and DIP joints (1st, 2nd right and 1st, 3rd, 4th left), with anterior dislocation of the 3rd, 4th right DIP and 2nd left DIP; as well as geodes and erosions on the interphalageal joints bilaterally.
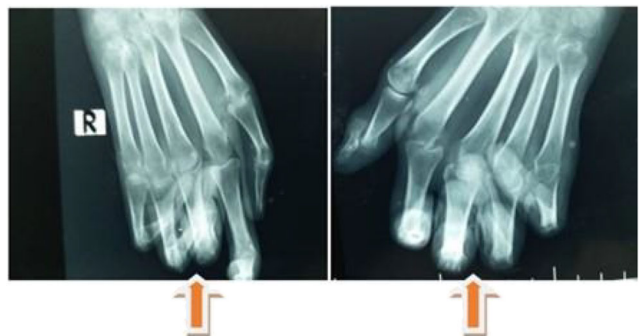


Figure 2. X-ray taken 15 months later, when gout was discovered. Joint destruction was more advanced on the proximal interphalangeal joints with associated subluxation.

## P465

## BILATERAL HUMERAL SOLITARY BONE CYST: ABOUT A CASE

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**Objective:** The solitary bone cyst (SBC) is a benign osteolytic bone tumor with fluid content. It has also been described as a pseudocystic intraosseous formation without epithelial coating, whether empty or filled with serous or blood fluid. For some authors, this lesion is not a real bone tumor but a benign cystic dystrophy. Usually asymptomatic, it is most often located in the proximal metaphyseal part of the humerus and femur in children and young adults, with a slight female predominance. In 90% of cases, the diagnosis is essentially radiological and made during the first two decades of life, exceptionally after 30 years. We report a case of a bilateral SBC discovered fortuitously in a 39-year-old patient.

**Case report:** Mrs. C.M, aged 39, with a history of pulmonary tuberculosis treated 15 y ago, and type 2 diabetes mellitus under oral antidiabetics, consulted for a mechanical pain in both of her shoulders. Standard radiographs revealed ovoid lacunae respecting the cortical bone, with an osteolytic feature, clear contours, and a bilateral "egg-cup shape" in the metaphyseal-epiphyseal regions of the 2 humeral bones. These gaps were associated with acromioclavicular osteoarthritis (Figure 1). The CT scan confirmed the diagnosis of SBC (Figure 2). However, the pain has been linked to the presence of chronic tendinopathies of the subscapular and supraspinatus tendons bilaterally, as well as the right infraspinatus tendon, and to the presence of subacromiodeltoid bursitis in the right shoulder. Regarding the bone cysts, the management consisted of radiographic monitoring with hygienic-dietetic measures in view of the risk of fractures.

SBC is common. It ranks third in frequency among bone lesions after non-ossifying fibroids and exostoses in the growing period. The majority of the cysts are discovered between 5 and 15 years (60%), 10% before 5 years; some (7%) are sequelae discovered in adulthood. It is usually a single lesion, although very rare cases of multiple locations have been described. SBC discovered incidentally in adulthood is often an old cyst that has migrated to the diaphyseal region. It is often latent or consolidated. Sometimes it remains in the metaphyseal region but becomes latent with partial union and persistence of cystic lacunae, and lacunae with fatty replacement. The patient remains completely asymptomatic until the "inaugural fracture" or until the onset of microfractures, which generate pain. The location in the proximal humerus remains particularly asymptomatic (because it is a nonbearing bone) until the inaugural fracture, which makes it possible to make the diagnosis in 95% of cases. The other 5% are discovered fortuitously. The x-ray is often sufficient to make the diagnosis. CT helps in the differential diagnosis, particularly with an aneurysmal bone cyst which has a homogeneous appearance, with or without trabeculations. Humeral cysts that have spared the growth cartilage and humeral diaphyseal cysts have the best prognosis, so the absence of growth cartilage in adulthood may explain their good prognosis. It is a benign lesion, rarely painful or disabling. In fact, the goal of treatment is to avoid fractures, and it should therefore be as simple and as less damaging as possible. The oncological resections proposed by McNamee ADDIN ENRfu are not justified. On the other hand, Morton offered to give spontaneous recovery a chance if a SBC was discovered following a fracture.

Our patient's case is rare depending on the advanced age of discovery, and multiple locations. In addition to the fact that the humerus is a non-bearing zone, associated with the absence of growth cartilage, our aim was to educate the patient regarding the risk of possible fractures.

**Conclusion:** The discovery of a SBC in adulthood is most often fortuitous due to its asymptomatic clinical nature and the rarity of possible fractures, which are the main complication. The prognosis is always better than in children or adolescents because of the absence of growth cartilage. This gives the bone good strength. The management may consist in abstaining from therapy, and is based on clinical and radiological monitoring given the risk of fracture, especially when it is a location in a non-load bearing area (humerus).



Figure 1. Standard X-ray of the shoulders showing ovoid lacunae respecting the cortical bone, with an osteolytic appearance, clear contours, and bilateral "egg-cup shape" fundus in the metaphyseal-epiphyseal regions of the 2 humeral bones. These gaps are associated with an acromioclavicular arthritis.
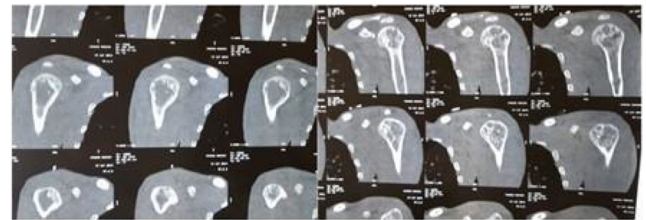


Figure 2. CT scan of the shoulders showing well-limited osteolytic formations with clear contours, respecting the cortex, and homogeneous compartmentalized fluid content. Metaphyso-epiphyseal locations. Typical SBC appearance.

## P466

## LACTOBACILLUS RHAMNOSUS ENHANCES BONE HEALTH VIA MODULATING PERIPHERAL TREGS (PTREGS) IN OSTEOPOROTIC MICE

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**Objective:** Probiotics are defined as viable microorganisms that upon administration in adequate amount confer various health benefits via modulating gut microbial composition. Very few bacterial strains have been studied till date in relation to their effect on bone health. The decrease in number of Tregs leads to various inflammatory conditions of the bone such as osteoporosis, rheumatoid arthritis, etc. Probiotics induce the differentiation of peripheral Treg (pTreg) cells, thereby resulting in prevention of various inflammatory diseases. Based on these facts we were interested in investigating the role of probiotics on the modulation of bone health via its effect on pTregs. In the present study we selected *Lactobacillus rhamnosus* (LR) strain of probiotics to examine its effect on bone health in ovariectomy (Ovx) induced osteoporotic mice model. We were interested in investigating the role of LR on modulation of bone health (in Ovx induced osteoporotic mice model) via its effect on pTregs.

**Methods:** Female C57BL/6 mice were divided into three group's (n=6/group) viz. Sham, Ovx and Ovx+LR. LR was administered orally ($10^9$ CFU/ml) and after 45 d, mice were sacrificed and tissues were analyzed for accessing the role of LR on bone health via various cutting-edge technologies such as SEM, AFM, μCT, FACS and ELISA.

**Results:** We observed that oral administration of LR protected mice from Ovx-induced bone loss, which was confirmed by SEM, AFM, FTIR and μCT analysis of bone samples. We further observed that LR-intake

enhanced bone density in both cortical and trabecular bones of Ovx mice. Interestingly, it was observed that LR-intake enhances percentage of CD4^{+}Foxp3^{+}NRP^{-}Treg cells (pTregs) in both bone marrow (prime site of osteoclastogenesis) and GUT lymphoid tissues (viz. mesenteric lymph nodes, Peyer's patches, small intestine and large intestine). Furthermore, serum cytokine analysis revealed that Ovx mice administered with LR had significantly decreased levels of osteoclastogenic cytokines IL-6, IL-17 and TNF$\alpha$ along with significantly enhanced levels of anti-osteoclastogenic cytokines IL-10, IL-4 and IFN$\gamma$ with respect to Ovx group.

**Conclusion:** Taken together our results for the first time establish an osteoprotective role of LR on bone health via induction of pTregs in Ovx mice.

## P467
### PRESCRIPTION AND USE OF ANALGESICS IN A TERTIARY CARE HOSPITAL

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**Objective:** The rational use of drug is one of the main objectives of national and European drug policy. Analgesics are found in the group of medications frequently prescribed by doctors for pain management. Pain management in the hospital consists of the administration of drugs with analgesic effect. Analgesics vary quite a bit. Depending on the type and etiology of pain, the body may respond better to one painkiller than another. Also, each person responds slightly differently to pain medication. Given these aspects, the objective of this study is to evaluate the prescription of analgesics and the combination of analgesics at a county hospital, in order to properly use these drugs by doctors.

**Methods:** A longitudinal descriptive, retrospective study was performed, based on a quantitative research, using the computer statistical database of the Clinical County Emergency Hospital of Oradea, in 2019. The prescription and consumption of analgesics in hospital departments was analyzed, by types of analgesics, on the medical, surgical, anesthesia and intensive care units, surveillance unit and advanced treatment of critical cardiac patients - USTACC, neonatology intensive care. During the analyzed period, the hospital had 861 beds in its structure, and 39,420 cases were discharged in continuous hospitalization (19463 cases first semester and 19957 cases second semester). It should be mentioned that the hospital does not have an oncology department in its structure (where the prescription of analgesics is increased). Only injectable variants of analgesic medication were analyzed. Local analgesic drugs (patches) were excluded from the analysis.

**Results:** Pain therapy in hospital is performed either using a single analgesic drug or several, in variable combination. The use of analgesic associations is practiced that act through different mechanisms, the final effect being an additive, potentiated one. The combination of three and over three analgesics was not made at the same time, but we find the analgesics prescribed throughout the hospitalization period. The administration of different types of analgesics to the same patient is due to the fact that the initial therapy did not give results and, later, the treatment continued with other analgesics. The prescription of analgesics is performed as follows:

- Non-opioid analgesics are indicated in the treatment of low-intensity pain
- mild nonopioid/opioid analgesics or combinations of paracetamol + opioid are indicated in the treatment of moderate-intensity pain,
- Opioid analgesics are indicated in the treatment of severe pain.

Out of the total number of hospitalized patients in 2019 (39,420), 23,808 patients received at least one analgesic, which represents 60.4% of patients with analgesic treatment out of the total number of hospitalized patients.

**Conclusion:** The most widely used injectable analgesic was metamizole ampoule, with no adverse effects, according to studies and warnings received from the National Agency for Drugs and Medical Devices (agranulocytosis with a lethal prognosis). During the analyzed period, the consumption of metamizole ampoules, as well as the treated patients, decreased in number, however, metamizole ampoules still represent a therapeutic choice of first alternative. Another commonly used analgesic was infusion paracetamol, in which the number of indications increased rapidly. Algifene and dexketoprofen have an upward trend both as therapeutic units used and as the number of patients treated.

## P468
### MEDICAL SERVICES PROVIDED THROUGH HOME CARE

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**Objective:** Home care aims to meet the health and social needs of people in their own homes by providing appropriate and high quality care. People with acute and chronic conditions, who have a certain level of dependence and have a limited capacity to go to a health unit in order to provide the outpatient care recommended by doctors, have the right to medical care at home. The beneficiaries of home health care services are patients of all ages, suffering from chronic progressive, incurable or life-threatening diseases, who have uncontrolled symptoms or psycho-social or spiritual suffering. The purpose of the study is to evaluate the medical services provided through home care.

**Methods:** The study is based on a group of 230 patients from Bihor County, with various pathologies, who were given special care at home by the company SC.X.SA for home medical services, for a well established period. The analysis period was 2018-2019. This study is a retrospective one and in order to achieve it, we analyzed the home care sheets of each patient. The data obtained were centralized in order to analyze the pathological events of the patients included in the study. In this study the evaluation method used was observation and the method of standardized tests.

**Results:** Characteristics of the analyzed group: 57% of patients are over 60 years old, 70% are men and 72% of patients come from rural areas. 30 patients live alone, without relatives (13%), 140 patients live with their family (61%), and 60 patients are cared for by various people (26%). The most common pathologies: oncological diseases (38%), ulcerative diseases (29%) and diabetes (9%). In terms of the type of treatment applied throughout the study, the following distribution was made: antibiotic treatment (22%), wound toilet and local dressing (39%), continuous blood glucose monitoring and insulin administration (7%), monitoring of epileptic seizures (5%), oxygen therapy (10%), administration of anticoagulant treatment subcutaneously (17%). From the beginning of the study until its end, a number of 80 patients were hospitalized due to their worsening condition.

**Conclusion:** The need for home care is undeniable. The incidence of pathologies whose recommendation is home care gradually increases from birth reaching the maximum value towards the end of life, when the patient presents a set of associated pathologies. These conditions require specialist care for a longer period of time, which makes it necessary to provide care at the patient's home.

## P469
### PREVALENCE OF LDL-CHOLESTEROL CONTROL ACCORDING TO THE NEW GUIDELINES IN ELDERLY DIABETES PATIENTS WITH VERY HIGH CARDIOVASCULAR RISK

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**Objective:** Dyslipidaemia is highly prevalent in diabetes mellitus patients and its management has been much improved in the last decades by introduction of statins. Numerous studies demonstrate that very demanding LDL-cholesterol targets are necessary in patients with very high cardiovascular risk in order to prevent the macrovascular events. ESC/EASD 2019 consensus for diabetes and prediabetes gives a target of <55 mg/dL for LDL-cholesterol in diabetes mellitus patients with very high cardiovascular risk. The purpose of our study was to evaluate the value of LDL-cholesterol in a group of elderly patients with type 2 diabetes mellitus according to their pharmacological treatment for dyslipidaemia.

**Methods:** The study is a retrospective one. 145 type 2 diabetes mellitus patients from the Clinical County Hospital of Oradea treated in the Internal Medicine - Diabetes compartment between 1.09.2020 – 1.05.2021 were considered for inclusion in the study. Anamnesis, physical examination, assessment of cardiovascular risk factors, cardiologic exam, diabetes duration, screening for diabetes complications, LDL-cholesterol and investigations regarding dyslipidaemia treatment were investigated. Their cardiovascular risk was determined according to the definition provided by the ESC/EASD 2019 consensus on diabetes. After applying the inclusion criteria: age ≥65 y and the presence of very high cardiovascular risk 105 patients remained in the study.

**Results:** The average age of the patients was 68.5 years, there were 60 men and 45 women. 43 patients (40.95%) had a level of LDL-cholesterol <5 5mg/dL. 35 patients (33.33%) were on high-intensity statin therapy, among them 18 had an LDL-cholesterol <55 mg/dL (51.43% of 35). 14 patients (13,33%) were on high-intensity statin therapy + ezetimibe, among them 10 had an LDL-cholesterol in target (71.43% of 14). 4 patients were on state-of-the-art therapy with high-intensity statin+ ezetimibe and PSCK9 inhibitor, a newly introduced therapy for LDL-cholesterol management, among them 3 patients had LDL-cholesterol <55 mg/dl (75% of 4). 34 patients (32.38%) were on moderate-intensity statin therapy, among them only 12 patients had an LDL-cholesterol <55 mg/dL (35.29% of 35). 18 patients did not have any treatment for dyslipidaemia, mostly were not aware that they suffer of dyslipidaemia, among them none had LDL-cholesterol <55 mg/dL.

**Conclusion:** Screening for dyslipidaemia must be done in all diabetes mellitus patients. High-intensity statin therapy in combination with ezetimibe is effective in approximatively 70% of cases to achieve a target of LDL<55 mg/dL. PCSK9 inhibitors need to be more widely use as they appear promising for reaching a target of LDL-cholesterol <55 mg/dL in this category of population. A periodic monitorisation of LDL-cholesterol levels at 3 months needs to be done in all diabetes mellitus patients.

## P470
### INTERVENTION THRESHOLDS (ITS) FOR POSTMENOPAUSAL WOMEN: STUDY BASED ON PHILIPPINE FRAX MODEL

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**Objective:** The probability of major osteoporotic (MOFP) and hip fractures (HFP) derived from FRAX is widely used to identify patients with high fracture risk. This study was designed to estimate suitable ITs for the management of postmenopausal osteoporosis in Philippine women.

**Methods:** Age dependent ITs were established based on the rationale developed by the National Osteoporosis Guideline Group in the UK considering that if a woman with a prior fragility fracture is eligible for treatment, then a woman with the same fracture probability but in the absence of a previous fracture should also be eligible. ITs were calculated for a woman of BMI 25 kg/m$^2$ aged 40-80 y with a previous fragility fracture sans other clinical risk factors. Fixed ITs were developed using a database of 1500 postmenopausal women who underwent DXA as part of routine clinical evaluation. MOFP and HFP were estimated using clinical risk factors and femoral neck BMD as input variables. Women were categorized to high risk and low risk groups according to the age dependent ITs. ROC analyses were performed with the risk category as the dependent variable and MOFP and HFP as independent variables. The best cut-points (fixed ITs) were determined considering the optimum sensitivity and specificity.

**Results:** The age dependent ITs of MOFP ranged from 1.8-6.9% and HFP ranged from 0.3-3% between 40-80 y of age. MOF IT of 3.75% and hip fracture IT of 1.25% were the best cut off values observed as the fixed IT and noninclusion BMD in the fracture risk estimations did not change the values. Hybrid IT for those <70 y was 3% for MOFR and 1% for HF. For those >70 y, the ITs are age-dependent.

**Conclusion:** ITs estimated in the current study are concordant with those reported from the neighboring countries. These can be used to identify high fracture risk patients in the Philippines.

## P471
### INCREASED URIC ACID VALUES IN PATIENTS WITH PSORIASIS: THE RISK OF DEVELOPING PSORIATIC ARTHRITIS

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**Objective:** Psoriatic arthritis is a chronic inflammatory joint disease, which is part of the group of disease called spondyloarthritis, associated in most cases with skin damage. It is known for the diversity of its onset, evolution and response to treatment. Psoriasis is a chronic, inflammatory, systemic disease, with skin damage and with evolutionary potential for joint damage. The aim of this study is to identify a possible link between hyperuricemia present in patients with psoriasis and their risk of developing psoriatic arthritis.

**Methods:** A group of 37 patients diagnosed with psoriasis (21 men, 16 women) was studied, of whom 13 had psoriatic arthritis. The value of serum uric acid was measured by spectrophotometric method in all patients. The normal values are for men: <7 mg/dl, and for women: <5 mg/dl. The age of psoriasis was also assessed, ranging from 3-10 y.

**Results:** Of the 24 patients in the group with psoriasis who had not developed psoriatic arthritis, 2 (8.3%) were identified as having serum uric acid values above normal. Of the 13 patients diagnosed with psoriatic arthritis 3 (23%) had hyperuricemia. Two patients who had a disease history of 3 years did not have hyperuricemia. From the rest of the patients, who had the disease of >3 y they had hyperuricemia as follows: one (20%) at 4 y of illness, and the rest at more than 6 y of illness.

**Conclusion:** It is known that psoriasis is associated with elevated serum uric acid. Following this study we can conclude that a higher percentage of patients with psoriatic arthritis had associated hyperuricemia than patients with psoriasis who did not develop arthritis. We can also conclude that a longer history of psoriasis could predispose the patient to hyperuricemia. Therefore, this correlation may influence the evolution of patients with psoriasis to psoriatic arthritis. More specialized studies are needed to support these conclusions.

## P472
### CHRONIC FATIGUE SCORES DEPEND ON THE LEVEL OF PHYSICAL ACTIVITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Nonpharmacological treatment strategies can be used to reduce chronic fatigue in rheumatoid arthritis (RA) patients. This study aimed to evaluate the effect of a active lifestyle using aerobic exercise (walking) on changes in chronic fatigue in patients with RA in the short term.

**Methods:** 102 women with RA (mean age 54.8±11.3 y; duration of RA 9.5 [5;15] y; DAS28-SOE activity 2.85 [2.32;3.06] points; baseline fatigue on the VAS screening scale 71.2±9.1 points) were included in the study. Bristol Rheumatoid Arthritis Fatigue Numerical Rating Scales (BRAF-NRS V2) was used to assess fatigue, 50-m walking test was used to assess the functional state of patients in dynamics. Patients' rehabilitation program (RP) (for 21 d) included morning hygienic exercises, dosed walking (daily, 30-60 min duration, taking into account physical exercise tolerance according to the 6MWD test) and walking in the air for up to 3-3.5 h/d.

**Results:** Patients were divided into two groups according to their level of physical activity (according to the average number of steps walked per day): group I (sedentary lifestyle) included patients with <5-6 thousand steps/d; group II (active lifestyle) included patients with ≥7-8 thousand steps/d. Physical parameters underwent significant changes in group II of RA patients (reduction of walking time and number of steps in 50-m test: p<0.001 and p=0.013, respectively) upon completion of RP. No significant changes were registered in patients with sedentary lifestyle (group I) (p=0.60 and p=0.54, respectively). In group I of RA patients, against the background of preserved fatigue scores on the NRS-severity and NRS-overcoming scales, there was even a slight increase in VAS fatigue (p=0.008) and NRS-effect (p=0.01). Patients with an active lifestyle (group II) demonstrated decreased fatigue severity on all scales: VAS (p<0.001), NRS-severity (p<0.001), NRS effect (p<0.001), and NRS-overcoming (p=0.001).

**Conclusion:** The BRAF-NRS is a useful research tool to identify the different aspects of fatigue most affected by nonmedicinal treatments. Increased physical activity with walking has a significant effect on fatigue in RA, suggesting a good short-term effect of aerobic exercise.

## P473
### AIR POLLUTION IS A PREDICTOR OF POOR RESPONSE TO BIOLOGICAL THERAPIES IN CHRONIC INFLAMMATORY ARTHRITIDES

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**Objective:** There is increasing evidence that environmental air pollution is associated with both development of chronic inflammatory arthritides (CIA). The role of air pollutants on the treatment response of CIA (including psoriatic arthritis [PsA] and ankylosing spondylitis [AS]) is still unclear. The aim of the present study is to determine the association between the concentration of air pollutants and biological drug retention rates in CIA.

**Methods:** We retrieved longitudinal data of patients affected by CIA on biological therapies and of the daily concentration of air pollutants in the Verona area. We designed a case-crossover study to compare the exposure to pollutants in the 30-d and 60-d periods preceding a drug switch or swap due to disease progression referent to the 30-d and 60-d periods preceding a visit with stable treatment for at least 6 months.

**Results:** 1286 patients with CIA (888 with RA, 260 with PsA and 138 with AS) with 5454 follow-up visits were included in the study. 13,636 daily air pollution records were retrieved. We found an exposure-dependent relationship between exposure to air pollutants and CRP serum levels in CIA. At PM10 exposures of >50 μg/m³ and >40 μg/m³ we found a 150% and 65% higher risk of having CRP above 5 mg/L respectively (OR 2.564, 95%CI 2.114-3.110 and OR 1.659, 95%CI 1.440-1.910, respectively.). If the threshold was set at >30 μg/m³ of PM10 (below the European Union health protection limit) we still found a 38% higher risk of having altered CRP (OR 1.383, 95%CI 1.206-

1.588). Among CIA patients, 280 patients (21.7%) had at least 2 follow-up visits with at least one drug switch or swap due to drug inefficacy and one visit with stable treatment for at least 6 months, serving as our sample for the case-crossover study. We found that air pollutants concentrations were higher before a switch or swap due to drug inefficacy (Figure 1A). Figure 1B shows the receiver operating characteristic (ROC) curve for the prediction of switch or swap due to drug inefficacy. Discriminatory capacity of disease activity alone was the highest (AUC 0.841) but when the prediction model included the concentrations of air pollutants in the 60 d before the visit the discriminatory capacity increased (AUC 0.879).

**Conclusion:** We found that environmental air pollution was a determinant of poor response to biological treatment in a cohort of patients with CIA followed over a 5-y period. An intervention aimed to decrease the fossil combustion emissions might have beneficial effects on biologics persistence rate of patients with CIA.
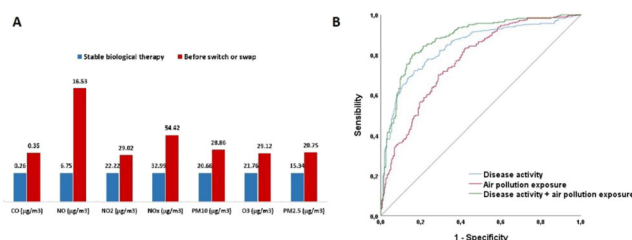


Figure 1. A) Mean concentrations of air pollutants in the 60-d period before switch or swap visit compared to the stable treatment visit. p<0.001 between all groups. B) ROC curves for the prediction of switch or swap due to drug inefficacy

## P474
### DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS (DISH) IS ASSOCIATED WITH POOR PROGNOSIS IN YOUNG PATIENTS WITH CORONARY ARTERY DISEASES (CAD)

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**Objective:** DISH has been largely associated with metabolic syndrome. However, it is not clear if DISH poses a risk of developing cardiovascular diseases (CVD) independently from traditional CV risk factors. In addition, an association between the extension of vertebral calcification and the severity of CAD has never been demonstrated.

**Methods:** We conducted an observational study on patients undergoing diagnostic coronarography at the cardiology department of the University of Verona, Italy. We collected clinical and radiographical data of the patients in the study, as well as the SYNTAX II score. The SYNTAX II score characterizes the anatomical extent and prognosis of CAD in terms of the number of lesions, functional importance, and complexity, SYNTAX II >34 is commonly considered a poor prognostic factor for revascularization. To determine the association between severity of CAD and DISH we performed a binary logistic regression. Syntax II score with a threshold of 34 was considered as the dependent variable, DISH and other important CVD risk factors were considered as independent variables.

**Results:** 185 patients were enrolled in the study. The mean age of the population was 66.7 y and the vast majority were men (82.9%). 44% of the cohort were diagnosed with DISH (definite diagnosis according to Resnick criteria), 114 (61%) were diagnosed with standard X-rays and 73 (39%) were diagnosed using chest HRCT. Overall, DISH was associated with an increased risk of having SYNTAX II score >34 points. In patients aged <70 y (n 110, 58.8%) the diagnosis of DISH was associated with a 7-fold higher risk of poor prognosis on SYTNAX II score independently

from age, sex, glomerular filtration rate, hypercholesterolemia, diabetes, smoking status, familiarity to CVD, stroke, arterial hypertension (aOR 7.24, 95%CI 1.08-48.38, p 0.041). The extension of vertebral calcifications was associated with SYNTAX II score in all patients (rho spearman 0.378 p<0.001) and in patients aged <70 y (rho spearman 0.255 p 0.012) (Figure).

**Conclusion:** In our cohort of patients at high risk of CAD, the diagnosis of DISH was associated with complex CAD and poor prognosis independently from traditional CVD risk factors.
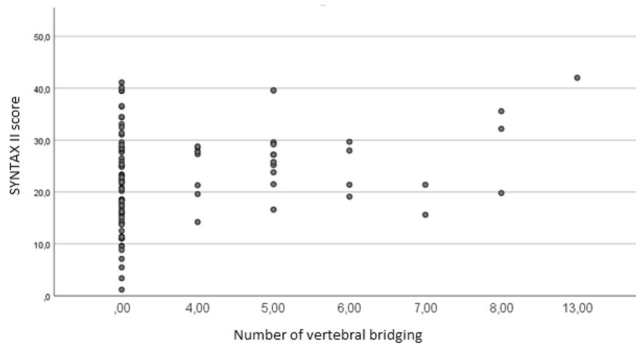


Figure. Association between extent of vertebral calcifications and complexity of CAD lesions (SYNTAX II Score).

## P475

### FRAX® PREDICTIVE ABILITY TO PREDICT MAJOR OSTEOPOROTIC FRACTURES AND HIP FRACTURES IN THE SPANISH POPULATION: THE EPIFROS ASTURIAS COHORT

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**Objective:** To assess the FRAX tool efficacy among the general population in the north of Spain where a medium hip fracture risk has been established.

**Methods:** The cohort EPIFROS-Asturias was made up of people aged 40-90 y of age. Spanish FRAX without BMD. All osteoporotic fractures (AOF), major fractures (MOF) from FRAX 2009 data register were analysed. Clinical risk factors (CRFs) included in FRAX were analysed along with the number of falls over the year prior to 2019. Risk estimation using odds ratio (OR) for variables: age (<65/≥65 y), sex (male/female), rheumatoid arthritis (RA) and others CRFs (yes/no).

**Results:** The CRFs showing significant differences when AOF are analysed: age OR 2.92 (95%CI 1.07-7.99), sex: OR 3.19 (95%CI 1.25-8.16) and RA OR 10.63 (95%CI 2.03-55.55). When MOF are analysed: age OR 4.91 (95%CI 1.10-21.90) and RA OR 18.93 (95%CI 3,50-102,39). When HF are analysed only prior fracture OR 49.27 (95%CI 4.15-585.44). The overall predictive value obtained using FRAX without BMD for MOF was 1.4 and 0.7 for HF. Compared with previous results in our country it seems that the predictive capacity of FRAX in Asturias is more efficient than in Catalunya for both MOF and HF.

**Conclusion:** The EPIFROS cohort from the Spanish general population shows statistically significant factor differences in ages ≥65 years old, females and cases of RA when all fractures were analysed. The Spanish FRAX without BMD predictive capacity used on the Asturian population shows more accuracy than in other regions of Spain like Catalonia. This

may be due to the differences in the intermediate hip fractures risk in Asturias as opposed to the high hip fracture risk in Catalonia.

## P476

### EPIDEMIOLOGY OF OSTEOPOROTIC FRACTURES AND SUBSEQUENT FRACTURES IN THE ASTURIAN REGION OF SPAIN: THE EPIFROS COHORT

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**Objective:** To assess the epidemiology of osteoporotic fracture (OFx) among people from general population in the north of Spain, where a moderate level of hip fracture risk has been detected.

**Methods:** The cohort EPIFROS-Asturias was made up of people aged 40-90 years old. OFx were analysed as: all osteoporotic fractures (AOF), major osteoporotic fractures (MOF): spine, hip, humerus and forearm in 2009-2019 period were analysed. Risk estimation using odds ratio (OR) for variables: age (<65/≥65 y) sex (male/female).

**Results:** 285 individuals were included. Global age 61.5±13.9 y. 129 men (45.3%). 27 AOF (21 in women) OR 3.1 (95%CI 1.2-8.1). 17 MOF (2 in <65 y and 15 in ≥65 y). The incidence increases progressively with age (<65/≥65 y) OR 4.9 (95%CI 1.1-21.8): 3 (20%) 65-74 y, 4 (26.7%) 75-84 y, 8 (53.3%) ≥85 y. Women with 21 AOF observed. 4 AOF in <65 y: 1 distal forearm, 1 humerus, 1 rib, 1 foot. 17 AOF ≥65 y: 11 MOF (2 spine, 2 hip, 6 forearm, 1 humerus) and 1 pelvis, 1 tibia/fibula, 2 foot, 2 ribs. 2 women had more than 1 OFx. Men with 6 AOF observed, 5 of them in ≥65 y: 3 MOF (1 spine, 1 proximal humerus, 1 forearm) and 2 tibia/fibula. 1 man suffers more than 1 OFx.

**Conclusion:** The epidemiology of fractures in this region of north of Spain shows that gender and age >65 y increase the risk of fractures for both men and women for any fracture or MOF combined. This is an excellent opportunity to identify people at risk of fractures and to consider the most suitable approach and treatment.

## P477

### FRAILTY AS A STATE OF INCREASED RISK OF FALLS IN ELDERLY PATIENTS WITH TYPE 2 DIABETES MELLITUS: THE TUGGI COHORT

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**Objective:** To evaluate the risk of falling in frail type 2 Diabetes Mellitus (2DM) patients.

**Methods:** An observational study of people aged ≥65 years old obtained from the general population. Including criteria were: 2DM ≥65 y. One year follow-up calls every 2 months asking for falls. Risk estimation using odds ratio (OR) for variables: age, comorbidity, physical performance, polypharmacy, falls.

**Results :**

- 107 men and women fulfilled the inclusion criteria (39% of total) (167 excluded) with a mean age of 77±6 y. 107 (100%) Barthel ≥90.
- 46 (43%) had 2DM complications: 6 (5.61%) neuropathy, 22 (21%) retinopathy, 8 (7.48%) altered peripheral pulses, 23 (21.5%) moderate to severe kidney disease, 8 (7.48%) ischemic heart disease, 9 (8.41%) cerebrovascular disease.
- During the follow up 27 (25.23%) (14 women, 13 men) reported falls, 7 (6.5%) >1 fall.
- Age ≥75 y [OR 2.71 (95%CI (1.03-7.17) p=0.04 ] and >1 2 DM complications conditions at baseline [OR 2.52 (95%CI 1.04-6.11) p=0.038] were associated with falls.

- Frailty conditions were evaluated: The Timed Up ang Go (TUG) test ≥13.5 s [OR 1.93 (95%CI 0.71-5.26) p=0.05] but it was 12.24 s and 10.37 s between fallers and non-fallers. Also remained not significant frail Fried phenotype, Charlson comorbidity index 4, gait speed over a distance of 4 m <cutoff point, hand grip <cutoff point, polypharmacy ≥5 drugs at the same time, moderate and large (Pfeiffer >4) cognitive impairment and risk nutritional status (MNA-SF 0-11).

**Conclusion:** Risk of falling in 2 DM is usually multifactorial as complications of the disorder itself, frailty, comorbidities and geriatric syndromes that contribute to a gait disorder. Our results have shown significant differences between fallers among advanced age ≥75 y and 2 DM complications combined. TUG test is known to identify physical frailty which negatively impacts the risk of falls: further studies with large population are required to demonstrate it in 2 DM.

## P478
## UROTHELIAL CARCINOMA-RELATED HYPERCALCEMIA

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**Objective:** Malignancy-related hypercalcemia might act as an iceberg top when it comes to detection of prior unknown cancer. Unless there is a mammary neoplasia, the prognostic is extremely poor. Therapy is oriented to control the calcium levels, also to target the potential bone metastasis and, of course, to control the primary oncologic disease (1-6).

**Case report:** This is a 58-year-old, menopausal female, known with type 2 diabetes mellitus under oral medication, admitted for persistent asthenia, fatigue, tendency to weight loss within last 2-3 months, thus a glycaemia control was performed and found normal (101 mg/dL, HbA1c=6.6%), but in addition to this assay, a serum total calcium was assessed and found high 12.5 mg/dL (normal: 8.5-10.2 mg/dL) under no oral uptake; also, suppressed PTH=6.26 pg/mL (normal: 15-65 pg/mL), high resorption marker CrossLaps=1.03 ng/mL (normal: 0.33-0.782 ng/mL), normal formation markers osteocalcin=30.77 ng/mL (normal: 15-46 ng/mL), P1NP=40.92 ng/mL (normal: 15-46 pg/mL), and vitamin D insufficiency 25OHD=24 ng/mL (normal >30 ng/mL), low 24-h urinary calcium 0.05 g/24-h (normal: 0.07-0.3 g/24-h). High erythrocyte sedimentation rate of 102 mm/1-h (normal <25 mm/1-h) indicated a imaging scan, hence computed tomography was performed and found a left kidney mass with retroperitoneal/adrenal infiltration of 13.53x10.65x7.6 cm, and multiple lymph nodes and intra-arterial several thrombus at left renal artery of maximum 1.68x1.14 cm; an osteocondensation area of 2.61x1.98x6.12 cm at the level of iliac bones, next to sacro-iliac articulations. Adrenal function seemed intact – morning plasma cortisol 18.74 μg/dL (normal: 6-21 μg/dL). She was referred to oncological urology, and urothelial carcinoma G4 was confirmed and removed, with fatal outcome within a few weeks later.

**Conclusion**: Hypercalcemia accompanying aggressive carcinoma is a warning sign, especially in the cases when the value itself is not very high (which on the other hand, may delay the diagnostic).

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## P479
## HOSPITAL / CITY OSTEOPOROSIS PATIENT FOLLOW-UP

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**Objective:** Densitometric osteoporosis and fracture osteoporosis are poorly diagnosed, assessed and treated. The creation of a day hospitalization and an osteoporosis course with liberal health professionals should make it possible to follow the patients over 4 years.

**Methods:** We defined a day hospitalization with an orthopedic surgeon, a rheumatologist, a doctor responsible for medical IT, a dietitian, an occupational therapist. The liberal care pathway was built around the computer tool Parceo with 2 treating physicians, a rheumatologist, a physiotherapist, a dietitian, 3 nurses.

**Results:** 6 weeks after the fracture the patient participate 2.5 day hospitalizations including the biological assessment, X-ray looking for vertebral compression, dental assessment to avoid subsequent dental avulsions, a rheumatological consultation, an individual consultation with a dietitian, an occupational therapist, a social worker for housing development assistance and a therapeutic education session on knowledge of the disease, how to provide 1.2 g of calcium in the diet, how to fit out your home. Drug treatment is defined by the rheumatologist and sent to the attending physician, a diphosphonate infusion is performed if this is the therapeutic indication selected. This assessment is sent to the attending physician.

Parceo is a computer tool that makes it possible to create a professional space in which are grouped together sheets written by each health professional for his colleagues, describing the goals and expected means in his field of activity. Thus the dietitian described the goal of an intake of 1.2 g of calcium in the diet by describing menus rich in calcium, the dietary calcium intake of the patient is assessed by a questionnaire. The patient file is opened by the attending physician which includes the history, type of osteoporosis, clinical and laboratory data, and the proposed medical treatment. Each health professional is required to enter the data he has collected concerning his field, for example the home nurse is responsible for assessing ground balance, the pharmacist for compliance, etc.

**Conclusion:** We hope to improve the diagnosis, the assessment, the follow-up and therefore avoid the appearance of fractures in elderly people in our territory.

## P480
## WHAT DO WE KNOW ABOUT TERIPARATIDE ON DELAYED AND NONUNION FRACTURE TREATMENT: A SYSTEMATIC REVIEW

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**Objective:** To systematically identify and review literature evaluating the efficacy and safety of teriparatide on delayed and non-union fractures.

**Methods:** A systematic literature search was performed in MEDLINE using the query ""fracture" AND "nonunion" AND "teriparatide"". All retrieved articles were screened by title and abstract and the eligible ones were kept for full text review. Reference lists were additionally searched. Original research papers encompassing treatment of delayed and non-union fractures with teriparatide in patients aged ≥18 years old were considered for inclusion.

**Results:** The systematic review identified 63 search results, of which 36 were excluded after title and abstract screening because they did not fit the purpose of the work. After full text review and addition of 5 articles from reference lists, 28 original research papers were included: 20 case reports,

6 case series and 2 longitudinal uncontrolled studies, in a total of 81 patients, 48 females (59.3%), with a median age [min, max] of 64 [19, 91] years old. Several fracture sites have been described, with the femur (n=35) and the tibia (n=26) being the most frequently affected. As for fracture mechanisms, 30 occurred after trauma and 17 were fragility fractures and, 39 patients were submitted to surgery before teriparatide. The study with the largest number of patients, however, did not describe the mechanisms nor the number of patients with previous surgery. The median time [min, max] between initial fracture and start of teriparatide was 7 [3, 36] months. Most studies used daily injection of 20 µg teriparatide, except 4 studies that used the weekly formulation of 56.5 µg. The median [min, max] duration of treatment was 6 [0.8, 24] months. Overall, 77 (95.1%) had fracture union following a median [min, max] time of 7 [3, 31] months. Only 1 patient (1.2%) reported minor adverse effects with teriparatide, although this information is missing in 22 patients. It should be noted that in 9 patients teriparatide was combined with revision surgery and in 1 patient with low intensity pulsed ultrasound.

**Conclusion:** Despite being an off-label use, the existing evidence suggests that teriparatide may be effective and safe for the treatment of delayed and nonunion fractures. However, there may be publication bias. Prospective randomized clinical trials are lacking and are needed to confirm these results.

## P481
### COMORBID DISEASES IN PATIENTS WITH RHEUMATOID ARTHRITIS AND OSTEOPOROTIC FRACTURES

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**Objective:** To study and compare the frequency and structure of comorbid diseases in rheumatoid arthritis (RA) patients with and without osteoporotic fractures.

**Methods:** The study included 80 women with RA, aged 30-80 y. Mean age 62.5±8.7 y. Mean disease duration 23.2±10.1 y. Most of the patients had moderate RA activity (DAS28 - 3.76±1.17), positive rheumatoid factor - 53 (66%), antibodies to cyclic citrullinated peptide - 44 (55%). All patients took a clinical examination, assessment of the anamnestic data. Comorbidity was assessed using the cumulative disease rating scale (CIRS) and the Charlson index (CCI).

**Results:** 74 (92.5%) patients had comorbidities diseases, 70% of them had hypertension (HT), 35% ischemic heart disease (IHD), 25% obesity, 20% peptic ulcer disease (PUD), 10% diabetes mellitus (DM); the total CIRS score and CCI were 7.21±3.21 and 4.66±1.76, respectively. Osteoporosis had 51 (64%) patients. Among patients with comorbid diseases, 36 (49%) had osteoporotic fractures. The patients were divided into two groups: group I - 36 patients with fractures, group II - 44 patients without fractures. Age, RA activity, disease duration, CIRS, CCI, incidence rate of IHD, PUD and DM did not differ significantly between groups. Patients of group I significantly more often had HT - 31 (86%) vs. 25 (57%) (p=0.004), while among patients of group II there were significantly more obese patients - 5 (14%) vs. 15 (34%) (p=0.039). Group I patients more often used glucocorticoids (GCs) for 3 months or more - 32 (88%) vs. 27 (61%) (p=0.004).

**Conclusion:** The incidence of comorbid diseases in women with RA - 74 (92.5%). Among patients with comorbidity, osteoporotic fractures had 36 (47%) patients. In comorbidity structure there was a predominance of HT, IHD and obesity. Osteoporotic fractures are associated with HT and GCs, while obesity may be a protective factor in the development of fractures.

## P482
### THE LINK BETWEEN RHEUMATOID ARTHRITIS AND AUTOIMMUNE DISEASE

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**Objective:** Autoimmune diseases are conditions during which individuals develop antibodies against their cells, tissues and organ systems. Autoimmune diseases can be either organ-specific or non-organ-specific in their clinical presentation. Rheumatoid arthritis (RA) is an autoimmune disease where the body's immune system attacks its healthy tissues. Systemic in nature, it mainly destructively targets the joints. It is characterized by increased levels of cytokines such as TNF. TNF appears to have an etiologic role in thyroid dysfunction, which is a common comorbidity in RA. Autoimmune thyroid disease (ATD) is a chronic disease and is the most common organ-specific autoimmune disorder, usually resulting in hypofunction of the thyroid gland. This research aims to explore the link between RA and ATD.

**Methods:** During one year, 843 patients with RA, mostly females aged 42-67 y, participated in the study. 629 of them had seropositive RA and 214 had seronegative RA. Among participants with seropositive RA, 396 developed ATD unrelated to the RA treatment strategy.

**Results:** 63% of patients with seropositive RA developed ATD regardless of the RA treatment scheme.

**Conclusion:** Our study demonstrated an increased risk of developing ATD in patient with seropositive RA. This association does not prove any causality and may also reflect the inverse relationship of an increased risk of RA in ATD patients. Further studies are warranted to explore the causal link between the two autoimmune diseases.

## P483
### THE EFFICACY OF VITAMIN D USE IN PATIENTS WITH ENDOMETRIOSIS

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**Objective:** Endometriosis is one of the most common diseases in reproductive ages. It affects patients' quality of life and fertility. Endometriosis causes severe pain and/or infertility in reproductive women. The prevalence of endometriosis is known to be 2-10% in the reproductive age. Symptoms of endometriosis are dysmenorrhea, non-cyclic pelvic pain. One of the widely used pain scales for endometriosis-related pain is the numeric rating scale (NRS-11) for indication of severity of dysmenorrhea. The rating was 0 for no dysmenorrhea, 1-3 for mild dysmenorrhea, 4-6 for moderate dysmenorrhea, and 7-10 for severe pain. Vitamin D deficiency is an important public health problem worldwide. Epidemiological studies showed that low D concentrations are associated with various acute and chronic diseases. Current study aims to assess the effectiveness of vitamin D supplementation in the complex treatment of endometriosis.

**Methods:** This is a prospective study with 74 participants aged 19-37 years old with documented endometriosis (endometrioma of up to 5 mm). Vitamin D group presented with 37 patients who received PO vitamin D of 50,000 IU twice a week, in addition to standard therapy. The control group received only standard therapy presented with oral contraceptives and NSAIDs as needed.

**Results:** Vitamin D group demonstrated a significant decrease in pain and discomfort compared to controls. Possible mechanisms of vitamin D in pain management are anti-inflammatory effects mediated by cytokine and prostaglandin release and effects on T-cell responses. Of particular interest is the recent discovery of vitamin D mediated inhibition of prostaglandin E2, which provides a reliable mechanistic explanation.

**Conclusion:** Taking into account all the above mentioned, we conclude that administration of vitamin D as a support treatment has a distinct positive influence on patients with endometriosis.

## P484

### ANALYSING DUAL-ENERGY X-RAY ABSORPTIOMETRY IMAGES USING MACHINE LEARNING

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**Objective:** Osteoporosis is a bone disease which is diagnosed through x-ray imaging methods such as DXA on different anatomical regions, i.e., hip, neck. The images acquired through DXA and their diagnostic classification is a problem, which could easily be solved using machine learning (ML). This is achieved through model training using a known dataset. The method uses x-ray image data on the above mentioned anatomical region and uses them for diagnostic. The aim of our study is to classify DXA images of healthy bone and such with low BMD using ML and in that way to diagnose osteoporosis of the hip neck.

**Methods:** In our study we used TensorFlow and Pyhon to create a convolutional neural network (CNN) which we consequently trained to classify DXA images of the hip. The two classes consisted of one class of subjects with low BMD (osteoporosis) and another class of subjects with healthy bone (normal BMD). The dataset for training consisted of 895 images of the hip. The images were in the PNG format with dimension 800x800. The model was created with subsequent layers of nodes in the CNN. We used the open source library for Computer Vision (OpenCV) for image processing. The validation and training loss were graphically visualized using matplotlib for Python.

**Results:** The model was trained with 671 images and then tested on 224 images, which demonstrated high accuracy and low loss function. The achieved accuracy was almost 90% and the loss function as low as 0.05. We used the model to classify all 895 images of the hip. The diagnosis which the model classified for each image was compared with the actual diagnosis from the dataset using phi coefficient. The coefficient showed strong correlation of the predicted values with the actual ones reaching value of 0.750. This confirmed the high accuracy of the model.

**Conclusion:** ML is a powerful method, which could be used in the healthcare and medicine to help physicians make decisions regarding diagnosis. In our study it showed its potential to predict and classify DXA image data.

## P485

### RISK FACTORS FOR FRAX-ESTIMATED 10-YEAR PROBABILITY OF MAJOR OSTEOPOROTIC FRACTURE ASSESSED WITH RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY

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**Objective:** Osteoporosis is a socially significant disease with high prevalence, leading to fractures with great economic burden (1,2). Fracture risk assessment tool (FRAX) is the most popular algorithm to determine fracture risk by risk factors with or without BMD. Radiofrequency echographic multispectrometry (REMS) is an innovative approach for assessment of the ultrasound-based BMD ($BMD_{US}$) of the axial skeleton with integrated FRAX software. The aim of the current study is to assess the multivariate significant risk factors for FRAX 10-y major osteoporotic fracture (MOF) ≥20%.

**Methods:** 274 women with mean age 62±12 y (range 33-88 y) underwent REMS acquisitions with evaluation of FRAX. Patients were divided into two groups: with FRAX 10-y major osteoporotic fracture (MOF) <20% and with FRAX MOF ≥20%. Multivariate logistic regression analysis was used to assess the risk factors for FRAX-estimated 10-y MOF ≥20%.

**Results:** Use of corticosteroids (CS), rheumatoid arthritis (RA) and $BMD_{US}$ of the left femoral neck (FN) were independent risk factors for FRAX MOF ≥20% with significance of the model p=0.006. Previous fracture increased the risk of FRAX MOF ≥20% by a factor of 38.77, so women with a previous fracture showed about a 38.8 times higher risk of major osteoporotic fracture than women without a previous fracture. Women who used CS had about a 13.5-fold higher risk of major osteoporotic fracture than those who did not use CS. RA increased the risk by 6.92 for FRAX MOF ≥20%. Odds ratio for $BMD_{US}$ of the left FN was 0.710 g/cm$^2$ hence each 1% increase in the $BMD_{US}$ of the left FN decreased the risk for FRAX MOF ≥20% by 0.29%.

**Conclusion:** Previous fractures, use of CS, RA and $BMD_{US}$ of the left FN were the only independent risk factors for FRAX-estimated 10-y MOF ≥20% assessed with REMS.

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## P486

### TRENDS IN THE USE OF ANTIOSTEOPOROSIS MEDICATIONS AMONG POSTEMENOPAUSAL WOMEN: THE NHANES 1999-2000 TO 2017-2018

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**Objective:** To examine trends in the prevalence of antiosteoporosis medications (AOM) use among U.S postmenopausal women between 1999-2000 and 2017-2018.

**Methods:** The National Health and Nutrition Examination Survey cycles 1999-2000 through 2017-2018 were analyzed to examine trends in the prevalence of AOM use among women aged 50 years and older. The joinpoint regression software was used to detects points at which significant changes in the direction and magnitude of the trends occur over time. The results are presented as the average annual percent change in prevalence with their corresponding 95% confidence interval.

**Results:** A total 13,826 women with a mean age of 64.2 y comprised the study sample. Of those, 6.9% were taking AOM, accounting for an estimated 3.3 million postmenopausal women during the study period. Overall, older women and non-Hispanic white had a higher prevalence of AOM use than those who did not. Moreover, the mean use of AOM increased from 1.4 y in 1999-2000 to 6.3 y in 2017-2018. Notably, 5.1% of women were taking bisphosphonates, which was the most frequently AOM prescribed (74.2%). As shown in Figure, the prevalence of AOM use increased from 5.0% in 1999-2000 to 10.9% in 2007-2008, corresponding to an annual percent change in prevalence rate of 12.5% (95%CI, -12.2 to 44.2%). However, from the cycle 2007-2008 onwards, a significant downward trend in the prevalence of AOM use by -23.3% (95%CI, -23.3% to -37.7%) per survey cycles occurred. Similarly, the prevalence of bisphosphonates use increased by 9.9% (95%CI, -24.4% to 59.6%) from 2.2% in 1999-2000 to 8.0% in 2007-2008. Subsequently, the prevalence of bisphosphonates use markedly decreased by -22.6% (95%CI, -38.8% to -2.1%) from 8.0% in 2007-2008 to 3.7% in 2017-2018.

**Conclusion:** The progressive decrease in the prevalence of AOM use among postmenopausal between 2007-2008 and 2017-2018 may be explained by a marked downward trend in the use of bisphosphonates during the same period. Further research is needed to identify factors associated with a low prevalence in the use of AOM.

Figure 1. Trends in the prevalence of antiosteoporosis medications use in postmenopausal women
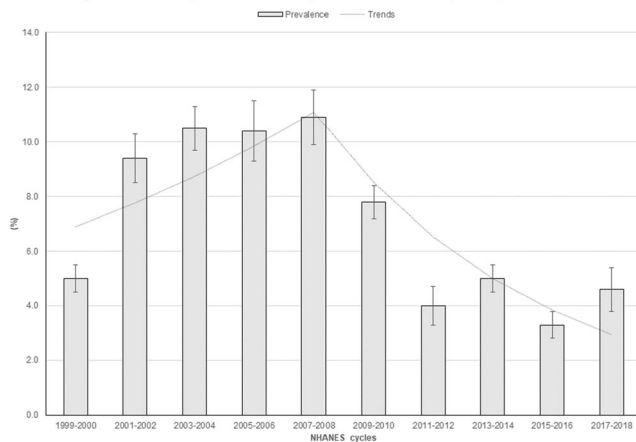


## P487
### RANKL AND OSTEOPROTEGERIN ASSOCIATIONS WITH BONE MINERAL DENSITY IN ARAB POSTMENOPAUSAL WOMEN

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This study aims to investigate the relationship between serum OPG and RANKL with BMD in Arab postmenopausal women. In this cross-sectional study, a total of 617 Saudi postmenopausal women were included. Anthropometric, biochemical parameters, BMD and bone markers were measured. RANKL was found to had a significant inverse correlation with NTX in osteopenia group (r=-0.37, p<0.05). OPG was found to be significantly and positively correlated with age in osteoporosis group (r=0.29, p<0.05), while it was inversely correlated with BMD left (r=-0.56, p<0.001) and BMD right (r=-0.37, p<0.05) in the same group. RANKL/OPG ratio had a positive and significant correlation with BMI (r=0.34, p<0.05), T-score dual left (r=0.37, p<0.05), BMD left (r=0.36, p< 0.05) and BMD right (r=0.35, p<0.05) in osteopenia group. While it was significantly inversely correlated with WHR in osteoporosis group (r=-0.38, p<0.05). In multiple regression analysis, our data found that OPG could be a contributing factor for BMD right in osteopenia group (p=0.033). Results suggest that changes of RANKL and OPG levels might be a protective mechanism contrary to the increased bone loss in postmenopausal women.

## P488
### PTHR1 GENETIC POLYMORPHISMS ARE ASSOCIATED WITH OSTEOPOROSIS AMONG POSTMENOPAUSAL ARAB WOMEN

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**Objective:** The PTH 1 receptor (PTHR1) plays a crucial role in calcium homeostasis and bone metabolism. However, its genetic role in regulating bone turnover markers (BTMs) in postmenopausal osteoporosis (PMO) remains unclear. Herein, we explored PTH and PTHR gene variants susceptibility to osteoporosis and their association with various circulating BTM and inflammatory markers in postmenopausal women of Arab ethnicity.
**Methods:** In total, 600 postmenopausal Arab women (300-PMO and 300-control) were genotyped for selected SNPs in PTH (rs1459015, rs307253, rs6054, rs307247, rs10500783 and rs10500784), PTHR1 (rs6442037, rs1138518 and rs724449 SNPs) and PTHR2 (rs9288393, rs10497900 and rs897083). Anthropometrics, BTMs, and inflammatory markers were measured.

**Results:** *PTHR1* rs1138518 genotype C/T was found to be a significant risk factor for PMO (OR=1.49, 95%CI 1.0-2.1, p=0.03). The genotypes C/T and T/T of *PTHR1* rs1138518 were associated with 25-hydroxy-vitamin D (25(OH)D) regulation. In the PMO group, carriers of the C/T genotype had significantly lower 25(OH)D levels (p=0.048) than carriers of the same genotypes in the control group.
**Conclusion:** Our study conclude that the *PTHR1* rs1138518 genotype could be a potential risk factor for osteoporosis and 25(OH)D regulation in Arab women with PMO.

## P489
### PRIMARY HYPERPARATHYROIDISM IN SAUDI ARABIA: A MULTICENTER OBSERVATIONAL STUDY

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**Objective:** Primary hyperparathyroidism (PHPT) is a common cause of hypercalcemia and remains understudied within the Arabian population. The present study, which is the largest of its kind within the Gulf Cooperation Council (GCC) countries, aims to determine the demographics and clinical presentation of PHPT in Saudi Arabia.
**Methods:** In this multicenter retrospective study involving three tertiary hospitals in different geographic locations of Saudi Arabia namely, Riyadh, Al Ahsa and Jeddah, a total of 205 out of 243 confirmed PHPT cases aged 16-93 years old were included (N=96 from Riyadh; N=59 from ALAhsa and N=50 from Jeddah). Demographics, clinical manifestations, and surgical outcomes were recorded as well as laboratory and radiologic investigations including serum PTH, 25(OH)D, adjusted calcium, estimated glomerular filtration rate and nuclear scan outcome.
**Results:** PHPT cases appeared to increase over time when compared to other local studies published so far. Females outnumber males (3:1) with 86% seen as outpatients. The average age was 59.8±15.5 y. Abnormal PTH scan was seen in 171 patients (83.4%). Kidney stones was the most common renal manifestation (32 cases, 15.6%) and selective cortical bone loss was the most common skeletal manifestation (67 cases, 32.7%). Al Ahsa had the highest prevalence of multiple comorbidities at 54% and the highest prevalence of obesity as a single comorbidity (17%) compared to other regions (p<0.05). Jeddah recorded the highest prevalence of combined selective cortical bone loss with bone and joint pains (30%) (p<0.05).
**Conclusion**: Comparison of present data with previous local studies suggest a surge in PHPT cases in Saudi Arabia. Regional variations in the clinical presentation of PHPT were observed and warrant further investigation.

## P490
### VITAMIN D AND DISEASE OUTCOME IN SARS-COV-2 INFECTION

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**Objective:** Infection with the new SARS-CoV-2 or COVID-19 virus has a variable course. It may run as a mild disease or may cause severe

pneumonia necessitating hospitalization. Vitamin D has immunostimulatory action and causes the release of substances necessary for combating an infection. Therefore, the relationship of vitamin D with the SARS-CoV-2 virus is under scientific evaluation. The aim was to measure vitamin D levels in a cohort of patients hospitalized with SARS-CoV-2 infection.

**Methods:** In a cohort of 43 patients, 20 male and 23 female, hospitalized with the SARS-CoV-2 infection $25(OH)D_3$ levels were measured. $25(OH)D_3$ levels were also measured in a group of control subjects. The patients were classified in 4 groups, a group with uncompromised respiratory function (n=17 patients), a group with mild respiratory insufficiency (n=12), a group with severe respiratory insufficiency (n=5) and a group with severe respiratory insufficiency requiring intubation (n=8). For the evaluation of the results of the present study $25(OH)D_3$ levels were classified as deficiency (0-10 ng/ml), insufficiency (10-20 ng/ml) and sufficiency >20 ng/ml.

**Results:** $25(OH)D_3$ levels in the SARS-CoV-2 patients were $16.16\pm1.55$ ng/ml (mean±SEM) as compared to those in the control group, $27.28\pm1.94$ ng/ml (p<0.001, Student's t-test). Within the group 37 patients finally survived the infection while 6 died either during hospitalization or immediately thereafter. The outcome of the infection, i.e., respiratory insufficiency or need for intubation was found to be related to the levels of $25(OH)D_3$ (p=0.003, chi-square test).

**Conclusion:** It appears that vitamin D deficiency as assessed by the measurement of $25(OH)D_3$ levels is prevalent in patients with severe SARS-CoV-2 infection requiring hospitalization. Vitamin D levels appear also to be related to the outcome of the infection. This result is in accordance with the immunostimulatory action of vitamin D, an action known since the very early years of its discovery.

## P491
### PRIMARY HYPERPARATHYROIDISM IN THE CONTEXT OF LITHIUM TREATMENT: REPORT OF A CASE

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**Objective:** Lithium is considered a mainstay treatment option for the management of bipolar affective disorder. However, lithium administration is characterized by endocrine effects. The aim was to present the case of a patient who was on treatment with lithium for many years for the management of bipolar affective disorder and presented with a large parathyroid adenoma causing clinical hyperparathyroidism with severe hypercalcemia who was successfully treated by surgical excision of the adenoma and hypothyroidism.

**Case report:** A patient, aged 68 y, presented with severe hypercalcemia, calcium levels on admission 13 mg/dl and difficulty in walking due to osteoporosis. PTH levels on admission were 300 pg/ml. After rehydration and diuretic treatment for the management of hypercalcemia, cinacalcet was administered at a dose of 30 mg twice daily for the management of hypercalcemia. Diagnostic evaluation revealed the presence of a large parathyroid adenoma situated inferiorly to the left thyroid lobe. Surgical treatment was undertaken and the parathyroid adenoma was successfully excised. Histology revealed a large cystic parathyroid adenoma. During follow up calcium levels normalised and the patient improved clinically. During follow up a TSH level of 6.7 mIU/L was noted. Thyroxine was administered.

Lithium administration for the management of bipolar affective disorder is used successfully for many years. However, it may cause many endocrine effects. It may cause hypothyroidism and hypercalcemia due to hyperparathyroidism. Hypothyroidism is easily managed by thyroxine administration. However, hyperparathyroidism is usually due to one or more parathyroid adenomas or parathyroid hyperplasia. The optimum management of parathyroid adenomas in the case of long-term lithium treatment is surgical and usually controls hyperparathyroidism. In other reports most cases of hyperparathyroidism in the context of lithium treatment were due to one or more parathyroid adenomas.

**Conclusion:** The case of a patient presenting with endocrine disease, namely primary hyperparathyroidism and hypothyroidism due to long term lithium administration is described. The disease was successfully treated with surgical excision of the parathyroid adenoma and thyroxine administration.

## P492
### MULTICENTERED JAPAN OSTEOPOROSIS LIAISON SERVICE (JOLS) STUDY FOR PREVENTION OF SECONDARY FRACTURE: REGISTRATION DATA

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**Objective:** Fracture Liaison Service (FLS) is nowadays well accepted as effective coordinator-based system to prevent secondary fracture. Japan Osteoporosis Society offered Osteoporosis Liaison Service (OLS) including FLS for both primary and secondary prevention of osteoporotic fracture. In this study, we focus on secondary prevention after clinical vertebral fracture and hip fracture to show the efficacy of FLS in super-aging society as in Japan.

**Methods:** This multicentered historical-control study has been performed in 22 hospitals and institutions in Japan. The inclusion criteria are the newly hospitalized patients with fresh clinical vertebral fracture or hip fracture in postmenopausal women or men equal to or above 50 years old. Multidisciplinary team assesses the risk of osteoporosis, and educates the patients and their family, and registers the patients in database center in Fujita Health University during 3 months after the first fracture. The hospital staffs send letter to each patient at 6, 12, 24 and 36 months to check the adherence and secondary fracture.

**Results:** This study enrolled 1506 fracture patients (male 300/ female 1206) from 2018-2020. Their mean age was $81.6\pm8.5$ years old. BMI in male patients ($21.3\pm3.2$ kg/m$^2$) was same as that in female ($21.4\pm3.6$ kg/m$^2$). There were 618 clinical vertebral fractures (primary 329/ secondary 289) and 888 hip fractures (primary 537/secondary 351). Patients experienced fall in the last 1 year before admission were 457 (30.3%). Multidisciplinary intervention and guidance were performed by OLS coordinator including nurse, pharmacist, physical therapist, occupational therapist and registered dietitian.

**Conclusion:** This prospective study could enroll planned number of patients and is expected to provide useful information to improve FLS in super-aging society.

## P493

### TEN-YEAR DIFFERENCES IN THE JOINT SPACE WIDTH AND OSTEOPHYTE AREA OF THE KNEE JOINT: COMPARISON BETWEEN BASELINE AND THE 4TH ROAD STUDY SURVEYS

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**Objective:** To elucidate differences in the joint space width and osteophyte area (OPA) of the knee joints of Japanese men and women between baseline and 4th survey data after 10 y of the population-based cohort.
**Methods:** The baseline survey of the Research on Osteoarthritis/ Osteoporosis Against Disability study was conducted from 2005 to 2007; 2975 participants (1041 men and 1934 women; mean age, 70.2 y) completed all examinations of knee osteoarthritis (KOA), including an interviewer administered questionnaire and radiographic examinations of both knees in the anteroposterior view of the weight-bearing position. The 4th survey was performed from 2015-2016; 2445 participants (764 men and 1681 women; mean age, 68.8 y) completed assessments identical to those at baseline. The medial minimum joint space width (mJSW) and medial tibial OPA were measured bilaterally with the KOA computer-aided diagnosis system (Windows program) by two observers (H.O. and B.K.), and interobserver variability was confirmed.
**Results:** The mean (SD) medial mJSWs at baseline were 3.22 (0.96) mm for men and 2.65 (0.95) mm for women and at the 4th survey were 3.81 (1.20) mm for men and 3.13 (1.15) mm for women. Compared to the corresponding age group, the mean medial mJSW at the 4th survey tended to be greater in both men and women of all age groups (p<0.01). The mean OPAs in men aged 40–49 and 60–69 y and women aged 40–49, 50–59, 60–69, and 70–79 years were significantly smaller in the 4th survey compared to the corresponding age group at baseline (p<0.05).
**Conclusion:** In this population-based survey, knee joint radiographic measurements, such as the medial mJSW and OPA, tended to improve over the 10-y interval. These changes in KOA parameters could decrease the occurrence and progression of KOA and prevent subsequent walking disability in the future.

## P494

### TBS PARAMETERS IN PATIENTS OVER 50 YEARS OLD WITH CHRONIC KIDNEY DISEASE AND SECONDARY HYPERPARATHYROIDISM

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**Objective:** Secondary hyperparathyroidism (SHPT) is a universal complication of chronic kidney disease (CKD), which begins to develop when the glomerular filtration rate falls below 60 ml/min. Thus, the aim was to study the features of trabecular bone score (TBS) in CKD patients.
**Methods:** This subgroup included 236 patients with CKD. Only in 33.5% (79 people) BMD corresponded to the norm, in 31.8% (75 people) osteoporosis was detected, in 34.7% (82 people) osteopenia. The research involved general clinic examination, serum bone-specific parameters, DXA performed on "Prodigy Lunar".
**Results:** Lower values of the bone quality were noted in women: an absolute value of TBS (1.25 (1.15–1.35) vs. 1.33 (1.22–1.44), U=2477; p=0.009) and the T-score (–0.50 (–1.60–0.50) vs. 0.00 (–1.00–1.00), U=2545; p=0.045). SHPT was confirmed in 31.4% (74 people), including 35.9% (33 people) of men and 28.5% (41 people) women. Comparative analysis of the BMD decreases in the regions confirmed the predominant decrease in the mineral component in the femoral neck and lower third of the radius as in the general subgroup with CKD (n=236, $x^2$=245.3 p<0.001) and in SHPT subgroup (n=74, $x^2$=69.6; p 0.001). Only 36.3% (37 women) had a normal trabecular bone structure, in 22.5% (23 women) partial violations of microarchitectonics were noted, and 41.2% (42 women) had pronounced violations of the quality. In persons with SHPT lower TBS values were determined, without statistical significance of differences: n=166 1.26 (1.11-1.40) vs. 1.27 (1.20-1.37), U=2773, p=0.388. There was a tendency towards a decrease in TBS with the progression of CKD ($x^2$=2.37; p=0.795). A significant minimum value of TBS was established if the cause of CKD was a congenital anomaly of the urinary tract both in the general subgroup with CKD ($x^2$=13.8; p=0.017) and in the SHPT subgroup ($x^2$=13.3; p=0.021).
**Conclusion:** CKD has a negative impact on the qualitative and quantitative parameters of bone in patients over 50 years of age. At the same time, there are significant differences in parameters taking into account gender, which requires further research.

## P495

### WHERE HAVE THE FRAILTY PERTROCHANTERIC FRACTURES GONE?

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**Objective:** To evaluate the attendance of patients presenting in our institution with a frailty pertrochanteric hip fracture during the COVID-19 pandemic and the imposed quarantine and curfew and compare the results with the ones of the previous 5 y.
**Methods:** Retrospectively we checked the hospital's archives for a total period of 1 y, and from March 2020 until March 2021, regarding the patients admitted in the orthopaedic department diagnosed with a frailty pertrochanteric hip fracture during the COVID-19 pandemic.

**Results:**

| Pertrochanteric hip fracture | March 2015-March 2016 | March 2016-March 2017 | March 2017-March 2018 | March 2018-March 2019 | March 2019-March 2020 | COVID-19 Pandemic | Total |
|---|---|---|---|---|---|---|---|
| Operative treatment | 50 | 52 | 56 | 58 | 51 | 34 | 301 |
| Conservative treatment | 3 | 4 | 7 | 8 | 7 | 6 | 35 |

**Conclusion:** The results of our data review regarding the attendance of patients with a frailty pertrochanteric fracture in our institution over the last 5 y show an important decline during the COVID-19 pandemic. Our hospital is a COVID-19 reference institution and covers an area of 150.000 citizens in the northwestern part of Greece and the population has a steady number over the last years. The frailty pertrochanteric fractures are considered to be sustained mainly at home or during activities nearby due to the patients' limited mobility and also due to the quarantine and the curfew during the pandemic, the transfer of patients to other hospitals in other areas was not possible so the question of where all the frailty hip fractures have gone during this period of time is an update which still finds answers. Furthermore, an important question arises now while the society is trying to find its way back to normality, whether the attendance of patients with frailty pertrochanteric hip fractures will present an increase in numbers over the next period of time.

## P496
### THE EFFECT OF REGION OF INTEREST ON THE MEASUREMENTS OF BONE MINERAL DENSITY OF THE PROXIMAL FEMUR

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**Objective:** The BMD of the proximal femur is usually measured using the DXA at the region between the head-neck junction and the distal of the lesser trochanter. While some studies reported the effect of the region of interest (ROI) setting on the BMD measurements, limited information has been provided regarding the degree of change in BMD caused by the alteration of the ROI. In this study, we performed a simulation analysis using CT images to clarify the effect of changing the ROI on the measurement of the BMD.
**Methods:** Hip CT images of 75 women (mean age: 62.4 y) were analyzed herein. After the volume of the proximal femur was isolated from the CT images, the volume was rotated to account for the positional variance found during CT imaging. Then, the volume was projected towards the anteroposterior direction to generate a simulated DXA image used for analysis (Fig. a). For the simulated DXA image, the neck cut was simulated 0-10 mm distal from the head-neck junction, and the distal cut was simulated 0-40 mm distal from the tip of the lesser trochanter. The cut level was altered with a 1mm increment to create each ROI, and the mean density/ pixel of each ROI was quantified as the BMD. The BMD of each ROI was compared with that at a cut level of 0 mm, and the percent changes were calculated. Analyses were performed automatically using MATLAB.
**Results:** An absolute maximum change of 1.6% was found for the neck cut when the cut level was 10 mm distal from the head-neck junction (Fig. b). For the distal cut, the BMD increased linearly as the cut level was transferred distally. The changes were 5.5% at 10 mm, 11.8% at 20 mm, 18.7% at 30 mm, and 25.4% at 40 mm (Fig. c).
**Conclusion:** Small changes in BMD were found when the neck cut level was altered. On the contrary, BMD changed substantially when the distal femur cut level was altered. We recommend confirming the ROI of the distal femur when the BMD changed significantly from the previous measurements.
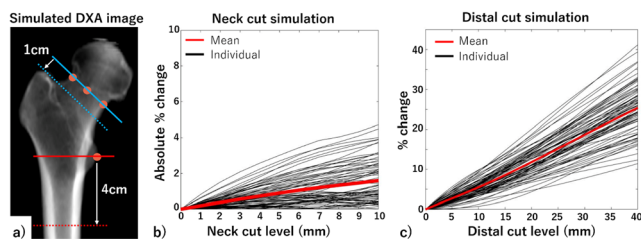


Figure. Simulated DXA image (a), results of the neck cut simulation (b), and results of the distal cut simulation.

## P497
### MODELLING OF LEAN AND FAT ARTIFACTS ON TRABECULAR BONE SCORE USING A DXA PHANTOM

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**Objective:** Trabecular bone score (TBS) software analyzes image patterns from lumbar spine DXA to evaluate the architecture of trabecular bone. TBS is an independent predictor of fracture risk and can be used to adjust FRAX absolute fracture risk assessments. Low TBS values indicate deteriorated trabecular microarchitecture. TBS has limitations and cannot be used in patients who are overweight or underweight. In overweight patients, there may be deterioration of image quality due to increases in abdominal thickness. We studied the effect on TBS of increasing fat and water overlying the Hologic spine phantom region of interest (ROI) and/or reference area (ref).
**Methods:** Varying depths of water or fat were placed overlying the ROI and ref areas of the Hologic spine phantom, scanning on a Hologic Discovery densitometer. Both vegetable oil in plastic trays and 6.5 cm thickness blocks of lard were used to model overlying fat; trays of water were used to model overlying lean.
**Results:** There was severe degradation of DXA image quality and ROI edge detection when 13 cm of lard was placed over the ROI. Increasing from 0 cm to 8 cm of oil over both the ROI and ref area led to linear decreases in TBS (with 8 cm oil, decreases of 10.8%, Pearson r=-0.98). Increasing from 0 cm to 8 cm of oil over the ROI alone led to linear decreases in TBS (with 8 cm oil, decreases of 24.7%; r=-0.99). Increasing from 0 cm to 8 cm of oil over the ref area alone led to progressive increases in TBS (with 8 cm oil, increases of 4.1%; r=0.98). Trays of water overlying the ROI and the ref area introduced much less artifact than trays of vegetable oil.
**Conclusion:** Increasing thickness of fat over ROI, ref, and both the ROI and ref areas introduces a significant artifact to TBS results. Artifact is much less with water than with oil. Documenting these artifacts may help to understand changes in TBS results in patients with marked changes in body weight.

## P498
### DEVELOPMENT OF A REPRODUCIBLE RESEARCH PLATFORM TO ASSESS BONE MINERAL DENSITY OF THE PROXIMAL FEMUR FROM CLINICAL CT IMAGES

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**Objective:** Quantitative CT (QCT) can be employed as a substitute for DXA in measuring proximal femur BMD. However, commercially available software that is not accessible from all institutions is needed to diagnose osteoporosis from QCT. We therefore aimed to 1) develop an open source reproducible research platform that quantifies BMD from CT images and 2) validate its accuracy.
**Methods:** This study analyzed 75 pairs of hip CT and DXA images of women with a diagnosis of osteoporosis (25 hips), osteopenia (25 hips), and normal (25 hips), according to the T-score calculated from the DXA measurements of the proximal femur (DXA-BMD). From the CT images, the femur and a calibration phantom were automatically segmented using pretrained codes/models available at https://github.com/keisuke-uemura (Fig). The proximal femoral region was isolated by manually selected landmarks, and the mean Hounsfield units within the region was quantified (CT-vHU, Fig: upper row). The region was projected onto the coronal plane to measure the areal density (CT-aHU, Fig: lower row). The calibration phantom was employed to convert the CT-vHU into

CT-vBMD and the CT-aHU into CT-aBMD. Each parameter was correlated to the DXA-BMD, and the accuracy in diagnosing osteoporosis was quantified by a receiver operating characteristic (ROC) analysis.

**Results:** The correlation coefficients between the four parameters and DXA-BMD were all ≥0.9 (all p<0.001). In the ROC analysis, the area under the curve (AUC) for diagnosing osteoporosis was ≥0.96 for all parameters.

**Conclusion:** Quantification of proximal femur BMD and diagnosis of osteoporosis from CT images were accurately performed with the system developed in this study. Given that the models necessary for segmentation are open source, researchers may apply this reproducible platform for quantifying proximal femur BMD.
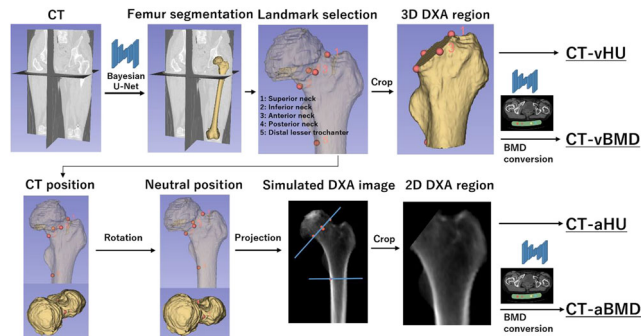


Figure. Flowchart for quantifying the CT-vHU, CT-vBMD, CT-aHU, and CT-aBMD of the proximal femur from CT images.

## P499

### FAT AND LEAN ARTIFACTS OVER REGION OF INTEREST AND REFERENCE AREA OF SCANS OF A DXA PHANTOM

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**Objective:** Body weight is correlated with BMD; weight changes may alter DXA-measured bone mass due to artifact and imprecision in addition to real changes in bone mineral content (BMC). DXA instruments compare BMC over the bone region of interest (ROI) with a reference area (ref) where bone is absent. Artifact may originate from changes in the ROI, the ref area, or both. We modeled the effects of changes of lean and fat overlying the ROI and overlying the ref area.

**Methods:** Vegetable oil and water in plastic trays and 6.5 cm blocks of lard of increasing mass were placed over the Hologic spine phantom, tested on a Hologic Discovery densitometer. Each phantom was scanned in triplicate with fat or water overlying the ROI, the ref area and both.

**Results:** Placing blocks of lard and oil on the phantom overlying the ROI resulted in decreases in BMC, area and BMD values (Pearson r=-0.99 for all). With 13 cm lard, BMD decreased 37% (from 0.903 g/cm$^2$ to 0.572 g/cm$^2$). Lesser changes were observed with increases from 0 cm to 8 cm of water (BMD decreased by 1.9% with water and 10.5% with oil). BMD increased with increasing thickness of lard and oil overlying the ref area (8.8% with 13 cm of lard and 7.3% with 8 cm of oil, r=0.98) and decreased 1.7% (r=-0.81) with overlying 8 cm of water. Placing blocks of lard and oil overlying both ROI and ref areas resulted in decreases in both BMC and BMD (BMD r=-0.94 for lard and r=-0.97 for oil). Water placed over ROI and ref resulted in small increases in BMC and BMD (0.2% and 1% respectively).

**Conclusion:** Fat over both ROI and ref area leads to artifact in both ROI area and BMC. Increasing thickness of fat leads to progressive decreases in BMD. There is less artifact with increasing depth of water compared to fat. These data may help understand the DXA artifact introduced with changes in patient weight in patients monitored with DXA.

## P500

### ASSESSMENT OF BONE QUALITY IN YOUNG ADULTS WITH CHRONIC KIDNEY DISEASE AND SECONDARY HYPERPARATHYROIDISM

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**Objective:** The negative effect of secondary hyperparathyroidism (SHPT), including in chronic kidney disease, on bone metabolism is undoubtedly an increase in PTH alters the processes of mineralization and bone metabolism in general, increases the risk of bone fractures, and metastatic calcification is formed. Thus, the aim was to study the features of trabecular bone score (TBS) in young adults with CKD patients.

**Methods:** This subgroup included 213 patients with CKD and 34 people in the control group, SHPT was determined in 39.0% (83 people) of patients in the main group. The research involved general clinic examination, serum bone-specific parameters, DXA (BMD) and TBS of lumbar spine) performed on "Prodigy Lunar". Z-score of –2.0 or less was regarded as low BMD. The TBS was performed in absolute units (gray scale pixel deviation) of the lumbar spine L1-L4 and Z-score TBS were also taken into account.

**Results:** Low bone mass was detected in 32.7% (70 people) of the examined patients. According to the results of the study, a decrease in TBS (L1-L4) (1.36 (1.24–1.44) vs. 1,44 (1.40–1.49), U=1211; p<0.001) and Z-score TBS (L1-L4) (-0,60 (-2.00–0.00) vs. 0.10 (-0,2.0–0.70), U=545; p=0,001) was noted in patients with CKD compared with controls. There were no significant differences in the parameters of BMD and TBS in men and women in both the main and control groups, which makes it possible to evaluate these parameters without dividing by gender. There was established a direct moderate statistically significant relationship between TBS and BMD of the lumbar spine in patients with CKD ($\rho$=0.40; p<0.001). In patients with SHPT, lower TBS values were determined (1.32 (1.22–1.12) vs. 1.39 (1.28–1.45), U=2031; p=0.078). Young adults with CKD ($X^2$=7,805; p=0.050), including those with SHPT ($X^2$=2.620; p=0.270), showed a decrease in TBS with decreasing GFR, but not in dialysis patients.

**Conclusion:** Young adults with hyperparathyroidism have lower parameters of bone quality. The absence of gender differences may indicate the specificity of the effect on bone metabolism of the underlying disease.

## P501

### TREATMENT OF CUTIBACTERIUM ACNES INFECTION RESULTING IN PROSTHETIC PROTRUSIO ACETABULI

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**Objective:** As we face an increasingly aging population, more and more arthroplasty surgeries are performed. Hip bipolar hemiarthroplasty is commonly done for elderly patients who suffer from femoral neck fractures, with good functional outcomes.[1] Amongst the complications of hip bipolar hemiarthroplasty surgery, prosthetic acetabular protrusio is rare. It is thought to occur in prosthetic joint infections (PJI) due to destructive osteolysis and resorption of surrounding bone resulting in prosthesis migration.[2] Amongst prosthetic joint infection pathogens, Cutibacterium acnes is increasingly being implicated. It typically results in infections via biofilm production and has an indolent and nonspecific clinical presentation. It can cause significant soft tissue damage and unstable implants.[3] There is no gold standard for treatment of C. acnes infections yet, and we seek to contribute to current literature regarding C. acnes PJI.

**Methods:** We review the current literature surrounding the treatment of C. acnes prosthetic infections, and also discuss the treatment of a challenging case of C. acnes infection resulting in prosthetic protrusio acetabuli.

**Results:** Our patient was successfully treated with antibiotic treatment and a two-staged revision total hip arthroplasty, and recovered well postoperatively.

**Conclusion:** PJIs continue to increase as more arthroplasty surgeries are done for an increasingly elderly population. We report a PJI case which contributes to literature on C. acnes infections and prosthetic acetabular protrusio.

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## P502
## SURGICAL TECHNIQUE FOR ALL-INSIDE REPAIR OF BUCKET-HANDLE MENISCAL TEARS
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**Objective:** Bucket-handle meniscal tears (BHMT) remain challenging to manage due to their complex pathology and technical difficulty. Subtotal meniscectomy has been shown to improve symptoms but leads to accelerated osteoarthritis in the affected compartment and poorer long-term outcomes.[1] BHMT repair and meniscal preservation is hence the preferred option. It can be done via inside-out, all-inside, or hybrid meniscus repair techniques. All-inside meniscus repair avoids the need for additional safety incisions, trained assistants for suture passing, and reduce concerns of soft-tissue and neurovascular complications.[2] We present our technique for all-inside BHMT repair.

**Methods:** We utilize the all-inside device (FAST-FIX 360 Meniscal Repair System from Smith and Nephew) for successful all-inside BHMT repair. Good anatomical reduction of the BHMT can be achieved via adequate release of perimeniscal scar tissue, and assisted with an inside-out reduction stitch. Both horizontal and vertical stitch configurations are used for the all-inside repair with the depth limiter of the device set at 16 mm for the meniscus body and 18mm for the posterior horn. We place at least five to six all-inside stitches at intervals of 3-5 mm for adequate repair of the BHMT, with a vertical stitch placed at the edge of the tear to prevent tear propagation.

**Results:** Good long-term outcomes have been shown for BHMT for all-inside techniques.[2] We demonstrate our all-inside technique, and share out tips for technical success.

**Conclusion:** All-inside repair of BHMT can achieve good outcomes. We present our technique for all-inside BHMT, emphasizing good reduction and stable fragment fixation. This will shorten surgery time, reduce complications, and provide predictable outcomes.

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## P503
## HIGH-INTENSITY LASER IN THE TREATMENT OF OSTEOARTHRITIS OF THE KNEE
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**Objective:** Osteoarthritis of the knee is associated with the aging process. Genetic factor, body weight, previous knee injury, etc. also play an important role in the pathogenesis. In addition to traditional physical

therapy, one of the possible modalities is the high-intensity laser treatment (VILT). This study aimed to show the role of VILT in osteoarthritis of the knee.

**Methods:** The study involved 36 patients, 23 (63.89%) women and 13 (36.11%) men, who were treated by the institute with VILT. For the application of VILT, a standardized protocol presented in the device was applied, every day, for a total 10 d. WOMAC was used to assess functional ability at baseline, 10 d and 1 month after treatment.

**Results:** There was no significant difference in the mean age p=0.7105 and BMI p=0.6162. We found that in the WILT group the height of the WOMAC index significantly decreased from 0-time to 1 month with a significantly lowest value after 1 month (p=0.00001).

**Conclusion:** VILT has a significant role in reducing pain and improving functional ability in patients with osteoarthritis of the knee.

## P504
## THE EFFECTS OF MESENCHYMAL STEM CELL INJECTION ON THE 15TH DAY AFTER IMPLANTATION OF OK-015 INTO THE TIBIA ON GROWTH RATE OF THE LOWER INCISORS
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**Objective:** To investigate growth of the lower incisors (LI) in rats after injection allogenic stem cells (ASC) on the 15th day after implantation of hydroxyapatite material OK-015 into the tibia.

**Methods:** 150 male rats with body weight of 190-225 g were used. Group K comprised the intact controls, group D comprised animals with 2 mm opening in the proximal part of the tibiae. Group OK consisted of the animals with the openings in the tibiae filled with material OK-015. In the group MSC15D and MSC15OK animals received injections of 5E6 ASC on 15th day after intervention. ASC were obtained from red bone marrow from donor animals. After 7, 15, 30, 60 and 90 d after intervention LI were excised and prepared for gross morphometry with 0.05 mm precision. ANOVA and other tests were performed with the use of standard software.

**Results:** LI length in the group D was lower than that of the controls from the 15th to the 90th day by 4.59%, 5.98%, 4.86%, and 4,28%. Width of the LI was lower from the 15th to the 60th day by 10,00%, 9,88%, and 6,10%. In the group OK by the 7th and the 15th days the LI shortened by 3,33% and 3,83% (in comparison with the group D). Width in the same period decreased by 6.39% and 5.83% and height – by 5.60% and 4.76%. In later terms growth of the incisor accelerated. In group MSC15D from the 30th to the 90th day length of the LI increased by 3.87%, 2.99%, and 3,63%; height of the LI increased by 6.85% on the 30th day. In MSC15OK group width and height of the LI increased in comparison with OK group by 4.15% and 5.33% on the 30th day.

**Conclusion:** Injection of ASC on the 15th day after implantation of OK-015 into the tibia reduces adverse effects of intervention on LI growth. This is manifested as increase of LI dimensions in the group MSC15D in comparison with D group in the period from the 30th to the 90th day. Same effects were observed in MSC15OK group in comparison with OK-015 group yet in the period from the 30th to the 60th day after intervention.

## P505
## ULCERATIVE COLITIS AS A CAUSE OF HIP FRACTURE
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**Objective:** Ulcerative colitis is an autoimmune inflammatory disease which affects the intestine and induces chronic inflammation and

symptoms such as pain and bowel movement disturbance. The aim was to describe the case of a patient, male, age 67 y who suffered from inflammatory bowel disease and presented with a hip fracture.

**Case report:** The case of a patient, male, aged 67 years who suffered from inflammatory bowel disease is described. The disease was well controlled on treatment with mesalazine. No disease recurrence had been observed for many years. He was on treatment with cholecalciferol and $25(OH)D_3$ levels were within normal range at various time points in the past. Testosterone levels were within normal range. The patient had a right hip fracture after a fall from his own height. The hip fracture was successfully managed by surgery. Subsequently, a diagnostic control for osteoporosis revealed a T-score of -2.7 in the left hip and a $25(OH)D_3$ level of 31.2 ng/ml. Alendronate was administered along with calcium and cholecalciferol orally. Thereafter, zoledronic acid was administered iv. Alendronate was discontinued and alphacalcidol orally was initiated.

**Conclusion:** Ulcerative colitis, even if adequately controlled on mild drug treatment and even if the patient is on adequate treatment with cholecalciferol seems to affect bone metabolism and may induce osteoporosis. Osteoporosis in the context of ulcerative colitis may be due to the circulation of inflammatory cytokines which affect bone metabolism and induce decreased BMD. Decreased BMD in a patient with inflammatory bowel disease may also be due to altered mucosal absorption of salts and vitamins. Therefore, osteoporosis in the context of inflammatory bowel disease should be managed promptly and aggressively.

## P506

### FRACTURE OF THE PUBIC RAMUS AS PRESENTING MANIFESTATION OF POSTMENOPAUSAL OSTEOPOROSIS

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**Objective:** Fractures of the pubic ramus are relatively rare. They have been described as traumatic fractures in cases of gunshot injury and after accidents in young patients. They may also occur as stress fractures. The aim was to describe the case of a patient, female, who underwent hysterectomy and ovariectomy at the age of 45 and presented with osteoporosis and a pubic ramus fracture as a presenting manifestation of osteoporosis.

**Case report:** A female, aged 55 y who presented with a left sided pubic ramus fracture and a left sided fracture of the sacrum after a fall is described. The patient had been subjected to hysterectomy along with ovariectomy at the age of 45 y. After the operation she was not offered preventive treatment for osteoporosis. 10 y later and after a fall she presented with a left sided pubic ramus fracture and a fracture of the left side of the sacrum. She was managed conservatively. Consequently, the patient was investigated for osteoporosis. T-score of the lumbar spine was -2.6. Alendronate was administered for the management of osteoporosis.

Fractures of the pubic ramus are relatively rare. They are often observed in young patients after injury or as stress fractures following intense exercise. The development of pubic ramus fractures in the context of osteoporosis and especially as a presenting manifestation of postmenopausal osteoporosis is rare. The diagnosis of a pubic ramus fracture is difficult and requires intense clinical suspicion. Radiological investigation which may be complemented by bone scintigraphy and computed tomography may be required for early diagnosis. Pubic ramus fractures cause intense inguinal or hip pain and may induce limping. They are managed conservatively.

**Conclusion:** The case of a patient is described in which the first manifestation of postmenopausal osteoporosis was a pubic ramus fracture.

## P507

### ASSESSING THE EFFECTIVENESS OF BISPHOSPHONATES FOR THE PREVENTION OF FRAGILITY FRACTURES: AN UPDATED SYSTEMATIC REVIEW AND NETWORK META-ANALYSES

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**Objective:** Bisphosphonates have been found to be effective in preventing fragility fractures, but, as with all pharmacological agents, their benefit-to-risk ratio must be considered in the round. In light of recent clinical trials, there is a need to update the estimates regarding their comparative effectiveness in preventing fragility fractures. This is an update of a systematic review previously published as part of a NICE HTA report. This study aimed to update the estimates regarding the clinical effectiveness and safety of bisphosphonates (alendronate, risedronate, ibandronate, and zoledronate) for the prevention of fragility fractures.

**Methods:** Searches of 14 databases, unpublished sources and trial registries were conducted, covering the period 2014 to March 2021. Screening, data extraction and risk of bias assessment were independently undertaken by two study authors. Data was analysed using NMA embedded within a Bayesian framework. Outcomes were fractures, femoral neck BMD, mortality, adverse events and health-related quality of life.

**Results:** 25 additional eligible trials were identified, resulting in a total population of 47,007 participants. Overall, 34 trials provided data for the fracture NMA and 44 trials provided data for the BMD NMA. All treatments had beneficial effects on fractures vs. placebo with hazard ratios varying from 0.38 (95%CI: 0.28, 0.49) to 0.77 (95%CI: 0.63, 0.91) for zoledronate and alendronate respectively. All treatments were associated with increases in BMD vs. placebo with mean percentage differences ranging from 2.25 (95%CI: 1.61, 2.87) to 4.02 (95%CI: 3.2, 4.84) for risedronate and zoledronate respectively.

**Conclusion:** Zoledronate was found to be the most effective treatment in reducing the risk of vertebral, non-vertebral, hip and wrist fractures and, in increasing femoral neck BMD. Zoledronate could be considered a first-line option for people at increased risk of fractures.

## P508

### HIGHER URATE LEVELS ASSOCIATED WITH GREATER BONE MINERAL DENSITY IN OLDER ADULTS

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**Objective:** Higher serum urate levels are associated with greater BMD and lower prevalence of fractures in several large studies. While first reported in 2011, the mechanism remains unclear, and some studies are conflicting. Urate is an antioxidant and may influence bone health via effects on osteoblast function. This study aimed to explore the relationship between serum urate and BMD in older Irish adults.

**Methods:** We identified patients aged >60 y at our bone health clinic who had serum urate measured and BMD assessed using DXA. Patients who were on teriparatide treatment were excluded as it is known to increase serum urate. The relationship between urate and BMD at the hip and spine was explored in multinomial regression models.

**Results:** Study included 1538 with a mean age of 74.5±8.3 y, of whom 83.6% were female. 67.1% had osteoporosis and 28.1% had osteopenia. Higher urate levels were associated with greater BMD in the spine (P=0.0001) after adjustment for age, gender, BMI, eGFR and serum 25(OH)D. In a smaller subset (n=1046) serum urate also independently predicted greater BMD at the total hip (P=0.02).

**Conclusion:** Higher serum urate was associated with greater BMD at the hip and spine in keeping with other studies. We were not able to account for thiazide diuretics which increase serum urate, reduce urinary calcium excretion and are positively associated with BMD. More research is needed to better understand the potential mechanisms underlying this relationship.

### P509
### THE UTILITY OF ULTRASOUND OF THE HEEL IN DIAGNOSING OSTEOPOROSIS: EXPERIENCE FROM A BONE HEALTH CLINIC

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**Objective:** Heel ultrasound can be used as an alternative to DXA scanning in assessing BMD. While not validated as a diagnostic tool, population studies show a high negative predictive value for osteoporosis. This study aimed to investigate its utility in patients attending a specialist bone health clinic.

**Methods:** Heel ultrasound results were compared to DXA diagnoses at our clinic and concordance rates, negative predictive value (NPV) and positive predictive value (PPV) were calculated. We also identified the correlation between BMD and bone ultrasound attenuation (BUA) and speed of sound (SOS) and the predictive value of heel ultrasound for hip fractures.

**Results:** 3753 patients were identified with a mean age of 67.2±8.8 y, of whom 76.5% were female. Concordance rate for osteoporosis were 87.8% (1117/1271) and osteopenia 27.4% (362/1324). Ultrasound T-scores were worse than DXA in 5% of cases. For diagnosing osteoporosis, PPV was 87.8% using (ultrasound T-score < -2.5.) and NPV was 63.3% (using ultrasound T-score > -2.5). In sub-analysis (n=2822) there was only a modest correlation between total hip BMD and SOS ($r^2$=0.24, P<0.001) and BUA ($r^2$=0.19, P<0.001). An ultrasound T-score < -2.5 vs. normal predicted a history of hip fracture (OR 2.39, CI. 2.00 - 2.87, P<0.0001)

**Conclusion:** Ultrasound of the heel had a good positive predictive value for diagnosing osteoporosis. However, it was less effective at ruling out osteoporosis, missing about a third of cases. As a specialist centre however, many of our patients were not treatment naive and had secondary causes for their bone loss. The results suggest that ultrasound of the heel is of less value at a specialist bone health clinic.

### P510
### PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY DERIVED BONE PARAMETERS IN MEN WITH IMPAIRED FASTING GLUCOSE AND TYPE 2 DIABETES

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**Objective:** Individuals with type 2 diabetes mellitus (T2DM) are at higher risk of fracture, but paradoxically do not have reduced BMD as measured by DXA. This study investigated associations between pQCT-derived bone parameters and glycaemia status.

**Methods:** Participants were men (n=414, age 33-96 y) from the Geelong Osteoporosis Study. Diabetes was defined by fasting plasma glucose (FPG) ≥7.0 mmol/L, self-report of diabetes or antihyperglycaemic medication use. Two men with type 1 diabetes were excluded. Impaired fasting glucose (IFG) was classified as FPG 5.6-6.9 mmol/L. Bone measures were derived using pQCT (XCT 2000 Stratec Medizintechnik, Germany) at the radius (4% site: n=376, 66% site: n=348) and tibia (4%, n=366, 66%: n=355). Linear regression was used to investigate associations between glycaemia status and pQCT-derived bone parameters, adjusting for potential confounders.

**Results:** There were 301 (72.7%) men with normoglycaemia, 62 (15.0%) with IFG and 51 (12.3%) with T2DM. At the 4% site, men with T2DM had lower age-, weight- and height-adjusted bone total area at the radius (-6.5%) and tibia (-4.3%) compared to the normoglycaemia group. Trabecular and cortical area were also lower at the radius (-6.5%) and tibia (-4.4%). Cortical density was higher for men with T2DM at the radius (+5.9%) and tibia (+4.8%). Adjusted total bone density at the radial site was also higher (+4.9%). At the 66% site, adjusted polar stress strain index was lower for men with T2DM at the radius (-8.1%) and tibia (-5.6%). No differences were detected for IFG. Femoral neck BMD was not different between the three groups (normoglycaemia: 0.954±0.136, IFG: 0.982±0.121, T2DM: 0.964±0.116 g/cm$^2$, p=0.320).

**Conclusion:** Men with T2DM had lower polar stress strain index and total bone, trabecular and cortical areas than the other two groups; however, cortical density was higher. No differences were detected between the groups for femoral neck BMD.

### P511
### BATCHBMD: AN ACCURATE AND EFFICIENT DUAL-ENERGY X-RAY ABSORPTIOMETRY REPORT GENERATOR

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**Objective:** In recent years, studies have shown that structural reporting systems can increase the efficiency and accuracy of reporting. However, there is still room for further improvements especially with respect to workflow, software functionality, and reporting performance. This study evaluates the use of the standalone software BatchBMD, which is used to generate a self-defined DXA report from a structured report (SR).

**Methods:** The BatchBMD software extracts data from DXA and body composition SRs stored in the Picture Archiving and Communication System (PACS) per the ISCD guidelines as stated in the 2019 Official Positions for adults. The software allows users to export searched DXA reports with a single click. To determine the efficiency and accuracy of the BatchBMD software, 500 random DXA SRs from January 2020 to March 2021 were selected. Subsequently, these cases were used to compare the BatchBMD software with the former web-based reporting system which was used at Taipei Municipal Wanfang Hospital. The reporting time was defined as the time from when a radiological technologist completed an exam and submitted the SR to PACS to when the reporting radiologist reviewed and approved the generated report and submitted it to the Radiology Information System (RIS) or Hospital Information System (HIS).

**Results:** 500 randomly selected DXA SRs were generated using GE Encore software and reviewed by referring physicians. Average reporting time was 10.8 min using the former reporting system, though only 6.7 min using the BatchBMD software. The reporting error rate was 1.8% using the former reporting system, though only 0.6% using the BatchBMD software. The most common error committed by the former reporting system was related to the inaccurate identification of the position of a compression fracture, while the most common error committed by the BatchBMD software was generating an inaccurate second digit after the decimal point when computing the patient's age or appendicular skeletal muscle index.

**Conclusion:** BatchBMD software improves both the accuracy and efficiency of structured DXA reporting.

## P512

### DOES LOW LEVELS OF VITAMIN D INCREASE SEVERITY IN COVID-19 PATIENTS? ARGENTINE EXPERIENCE

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**Objective:** Vitamin D (VD) plays a role in immune response. Recent data shows that low levels of VD could worsen COVID-19 outcomes. This study aimed to establish an association between VD levels among COVID-19 patients with clinical outcomes and inflammatory markers.
**Methods:** Prospective multicentric cohort study. Consecutively recruitment. Patients were grouped according admission status and level of VD [sufficient >30 ng/ml (VDS), insufficient 20-30 ng/ml (VDI), deficient <20 ng/ml (VDD)]. The variables evaluated were age, gender, oxygen mask requirement (O2r), mechanical ventilation (MV), pre-existing comorbidities, inflammatory markers, severity of COVID-19 measured by News Score.
**Results:** 363 patients were recruited (age 53±16), 59% male, 88% from total were hospitalized, whose VD levels were significantly lower than ambulatories (19±11 vs. 24.3±14 ng/ml p:0.006). The amount between groups was VDS (15%), VDI (27%), VDD (58%).VD levels correlated negatively with hospitalization days and evolution time (p:0.045-p:0.043). Severity of COVID-19 adjusted by comorbidities was linked to a lower VD status (p:<0.001) Also an association with pronation requirement among patients with lower VD levels (p: 0.008) was observed. O2r risk was elevated among VDI (OR 2.9 95%CI 1.3-7) and VDD (OR 3 95%CI 1.4-6), multiplying the odds in 2.6 and 3.7 in presence of 1 or more comorbidities with a higher need of ICU in VDD groups (OR 4.8 95%CI 1.2-20). A negative relation between VD levels, basal ferritin and LDH was described (p:0.018 and p:0.045).
**Conclusion:** Among COVID-19 hospitalized VD level was significantly lower than ambulatory patients. There is an association between low VD with a worse course of disease needing more days of hospitalization, thus lengthening the time of sickness. VDI and VDD group had severe forms of COVID-19. VDD presented a higher risk for ICU attention. Further studies are needed to emphasize the importance of adequate levels of VD to improve COVID-19 outcomes.

## P513

### LOWER CALCIUM LEVELS AND CORRELATION WITH WORSE COURSE OF COVID-19

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**Objective:** An osteometabolic phenotype is suspected in COVID-19 patients. Calcium levels (ca) could have repercussions on clinical course and therefore investigational lines should be open. This study aimed to determine if ca could influence clinical outcomes or inflammatory markers in SARS-CoV-2 patients.
**Methods:** Prospective multicentric cohort study. Consecutively recruitment. The variables evaluated were age, gender, oxygen mask requirement (O2r), mechanical ventilation (MV), pre-existing comorbidities, inflammatory markers, severity of COVID-19 measured by News Score. Patients were grouped according Vitamin D (VD) level [sufficient >30 ng/ml (VDS), insufficient 20-30 ng/ml (VDI), deficient <20 ng/ml (VDD)]. Hypocalcemia is considered when ca was lower of 8.4 mg/dl.
**Results:** 363 patients were recruited, aged 53±16, 59% male. 88% of patients were hospitalized, no differences in ca against ambulatory patients were found. 20% of patients presented hypocalcemia. Significant differences in ca between VDS, VDI and VDD was seen (9.13±0.4-8.9 ±0.42-8.7±0.7 p:<0.001) observing an increase of 0.014 mg/dl of ca for each point of ng/ml of VD ca correlated with severity of the disease, noticing a drop of 0.17 mg/dl in severe cases by News score, lower ca adjusted by comorbidities had an OR 1.74 95%CI 1.08-2.85 for severity. It was also associated with O2r p:0.041, prone position p:0.029, ICU attention p:0.005, MV p:0.002, days of MV p:0.007 and mortality p:0.001, having an OR for this last of 7.9 95%CI 2.6-24. A cut off value ≤ 8.3 mg/dl of ca was related with a HR:5 95%CI 1.4-17 p:0.013 for mortality.
**Conclusion:** Low ca is frequently seen in COVID-19 patients and could be associated with worse outcomes as O2r, MV, ICU attention and mortality, perhaps because of repercussions on neurological and vascular functions. Calcemia ≤8.3 mg/dl was significantly correlated with an increase in mortality. However further studies are need it to assess its real repercussion and treatment impact.

## P514

### ACTIVITIES OF TURKISH OSTEOPOROSIS SOCIETY

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The Society performed various activities to increase the awareness for the prevention of osteoporotic fractures and loss of independence.
The Turkish Osteoporosis Society is a national, neutral, nonprofit organization which aims to increase the standards in the field of "osteoporosis, osteoarthritis and musculoskeletal problems" including education of health professionals, patient care and treatment.
The society was founded in 1998 by the medical school faculty members who had been working in the field of osteoporosis aiming to create or make contributions for the development of technical, scientific and social facilities and it also cooperates with international and national institutions, organizations, foundations and societies for this purpose. The Turkish Osteoporosis Society is a member of International Osteoporosis Foundation (IOF). Education- In order to prevent osteoporotic fractures, one of the priorities of the society is education for the physicians and the other health professionals. Since its foundation the society performed various activities regarding the osteoporosis prevention, early diagnosis and effective treatment approaches not only for the health professionals but for the public as well. Pharmacologic treatment and nonpharmacologic approaches, also the chronic consequences and rehabilitation are considered as the important themes in these training programmes. Congresses, symposiums and courses are organized regularly. Also various conferences and panels are organized by the society in different cities of the country with the local tutors. Recently OSTEOACADEMY-Istanbul was organized online on October 10-11, 2020 and OSTEO2021 "Osteoporosis, Osteoarthritis and Musculoskeletal Pain Congress" will be held on digital platform on October 8-10, 2021. Other important events that should be mentioned are, Turkish Osteoporosis Society organized several Clinical Densitometry Certificate Courses, which were endorsed by IOF.
Publications: The Turkish Journal of Osteoporosis is the society's scientific publication, which has been published regularly since 1998 and is included in the Emerging Science Citation Index-ESCI. By the Scientific Council of the Turkish Osteoporosis Society several books were published for the physicians. Also various booklets were distributed free of charge for the public. Recently 3 newspapers (osteogazette) were

prepared, published and distributed in the digital platform. A consensus report entitled; "Updated approach for the management of osteoporosis in Turkey" was published in 2020. A panel of multidisciplinary experts developed a thorough review to assist clinicians in identifying osteoporosis and associated fracture risk patients, diagnosing the disease with the appropriate available diagnostic methods, classifying the disease, and initiating appropriate treatment. The panel expects to increase the awareness of this prevalent disease, decrease consequences of osteoporosis with corresponding cost savings and, ultimately, decrease the overall burden of osteoporosis and related fractures in Turkey. The Turkish Osteoporosis Society's epidemiologic, scientific publication on the prevalence of hip fracture in Turkey has led to the national data in country based FRAX and is used in our country for risk assessment.

Public Education Activities: Translations of IOF publications continue to be made and shared on the society's web page. Very recently a document entitled "Osteoporosis in the Covid 19 pandemic" was prepared by the board of Directors of the society.

Virtual Osteoporosis Congress for the Public: A two days Osteoporosis Congress was held free of charge for the public education in April 1-2, 2021 also. Important aspects of osteoporosis prevention, early diagnosis, lifestyle modification and awareness on risk factors were discussed in detail.

World Osteoporosis Day: Public conferences and BMD measurements for screening (calcaneal US) are performed free of charge every year on the World Osteoporosis Day in various cities of the country. Also press conferences and press releases are prepared. In 2020 a declaration was made by the board of directors of Turkish Osteoporosis Society focusing on: "Osteoporosis is a disease that should not be overshadowed during the COVID-19 pandemic".

Social Responsibility Projects: Turkish Osteoporosis Society planted 1000 pine saplings in 1998 as a social responsibility project. 20 years later the planted saplings became a magnificent pine grove. In order to attract interest and raise awareness, in 2020 "Break records, not bones " campaign was organized. The Society took place in the Guinness Book of World Records for the highest number of BMD screening in 24 h.

The most important project aiming at prevention of the disease and solution of fractures is the latest one entitled; "Keep on living with healthy bones". In this context all the members of the executive board of the society prepared videos about the risk factors, signs and symptoms, diagnosis, prevention, treatment of osteoporosis. Also nutrition, physical activity and the impact on quality of life are presented in those videos in the web site of the society. The activities are announced and shared not only by the web site, but Facebook and Instagram pages as well.

FLS: Fracture liaison service is another solution for post fracture care. In coordination of the IOF, training of the Turkish FLS team has been started with the representatives of our society. This programme is considered as an important goal is to increase the number of FLS centers throughout Turkey.

Since 1998, a considerable number of people have been reached through various activities carried out by the Society on different platforms and have contributed to the protection of this public health issue by raising awareness of disease prevention and early diagnosis.

## P515
## KINETOTHERAPY IN KNEE OSTEOARTHRITIS IN TIMES OF PANDEMIC IN REPUBLIC OF MOLDOVA

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Objective: Kinetotherapy is proposed as a method of nonpharmacological treatment of knee osteoarthritis (OA) by the EULAR and OARSI recommendations. Since the COVID-19 pandemic was declared by the WHO in March 2020, there have been different restrictions for outpatient rehabilitation clinics in the Republic of Moldova, from banning clinic visits, limited access, or the need for additional precautions for both patient safety and health professionals. This study aimed to assess the restrictions of the kinetotherapy rehabilitation program in patients with osteoarthritis during the pandemic.

Methods: We performed a qualitative study of patient attitude and the impact of COVID-19 restrictions on their rehabilitation program. The sample (n=28) consisted of patients with osteoarthritis that were admitted to outpatient rehabilitation facilities associated with University Rehabilitation Center. All patients underwent a standard kinetotherapy 10 d program between September 2020-March 2021. The patient's opinions were assessed in semi-structed interview by phone calls, after completing the kinetotherapy program. The qualitative findings of the impact of pandemic restrictions on patients with OA.

Results: In the study were included 28 patients (9 men and 19 women). The analysis revealed 9 areas concerning challenging reasons in patients with knee OA during the rehabilitation program: certain restrictions across the country determined by infection rate, fear for traveling in public transport or becoming infected during exercise program because they cannot keep a safe distance, high rate of abandon or poor adherence to kinetotherapeutic program due to patient infection or need to respect the self-isolation, preference of individual sessions rather than group sessions, increased rate of telerehabilitation, challenges in elderly to use gadgets, post-COVID symptoms caused some limitation for the intensity of the program, increased communication needs of patients.

Conclusion: Kinetotherapy rehabilitation is an important part of the management of knee osteoarthritis, its realization in pandemic conditions determined several challenges, as brought challenges but also opportunities.

## P516
## FREQUENCY OF HYPOVITAMINOSIS D AND ASSOCIATIONS OF 25 (OH)D PLASMA CONCENTRATION WITH INDICATORS OF DISEASE ACTIVITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Vitamin D deficiency is an important environmental risk factor that influences the prevalence and severity of several autoimmune diseases, including rheumatoid arthritis (RA). The aim of this study was to determine the frequency of vitamin D deficiency and insufficiency in patients with RA and to establish associations of plasma concentration of 25(OH)D with indicators of disease activity.

Methods: 156 patients with RA were enrolled in the study: 139 women (mean age 60.1±13.7 y) and 17 men (mean age 58.8±13.4 y). Clinical status, level of rheumatoid factor, C-reactive protein, total vitamin D (25(OH)D), antibodies to cyclic citrullinated peptide (ACCP) were determined. RA activity was assessed using indices DAS28 (Disease Activity Score), SDAI (Simplified Disease Activity Index) and CDAI (Clinical Disease Activity Index).

Results: Average levels of 25(OH)D in the surveyed sample were 25.2 ±13.2 ng/ml. Normal 25(OH)D, its insufficiency and deficiency were observed in 47 (30.3%), 45 (28.7%) and 64 (40.7%) patients, respectively. The average level of 25(OH)D in patients taking vitamin D preparations was 29.1±10.7 ng/ml, in those who did not take it - 21.4±12.5 ng/ml (p=0.002). Patients with vitamin D deficiency had statistically significant higher levels of DAS28 (4.5±0.2), CDAI (48.7±6.6), SDAI (22.4±2.1) and tender joints count (13.6±1.5) in comparison with those who had vitamin D insufficiency (3.5±0.4; 14.3±1.9; 27.3±4.6; 8.1±1.3) and normal 25(OH)D (3.3±0.4; 15.1±2.1; 31.0±5.6; 9.5±1.6) respectively.

Conclusion: The results of the study indicate a high prevalence of hypovitaminosis D in patients with RA. One of the main causes of

hypovitaminosis D deficiency in patients with RA is the low level of vitamin D supplementation - 39.1%. Vitamin D deficiency in RA patients are associated with higher scores of disease activity and number of tender joints. It is advisable to prescribe vitamin D as an adjunctive therapy in patients with active RA with a potential immunomodulatory purpose, as well as for the prevention and treatment of disorders of bone metabolism.

## P517
### EFFECT OF A MULTICOMPONENT MEDICAL REHABILITATION PROGRAM ON PAIN AND FATIGUE IN PATIENTS WITH OSTEOARTHRITIS AND RHEUMATOID ARTHRITIS

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**Objective:** To evaluate the short-term effectiveness of a multicomponent rehabilitation program based on aerobic exercises in patients with osteoarthritis (OA) and rheumatoid arthritis (RA).

**Methods:** We observed 60 patients with OA (mean age 57.4 [49.3:71.1] y, duration of disease 14.8 [5.5:21.9] y) and 74 patients with RA (mean age 52.1±9.6 y, duration of disease 9.2 [4.8;13.6] y). The following rehabilitation technologies (RT) were used at the sanatorium-resort stage of medical rehabilitation (within 21 d): I - kinesitherapy (dosed walking from 30-60 min daily), II - hydrokinesitherapy (therapeutic swimming in a pool with seawater, 10 -12 procedures for 30 min daily or every other day), III - low-frequency magnetotherapy (LFM) (from 0.3-100 Hz; up to 5 mT; 10 procedures for 30 min every other day), IV - a method of functional biocontrol with biofeedback (BFB therapy) (10-12 sessions of thermal and myographic BFB therapy, for 20-25 min daily). The intensity of pain in the affected joints (while walking) was assessed using the visual analogue pain scale (VAS Huskisson). The $VAS_{0-100}$ and Bristol Rheumatoid Arthritis Fatigue Numerical Rating Scales (BRAF-NRS V2) were used to assess fatigue.

**Results:** The combined use of RT-I and RT-II in OA patients (n=24) resulted in a decrease in pain intensity (p=0.041) and fatigue on the $VAS_{0-100}$ scale (p=0.044), and in RA patients (n=28) resulted in decreased pain on the VAS scale (p=0.031), decreased fatigue on the $VAS_{0-100}$ (p=0.04), NRS severity and NRS-overcoming scales (p=0.008 and p=0.013, respectively). The combined use of RT-III and RT-IV in OA patients (n=20) reduced pain (p=0.017) and the number of swollen joints (p=0.044), and in RA patients (n=22) reduced NRS-overcoming (p=0.027). The use of a multicomponent treatment regimen (combination of all RTs) in the group of OA patients (n=16) showed a significant decrease in pain intensity (p=0.022), $VAS_{0-100}$ fatigue (p=0.021), number of painful joints (p=0, 034), and in the group of patients with RA (n=24) resulted in a decrease in pain intensity on the VAS scale (p=0.018), number of painful joints (p=0.023), level of chronic fatigue on $VAS_{0-100}$ (p=0.002) and all components of BRAF-NRS (NRS-degree of severity, p=0.009 NRS-overcoming, p<0.001; NRS-effect, p=0.033).

**Conclusion:** Dynamics of joint syndrome indexes, pain and chronic fatigue demonstrate the positive result of multicomponent treatment scheme on the basis of combination of aerobic exercises and methods of modern physiotherapy in patients with RA. It is possible to achieve significant changes in the studied parameters in patients with OA even with the isolated use of aerobic exercises (walking, swimming).

## P518
### GENETIC VARIATION IN VITAMIN D METABOLISM IN THE MOTHER, RATHER THAN THE FETUS, IS ASSOCIATED WITH UMBILICAL CORD BLOOD 25-HYDROXYVITAMIN D STATUS: FINDINGS FROM THE MAVIDOS RANDOMIZED CONTROLLED TRIAL

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**Objective:** Single nucleotide polymorphisms (SNP) in the vitamin D metabolism pathway are associated with serum 25-hydroxyvitamin D [25(OH)D] in adulthood. The fetus is dependent on transfer of 25(OH)D across the placenta. We assessed whether maternal and/or offspring SNPs in this pathway are associated with umbilical cord blood (UCB) 25(OH)D, and if antenatal vitamin D supplementation modifies the relationships.

**Methods:** MAVIDOS is a randomised placebo controlled trial of 1000 IU/d cholecalciferol from 14 weeks gestation until delivery. UCB 25(OH)D was assessed by tandem mass spectrometry. SNPs at rs12785878 (7-dehydrocholesterol reductase, *DHCR7*), rs10741657 (25-hydroxylase, *CYP2R1*), rs6013897 (24-hydroxylase, *CYP24A1*) and rs2282679 (vitamin D binding protein [DBP], *GC*) were genotyped in maternal and UCB blood. Associations between deseasonalised 25(OH)D generated by Fourier analysis and the SNPs were assessed by linear regression for each study group using an additive model (β=change in 25(OH)D per additional common allele). Models were adjusted for maternal age, triceps skinfold thickness and late pregnancy smoking as these were associated with UCB 25(OH)D.

**Results:** 329 mother-offspring pairs were included (165 cholecalciferol, 185 placebo). The cholecalciferol group had higher UCB 25(OH)D (mean 42.3 nmol/l; SD 13.1) than the placebo group (mean 28.6 nmol/l; SD 12.1), p<0.001. The SNP at rs22825679 (*GC*) in the mother was associated with UCB 25(OH)D in the cholecalciferol group (β=4.2 nmol/l per allele; 95%CI 1.0, 7.3). The effect of this SNP in the placebo group was smaller (β=1.9 nmol/l per allele; 95%CI -0.6, 4.4). The other maternal SNPs and all offspring SNPs were not associated with UCB 25(OH)D in either group.

**Conclusion:** Maternal rather than fetal genetic variation in *GC*, encoding DBP, is associated with fetal 25(OH)D. The effect of the SNP was larger in pregnancies supplemented with cholecalciferol, suggesting a possible effect of the SNP on DBP binding affinity or concentration, which becomes more important in a vitamin D replete state. Future work needs to establish the effect of this SNP on DBP levels in pregnancy, and the role of maternal DBP in transport of 25(OH)D to and across the placenta.

## P519
### NECK PAIN AMONG HEALTH WORKERS IN PRIMARY HEALTH CARE

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**Objective:** Neck pain (NP) has shown as prevalent and non-ignorable health problem among health professionals. The aim of this study was to examine the presence of NP, as well as the some factors associated with the NP among health workers in primary health care.

**Methods:** A prospective cross-sectional study was conducted in the period from April 1 to May 1, 2021 and included 31 respondents of both genders employed at the Health Center Bač, Serbia. Data were collected on current neck pain and its duration, years of work experience, professional qualification and daily time spent on computer and mobile phone. Degree of disability due to neck pain was assessed with neck disability index (NDI). EZR statistical software was used for statistical analysis.

**Results:** In the examined sample (n=31; female 83.9%), the average age of the respondents was 45±13.6 y, and the average work experience was 19.4±13.9 y. Most of the respondents had a high school degree (19 (61.3%)). Average daily time spent on computer and mobile phone was 6±2.8 h and 2.8±2.8 h, respectively. Current NP was reported by 12 (38.7%) subjects, and in most of them (9 (50%)) the duration of pain was up to 6 weeks. The average NDI score was 8.6±6.9, which indicates mild disability due to the NP. Statistically significant positive correlation was found between years of work experience and NDI score (r=0.401, p=0.025), but not between NDI score and age and daily time spent on computer/mobile phone.

**Conclusion:** Our study has shown the presence of NP in a significant number of respondents working in primary health care and that years of work experience positively correlate with disability due to NP measured with NDI. It is necessary to identify and further analyze risk factors for NP in health workers, as well as to take prevention strategies.

## P520
### WHY NOT MORE CONFIDENCE IN THE BONEMARKERS PUBLISHED IN THE GERMAN DVO GUIDELINES 2017?

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**Objective:** In an earlier release (Osteoporose & Rheuma aktuell 1/03, 12-13) we could show, that in bisphosphonates therapy – in contrast to international literature with a 3-6 months examination interval after starting the treatment - short time monitoring of the bone marker is possible already after two weeks. In the updated DVO guidelines (valid since 28 Jan 2018) the bone markers are only given the status of a "single case decision". Following our own clinical experiences, the bone markers are underestimated and used too seldom in spite of right and/or wrong application. This article is willing to induce a "PRO".

**Methods:** Included were 31 patients (26 female, 5 male, all age of 67 y) with an LWS T-score < -2.5 and the related risk factors following the DVO guidelines. The patients were treated, as a basic therapy, with 800 mg calcium/d and 1000-1200 mg vitamin D /d and a weekly dose of 35 mg risedronate. As a bone marker the β-CrossLaps with the Elecsys β-CrossLaps Test (Roche Diagnostics GmbH) were taken before the beginning of the therapy in the morning between 8 and 9 and again 14 d after the start. It is important that the time of the taking of the blood sample must not differ more than 15 min ± in comparison to the first blood sample. The results have been intensely discussed with the patient, the drop of CrossLaps was visualized and the effect of the treatment was demonstrated obviously and profoundly. One year after the start of the treatment, the patients were contacted on the phone and questioned about their compliance.

**Results:** Compliance data could be collected from 83.9% (i.e., 26 out of 31). Five patients reported that their family doctor stopped the treatment. But after twelve months 21 out of the remaining 26 (80.8%) continued with bisphosphonate therapy.

**Conclusion:** In spite of extremely low persistence rates in the Grand I-Study (Hadji et al. Osteoporos Int 2012;23:223) – 9,6% with daily, 28.4% with weekly und 29.4% with monthly oral intake of bisphosphonates – our persistence rate is remarkably higher with 80.8%. This shows that the

application of bone markers in short time monitoring after 2 weeks – along with the right application and plausible explanation of the optimistic results to the patient – is a simple but effective instrument in the leading of patients on the way to an improved compliance. Therefore we encourage all our osteological colleagues to make more generous use of the bone markers than advised in the guidelines 2017, but always with strict control of blood samples (taken at the same time) before and after the start of the treatment. This could under special circumstances be cofinanced by the patient who will be thankful for a positive development of his wellbeing. Always remember: only the osteoporosis medication – and we have a lot of great medicines – that is really taken by the patient can make the best effect.

## P521
### SERUM MICRORNAS IN OSTEOPOROTIC FRACTURE AND OSTEOARTHRITIS: A GENETIC AND FUNCTIONAL STUDY

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**Objective:** The rising incidence of bone pathologies such as osteoporosis and osteoarthritis is negatively affecting the functional status of millions of patients worldwide. The genetic component of these multifactorial pathologies is far from being fully understood, but in recent years several epigenetic mechanisms involved in the pathophysiology of these bone diseases have been identified. The aim of the present study was to compare the serum expression of four miRNAs in women with hip fragility fracture (OF group), osteoarthritis requiring hip replacement (OA group) and control women (Ctrl group).

**Methods:** Serum expression of miR-497-5p, miR-155-5p, miR-423-5p and miR-365-3p was determined in a sample of 23 OA women, 25 OF women and 52 Ctrl women.

**Results:** Data shown that women with bone pathologies have higher expression of miR-497 and miR-423 and lower expression of miR-155 and miR-365 than control subjects. Most importantly, miR-497 was identified as an excellent discriminator between OA group and control group (AUC: 0.89, p<0.000) and acceptable in distinguishing from the OF group (AUC: 0.76, p=0.002).

**Conclusion:** Our data suggest that circulating miR-497 may represent a significant biomarker of OA, a promising finding that could contribute towards future early-stage diagnosis of this disease. Further studies are required to establish the role of miR-155, miR-423 and miR-365 in bone pathologies.

## P522
### IMPACT OF COVID-19 ON OSTEOARTHRITS OF KNEE

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**Objective:** COVID-19 is a pandemic disease which affected huge number of people all over the world. Many post COVID patients experienced exacerbated musculoskeletal symptoms especially those who had preexisting problems. Osteoarthritis [OA] of knee is a common problem that exists among the elderly because of which there is a functional limitation. COVID-19 adds on to the disability and impairment. The purpose of this study was to evaluate pain, functional impairment, and daily activity in post COVID-19 patients with knee OA. To check if there was any

co-relation between COVID-19 functional status and knee function in patients with OA

**Methods:** The study included 36 patients who got infected with COVID-19 and with knee OA. They were classified based on Kellgren-Lawrence criteria and graded accordingly. Data was collected from patient telephonically during the first week of isolation and also on the 4th week when they visited the specialised post COVID rehabilitation opd. Patients rated their pain level on the basis of a visual analog scale (VAS) and completed WOMAC and the post COVID-19 functional status scales. Statistical tool: The collected data was compared for the first and the fourth week for significance. Karl Pearsons test for correlation was used to find the correlation between WOMAC and post COVID-19 functional status index.

**Results:** VAS and WOMAC scores increased significantly after COVID-19 infection. A positive co-relation existed between WOMAC and post COVID-19 functional status index.

**Conclusion:** COVID-19 has had a significant impact on pain, joint function and physical function in patients who already had OA of knee.

## P523

### OSTEOPOROTIC FRACTURES IN PATIENTS WITH RHEUMATOID ARTHRITIS IN LONG-TERM PROSPECTIVE OBSERVATIONAL STUDY

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**Objective:** To determine the frequency and localization of osteoporotic fractures in rheumatoid arthritis (RA) patients with RA occurred during the long-term prospective observational study.

**Methods:** The study included 80 woman with RA, aged 40-80 y. Mean duration of observation $8.23\pm1.3$ y; mean age $62.5\pm8.7$ y; the mean RA duration $23.2\pm10.1$ y; 74 (92.5%) were in menopause, mean age at menopause $47.9\pm4.8$ y. All patients took a clinical examination, assessment of the anamnestic data, X-ray of hands, feet, thoracic and lumbar spine and DXA of lumbar spine and femoral neck.

**Results:** During the follow-up period, the number of patients with fractures was increased from 22 (27.5%) to 36 (45%). There were occurred 25 new cases of osteoporotic fractures: 6 patients with re-fractures and 14 patients with a fracture for the first time. We divided patients into two groups: group I - 20 patients with fractures, group II - 60 patients without fractures, occurred during the follow-up period. The mean age, disease duration, activity of RA and the number of patients with history of prior fracture was not significantly different in groups. The number of patients with BMD corresponding to OP at baseline was not significantly different between groups: 12 (60%) vs. 23 (38%) (p=0.08), while in dynamics there was a significant difference: 16 (80%) vs. 30 (50%) (p=0.01), respectively. During the follow-up period glucocorticoid therapy (GC) had 16 (80%) patients in group I vs. 28 (47%) in group II (p=0.01). Localizations of fractures: wrist - 6 (24%), ankle - 5 (20%), vertebrae - 4 (16%), anatomical neck of the humerus - 4 (16%), others - 6 (24%).

**Conclusion:** Over the 8-y follow-up period, the number of patients with osteoporotic fractures has increased by 17.5%. Every 4th patient had a fracture. Patients with fractures were significantly more likely to take GC and had OP.

## P524

### EFFECT OF CLOSE KINETIC CHAIN EXERCISES ALONG WITH BRISK WALKING ON QUALITY OF LIFE IN PATIENT WITH POSTMENOPAUSAL OSTEOPOROSIS

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**Objective:** Osteoporosis is a systemic skeletal disease characterised by a low BMD and increased risk of fractures. The quality of life is closely related to the presence of osteoporosis and its complications as fractures. Menopausal women represent the most important segment of population at risk. Treatment of these patients has to be comprehensive and include both, pharmacological and non-pharmacological interventions. The aim of this study was to investigate how close kinetic chain exercises and brisk walking for osteoporosis in the duration of 6 weeks can impact quality of life in patients with postmenopausal osteoporosis.

**Methods:** A randomised single-blind randomised controlled prospective trial study, which included 54 women with postmenopausal osteoporosis diagnosed. Exclusion criteria were secondary osteoporosis, lumbar sciatica, pacemaker, cardiorespiratory instability, arrhythmia, malignant disease, neurological diseases, severe knee OA, people involve in any physical exercises in past 6 months. Patients were randomly assigned to two groups: the first group of patients in exercises group, the second group is control group of patients who did not practice exercises. Close kinetic exercises were practiced 4 times a week and brisk walking was advised for 30 min 4 times in week. Quality of life was determined with a specific questionnaire Qualeffo-41.

**Results:** Mean age of Patients were $60.6\pm6.7$ y; The results showed, significant statistical difference in terms of pain, physical activity, social life, the perception of own health between the groups (p<0.0001).

**Conclusion:** Patients who practice close kinetic chain exercises and brisk walking for osteoporosis have a significantly better quality of life than patients who do not perform exercises.

## P525

### REGIONAL FEATURES OF AGE-RELATED LOSS OF BONE MINERAL DENSITY ACCORDING TO DXA

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**Objective:** To identify regional features of age-related loss of BMD according to the results of DXA in elderly and old women.

**Methods:** The BMD was assessed with DXA by Lunar Prodigy Advance, GE, USA, 2018 in the lumbar spine (LS) (BMD L1-L4, $g/cm^2$; T-score L1-L4, standard deviation (SD)) and femoral neck (FN) (BMD region total, $g/cm^2$; T-score region total, SD). Vertebral fracture assessment in the lateral projection carried out as necessary. Statistical processing was performed using the program Statistica 10.0 (Stat Soft Inc., USA).

**Results:** There were examined 27 postmenopausal women (n=27) aged 70 y and older (mean age $75.3\pm4.5$ y). The initial BMD of all participants on average were 0.96 ($\pm0.15$) in the LS, 0.75 ($\pm0.09$) in the FN of the left femur, 0.73 ($\pm0.07$) $g/cm^2$ in the FN of the right femur. The rate of involutive bone mass reduction was estimated based on the results of dynamic changes in BMD at 12, 24, and 36 months. After 36 months of follow-up the BMD of the LS significantly decreased by 0.5% (p=0.001), the BMD of the FN of the left femur significantly decreased by 5.2% (p=$8.2\times10$-7), and the BMD of the FN of the right femur significantly decreased by 5.9%.% (p=0.0003). The average rate of decrease in BMD in women with osteoporosis was 0.17% per year in the LS, 1.97% in the FN of the left femur and 1.73% in the FN of the right femur.

**Conclusion:** The difference in the rate of decrease in the BMD of the lumbar spine and the proximal femurs was associated with the presence of artifacts that overestimate the value of the average BMD of the lumbar spine and have a false positive effect on the change in BMD in dynamics (vertebral deformities - 37.0%; degenerative- dystrophic changes leading to additional pathological ossification - 40.8%). It is preferable to evaluate the effectiveness of medical treatment of osteoporosis based on the results of BMD of the proximal femurs, which will allow you to get the correct result and reduce the time of examination of elderly and senile patients.

## P526

### BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES MELLITUS WITH AND WITHOUT DIABETIC NEPHROPATHY

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**Objective:** Diabetes mellitus and osteoporosis are both common human diseases. Diabetic nephropathy (DN) is characterized by the presence of pathological quantities of urine albumin excretion, diabetic glomerular lesions, and loss of glomerular filtration rate in diabetics. Little evidence has been reported on relationships between BMD and albuminuria. The aim of this study is to compare the BMD in postmenopausal women with type 2 diabetes mellitus (T2DM) with and without DN.

**Methods:** We retrospectively analysed the BMD of the lumbar spine and femur using DXA in 84 postmenopausal women with T2DM with (39) and without (45) DN. The serum levels of calcium, phosphorus, total alkaline phosphatase, and urine albumin excretion were measured in all participants. Diagnosis of albuminuria was based on albumin-creatinine ratio.

**Results:** Age, BMI and time since menopause were not significantly different between the two groups. The T-scores of basal BMD at L4 were significantly lower in patients with DN (-0.94±0.40) compared to patients without nephropathy. No significant differences in serum creatinine were detected between two groups of patients. Our data suggest that ACR was negatively associated with lumbar spine and femoral neck BMD.

**Conclusion:** Our results suggest that postmenopausal women with DN have a lower BMD and are at increased risk of osteoporosis in the lumbar spine compared with postmenopausal women without DN. ACR was negatively associated with lumbar spine and femur neck BMD. One of the explanations that have been proposed for the association between albuminuria and osteoporosis is that albuminuria is associated with reduced bone blood flow, resulting in a decreased rate of bone remodeling and the development of osteoporosis.

## P527

### QUANTIFYING THE EMPLOYER BURDEN OF PERSISTENT MUSCULOSKELETAL PAIN AT A LARGE EMPLOYER IN THE UK: A NON INTERVENTIONAL, RETROSPECTIVE STUDY OF ROLLS-ROYCE EMPLOYEE DATA

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**Objective:** Quantify the employer burden of persistent musculoskeletal (MSK) pain to a large UK employer (Rolls-Royce [RR]).

**Methods:** A retrospective, longitudinal cohort study of RR UK employees indexed (Jan 2016 to Dec 2018) on their first MSK-related occupational health (OH) management referral (a proxy for persistent MSK pain) using linked OH and human resources data. Cases were matched 1:1 to controls without persistent MSK pain on birth year, gender and job role. All-cause and MSK-related OH referrals, sickness absence days and costs of absences (direct + indirect) were compared between cases and controls at 12 months' follow-up (FU).

**Results:** 2382 matched case-control pairs were analysed (mean age: 46 y; male: 82%; works/staff/management: 50%/38%/12%; mean FU: 31 months). Most (78%) cases were indexed on back pain (36%), lower limb disorder (23%) or upper limb disorder (20%). Significant differences in outcomes were observed between cases and controls within 12 months' FU (Table).

Table. OH referrals, sickness absences and costs of absences for cases and controls within 12 months' FU

| Mean (SD) [total] – unless otherwise stated | Cases | Controls |
|---|---|---|
| OH Referrals | | |
| MSK-related | 1.2 (0.5) [2,902] | - |
| ≥1 additional referral post-index, n (%) | 439 (18) | - |
| All-cause | 1.3 (0.6) [3,136] | 0.1 (0.3) [135] |
| ≥1 referral, n (%) | 2382 (100) | 118 (5) |
| Sickness absence days | | |
| MSK-related | 16.5 (45.2) [39,200] | - |
| ≥1 sickness absence, n (%) | 807 (34) | - |
| All-cause | 34.6 (62.1) [82,341] | 8.2 (31.2) [19,628] |
| ≥1 sickness absence, n (%) | 1774 (74) | 1049 (44) |
| Costs of absences (£K) | | |
| MSK-related | 21 (59) [50,099] | - |
| All-cause | 44 (81) [105,567] | 11 (45) [25,676] |
| P<0.0001 for all comparisons | | |

**Conclusion:** Cases took significantly more sickness absence days vs. matched controls, resulting in higher costs to RR. Annual costs of absences equated to £105 million (≈82,000 days lost) for cases; 47% of which were MSK-related. These unique data provide evidence of the employer burden caused by persistent MSK pain.

## P528

### CORELATION BETWEEN TMJ JOINT DYSFUNCTION AND CERVICAL SPINE DYSFUNCTION

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**Objective:** The temporomandibular joint is directly related to the cervical and scapular region. This study aimed to assess any possible relationship between temporomandibular dysfunction (TMD) and cervical spine dysfunction (CSD). **Methods:** Total 30 volunteers,15 volunteers that were presenting clinical signs and symptoms of TMD and15 volunteers that were presenting CSD according to Temporomandibular Dysfunction Assessment Questionnaire and Neck disability Index respectively were selected for this study. Individuals having TMD were assessed for any signs and symptoms of CSD using Neck disability Index, Index of Cervical Mobility and VAS score. Individuals having CSD were assessed for TMD using Temporomandibular Dysfunction Assessment Questionnaire, Mandibular Mobility Index and VAS score.

**Results:** Correlation test (p≤0.05) was performed to verify the relationship between CSD and TMD. The increase in TMD signs and symptoms was accompanied by increase in CSD severity.

**Conclusion:** The result of this study concluded that TMD is accompanied with CSD and vice versa.

## P529

### EFFECTS OF SENSORY MOTOR STIMULATION AND KINESIO TAPING ON DROOLING IN SPASTIC CEREBRAL PALSY CHILDREN

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**Objective:** Oral motor and oral sensory issues are frequently observed in children with cerebral palsy. Delay in feeding, failure to thrive, management of oral secretions, phonological and articulation development is often impaired. Purpose to study the effect of physiotherapy intervention to control drooling. This study is conducted to assess the effectiveness of sensorimotor stimulation and kinesiotaping in controlling drooling in children with cerebral palsy.

**Methods:** Children diagnosed with cerebral palsy and satisfying the inclusion criteria was be selected for the study, severity and frequency of drooling (Thomas-Stonells drooling scale) drooling quotient and drooling impact scale was used as outcome measure.

**Results:** Paired t-test of significance will be used to estimate the difference in the drooling severity and frequency, drooling quotient and impact of drooling before and after treatment. There was a significant reduction in drooling frequency, severity, drooling quotient and drooling impact scale post treatment As the p value was <0.0001

**Conclusion:** The study concludes that sensory motor stimulation, kinesiotaping and activities are effective in controlling drooling in cerebral palsy children.

## P530

## IMPACT OF RHEUMATOID ARTHRITIS ACTIVITY AND ANTICYCLIC CITRULLINATED PEPTIDES IN BONE MINERAL DENSITY DYNAMICS DURING THE 12 MONTHS THERAPY OF DENOSUMAB

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**Objective:** As it known the inflammation in rheumatoid arthritis (RA) leads to local and generalized bone loss. The use of such new antiresorptive drug as denosumab (monoclonal antibody that binds RANKL) decreases an osteoclast activity, increases BMD and also has potential influence on erosive process in RA. The aim of this study was to evaluate the effects of denosumab on BMD depending on RA activity and anticyclic citrullinated peptides (aCCP) positivity/negativity.

**Methods:** 66 postmenopausal women (mean age 59.6±7.4) with RA (mean duration 17.7±10.4 y) and osteoporosis (OP) received s/c denosumab 60 mg every 6 months pro 12 months. At baseline and after 12 months it was carried out DXA at 3 sites: lumbar spine (L1-L4), hip neck (HN) and distal forearm (DF) and x-ray of hands and feet (Sharp/van der Heijde score). RF-positive were 47 (72%), aCCP – 48 (74%) patients. 34 (49%) patients have continued glucocorticoids (GC). In previous studies we showed the significant evaluation of BMD in general (regardless of GC intake), the influence of different factors on BMD dynamics. The present study analyzed the BMD change in aCCP ± groups of patients and with different RA activity levels. The mean DAS-28 was 4.01±1.02 and it was not changed significantly after 1 y of therapy. According to DAS-28, 5 (7.6%) patients had 0 level of RA activity, 7 (10.6%) – 1, 45 (68.1%) – 2 and 9 (13.6%) – 3, respectively.

**Results:** After therapy it was noted that in group of patients with RA activity level 0 it was not any significant changes of BMD, probably because of small number of group. In group 2 (RA activity level 1) BMD in L1-L4 was significantly increased (p=0.02). In group 3, the largest group of patients in this study, the significant increase of BMD (p<0.05) was noted in L1-L4, hip neck and total hip. In group 4 the significant increase of BMD was noted in L1-L4 and total hip. In aCCP "+" patients the mean BMD was significantly increased (p<0.05) in L1-L4, hip neck, total hip and distal forearm while in aCCP "-" patients the mean BMD was significantly increased only in L1-L4 and total hip.

**Conclusion:** Our study showed that the increase of BMD after the 12 months of denosumab therapy did not depend on initial RA activity. The increase of BMD in L1-L4 was noted in patients with low, moderate and high activity, as well as in hip in patients with moderate and high activity. Also it was shown that the increase of BMD in main sites of the skeleton is observed regardless of aCCP positivity/negativity.

## P531

## FRAX BASED OSTEOPOROSIS MANAGEMENT PATHWAY FOR UKRAINIAN MEN

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**Objective:** Ukrainian FRAX model for Ukraine was launched in 2016 and intervention thresholds for women were published in 2019. The impact of intervention thresholds for Ukrainian men was not explored. The aim of this research was to assess the impact of the use of these thresholds in Ukrainian men.

**Methods:** 653 men (age 60.5±11.8, range 40-88 y) referred as outpatients to the Dmitry F. Chebotarev Institute of Gerontology of the National Academy of Medical Sciences of Ukraine for the evaluation of skeletal status were studied. The 10-y probabilities of hip fracture and a major osteoporotic fracture were calculated using the Ukrainian FRAX model (version 4.2) with and without femoral neck BMD.

**Results:** 174 of 653 men (26.6%) had a prior fragility fracture and would be eligible for treatment on this basis. From the 479 males without a prior fracture, 447 were at low risk (68.5%) and were not be eligible for further assessment of fracture probability. The intermediate category of risk comprised 32 men (4.9%) in whom FRAX was recalculated with the inclusion of femoral neck BMD. Of these 23 were categorized at low risk (3.5%) and 9 at high risk (1.4%). Fracture probability calculated with BMD was higher than that without BMD. The disposition of the cohort in men was markedly different from that for women. 28% of men and 57% of women were eligible for antiosteoporotic treatment. The eligibility for treatment by FRAX alone was higher in women than in men (6.1 vs. 1.4% had a prior fragility fracture and were eligible for treatment). The requirement for BMD testing was also higher in women than in men (18.3 vs. 4.9%, respectively).

**Conclusion:** We have examined the assessment of fracture risk in Ukrainian men and compared their disposition with that of a referral population of women. 27% of men referred for skeletal assessment had a prior fracture that categorized eligibility for treatment, and this characteristic was less frequent than in Ukrainian women (51% of referrals).

## P532

## BURDEN ON CAREGIVERS OF HIP FRACTURE SURVIVORS: A SYSTEMATIC REVIEW

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**Objective:** To determine the caregivers' (CG)' burden of hip fracture (HF) patients and factors associated with CG burden.

**Methods:** A systematic search was done in PubMed using the terms "caregiver burden" or "caregiver outcome" or "caregiver stress" and "hip fracture" or "femur fracture" or "osteoporotic fracture". Original studies (English language) on CG burden of HF patients published during last 10 y were selected. Review articles, meta-analyses and case reports were excluded and we followed the PRISMA guidelines.

**Results:** The original search resulted in 100 publications and based on selection criteria 11 studies (3 qualitative and 8 quantitative) were considered for this study. Quantitative studies have used different tools such as CG burden questionnaire, Zarit burden interview, SF-36 survey and pain scales. The majority of primary CG were either spouse or daughter of the patient and unemployed. CG had experienced moderate to high level of physical and emotional burden and limitations of personal freedom, emotional stability and self-efficacy. They have reported physical pain, limited rest and sleep, lack of social support and exposure to information and high medical costs. CG burden has shown significant associations

with system related factors (health care cost for treatments and palliative care, available health facilities, social support), patient related factors (existing comorbidities, functional status and activities of daily living, cognitive status) and CG related factors (age, self-efficacy and lack of exposure to information).

**Conclusion:** CG of HF survivors report moderate to high level of burden with limitations of physical, emotional and general health status. CG burden is associated with a multitude of factors related to system, patient and CG.

## P533

### HOW OFTEN DO MEDICAL DOCTORS ASSESS CALCIUM AND PHOSPHATE LEVEL IN THE BLOOD SERUM IN PATIENTS WITH VITAMIN D DEFICIENCY?

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**Objectives:** Vitamin D is required to maintain a normal blood level of calcium and phosphate, which are of crucial importance for normal bone mineralization, muscle contraction, nerve conduction, and general cellular function in all cells of the body. Vitamin D deficiency causes a decrease in the efficiency of intestinal calcium and phosphorus absorption. Adequate levels of calcium and phosphate ensure optimum PTH secretion, which in turn, stimulates the production of 1,25 dihydroxyvitamin D3 by the kidney. The aim of our survey was to find out the level of awareness on the need for assessment of calcium and phosphate in patients with vitamin D deficiency among healthcare providers.

**Methods:** We conducted a national online-based survey to collect the data on how frequently medical doctors evaluate calcium status by measuring total calcium, ionized calcium, calcium corrected for albumin and phosphate levels in patients with vitamin D deficiency. The survey included 704 physicians who specialized in various fields. Endocrinologists accounted for 80% of them.

**Results:** According to the survey results, the rate of physicians who measure total serum calcium, ionized calcium, calcium corrected for albumin and phosphate level in patients with vitamin D deficiency accounted for 70.5%, 69.1%, 41.9%, and 65.6% of medical doctors respectively. The survey revealed that 92.3% of all questioned endocrinologists assess calcium and phosphate metabolism.

**Conclusion:** Sequestration of the assessment of the parameters of calcium-phosphorus metabolism before the isolated determination of the level of vitamin D, including in the dynamics of its correction, is dangerous due to the potential underdiagnosis of various forms of hyperparathyroidism and the potentiation of hypercalcemia. Our survey revealed that endocrinologists assess calcium and phosphate levels in the blood serum more frequently in compare with other medical professionals. Raising awareness among health care providers in various fields on this matter will prevent mismanagement in terms of bone and mineral metabolism and will assist to prevent deleterious effects on patient's wellbeing.

## P534

### EFFICIENCY OF PHARMACOTHERAPY FOR LOWER JAW FRACTURES

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**Objective:** Acute maxillofacial trauma, accompanied by fractures of the lower jaw, more or less pronounced damage to the surrounding soft tissues, blood vessels and nerves, affects the entire body of the victim. Bone densitometry methods allow quantitatively, with high accuracy (from 2-5%) to determine the loss of bone mass in various parts of the skeleton at the stages of a person's life. This study aimed to study the structural and functional state of bone tissue in patients with mandible fracture and the effect of osteogenon preparation on fracture consolidation and bone tissue remodeling.

**Methods:** The study included 80 male patients with mandible fracture, aged 18-58 y. All patients first underwent splinting of bone fragments with a splint-brace with hook loops according to Tigerstedt. The teeth were set in the bite and fixed with a rubber rod.

Osteogenon (ossein-hydroxyapatite complex), used for systemic osteoporosis's prevention and treatment. Course is 2 tablets 2t/d for 14 d. In group II, treatment was carried out according to the generally accepted method (splinting, anti-inflammatory therapy). To assess bone metabolism, blood calcium and phosphorus were examined.

**Results:** From the initial data on the structural and functional properties of bone tissue in patients with mandible fracture made it possible to note that 40 (50%) of them had osteopenic syndrome, with high degree of reliability in comparison with the norm. Decreased levels of calcium and phosphorus in blood were noted. After treatment, the densitometric parameters significantly increased in group I. It remained within the normal range, but had a tendency to decrease in group II. Positive changes in mineral metabolism, was more pronounced in group I. So, we noted that group I treated with osteogenon had a double effect on bone tissue metabolism with stimulating and inhibitory effect on osteoblasts and osteoclasts respectively which is accompanied by an increase in calcium absorption.

**Conclusion:** Initial osteopenia with corresponding changes in densitometric and metabolic parameters is a predisposing factor in the development of mandible fracture. The greatest effect on the restoration of the structural and functional properties of bone tissue by the use of the drug osteogenon.

## P535

### LEVELS OF BONE METABOLISM MARKERS IN ADOLESCENTS WITH IDIOPATHIC SCOLIOSIS

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**Objective:** The steady increase in the incidence of idiopathic scoliosis (IS) in young people necessitates the search for informative prognostic markers of the progression of this pathology, which is required for their early treatment and prevention. This study aimed to study the levels of markers of bone metabolism in young people with IS.

**Methods:** We observed 152 adolescents aged 15-16 y (62 boys, 90 girls) with varying degrees of spinal deformity and 20 volunteers in control group. The average age of the patients were 15.26±0.04 y. The levels of markers of inert metabolism, such as osteocalcin in the blood serum (an indicator of osteosynthesis) and deoxypyridinoline in the urine (an

indicator of osteoresorption) were studied. The control group consisted of 20 healthy volunteers.

**Results:** Our study has revealed a decrease in the concentration of osteocalcin in 96 (63.16%) adolescents. The indicator in the group of patients with IS was 76.44±0.66 ng/ml, which is significantly lower (p<0.001) in comparison with the control group (96.66±2.17 ng/ml) and the age norm (93.4±14.1 ng/ml). This indicated the inhibition of the osteosynthesis process due to a decrease in the activity of osteoblasts. Along with this, an increase in the level of deoxypyridinoline was noted in 41 (26.97%) patients. In the group of patients with IS, the indicator was determined as 51.78±1.08 nmolDPD/mmolCr, which is significantly higher (p<0.001) compared to the control group (31.43±1.72 nmolDPD/mmolCr). In comparison with the generally accepted laboratory norm (no more than 59 nmolDPD/mmolCr), the marker value approached the upper (critical) limit. This result indicated an increased level of osteoresorption due to increased osteoclastic activity. A detailed analysis of the data obtained shows that the progressive change in the indicators were accompanied by an increase in the degree of curvature of the spine.

**Conclusion:** To assess bone metabolism and early prevention of the progression of the degree of curvature of the spine in young people with IS, it is advisable to periodically determine the levels of markers of bone metabolism.

## P536
### TRANSCRIPTOME ANALYSES REVEALED THE DIFFERENTIALLY EXPRESSED GENES AND PATHWAYS ASSOCIATED WITH STEROID- INDUCED OSTEONECROSIS OF THE FEMORAL HEAD

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**Objective:** Steroid-induced osteonecrosis of the femoral head (SONFH), which is caused by long-term and high-dose glucocorticoid use, has been accounting for 57% of the total femoral head necrosis. Numerous genes changed expression in bone may be the potential pathogenic factor of SONFH. However, previous researches used cell lines and mouse models to simulate the SONFH which cannot truly represent the response to glucocorticoids in human. The objective of our project is to identify the differential expression genes (DEGs) in the femoral head from patients with SONFH and healthy controls to find the new targets for SONFH therapy.

**Methods:** A total of 6 necrotic femoral head samples and 12 normal control samples were obtained from patients. After RNA extraction, reverse transcription, and adaptor ligation, the library was sequenced by the Illumina platform. Clean reads were aligned to human hg19 build and reads count for each gene was extracted by featureCount software with gencode v19 annotation file. Then, we identified the DEGs via the DESeq2 R package from Bioconductor. Finally, we did KEGG pathway enrichment analyses for DEGs by cluster profile R package.

**Results:** A total of 735 genes were identified as significant DEGs (P≤0.05) in the femoral head between SONFH patients and healthy controls. Among them, 482 genes were upregulated and 253 genes were downregulated in the necrotic femoral head, respectively. KEGG enrichment analyses identified the DEGs enriched at 28 pathways (P≤0.05), the novel and most enriched pathway term was protein digestion and absorption (P=$2.06 \times 10^{-7}$), furthermore, Toll-like receptor signaling pathway (P=$5.2 \times 10^{-3}$) which have been proved associated with SONFH is significantly changed as well.

**Conclusion:** Overall, by performing DEG and KEGG pathway analyses, we identified hundreds of genes dysregulated in the necrotic femoral head compared to healthy controls. In addition, the DEGs enrichment in multiple pathways could provide new insights into the SONFH pathophysiology.

## P537
### EFFICACY OF ANTIRESORPTIVE TREATMENT IN OSTEOPOROTIC OLDER ADULTS: RESULTS OF A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CLINICAL TRIALS

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**Objective:** Antiresorptive drugs are usually the first-line treatment in older adults(1). However, there is no clear evidence in older adults(2). A study based on screening for osteoporosis in older women did not reduce the incidence of osteoporosis-related fractures(3). The purpose of our update study was to determine actual evidence of antiresorptive treatment in this specific population.

**Methods:** Database Search: MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, ISI Web of Science, and Scopus will be searched for studies from inception until 31th January 2020 without language restriction.

Selection Criteria

Types of studies: RCTs

Participants: older adults (65 years old and above) with osteoporosis with or without previous fragility fracture.

Intervention: antiresorptive treatment with or without calcium/vitamin D as compared to placebo or a nonpharmacological intervention with or without calcium/vitamin D.

Comparator: No treatment

Outcomes: Primary outcome: patients with hip fracture. Secondary outcome: other fractures

Data Extraction and Management: Two review authors independently extracted data from the included trials with a previously prepared data extraction form. Any differences between review authors were resolved by discussion. The data extraction form included details of study design, randomization, blinding, assessment of risk of bias, duration of treatment, follow-up, baseline characteristics, number of participants, lost to follow-up, interventions, outcomes and statistical analysis.

Analysis: We performed the meta-analysis according to the Cochrane handbook version 6(12). If a meta-analysis could not be performed, a narrative description of the results was provided.

**Results:** Alendronate (3 studies), clodronate (1 study), denosumab (1 study, etidronate (1 study), risedronate (1 study) and zoledronate (3 studies) were assessed as drug treatments against hip fracture. Antiresorptive treatment showed lower risk of hip fracture than control group: RR=0.75 (95%CI 0.64 to 0.87), 10 studies, $I^2$=30%. This means a RAR of 0.41% (95%CI 0.13 to 0.69) and a NNT of 241 (95%CI 144 to 771). Considering any type of fractures, treatment was associated with lower risk: RR=0.67 (95%CI 0.62-0.71), 9 studies, $I^2$=39%; RAR=4.43% (95%CI 3.68 to 5.18), NNT=23 (95%CI 19 to 27).

**Conclusion:** Antiresorptive drugs are widely used as a first-line drug therapy for preventing osteoporotic fracture and their efficacy for hip fracture prevention is confirmed in this study. However, the absolute magnitude of benefit is small (NNT of 241) and studies show moderate heterogeneity. The main limitations are related to the quality of the studies, which showed unclear/high risk of bias. The limited number of studies in some of the subgroup analyses is also a limitation. Antiresorptive drugs do have a significant effect on preventing hip fracture. Alendronate, denosumab, risedronate and zoledronate may have a significant role on preventing hip fracture. Evidence on very older adults come from post

hoc study with inconsistence results. More randomized controlled trials in very older osteoporotic adults are needed.

## P538
### CONSTRUCTION OF NON-CODING RNA MEDIATED GENE EXPRESSION REGULATORY NETWORK RELATED TO STEROID-INDUCED OSTEONECROSIS OF THE FEMORAL HEAD

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**Objective:** Steroid-induced osteonecrosis of the femoral head (SONFH) is a challenging disorder caused by long-term and high-dose glucocorticoid use. As shown previously, gene dysregulation plays an important role in the pathogenesis of SONFH. Exploring the way of gene expression regulation is helpful for further understanding the mechanism of disease and may provide a basis for drug development. The object of this project is to construct a non-coding RNA-mediated gene expression regulatory network for all dysregulated mRNA in the necrotic femoral head.
**Methods:** A total of 6 necrotic femoral head samples and 12 normal control samples were obtained from volunteers. Total RNA was isolated and used for RNA-seq library preparation. The expression of mRNA, lncRNA, and miRNA was measured for each sample. Sequencing reads of mRNA and lncRNA were aligned to human hg19 build and raw reads count for each mRNA and lncRNA was extracted by featureCount software with gencode v19 annotation file. Then, the differential expression genes (DEGs) were identified via the DESeq2 package. The target mRNA of miRNA was gotten from MirSNPInTarget, MirSNPInTarget, miRWalk and miRDB databases, the target lncRNA of miRNA were gotten from the lncBaseV2 database. At last, we constructed two types network: 1. lncRNA-↓- miRNA↑-mRNA↓; 2. lncRNA↑-miRNA↓->mRNA↑.

A total of 735 differentially expressed mRNA were identified (P≤0.05) with 482 mRNA upregulated and 253 mRNA downregulated in the necrotic femoral head, respectively. And we found 176 differentially expressed lncRNA (P≤0.05) with 78 lncRNA upregulated and 98 lncRNA downregulated in the necrotic femoral head. In addition, 111 differentially expressed miRNA were identified (P≤0.05), among them, 77 miRNA were upregulated and 34 miRNA were downregulated in the necrotic femoral head, respectively. Through the integration of DEGs (mRNA, lncRNA, miRNA) and miRNA targets from several databases, we constructed two types of regulatory networks containing 699 mRNA, 134 lncRNA, and 106 miRNA.

Overall, we performed <?thyc=RNA-seq for total RNA of femoral head samples from SONFH patients and controls and then identified differentially expressed mRNA, lncRNA, and miRNA. Integrated with target gene information from multiple databases, we constructed a non-coding RNA mediated gene expression regulatory network involved almost all DEGs, this would provide a wealth of bases for the analysis of the mechanism of SONFH.

## P539
### TRANSCRIPTOME ANALYSIS REVEALED HMOX1 IS A CANDIDATE GENE RELATED TO THE PATHOGENESIS OF FEMORAL HEAD NECROSIS AND IS REGULATED BY MULTIPLE MIRNA

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**Objective:** Osteonecrosis of the femoral head (ONFH) is a disease caused by reduced blood flow to bones in the joints which leads to reduced cell nutrition, especially oxygen. Although bones can adapt to this microenvironment by regulating the expression of related genes, however, it is difficult for cells to adapt to environmental changes when these genes are expressed abnormally, and then cause cell apoptosis and death. We speculate that there is a dysregulation in the expression of genes related to hypoxia adaptation in the necrotic femoral head. The purpose of this study is to identify these genes and reveal the non-coding RNA-mediated regulatory mode.
**Methods:** A total of 6 necrotic femoral head samples and 12 normal control samples were obtained from volunteers. The total RNA was extracted and sequenced by the Illumina platform. Differentially expressed gene was identified via DESeq2. To construct the miRNA-mediated regulatory network, we downloaded miRNA target mRNA from MirSNPInTarget, MirSNPInTarget, miRWalk, and miRDB databases.
**Results:** A total of 735 differentially expressed mRNA were identified (P≤0.05), among them, we found *HMOX1* which codes the Heme Oxygenase 1 was downregulated in necrotic femoral head samples (P=0.042, log2FC=-0.882). It has been shown that overexpressed *HMOX1* could reduce osteoblast apoptosis caused by hypoxia in mice models, suggesting *HMOX1* may also play an important role in the pathogenesis of human femoral head necrosis. Integrate miRNA target databases and differentially expressed miRNA data, we found 8 upregulated miRNA in necrotic femoral head that potentially bound to *HMOX1* mRNA sequence, including hsa-miR-218-5p (P=0.025, $log_2$FC=1.07), hsa-miR-552-5p (P=0.046, $log_2$FC=1.74), hsa-miR-138-5p (P=9.78 x$10^{-5}$, $log_2$FC=2.28), hsa-miR-4491 (P=0.038, $log_2$FC=1.65), hsa-miR-199b-3p (P=0.031, $log_2$FC=0.85), hsa-miR- 4761-3p (P=0.040, $log_2$FC=1.85), hsa-miR-181c-5p (P=0.005, $log_2$FC=0.68), hsa-miR-130b-5p (P=0.002, $log_2$FC=0.97).
**Conclusion:** Overall, DEGs analysis identified the downregulation of *HMOX1* in the necrotic femoral head as a candidate factor for the pathogenesis of ONFH, and multiple upregulated miRNA may act as its expression regulator.

## P540
### MOTIF AND GENE CO-EXPRESSION ANALYSES IDENTIFIED 4 CANDIDATE TFS REGULATE HMOX1 EXPRESSION IN NECROTIC FEMORAL HEAD

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**Objective:** Osteonecrosis of the femoral head (ONFH) is a condition caused by a compromise of the blood supply of the femoral head and may lead to progressive destruction of the hip joint. We have identified the downregulation of *HMOX1* expression as a candidate marker for ONFH and constructed a miRNA-mediated regulatory network. However, there may be other ways involved in the regulation of gene expression, such as transcription factor (TF) regulation. The object of this project is to identify whether there are TFs that could bind to the *HMOX1* promoter region and regulate its expression.
**Methods:** Firstly, we compared the expression among all transcripts of *HMOX1* and use the transcript with the highest expression value for the following analyses. Next, we defined the 2 kb upstream and downstream of the transcription start site as promoter according to the genecode v19 annotation file and extracted the genome sequence of the promoter via samtools faidx software. Then, we used fimo software to predict the binding motif of TFs from the JASPAR database with p-value set to $1×10^{-4}$, the TFs have at least one motif found in the *HMOX1* promoter

was treated as a candidate regulator of *HMOX1*. Finally, the regulator TF which expression was lower in the necrotic femoral head and positively correlated with *HMOX1* treats as the true regulator of *HMOX1*.

**Results:** By comparing the expression levels of different transcripts of *HMOX1*, we found the expression of transcripts ENST00000216117.8 (FPKM: 128.58) was significantly higher than the other four transcripts of *HMOX1* (ENST00000412893.1: $3.27 \times 10^{-6}$; ENSG00000100292.12: 2.36; ENST00000481190.1: 1.23; ENST00000494998.1: 0.60). The motif analyses in the ENST00000216117.8 promoter region found that 535 TFs have at least one motif in this region. Among them, only 7 TFs were downregulated in the necrotic femoral head, including *STAT1, EFNA2, POU4F2, PRDM1, EOMES, GATA3, TBX21*. Coexpression analyses found that the expression of *STAT1* (R=0.495, P=0.037), *EOMES* (R=0.615, P=0.007), *GATA3* (R=0.527, P=0.025) and *TBX21* (R=0.535, P=0.022) were positively correlated with the expression of *HMOX1*, suggesting that these four TFs may contribute to the downregulation of *HMOX1* in the necrotic femoral head.

**Conclusion:** Overall, through motif and gene co-expression analyses, we identified four TFs which have potential binding ability to the promoter region of *HMOX1* and co-expressed with *HMOX1*. The project provides deep insight into the regulatory mechanism of *HMOX1* and the methods used in the present research could be applied to find other dysregulated genes in the disease.

## P541

### MUSCULOSKELETAL HEALTH IN ANDROGEN DEPRIVATION THERAPY (ADT) FOR PROSTATE CANCER

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**Objective:** In this study we aimed to quantify the prevalence of osteoporosis and sarcopenia in ADT-treated men (>12 weeks) for prostate cancer.

**Methods:** 49 ADT-treated men (mean age 77 years old, range 58-92) who referred to our Bone Unit of Galliera Hospital were recruited. Bone metabolism parameters, before antifracture treatment, were assessed by the laboratory. BMD was performed by DXA. BMI was calculated. Muscle strength was measured using hand grip dynamometry (HD). Body composition was estimated by bioelectrical impedance analysis (BIA). X-rays of thoracic and lumbar spine were performed.

**Results:** 33 patients, were already under cholecalciferol supplementation at the first visit and presented a range of 21-43.4 ng/ml of serum 25-OH vitamin D. "Naive" patients, who did not take cholecalciferol presented a range of 4-16.9 ng/mg. Even with low 25-OH vitamin D levels, only 2 cases of secondary hyperparathyroidism were noted. C-terminal collagen crosslinks (CTX) in serum were high in all of them, with a media of 768.4 pg/ml. All patients were overweight (BMI=27.5±2). HD revealed relatively low muscle strength: 20.8±10 kg. Muscle mass as Skeletal Muscle Mass Index estimated by BIA was between 8.2 kg/m² and 11.2 kg/m² with a media of 9.41 kg/m². Only 11 of them had a normal T-score in DXA, 11 of them were osteoporotic and the 27 were osteopenic. Five of them had vertebral fractures due to fragility, as detected by X-rays.

**Conclusion:** ADT treatment can compromise bone and muscle health with physical function consequences and lose of autonomy. The assessment of muscle mass, muscle strength and bone density should be included in the routine evaluation of this population. A straight collaboration between bone health specialists, urologists and radiotherapists is necessary.

## P542

### TRANSCRIPTOME ANALYSES REVEALED THE DIFFERENTIALLY EXPRESSED GENES AND PATHWAYS ASSOCIATED WITH OSTEOPOROSIS

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**Objective:** Osteoporosis is a disease that increases the risk of fractures due to decreased bone density. As previous studies showed that dysregulation of bone tissue gene expression which changes cell function is one of the causes of osteoporosis. Here, we collected femoral head samples from patients with femoral neck fractures and patients undergoing femoral head replacement for other non-fracture reasons. We aim to identify the new gene and pathways involve in the pathology of osteoporosis via differential gene expression analyses and function enrichment analysis,

**Methods:** A total of 10 femoral head samples from patients with femoral neck fractures and 5 control samples were collected. the library was sequenced by the next generation sequencing platform (Illumina). Raw data were filtered via trimmomatic software. Clean reads were aligned to human hg19 build via hisat2 software, raw reads count for each gene was extracted by featureCount software with gencode v19 annotation file. Then, the DEGs were identified via the DESeq2 R package from Bioconductor. Finally, we did GO enrichment analyses for DEGs via clusterprofile package from Bioconductor.

**Results:** A total of 693 genes were identified as significant DEGs (P≤0.05) between osteoporosis patients and controls. Among them, 228 genes were upregulated and 465 genes were downregulated in osteoporosis samples, respectively. GO enrichment analyses identified that the upregulated genes in osteoporosis samples were enriched at 429 GO terms (P≤0.05), and the downregulated genes were enriched in 651 GO terms. Interestingly, the most enriched GO terms of downregulated genes in osteoporosis samples is Ossification (GO:0001503, $P=1.45 \times 10^{-17}$), in addition, there were several other GO terms associated with bone phenotype, including extracellular matrix organization (GO:0030198, $P=1.74 \times 10^{-11}$), extracellular structure organization (GO:0043062, $P=1.87 \times 10^{-11}$), skeletal system morphogenesis (GO:0048705, $P=5.71 \times 10^{-9}$), bone development (GO:0060348, $P=2.40 \times 10^{-8}$), osteoblast differentiation (GO:0001649, $P=5.71 \times 10^{-9}$).

**Conclusion:** Overall, by performing DEG and GO enrichment analysis, we identified hundreds of genes downregulated in osteoporosis samples, and they enriched in multiple biological processes related to bone formation. It further showed that the dysregulation of gene expression is a key factor in the occurrence of osteoporosis and would provide potential candidate genes for further mechanism research.

## P543

### CONSTRUCTION OF NONCODING RNA MEDIATED GENE EXPRESSION REGULATORY NETWORK RELATED TO OSTEOPOROSIS

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**Objective:** Osteoporosis occurs when bone density decreases, which is manifested by thinning and weakening of bones. By comparing the gene

expression of the femoral head from osteoporosis patients and normal controls, we showed that the osteoporosis downregulated gene enriched in multiple bone development GO terms. Dysregulation of gene expression is a pivotal factor for the pathogenesis of osteoporosis, however, the mechanism underlying the dysregulated mRNA is unknown. The object of this project is to construct a noncoding RNA-mediated gene expression regulatory network for downregulated genes in osteoporosis samples.

**Methods:** To construct the noncoding RNA-mediated gene expression regulatory network, we measured mRNA, lncRNA, and miRNA expression by the next generation sequencing technology for 10 femoral head samples from patients with femoral neck fractures and 5 control samples. The differential expression genes (DEGs) were identified via the DESeq2 package. The target mRNA of miRNA were gotten from MirSNPInTarget, MirSNPInTarget, miRWalk, and miRDB databases, the target lncRNA of miRNA was gotten from the lncBaseV2 database. Finally, we constructed the network for downregulated mRNA: lncRNA↓-miRNA↑- mRNA↓.

**Results:** We identified 35 upregulated miRNA and 99 upregulated lncRNA in osteoporosis samples. We integrated the above results, miRNA target genes from several databases, and the differentially expressed mRNA from our previous results, we constructed a gene expression regulatory network involved 229 mRNA, 68 lncRNA, and 33 miRNA. In this network, the mean target mRNA number of each miRNA was about 30, the mean target lncRNA number of each miRNA was 2.

**Conclusion:** We constructed a gene expression regulatory network through the integration of differentially expressed mRNA, lncRNA, and miRNA and miRNA potential targets from several databases. This would provide insight into the pathogenesis of osteoporosis.

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## P544
### EFFECT OF COMBINED THERAPY ON THE INFLAMMATION BIOMARKERS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** To evaluate efficiency of combination therapy including infliximab (IF) in RA patients by means of inflammation markers (ESR, CRP) and serum pro-inflammatory (TNFα, IL-1) cytokines.

**Methods:** 18 patients with RA diagnosis were included in the 30-week study. The average age of patients was 46.0±8.4 y, disease duration 13.2 ±5.3 y. 83.3% of patients were seropositive for rheumatoid factor, 66.8% were ACCP-positive. Each patient was treated with methotrexate (MT) 12.5-20 mg/week. IF was administered at the dose of 3 mg/kg, according to the common scheme. Patients were examined at week 0 (before the inclusion), week 14, and week 30 after beginning of IF therapy.

**Results:** All patients had DAS28-CRP(4)>5.6. ESR and CRP have decreased by the 30th week. The average VAS score at week 0 was 68.3 mm, at week 30 - 26.0 mm. There were 50% of patients with good response to IF therapy, 33.3% with moderate one, and 16.7% without significant effect. Serum concentrations of pro-inflammatory cytokines (TNFα, IL-1) at week 30 were substantially decreased compared to initial levels along with trend of RF, ESR and CRP normalization as well as improvement of clinical manifestations (Table).

Table. Dynamics of clinical and laboratory markers in combination therapy (Me)

| Indicator | 0 week | 14 week | 30 week |
|---|---|---|---|
| RF, IU/l | 45295 [12830; 134920] | 25375 [7080; 80350] | 9920 [5600; 110230] |
| ESR, mm/h | 37 [4; 40] | 10.5 [3; 51] | 10 [2; 30] |
| CRP, mg/l | 20.8 [4.6; 194.8] | 2.65 [0.4; 33.4] | 5.2 [1.1; 9] |
| DAS28-CRP(4) | 5.63 [4.38; 6.24] | 4.5 [2.5; 6.76] | 3.58 [2.25; 4.91] |
| TNFα, pg/ml | 6.92 [3.46; 11.03] | – | 2.09 [1.74; 4.06] |
| IL-1, pg/ml | 8.18 [4.64; 10.12] | – | 3.25 [2.1; 6.45] |

**Conclusion:** Tight correlation between shifts of TNFα, IL-1 levels with common clinical and laboratory markers of RA activity against the background of combined IF-MT treatment enables us to use these innovational biomarkers for RA treatment monitoring.

## P545
### RISK OF FRACTURE IN GLUCOCORTICOID REQUIRING DISEASES: AN ANALYSIS ON A NATIONWIDE DATABASE

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**Objective:** Glucocorticoid-induced osteoporosis (GIOP) is the most common form of secondary osteoporosis. Glucocorticoids (GCs) are prescribed to patients affected by inflammatory diseases that are themselves independent risk factors for osteoporosis. The aim of the present study was to determine the risk of fracture associated with chronic GC use and a variety GC requiring diseases.

**Methods:** We conducted a retrospective cohort analysis of a nationwide cohort (DeFRACalc79 database). DeFRACalc79 is an algorithm for the estimation of the fracture risk that considers many risk factors, including glucocorticoid use. We used multivariable regression analysis adjusting for several risk factors for fracture and GC intake to estimate the independent role of glucocorticoid requiring illnesses on fracture risk.

**Results:** We found that GCs, at doses ≥5 mg/d for >3 months, were associated with a 60% increased risk of vertebral or hip fractures (aOR 1.58, 95%CI 1.43-1.76) and with a 30% increased risk of fragility fractures of any kind (aOR 1.32, 95%CI 1.20-1.45). We found that patients with rheumatoid arthritis (RA), connective tissue diseases (CTDs), chronic obstructive pulmonary disease (COPD) and neurological diseases (ND) were at greater risk of vertebral or hip fracture (crude ORs 1.31, 1.20, 1.92 and 2.97 respectively). After adjusting for potential confounders (i.e., GCs, age, BMD levels, menopause and familiar history of fractures) COPD and ND remained significantly associated with an increased risk of vertebral or hip fractures (aORs 1.33, 95%CI 1.18-1.49 and 2.43, 95%CI 2.17-2.74). RA, COPD, IBD and ND also significantly increased the risk of non-vertebral, non-hip fractures (aORs 1.23, 1.42, 1.52 and 1.94 respectively). Figure shows the risk of fracture in different diseases.

**Conclusion:** GC requiring diseases were independently associated with an increased risk of fractures: COPD and ND with both vertebral and non-vertebral fracture risk while RA and IBD were independently associated only with non-vertebral, non-hip fractures.
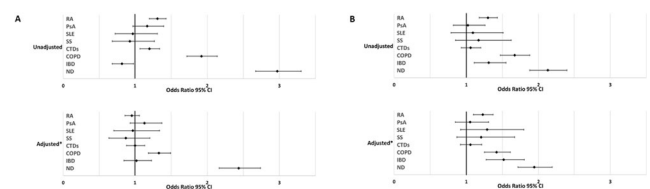


Figure. Forest plot showing the risk of vertebral or hip fractures in different diseases (panel A) and nonvert nonhip fractures (panel B). Upper panel unadjusted analyses, lower panel adjusted analyses.

## P546

### PREVALENCE OF MUSCULOSKELETAL SYMPTOMS OF COVID-19 AMONG HEALTHCARE PROFESSIONALS OF THE UNIVERSITY HOSPITAL OF IBN ROCHD OF CASABLANCA

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**Objective:** Since the beginning of the COVID-19 outbreak in March 2020, healthcare professionals were the first line of defense against the new coronavirus. Subject to a significant risk of contamination, healthcare workers still continue to serve the population. However, little data are available on the prevalence of SARS-CoV-2 infection, and its various clinical features in this population. The aim of this study is to assess the prevalence of osteo-articular manifestations among doctors and nursing staff in the Ibn Rochd University Hospital of Casablanca.
**Methods:** Cross-sectional study conducted between October and December 2020 using an anonymous selfadministered questionnaire, given to healthcare professionals working at the Ibn Rochd University Hospital of Casablanca. Inclusion criteria: Only people who had been contaminated by the COVID-19 virus were invited to answer the questionnaire. Epidemiological, clinical and evolutionary data were collected and analyzed.
**Results:** Our study included 59 respondents. The mean age was 34.72 (±11.73) y, the sex ratio F/M was 3.7. The main comorbidities were in order of frequency: obesity (16.9%), cardiometabolic syndrome, (11.9%), lung disease (11.9%), degenerative rheumatism (10.16%), and chronic inflammatory rheumatism (5.08%). 10.1% of respondents had toxic habits. In terms of vaccination status, 11.8% were vaccinated against influenza in the current year and 11.8% were vaccinated against pneumococcus. 93.2% of respondents were symptomatic, and the common signs were: fever (50.9%), cough (40.7%), flu syndrome (44.06%), anosmia and ageusia (53.23%). The osteoarticular signs were mainly: arthromyalgia (57.62%), back pain (72.9%), costalgia (11.8%) and ostealgia (10.16%). The management of the COVID-19 disease was at home in 86.4% of cases and in an intensive care unit in 6.7% of cases. All the cases received azithromycin, vitamin C, zinc and vitamin D. 16.9% of the cases received hydroxychloroquine, 40.7% of them needed thromboprophylaxis, and corticosteroids were necessary in 3.4% of cases. The outcome was favorable in all patients with an average healing time of 11.64 d (± 2.2), with the disappearance of general signs and OA signs in 71.2% of cases.
**Conclusion:** From the onset of symptoms and into the most severe stages of COVID-19 disease, musculoskeletal symptoms are consistently present in the majority of reported cases. However, the pathophysiology explaining the involvement of the musculoskeletal system remains unknown (1). In our study, COVID-19 disease was predominantly benign in healthcare professionals, with regression of osteoarticular signs after convalescence.
**Reference:** 1. Cipollaro L, et al. J Orthop Surg Res 2020;15:178.

## P547

### NEOPLASTIC HYPERCALCEMIA IN A RHEUMATOLOGY DEPARTMENT: CASES REPORT

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**Objective:** Malignancies are a common cause of hypercalcemia. About 20 to 30% of patients with tumor disease have had at least one episode of hypercalcemia. Its occurrence during certain neoplasms is a factor of poor prognosis, associated with significant mortality. The oncology and hematology departments were for a long time the first interfaces with these patients. The objective of our work is to discern the epidemiological and etiological characteristics of neoplastic hypercalcemia in a rheumatology department.
**Methods:** A descriptive study conducted at the rheumatology department of the Ibn Rochd hospital university of Casablanca, over a period of 9 y, between 2010 and 2019, including all patients in whom the diagnosis of neoplastic hypercalcemia was retained. Epidemiological, clinical, biological, radiological, etiological, and evolutionary data were collected and analyzed.
**Results:** We have enrolled 6 patients; the mean age was 52 y (±14.32) with extremes ranging from 32-68 y. The sex ratio was 1. The comorbidities of the patients were distributed as follows: hypertension in 1 case and chondrocalcinosis in 1 of the cases. All patients were symptomatic, and all of them had general and musculoskeletal, and neuropsychic, and digestive signs. The mean value of total serum calcium was 118.16 mg/l (±18.64) and the mean value of corrected serum calcium was on average 122 mg/l (±19.47), a hypercalciuria was noted in 1 patient, PTH level was normal in all patients, GFR <60 ml/mn was found in 1 patient. Serum protein electrophoresis showed a monoclonal peak in 2 patients and a polyclonal peak in 2 patients as well. On complete blood count, 5 out of 6 patients had normochromic normocytic anemia, and half had leukocytosis. Two patients had electrical disturbances on the electrocardiogram. An x-ray of the spine was requested in 2 patients, and have shown osteolytic lesions in one patient, and a vertebral fracture above T6 in another patient, a skull x-ray was necessary in 2 patients and had objectified geodic lesions and, a thoracic-abdominopelvic CT scan revealed diffuse osteolytic lesions in 5 out of 6 patients with the presence of a pulmonary process in 2 patients, a PET-Scan in 1 patient revealed diffuse osteolytic lesions with a pulmonary process and hypermetabolic mediastinal lymphadenopathy. The causes of hypercalcemia in this series were secondary to hematologic malignancy in 2 cases, metastasis in 2 cases, and a combination of the two in 1 case.
**Conclusion:** Neoplastic hypercalcemia remains rare in rheumatology, its etiologies are dominated by bone metastases. Management is now multidisciplinary and requires early diagnosis and effective treatment.

## P548

### THE PROFILE OF OSTEOPOROTIC FRACTURES IN OBESE WOMEN

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**Objective:** A low BMI has long been considered a classic risk factor for the occurrence of fractures. However, contrary to what one might think, a high mass index is absolutely not a protective factor according to the latest publications, with the presence of some particularities depending on gender. The aim of this study is to determine the different fracture aspects in a population of obese women.
**Methods:** Descriptive retrospective study, conducted in the rheumatology department of the Ibn Rochd hospital university over a total period of 5 y between 2015-2020, relating to obese patients in whom BMI ≥30 kg/m² with an osteoporotic fracture. Any fracture that had occurred in women with a BMI <30 kg/m² was excluded.
**Results:** Out of a total of 1200 files used, 120 obese women were identified, 16 of whom had a fracture. The average age was 68.31 y (±8.82). The mean BMI was 34.17 kg/m² (±3.006), 68.7% had secondary osteoporosis (all causes), 12.5% had postmenopausal osteoporosis and 18.7% had osteopenia. 8 patients had at least one vertebral fracture, 6 patients had a wrist fracture, 1 patient had a leg fracture and one patient had an ankle fracture. All occurring before the start of treatment with an average duration of 2.5 y. All patients received an antiosteoporosis treatment once connected to the consultation, with an average duration of treatment of 36.4 months (±30.62), a densitometric gain was noted in 31.2% of the patients. None of these patients fractured during treatment.

**Conclusion:** It is now well established that a BMI threshold of around 25 kg/m$^2$ provides a protective effect on the risk of fracture. Beyond this threshold, the fracture incidence no longer varies, and obesity appears to be more deleterious than protective. Despite the small number of our series, our results match those of the literature, with an increased risk of vertebral fractures and the occurrence of other atypical sites, particularly leg and ankle.

## P549

### POOR TRABECULAR MICROARCHITECTURE AND 12-YEAR FRACTURE RISK IN MEN: THE PROSPECTIVE STRAMBO STUDY

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**Objective:** Our prior study shows that poor trabecular microarchitecture at distal radius predicts fractures in older men followed prospectively for 12 y. The aim of this study is to assess whether bone microarchitecture predicts different types of fracture in similar models.

**Methods:** Among 825 men aged 60–87, 160 men had fragility fractures over 12 y (spine 68, nonspine 103, major osteoporotic fractures [MOF] 61). Bone microarchitecture was assessed at distal radius and distal tibia by HR-pQCT (Xtreme-CT Scanco). Femoral neck areal BMD (aBMD) was measured by DXA (Hologic Discovery A).

**Results:** After adjustment for age, weight, femoral neck aBMD, prior falls and fractures, low trabecular number (Tb.N) at distal radius was associated with higher risk of MOF (HR=1.56 /SD decrease, 95%CI: 1.16–2.08, p<0.005). In a similar model, high trabecular separation standard deviation (Tb.1/N.SD, index of trabecular distribution heterogeneity) was associated with higher risk of MOF (HR=1.30 /SD, 95%CI: 1.14–1.48, p<0.001). Low Tb.N and high Tb.1/N.SD were also predictive of nonspine fracture (HR=1.50 /SD decrease, 95%CI: 1.20–1.89, p<0.001 and HR=1.23 per SD, 95%CI: 1.10–1.39, p<0.001). The most discriminating threshold for distal radius Tb.N was 1.72/mm for MOF (HR=2.23, 95%CI: 1.28–3.89, p<0.005) and 1.75/mm for nonspine fractures (HR=1.89, 95%CI: 1.22–2.93, p<0.005). The most discriminating threshold for Tb.1/N.SD was 233 μm for MOP (HR=1.98, 95%CI: 1.12–3.49, p<0.05) and 205 μm for nonspine fracture (HR=2.12, 95%CI: 1.32–3.38, p<0.005). Other HR-pQCT indices at distal radius and those at distal tibia did not predict these fractures. HR-pQCT indices did not predict vertebral fracture.

**Conclusion:** After adjustment for relevant confounders, low Tb.N and high Tb.1/N.SD at distal radius were associated with higher risk of MOF and nonspine fracture in older men followed prospectively for 12 y.

## P550

### MIRNA PROFILES IN EWING SARCOMA CANCER STEM CELLS

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**Objective:** Ewing Sarcoma (EWS) is a malignant mesenchymal-derived tumour which usually arises in bone and rarely in soft tissues. In this study we have evaluated the presence of EWS cancer stem cells (EWS-CSCs) and we have investigated which is the miRNAs expression profile that characterizes the established EWS-CSCs lines to find new molecular diagnostic/prognostic factors for EWS.

**Methods:** The EWS samples have been collected at the Unit Ortopedia Oncologica e Ricostruttiva, AOUC Careggi, Florence, with informed consent approved by the local Ethical Committee. We have established primary EWS cell lines (ES) from each samples. Then we have isolated a putative CSCs line from each one of the established ES lines. The CSCs phenotype has been evaluated and confirmed by several cellular and molecular analyses and after that miRNAs expression levels of a panel of 15 miRNAs have been evaluated by specific TaqMan qRT-PCR assays.

**Results:** We have established five primary ES lines and we have isolated the CSCs from each. The stemness of each isolated ES-CSCs lines was evaluated inducing CSCs towards three different phenotypes, analysing specific mesenchymal end embryonic stem cells marker genes and proteins and evaluating their clonogenic capacity. We have also confirmed the neoplastic capacity of these lines through invasion and migration assays. Finally, we have analysed several miRNAs obtaining a preliminary miRNAs expression profile in ES-CSCs lines.

**Conclusion**: We have settled five new in vitro human models of ES-CSCs. The preliminary results obtained about the analysis of the miRNAs expression profile in these lines identifying a common miRNA code, that could be used to develop new molecular therapies against EWS and to find which miRNA could be represent novel EWS biomarkers.

## P551

### IN VITRO HUMAN HYPERTROPHIC CHONDROCYTES MODELS AND RET INVOLVEMENT ON BONE FORMATION AND ELONGATION

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**Objective:** To investigate the possible role of RET in osteogenic differentiation and mineralization process.

**Methods:** Growth plate (GP) lines were obtained by enzymatic digestion and mechanical dispersion, and cultured in growth medium. Characterization of GP lines as hypertrophic chondrocytes (HCs) was evaluated through several cellular and molecular analysis. We have evaluated the expression of RET gene and protein in our established cell lines. After that we have evaluate the role of RET in osteoblastogenesis treating GP lines with RET ligands.

**Results:** GP finite cell lines were established and characterized as HCs. The osteogenic differentiation assay has shown the capacity of the HCs lines to differentiate into osteoblasts vs. the articular cartilage (AC) cell line. All the HCs lines have showed a positive expression of RET gene and the presence of RET protein vs. the AC line. Osteogenic differentiation assay under treatment with RET ligands has reported that these are both able to induce a rapid increase of alkaline phosphatase levels and an early consequent mineralization process in vitro.

**Conclusion:** In this work we have established three primary cell lines of HCs. For the first time we have evaluated and discovered the presence of RET gene and protein in human in vitro established HCs models. On the base of the scientific evidences about a possible role of RET in osteoblastogenesis we hypothesise that this could be involved also in the osteogenic differentiation of HCs and in the endochondral ossification process also. Our obtained data on the role of RET in osteogenic differentiation of HCs lines showed an effective involvement of RET in it. Nowadays, we are evaluating the gene expression levels of osteogenesis and of RET during mineralization process under treatment with RET ligands, and we are starting to study the role of RET in chondrogenic differentiation of established GP lines.

## P552

### EFFECTS OF ANTIOXIDATIVE VITAMINS ON BONE HEALTH: A SYSTEMATIC REVIEW OF META-ANALYSIS STUDIES

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**Objective:** The key role of oxidative stress on bone health is well known. While antioxidative vitamins are important for development and maintenance of bone mass or bone formation, there are controversial findings in this regard. The aim of the current systematic review is to critically assess the meta-analyses of observational/ trials evaluating the influence of these vitamins on bone health.

**Methods:** Relevant studies from Web of Science, PubMed, Scopus, and Cochrane Library databases based on Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist until May 2021 were searched. All meta-analyses that evaluated the effect of antioxidative vitamins (A, C, E, K, B groups, and beta carotene) on bone health were included. Meta-analyses of in vitro, animal or review studies were excluded.

**Results:** Thirteen meta-analyses were included. Higher dietary intake of retinol or total vitamin A slightly (5-6%) decreases total fracture risk, while significantly increasing (29-40%) the risk of hip fracture. Blood retinol levels of 1.99 to 2.31 umol/L are considered optimal for bone health. Higher β-carotene intake significantly reduces (>20%) the risk of osteoporosis, hip and all types of fractures. Significant reduction of hip fracture risk (50%) in absence of any effect on the risk of vertebral fracture was reported with vitamin K1. Based on meta-analyses of trials, B vitamin supplementation is not effective in preventing fracture or improving bone turnover. Consumption of high doses of vitamin C significantly reduces the risk of osteoporosis and hip fracture. A 5% reduction in hip fracture risk is reported per every 50 mg/d consumption of vit C. High intake of vitamin E significantly reduces (44%) fracture risk. Higher levels of homocysteine and B12 are significantly associated with increased (4%). Decreased (4%) risk of fracture was observed per μmol/L increase in homocysteine or per 50 pmol/L increase in B12 concentrations.

**Conclusion:** Due to insufficient evidence, their routine supplementations with antioxidative vitamins are not recommended as a fracture-preventative factor. More well conducted observational/trials are required to confirm the effects beside determining their effective doses on bone health.

## P553

### CAUSES OF PERMANENT DISCONTINUATION OF DICLOFENAC IN THE TREATMENT OF KNEE OSTEOARTHRITIS

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**Objective:** Knee osteoarthritis is a disabling chronic degenerative rheumatism responsible of chronic pains which require the regular consumption of non-steroidal anti-inflammatory drugs (NSAIDs) and whose side effects are not negligible. Diclofenac remains the most prescribed and consumed in the treatment of knee osteoarthritis but with an increased risk of cardiovascular events, particularly if it is consumed over a long period. Through this work we will try to find out the frequency and causes of stopping diclofenac permanently in real life after a long period of consumption.

**Methods:** It is a retrospective study carried out on medical files of patients followed for knee osteoarthritis and who regularly consume diclofenac continuously over a period of >3 y (2015-2018), we evaluated the frequency of discontinuation diclofenac and its causes.

**Results:** We collected 107 cases, 90 women (84%) for 17 men (16%), the mean age was 59.9 y (between 42-86 y), the mean BMI was 29.89 kg/m$^2$, concerning the different radiographic stages of knee osteoarthritis: 11% were at stage 2 of Kellgren-Lawrence, 68% stage 3 and 22% at stage 4, knee osteoarthritis was bilateral in 94%. The final discontinuation of diclofenac affected 72/107 patients (67%), among the causes of discontinuation: 16/72 had kidney problems (22%), 24/72 had digestive problems (33%) and 32/72 had cardiovascular pathologies (45%). There was a significant relationship between the dosage of diclofenac and its permanent discontinuation (p<0.002).

**Conclusion:** In our sample, the continuous consumption of diclofenac for the treatment of knee osteoarthritis knows a definitively stopping in more than 2/3 of cases, for renal, digestive or cardiovascular inconveniences, this is all the more true if the daily dose diclofenac is important.

## P554

### HOW VERTEBRAL FRACTURES AFFECT BALANCE IN POSTMENOPAUSAL WOMEN?

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**Objective:** To evaluate the effect of previous vertebral fracture on balance and physical performance and its relationship with fall and fracture risk in a population with postmenopausal osteoporosis.

**Methods:** 95 patients, at the age of 50 and above with postmenopausal osteoporosis and/or osteoporotic vertebral fractures according to WHO criteria were included in this study. Two groups with (n=45) and without (n=50) vertebral fractures and two groups with single level (n=29) and multiple level vertebral fractures (n=16) were statistically compared. Detailed clinical history of the patients were collected, and demographic data were recorded. The presence of vertebral fracture and kyphosis, FRAX scores, DXA measurements, serum 25(OH)D values, Tandem stance and gait test, Timed Up and Go test (TUG), Berg balance scale (BBS) were performed. Stability index, fall index (FI) and Fourier frequencies were also measured with computed static posturography.

**Results:** In the group with vertebral fractures, the probability of FRAX-major osteoporotic fracture, lumbar total T-score with DXA and TUG time were significantly higher and the BBS score was lower compared to the group without vertebral fracture. Kyphotic posture was more prominent in the group with vertebral fractures. The group with vertebral fracture was found unsuccessful in Tandem stance and gait tests compared to the group without vertebral fracture. The probability of FRAX-major osteoporotic fractures was significantly higher in patients with multiple level fractures compared to the patients with a single level fracture. There was a strong positive correlation between the probability of FRAX-major osteoporotic and FRAX-hip fracture in both groups. There was also a moderately negative correlation between TUG and BBS, and between the BBS and FI.

**Conclusion:** This study showed that the presence of vertebral fracture had a negative impact on balance and physical performance leading an increase in the probability of fracture and fall, in patients with postmenopausal osteoporosis. In this population, the probability of fracture and fall parameters should be evaluated separately.

## P555

### ESTABLISHMENT AND CHARACTERIZATION OF A CANCER STEM CELL LINE FROM CHONDROSARCOMA

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**Objective:** Chondrosarcoma (COS) is a rare type of sarcoma which arises in bones and joints, where transformed cells produce an excess of cartilage. In this study we have evaluated the presence of cancer stem cells inside COS.

**Methods**: The human COS sample have been collected at the Unit Ortopedia Oncologica e Ricostruttiva, AOUC Careggi, Florence, with informed consent approved by the local Ethical Committee. First, we have established primary COS cell line (COS). From which we have isolated a putative subpopulation of CSCs by the sarcosphere assay[1]. Their CSCs phenotype has been evaluated by inducing isolated CSCs line towards osteogenic and adipogenic phenotypes, analysing specific mesenchymal stem cells markers proteins, analysing the expression of embryonic stem cells marker genes, evaluating their clonogenic capacity.

**Results:** We have established a primary COS line and its respective CSCs line (COS-CSCs). The CSCs phenotype of the isolated line from the primary COS line was confirmed by observing the capacity of COS-CSCs into osteoblasts and into adipocytes, by showing the presence of the mesenchymal and embryonic stem cells markers into the cell line and by evaluating a good rate as clonogenic capacity.

**Conclusion:** We have established a primary cell culture of this rare bone sarcoma. We have characterized and studied a COS-CSCs line at cellular and molecular level. We are currently completing the characterization of COS-CSCs line evaluating their migration/invasion capacity through cell biology analyses and by evaluating the expression of the regulatory genes of these processes. We are also starting the study of micro-RNAs to identify the miRNA profile of COS-CSCs line that could be used to develop new molecular therapies against COS.

**Reference:** 1. Palmini G, et al. J Vis Exp 2016;116:53884.

## P556
## LIPID EXCHANGE DISORDERS IN PATIENTS WITH CHRONIC INFLAMMATORY JOINT DISEASES

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**Objective:** Investigation of relationship between lipid profile of patients with rheumatoid (RA) and psoriatic (PsA) arthritis during methotrexate (MT) treatment, and identification their associations with the main predisposing factors.

**Methods:** We enrolled 15 patients with PsA and 20 with RA, treated with MT from 10-20 mg for at least 6 months. The exclusion criterion was the presence of a concomitant disease that could affect lipid metabolism.

**Results:** The age of PsA patients was $48.2\pm10.56$ y, the history of the articular syndrome was from 7 months to 5 y. All the patients had DAS28-CRP(4) from 4.28 to 5.01. BMI was $31.03\pm4.4$ kg/m$^2$. The mean total cholesterol (TC) value was $6.04\pm1.55$ mmol/L, and an increase of the TC levels was found in 80% of cases. Changes in TG, LDL-C and HDL-C were nonsignificant. The values of apolipoproteins A1 and B did not go beyond the reference range (apoB - 1.32 g/L, apoA1 - 1.59 g/L). Correlation analysis showed a positive TC relationship with age, overweight, and PsA duration. The age of RA patients was $53.8\pm9.4$ years, and disease history of $4.8\pm3.0$ y. All the patients had DAS28-CRP(4) $\geq7.06$, and 80% of them were RF positive. BMI was 28.3 kg/m$^2$. An increase TC level was revealed in 80% of cases. Mean TC value was

$5.63\pm1.6$ mmol/L. An increased level of TG was found in 40% of cases, LDL-C in 80%, and decrease of HDL-C in 60%. Mean HDL-C concentration was $1.09\pm0.2$ mmol/L, and mean LDL-C was $3.74\pm1.16$ mmol/L. The majority of patients had type II hyperlipidemia with a high degree of atherogenicity: IIa - 12 people, IIb - 8 people. Correlation analysis revealed direct TC relationships with age, menopause, and overweight. The duration of RA was directly correlated with TC (r=0.189), LDL-C (r=0.159). CRP level negatively correlated with HDL-C (r=-0.169).

**Conclusion:** TC increase was the most pronounced shift in lipid biomarkers. Lipid profile indicators are interrelated with traditional and disease-associated factors.

## P557
## LONG-TERM OUTCOME OF A PATIENT WITH SEVERE FACTOR VIII DEFICIT AFTER THREE JOINTS REPLACEMENT SURGERIES: A CASE REPORT

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**Objective:** People with severe deficit of factor VIII may develop haemophilic arthropathy due to recurrent joint bleeding. It leads to permanent deformities, limited range of motion, muscle wasting, misalignment, loss of mobility, and extremities of unequal lengths. They may also develop degenerative osteoarthritis of the hips. Total joint replacement is often used to improve the quality of life of these patients. The postoperative rehabilitation is crucial for better outcome of these patients. The purpose of this article is to present postoperative rehabilitation treatment of a patient with severe haemophilia A and functional outcome after three joint replacement surgeries on the lower extremities with five years follow-up.

**Case report:** A patient, at the age of 48 at follow-up, with severe haemophilia A, hip replacement surgery with total hip prosthesis on his both hips, and total knee replacement surgery on the right knee were undertaken. Prophylaxis was done with concentrate of human coagulation factor VIII. The patient also received physical therapy treatment before surgery to reduce pain and disability, as well as he performed postoperative rehabilitation after all surgical treatments. The postoperative rehabilitation treatment programs consisted of exercise therapy, occupational therapy, physical therapy modalities and education. Patient assessment was made with Numeric Rating Scale (NRS) for pain, clinical findings, Harris Hip Score and Functional Independence Score in Haemophilia (FISH) for disability. At follow-up assessment 5 y after the last operative treatment, the patient was subjectively and functionally significantly better than before the surgery treatments. He still has moderate pain in both ankles and the right shoulder periodically (NRS 3). Harris Hip Score was 82.8 points, which means good results and FISH score was 16 points. His gait on shorter distance was without a cane, and for longer distance with a cane.

**Conclusion:** People with severe hemophilia A may have successful functional outcome after multiple joint replacement surgeries. These results may remain during the next few years. The close collaboration between all team members are very important for achieving good results.

## P558
## CAN INTRANASAL CORTICOSTEROIDS INDUCE OSTEOPOROSIS?

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**Objective:** Glucocorticoids remain a cornerstone of guideline-based management of persistent asthma and allergic rhinosinusitis [1-4]. Glucocorticoid-induced osteoporosis (GIO) is the most common iatrogenic cause of secondary osteoporosis and an issue of concern for physicians treating patients with inhaled or oral glucocorticoids either continuously or intermittently. The aim of this study is to investigate the BMD in a group of patients with allergic rhinosinusitis.

**Methods:** 13 adult patients with a diagnosis of allergic rhinosinusitis and a history of at least 20 years of intranasal corticosteroids treatment were included in this study. Nasal endoscopy, skin prick tests, and nasal cytology were evaluated in all subjects. The BMD of the patients was measured by DXA.

**Results:** According to the T-scores, 4 patients were measured to have <-2.5 SD T-score, considered as osteoporosis.

**Conclusion:** This study shows that prolonged intranasal corticosteroids treatment in patients with allergic rhinosinusitis may induce osteoporosis [5-11].

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## P559
### MONITORING BISPHOSPHONATE TREATMENT IN PRIMARY CARE: PINP AND OSTEOPOROSIS IN SHEFFIELD EVALUATION (POSE STUDY)

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**Objective:** To evaluate whether Sheffield PINP monitoring algorithm (1) is associated with better treatment persistence, BMD increase, reduced fracture risk and is cost-effective compared to standard care.

**Methods:** Inclusion criteria were referral from Sheffield GPs, BMD scans performed between 2012-2013 and report advising initiation of oral bisphosphonate and monitoring. 906 patients were recruited and retrospectively divided into Group A (intention to monitor, with baseline PINP, n=588) and Group B (no intention to monitor, without baseline PINP, n=318). The model described by Davis et al (2) was used to extrapolate life-time costs and quality-adjusted life-years (QALYs).

**Results:** No differences were found in baseline characteristics between groups (age, gender, BMI, BMD and major risk factors for fractures). More patients in Group A started oral treatment (77.4% vs. 49.1%; p<0.001), but there were no differences in the presence of gap in treatment >3 months and in treatment duration. More patients in Group A had follow-up DXA scan at 4-6 y from baseline (46.9% vs. 29.2%; p<0.000) and higher change of total hip BMD (+2.74% vs. +0.42%; p=0.003).

Fewer new fractures occurred in Group A but this was not statistically significant. Patients in Group A were more likely to change management (p=0.005) including switching to zoledronate (p=0.03). The increased prescribing in Group A resulted in increases in both costs (£30.19) and QALYs (0.0039) relative to the no intention to monitor strategy, giving an incremental cost effectiveness ratio (ICER) of £7,660 in the probabilistic sensitivity analysis.

**Conclusion:** Patients monitored with PINP are more likely to start oral treatment, switch to zoledronate, have follow-up DXA scans and a greater increase of hip BMD. PINP monitoring has the potential to be cost-effective in a UK NHS setting given that interventions with an ICER under £20,000 are generally considered to be cost-effective in a UK context (3).

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## P560
### LATIN AMERICAN CONSENSUS ON THE MANAGEMENT OF GLUCOCORTICOID INDUCED OSTEOPOROSIS: A PRELIMINARY COMMUNICATION

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Glucocorticoid (GC) induced osteoporosis (GCIOP) is the most frequent form of secondary osteoporosis in clinical daily practice. GC therapy is frequently indicated to treat autoimmune and chronic inflammatory diseases. Two of the most devastating untoward effects are bone loss and fractures. Doses as low as 2.5 mg of prednisone for more than 3 months can impair bone integrity. Population at risk is defined based on the dose and duration of GC therapy and should be stratified according to FRAX, major osteoporotic fracture, prior fracture and bone density values (BMD). General measures include to prescribe the lowest dose of GC to control the underlying disease for the shortest possible time, maintain adequate Vitamin D levels and calcium intake, maintain mobility and prescribe a bone acting agent in patients at high risk of fracture. These agents include oral and IV bisphosphonates, denosumab and teriparatide. The aim of this consensus is to update the management of GCIOP according to the reality of clinical practice in Latin American countries.

Methods: To develop this position paper a multidisciplinary panel of experts including methodologists and key experts in the use of chronic glucocorticoids including a patient or patient advocate, will define the scope of the consensus; this will follow with a systematic literature search to find all relevant papers including guidelines and systematic reviews. A set of consensus statements will be derived from the literature review including the grading recommendation and an adaptation to the local context in Latin America when needed.

A questionnaire with a list of statements will be send by mail to a larger group of physicians of diverse specialties known to prescribe

glucocorticoids (rheumatologists, endocrinologists, primary care physicians, dermatologists among others) for a Delphi process aggregating and anonymizing feedback.

Responses to the statements will be collected and analyzed, items may be dropped or added for subsequent rounds. Cronbach´s α will be use as measure of internal consistency and the inter-rater agreement between participants in each round will be evaluated using intraclass correlation coefficient with 95% confidence intervals. Manuscript will be drafted and will be available for comments to all members of the group before submission and publication.

## P561

### PRIMARY DISABILITY DUE TO MUSCULOSKELETAL DISEASES IN THE IRKUTSK REGION (EAST SIBERIA, RUSSIAN FEDERATION)

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**Objective:** Patients with diseases of the musculoskeletal system and connective tissue have an increased prevalence and disability. This study aimed to examine primary disability due to musculoskeletal diseases in the Irkutsk region (East Siberia, Russian Federation) in 2010-2020.
**Methods:** The method of solid data base for persons recognized as disabled for the first time for 2010-2020 in Irkutsk region due to musculoskeletal diseases. Level calculated at 10.000 of the adult population, structure - in percentage.
**Results:** Primary disability due musculoskeletal diseases in the Irkutsk region is higher than in the Russian Federation. There is a decrease of percent of primary disability from 11.7% in 2010 to 6.0% (2018), 6.1% (2019) and to 7.6% (2020) and in its level in adults from 10.4 in 2010 to 5.9 in 2015 and to 4.4 to 10 thousand of population. The first place (45.5% - 40.5%) in the structure of primary disability in adults takes osteoarthritis, in the working-age population - dorsopathies (45.9% - 29.1% in 2020). In the persons of retirement age osteoarthritis takes the first place (from 75.1% to 61.3%). In the working-age population it occupies the second place (from 31.6% - 38.2% to 29.1% in 2020). In the third place, as in people of working age, and at retirement age, is rheumatoid arthritis (10-12%).
**Conclusion:** The level of primary disability is higher in urban residents and women. Reducing the level of disability due musculoskeletal diseases was reached by both the greater availability of high quality and high tech medical care for patients (operative treatment, early mobilization and rehabilitation), as well as changes in regulatory documents on disability criteria.

## P562

### ECHOCARDIOGRAPHIC ASSESSMENT OF LEFT HEART FUNCTION IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Assessment of the essential echocardiographic parameters of left heart chambers in rheumatoid arthritis (RA).
**Methods:** Patients with RA and symptoms arised at least 3 months before were included in the study. The exclusion criteria were presence of symptomatic coronary heart disease, arterial hypertension, or diabetes mellitus.

**Results:** All the included persons (n=24) were women. Their age was 49.6±7.9 y, and disease duration was from 0.5-12.0 y. DAS28-CRP(4) index was 5.0±0.6. All the patients were treated with basic antirheumatic drugs as well as NSAIDs therapy; in 25% of cases glucocorticoids were also applied. Weight excess according to their BMI was found in 16.7% of patients, but neither high blood glucose concentrations nor low GFR were revealed. Mean total cholesterol was 5.59±0.92 mmol/l. No low ejection fractions were registered in patients studied. Mean interventricular septum (IVS) thickness was 8.9±1.0 mm whereas 25.0% patients had high IVS thickness (>10 mm). Mean left ventricle (LV) myocardial mass index was 90.42±23.85 g/m$^2$, with patients had its mild (25.0%), moderate (8.3%) or pronounced (8.3%) increase. Mean LV posterior wall thickness was 0.92±0.12 cm, and 41.6% patients had it 11 mm or more. Mild LV diastolic dysfunction was also revealed in all the cases (decreased mean average E/A ratio, 0.87±0.24). In 92% of individuals, Grade 1 mitral or tricuspid regurgitation have been found in 92% patients, 8.3% had grade 2 tricuspid regurgitation, and 42% ultrasound manifestations of aortic atherosclerosis.
**Conclusion:** There are certain morphological and functional changes of heart in RA even in absence of arterial hypertension, or any other primary heart disease. Most common type of echocardiographic changes includes concentric LV hypertrophy with diastolic dysfunction, mild valvular dysfunction without ventricle dilation, and aortic atherosclerosis.

## P563

### TUMOR-INDUCED OSTEOMALACIA: DIAGNOSTIC AND REHABILITATION CHALLENGES

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**Objective:** Tumor-induced osteomalacia (TIO) is a rare paraneoplastic syndrome, which is characterized by renal phosphate wasting and disordered bone mineralization. Due to a non-specific symptoms, small size and slow growth of the tumor, it can take far more than several years to make a correct diagnosis since the appearance of the first symptoms, which may lead to irreversible consequences despite successful treatment. We present a case of the patient with TIO and secondary hyperparathyroidism (SHPT) caused by hungry bone syndrome. **Case report:** A 65-y woman had 12-y history of severe lower back pain, decrease in height by 16 cm during life, multiple atraumatic fractures of the ribs and pelvic bones. The patient moved around using a wheelchair, but initiation of therapy with alfacalcidol 3 mcg/d, cholecalciferol 15 000 IU/week, calcium 1000 mg/d in 2014 improved her condition and she began to move independently. However pain syndrome is contained exclusively by narcotic analgesics (tramadol 200 mg/d). Tumor was localized in 2018 using somatostatin receptor scintigraphy with 99mTc-Tektrotyd in the left inguinal region, which was resected (pathology - mesenchymal tumor, FGF23+). After tumor removal SHPT was observed during 2 following years despite medical treatment with alfacalcidol 3 mcg, cholecalciferol 15000 IU/week and calcium 2000 mg/d, which corresponded to hungry bone syndrome. Normalization of SHRT was achieved only after 2 y of treatment. The BMD increase was significant and continued throughout the 3 years after surgery: +127.7% at hip, +23.4% - lumbar spine, +3.2% - radius. Despite the normalization of the biochemical parameters and increase in BMD, patient's quality of life continues to be significantly reduced. The patient has to use cane and walk for short distances because of multiple bone fractures and severe pain syndrome. **Conclusion:** Our clinical case illustrates that despite the successful results of surgical removal of the tumor, a long course of rehabilitation may be required. Severe pain syndrome due to multiple fractures, hungry bone syndrome and secondary hyperparathyroidism is a challenge in the treatment of these patients. Early diagnosis and initiation of the therapy can reduce the number of complications and improve quality of life parameters.

## P564

### ASSESSMENT OF PAIN SYNDROME IN PATIENTS WITH SPONDYLOARTHRITIC PSORIATIC ARTHRITIS

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**Objective:** To assess the severity of pain and quality of life in patients with spondyloarthritic psoriatic arthritis (PsA), as well as the effectiveness of therapy with methotrexate (MT).

**Methods:** We examined 15 patients with PsA receiving MT (at a dose of 10-20 mg/week) as a basic therapy for at least 6 months. DAS28-CRP(4), DAPSA, the visual analogue scale (VAS), Likert scale were used. The quality of life was assessed using the BASDAI, SF-36, HAQ-DI, DLQI, QIDS SR-16. Skin manifestations of psoriasis was assessed by the PASI index, BSA.

**Results:** Among patients there were 12 men, 3 women. The age of the patients was 48.2±10.56 y, the duration of the articular syndrome was from 7 months to 5 y, the duration of the skin syndrome was from 1.5-22 y. All patients had DAS28-CRP(4) from 4.28-5.01; DAPSA from 23-26.8. The activity of the disease according to the VAS by the patient was 61±8.9 mm, by the doctor - 58±4.2 mm, according to the Likert scale - 2.5 points. The presence of pain and functional limitations negatively affected all parameters of quality of life. Physical (41.64±10.9) and mental (39.22±9.2) indicators changed according to SF-36. HAQ-DI values ranged from 0.50-1.25, BASDAI - from 3.4 to 5.6, DLQI - from 7 to 12, QIDS SR-16 - from 5 to 10. PASI, as an indicator of the severity and severity of psoriasis, ranged from 4-13.6 points, the BSA index in assessing the prevalence of skin manifestations - from 2 to 9.8%.

**Conclusion:** All patients with spondyloarthritic PsA did not achieve remission or low activity while taking MT as a DMARD. In 100% of patients, despite long-term use of MT in a stable dosage, moderate clinical and laboratory activity of the disease remained, which affected all indicators of quality of life (both physical and mental, including manifestations of mild depression).

## P565

### VITAMIN D STATUS AMONG RESIDENTS OF DIFFERENT REGIONS OF RUSSIAN FEDERATION

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**Objective:** To study the vitamin D status depending on age, season and geographical regions of Russian Federation.

**Methods:** In this retrospective study we analyzed 115,694 anonymised blood samples from "In vitro" commercial laboratory database. The samples were collected from 2012-2017 in the central, northwestern and southern regions of Russian Federation. Serum levels of vitamin D (25(OH)D) were measured using chemiluminescent assay. The participants over the age of 16 were included in this study.

**Results:** The median age was 45 [33; 58] y. 25(OH)D median value was 23.9 [17.0; 31.6] ng/ml. It was found that from 2012-2017, 69.5% of all samples had levels of 25(OH)D <30 ng/ml. There was no significant difference between prevalence of vitamin D deficiency (<20 ng/ml) in 2012 and 2017 (33.5% vs. 35%, p=0.188). The difference between number of samples with 25(OH)D <20

ng/ml in winter and summer was significant (35% vs. 30%, p=0.06). There was no evidence that number of participants with 25(OH)D in normal range (30-60 ng/ml) was different in various residential areas: central region 28.4%, northwestern region 30.1% and southern region 21.8% (p>0.05). However, severe deficiency (<10 ng/ml) was statistically higher in northwestern region (p<0.05). The analysis of different age groups had shown that 25(OH)D deficiency and severe deficiency were higher in group <20 y (42% and 7.7%) as compared with 20-29 y (31.5% and 3.9%) and 40-59 y (32% and 5.3%), p=0.000 for all. Moreover, only 22.6% in group <20 y was in normal range, what was comparable with group >80 y (18.1%), p=0.1.

**Conclusion:** We demonstrate that vitamin D deficiency is widespread in Russian Federation. No differences in vitamin D status has been observed in various regions. Lower prevalence of 25(OH)D <20 ng/ml in summer was discovered. The lowest level of vitamin D was observed in groups <20 and >80 y.

## P566

### PATIENTS FUNCTIONALLY CAPACITY AFTER OSTEOPOROTIC FRACTURES

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**Objective:** Osteoporotic fractures imposes a significant health care burden globally with the medium and long-term functional consequences being catastrophic. This study aimed to analyze the relationship between type of fracture, co-morbidities and functional dependence.

**Methods:** This was a retrospective cohort study that involved patients with a fragility fracture observed in a Fracture Liaison Service (FLS). Sociodemographic, clinical data and patients' outcomes, after 12 months, were collected. The data covered the period between 1 January 2019 to 31 December 2020 and was collected from the hospital database. A general descriptive analysis was performed, p-value <0.05 was statistically significant.

**Results:** A total of 187 patients were included (158 females, 29 males) averaging 76.98±11.99 years old. Most frequent comorbidities included hypertension, diabetes mellitus, dyslipidemia, chronic renal disease, thyroid pathology and depressive syndrome. Osteoporosis risk factors, such as alcohol consumption and corticotherapy, were also evaluated. The majority of fractures were hip fractures (62.6%), followed by vertebral (15%), tibia (13.4%), humerus (6.4%), and wrist (2.7%). In the prefracture period, most patients were autonomous (58.8%) and only 12.3% were total functionally dependent. After one year of follow-up, a general decrease in autonomy was observed (43.3% were autonomous, 19.3% were total functionally dependent, 5.9% died and 7.5% were lost for follow-up). No statistically significant differences between the two periods were found (p=0.704). In 22% of patients who were functionally independent before the fracture (81 patients), they became partially dependent for activities of daily living, after one year of follow-up. The type of fracture is associated with alterations in functionally dependence (p=0.015). No statistically relevant differences were found between different comorbidities (p<0.05). The use of systemic corticotherapy were related to vertebral fracture (p=0.02).

**Conclusion:** FLS has a fundamental roll to promote an early patients recovery to the pre-fracture functionally capacity and counsel the patient about the potential rehabilitative benefits.

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improve linear growth, daily weight gain and bone mineralization in the short term. By describing and implementing this protocol we hope to draw attention to PRM's role in improving standard of care for premature newborns.

## P568

### ASSESSMENT OF THE MAIN INDICATORS OF THE HEMOSTASIS SYSTEM IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** To assess the main indicators of blood coagulogram in patients with rheumatoid arthritis (RA), to determine their relationship with the degree of activity, duration and systemic manifestations of the disease.
**Methods:** 100 patients with RA were examined. The state of the blood coagulation system was determined according to the following indicators: prothrombin index (PTI) according to Quick (%), fibrinogen (g/l), activated partial thromboplastin time (APTT, s), international normalized ratio (INR).
**Results:** Among the surveyed there were 76% of women and 24% of men. The average age of the patients was $53.7\pm12.25$ y, the duration of the disease was $6.13\pm3.69$ y. Seropositive RA was detected in 63%. All patients had moderate to high RA activity (32% and 68%). Pathology of the cardiovascular system was detected in 84% of patients. More significant changes in the coagulogram were recorded in patients with systemic manifestations and concomitant cardiac pathology compared with the articular form: increased PTI ($107.20\pm1.26\%$ and $103.68\pm3.21\%$, respectively) and fibrinogen ($6.4\pm0.8$ g/l and $5.1\pm0.76$ g/l); decrease in INR ($0.83\pm0.06$ and $0.96\pm0.14$) and APTT ($27.5\pm1.21$ s and $34.1\pm2.4$ s). The same trend persisted in the group of patients with a disease duration of $>7$ y. Correlation analysis between coagulogram parameters and disease activity showed a direct positive relationship between IPT and ESR ($r=+0.23$), fibrinogen and ESR ($r=+0.34$), fibrinogen and CRP ($r=+0.32$). Also, inverse correlations were obtained between INR and ESR ($r=-0.24$), APTT and ESR ($r=-0.22$), APTT and CRP ($r=-0.26$).
**Conclusion:** In RA patients, an increase in PTI and fibrinogen level, a decrease in INR, and a shortening of APTT were found, which indicates activation of the blood coagulation system, hypercoagulation. The revealed disorders correlate with RA activity, disease duration, presence of systemic manifestations and concomitant cardiovascular pathology.

## P567

### PHYSICAL THERAPY PROTOCOL FOR THE PREVENTION OF METABOLIC BONE DISEASE OF PREMATURITY

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**Objective:** Metabolic bone disease of prematurity (MBDP) is characterised by reduced mineralization of the skeleton due to nutritional and biomechanical factors. Physical inactivity due to lack of mechanical stimuli and fetal movements against the uterine wall is a proposed contributor. As such, physical therapy intervention has been proposed for MBDP treatment. The aim of this paper is to review the published physical interventions in MBDP, in order to compile a protocol with defined selection and follow-up criteria and an objective physical therapy intervention.
**Methods:** A scientific review was performed using MEDLINE (PubMed), COCHRANE Library and Physiotherapy Evidence Database (PEDro). Clinical trials evaluating a physiotherapy intervention were selected for protocol elaboration. Major outcomes considered included growth and bone mineralization.
**Results:** Preterm infants with very to extremely low birth weight ($<1500$ g) are eligible. Other MBDP risk factors should be considered for referenciation to PRM. Intervention begins between 1-2 weeks of life. The proposed protocol consists of a tactile/kinesthetic stimulation - 6 soft strokes per region, bilaterally (shoulder-to-wrist, along the chest wall, hip-to-feet, occipital-facial-cervical and cervical-to-pelvis), in supine, for 15 min, followed by passive mobilization with soft articular compression based on the intervention proposed by Moyer-Mileur et al.,1995 - 10 reps of extension and flexion in each joint in a cephalocaudal direction for 15 min. Sessions are performed once a day for 30 min, 5-6 d/week, 30 min after feeding. The intervention is maintained, at least, until the infant reaches a weight of 2000 g or until discharge. Postdischarge follow-up will include growth, neuromuscular maturity parameters and adverse skeletal events (deformities, fractures).
**Conclusion:** MBDP's clinical spectrum can range from asymptomatic to a higher incidence of fragility fractures in the neonate. Long term consequences are poorly defined. Rehabilitation programs have proven to

## P569

### CARBOHYDRATE IMBALANCE IN PATIENTS WITH GOUTY ARTHRITIS

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**Objective:** To study the incidence of carbohydrate metabolism disorders in patients with gouty arthritis (GA).
**Methods**: The study included 40 patients with primary chronic GA, diagnosed on the basis of S. Walles criteria and with impaired carbohydrate metabolism. Among the examined men prevailed (65%), the average age of the patients was 52 y. A family history of gouty arthritis was observed in 25 patients. The average duration of the disease was $8.2\pm3.5$ y. All patients underwent daily fasting measurements of blood sugar levels with a glucometer, and a study of glycosylated hemoglobin was carried out.

**Results:** All patients were hospitalized in the rheumatology department. The onset of GA was observed on average at 35.6±10.0 y. Tofus form was diagnosed in 26 (65%) patients, 14 (35%) did not have tophus. The average level of fasting blood glucose is 8.4±2.8 mmol/l. Type 2 diabetes mellitus had 10 (25%) patients. In 25 (62.5%), impaired glucose tolerance was noted. Impaired fasting glucose was observed in 5 (12.5%) patients. The average level of glycosylated hemoglobin was 7.0±1.5%. At the time of examination, 8 (20%) were receiving hypoglycemic therapy. In the course of the study, complications of diabetes mellitus were identified. Diabetic retinopathy was most often detected in 6 (15%) patients; nephropathy at the stage of microalbuminuria was detected in 5 (12.5%) patients.

**Conclusion:** The study revealed a fairly high prevalence of carbohydrate metabolism disorders in patients with gouty arthritis. Careful monitoring of both the course of gout and its inherent comorbid pathology is necessary due to the numerous complications and concomitant disorders.

## P570
### DENOSUMAB IN MEN: 6 YEARS RETROSPECTIVE, REAL-WORLD CLINICAL PRACTICE SINGLE CENTRE STUDY (OSTEOPROM). OSTEOPOROSIS TREATMENT AND FRACTURES DATA – PART 1

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**Objective:** Osteoporosis represents a considerable threat to global health and national healthcare systems. It is a disease that causes bones to become weak and lose their strength, making them break more quickly than normal bones. Globally 20–25% of fragility fractures occur in men. In the coming decades' prevalence of osteoporotic fractures to increase due to population ageing, e.g., hip fractures to rise more in men than in women; men are twice as likely to die after a hip fracture. The treatment approaches to male osteoporosis are diverse. Osteoporosis in men is an under-recognized and undertreated disease.

**Methods:** We analyzed the effectiveness of osteoporosis treatment in men with denosumab (Dmab) from August 2014 to January 2021. We studied BMD changes and fractures in the men retrospective cohorts in a real-world clinical setting using patients (pts) data from single-centre (OsteoProM). We collected and analyzed at the beginning and end of the study: BMD changes of the spine L1/L4 and in some cases total spine, right and left femoral neck by using DXA and 1 case by QCT; risk factors; lab data (serum Ca, iPTH, vitamin D); comorbidities and concomitant medications. Men were divided into 6 groups according to the number of Dmab injections (inj): group (grp) 1 (12–13 inj.), grp 2 (9–11 inj.), grp 3(8 inj.), grp 4 (6–7 inj.), grp 5 (4–5 inj.), grp 6 (1–3 inj.). This grp was divided into 2 subgroups: 6A1 (BMD in spine L1/L4) and 6A2 (BMD in a total of the spine); grp 6B BMD made by QCT.

**Results:** Over the last 6 y, women with OP were 691 (89.2%) and men 84 (10.8%). We analyzed a total of 37 (44%) of 84 men who received Dmab. Men an average age 63.2±10.4SD y. The average BMI (kg/m$^2$) was 24.3 ±3.7SD. BMD analyzed by DXA scans in 36 pts (97.3%) and QCT in 1 pt (2.7%). Men with idiopathic osteoporosis were 83.8%, glucocorticoid-induced osteoporosis 10.8%, secondary osteoporosis 5.4%. At the beginning of the study, men with at least 1 fracture were 56.7% (62.0% in the spine, 9.5% hip, 14.3% forearm, 28.6% ribs, 28.6% other types of fractures). At the end of the study, men with at least 1 fracture were 2 (5.4%) – grp 6A2 (left olecranon) and grp 2 (vL1). DXA was made for all pts at the beginning of the study (n=37) and at the end of the study 43.2% (n=16). The most significant BMD gain in the 1st grp 12.8% (n=2). Then in the subgrp 6A2 – 9% (n=3); grp 2 (n=4), and grp 5 – 7.8% (n=2). The least significant gain was in the grp 3 – 2.8% (n=2). In the grp 4 – 6.6% (n=4)

and in the subgrp 6A1 – 3.8% (n=2). Also, total right and left BMD was analyzed (n=12); more significant gain was in grp 1st in the right hip – 4.7% and left hip – 5.9% (n=2). Lab data, data about co-morbidities and concomitant medications will be presented later. During the study, no cardiovascular events were detected.

**Conclusion:** Dmab is effective in increasing BMD at the lumbar spine and the hip. The most significant BMD increased after 12–13 Dmab injections. The study indicates that Dmab is effective and safe.

## P571
### EVALUATION OF DIABETES MELLITUS IN A COHORT OF FRAIL OLDER ADULTS

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**Objective:** To identify the prevalence of diabetes in a cohort of frail older adults who attended Tipperary University Hospital (TUH) and explore the relationship between frailty and diabetes in this group. Prognosis and treatment of diabetes can vary greatly in the presence of frailty.

**Methods:** A multidisciplinary team provide liaison geriatric input to frail older adults in TUH. This team carries out comprehensive geriatric assessments (CGAs) on patients identified using a VIP tool or via inpatient consults. These CGAs were accessed and reviewed regarding frailty scores, history of falls, diabetes diagnosis, medications and diabetes complications including hypoglycaemia.

**Results:** CGAs were reviewed for 213 patients from September to November 2019. 58 patients had a diagnosis of diabetes (27.2%), and all were type 2 diabetics. The median age was 84. The average Clinical Frailty Scale score was 5.4 indicating mild to moderate frailty. Over two-thirds of patients (n=137) were on >5 medications. 76 patients had a history of falls, and 24 (31.5%) of those had diabetes. 21 patients were prescribed either sulphonylureas and/or insulin. One patient had a sulphonylurea stopped on admission following CGA. Five patients had a documented history of hypoglycaemia, 2 of these patients were on insulin and one was on a sulphonylurea. The median HbA1c was 49 mmo/mol. 15 patients had complications associated with diabetes, including 3 with diabetic retinopathy and 6 with diabetic neuropathy. The median duration of diabetes was 9.5 y.

**Conclusion:** The management of frail older adults with type 2 diabetes is complicated by multimorbidity and increased risk of adverse effects of treatment such as hypoglycaemia. The assessment of frailty should be a routine component of a diabetes review for all older adults, and then glycaemic targets and medication choices should be adjusted accordingly.

## P572
### MAIN OSTEOSARCOPENIA RISK FACTORS IN STABLE COPD PATIENTS

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**Objective:** It is known that COPD is often combined with osteoporosis and sarcopenia, which are often under-diagnosed. The aim of the study was to analyze the main osteosarcopenia risk factors.

**Methods**: This cross-sectional study included 132 patients with stable COPD (102 males/30 females, mean age 67.6±8.2 y). All patients were assessed of symptoms and risk of exacerbations according to GOLD consensus report (ABCD assessment). Sarcopenia and its severity were diagnosed for all subjects according to the algorithm developed by the EWGSOP2 criteria. The Appendicular Skeletal Muscle Mass and BMD were estimated using DXA. Osteoporotic fractures were revealed by X-ray or anamnesis. The vitamin D level was assessed by

chemiluminescent immunoassay on microparticles according to international standards. Key risk factors were evaluated using multiple logistic regression analysis.

**Results:** Sarcopenia was diagnosed in 41.7% of COPD patients. A low BMD (osteopenia or osteoporosis) was diagnosed in 84.8% of patients. A combination of these two pathologies or osteosarcopenia was found in 38.6% of COPD patients (n=51). Moreover, 9.9% of patients had severe osteosarcopenia characterized by osteoporotic fractures, severe muscle weakness and atrophy. Osteosarcopenia was found at any "ABCD" groups and severity airflow limitation. However, very severe airflow limitation (OR=5.8 (95%CI 1.4-2.0, p=0.01)), use of systemic glucocorticoids (OR=4.7 (95%CI 1.1-10.5, p=0.03)), low BMI (OR=1.3 (95%CI 1.1-1.3, p<0.01)), group D by GOLD (OR=4.7 (95%CI 2.5-5.0, p=0.02)), low blood vitamin D concentration (OR=10.5 (95%CI 1.1-83.3, p=0.03))were the main osteosarcopenia risk factors.

**Conclusion:** Osteosarcopenia is a frequent pathology in COPD patients (38.6%), almost one in ten patients has osteoporotic fractures. The COPD clinical severity, the use of systemic glucocorticoids, low BMI and very severe airflow limitation, as well as low blood vitamin D levels are the main osteosarcopenia risk factors.

## P573

### DISCORDANCE IN DXA DERIVED T-SCORES AT THE HIP AND SPINE IN OSTEOPOROSIS

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**Objective:** There is often significant discordance between T-scores of the hip and spine and in some patients only one site can be measured. This study aimed to identify the importance of site-specific T-scores in diagnosing osteoporosis.

**Methods:** We analysed data from participants of the Trinity, University of Ulster and Dept. of Agriculture Study (TUDA) cohort who all had BMD measurements of both the spine and hip and a diagnosis of osteoporosis using standard ISCD criteria.

**Results:** 746 participants were identified with a mean age of 71.7±7.3, of whom 82.5% were female. Osteoporosis was identified in 82.8% in the spine, in 53.4% in the hip and in 13.9% osteoporosis was identified on the basis of only hip T-scores. The concordance rate for osteoporosis at the spine and hip was 36.1%. In 70% of cases, T-scores were lower in the neck of femur vs. total hip. Differences in site diagnosis was largely between osteoporosis and osteopaenia though in 7.7% there was a mismatch due to osteoporosis of spine and normal hip BMD. Hip osteoporosis was independently predicted by male gender (p<0.001), older age (P<0.001) and lower BMI (P<0.001).

**Conclusion:** In the vast majority, spine BMD inferred a DXA diagnosis of osteoporosis. However, in one in eight, a diagnosis of osteoporosis was based on only hip BMD. Multiple factors cause discordance including greater bone loss in the spine due to menopause, drugs and other secondary causes. Greater spine BMD readings occur in osteoarthritis while factors like BMI may impact the hip more. However, fragility fractures at either site independent of T-score can also indicate osteoporosis.

## P574

### SARCOPENIA AND FRACTURES IN COPD PATIENTS

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**Objective:** Sarcopenia is a progressive and generalized skeletal muscle disorder that is associated with increased likelihood of adverse outcomes.

The aim of the study was to analyze the main predictors and consequences (fracture development) of sarcopenia in COPD patients.

**Methods:** In the cross-sectional study 132 patients with stable COPD (102 males/30 females, mean age 67.6±8.2 y) were included. Sarcopenia and its severity were diagnosed according to the algorithm of the EWGSOP2. Muscle mass was evaluated using DXA. Vertebral fractures were diagnosed using semiquantitative morphometry in routine DXA. The main key risk factors were evaluated in multiple logistic regression analysis.

**Results:** Sarcopenia was diagnosed in 55 (41.7%) patients. 44 patients (33.3%) had severe sarcopenia. Sarcopenia was registered at any groups of COPD (the ABCD assessment tool). However, low FEV1 (OR=1.3 (95%CI 1.0-1.6, p<0.001)), use of systemic glucocorticoids (OR=3.4 (95%CI 1.2-12.7, p=0.03)), low BMI (OR=1.3 (95%CI 1.2-1.4, p<0.001)), group D (OR=4.0 (95%CI 1.2-13.7, p=0.03) were the main predictors of sarcopenia. Osteoporotic fractures were present in 35 patients (26.5%). Half of all patients with fractures (n=17) had asymptomatic vertebral fractures, which we first diagnosed using morphometric analysis. Multiple fractures were in 18 patients (13.6%). Patients with sarcopenia have osteoporotic fractures more often than patients without sarcopenia (OR=2.8 (95%CI 1.3-6.2, p=0.02).

**Conclusion:** Sarcopenia is a frequent pathology in COPD patients and it is associated with the severity of the underlying disease, the use of systemic glucocorticoids, low BMI and airflow limitation. Sarcopenia significantly increases the risk of osteoporotic fractures such as vertebral fractures which may be without symptoms.

## P575

### EXPERIENCE WITH TERIPARATIDE AS TREATMENT OF OSTEOPOROSIS IN THE MOSCOW REGION OF THE RUSSIAN FEDERATION

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**Objective:** To evaluate the efficacy of teriparatide in patients with different forms of osteoporosis in real clinical practice in the Moscow region of the Russian Federation.

**Methods:** The study included 83 patients with osteoporosis: 1) primary (42 postmenopausal women, 7 men >50 y), 2) glucocorticoid-induced (25 women, 4 men), 3) as a result of other causes (2 women, 3 men). The average age was 65±13 (22-92) y. The diagnosis of osteoporosis was made using densitometry (DXA, T-score is < -2.5SD in the lumbar spine or hip) and/or a history of low-energy hip, vertebral or multiple fractures. All patients were treated with teriparatide 20 μg/d. Treatment efficacy was assessed by DXA after 12 and 24 months and the new reported fractures. Procollagen type 1 N-terminal propeptide (P1NP) was tested in 8 patients at baseline and after 3 months of therapy.

**Results:** Initially, patients had multiple (27 (32.53%)), vertebral (32 (38.55%)) and femoral (3 (3.61%)) fractures. A statistically significant increase in P1NP level from 55.6±5.6 to 76.8±12.3 ng/ml (p=0.02) after 3 months was found in women with postmenopausal osteoporosis (n=7), that reflected the early treatment effectiveness. One man with senile osteoporosis also showed a rise in P1NP from 49.3 to 61.8 ng/ml. After 2 y of therapy, T-score and BMD increased from the initial -2.77±1.17SD and 0.77±0.14 g/cm$^2$ to -2.52±0.91SD and 0.82±0.1 g/cm$^2$ (p<0.001, n=70) respectively. Patients with postmenopausal osteoporosis without type 2 diabetes mellitus (n=32) showed an increase in T-score in the spine from -2.83±1.06SD to -2.58±1.24SD (p=0.014) and in the femoral neck from -2.16±0.77SD to -1.88±0.84SD (p=0.046). In the glucocorticoid-induced osteoporosis group, there was an improvement in T-score in the spine (-2.18±0.87 vs. -2.77±1.09 (p=0.011)) and in the hip (-1.71±0.88 vs. -2.09±0.63), but not statistically significant (p=0.609). There were no new cases of fractures and adverse events associated with the therapy.

**Conclusion**: The use of teriparatide in patients with both primary and secondary osteoporosis in real clinical practice in the Moscow region of the Russian Federation has shown a significant increase in BMD without new cases of fractures and it is characterized by acceptable tolerability profile.

## P576

### EFFECTIVENESS AND SAFETY OF PHARMACOLOGICAL AND NONPHARMACOLOGICAL THERAPY FOR RHEUMATOID ARTHRITIS: AN OVERVIEW OF REVIEWS

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**Objective:** Compare the efficacy and safety of DMARD synthetic and biological as well as nonpharmacological therapies in patients with rheumatoid arthritis (RA).
**Methods:** Systematic reviews were included that met the selection criteria: the efficacy outcomes studied were ACR, EULAR, and DAS28. The overlap of the included primary studies was assessed, as well as the risk of bias of the RS included using the ROBIS tool. PROSPERO ID: 255892.
**Results:** This "Overview of Reviews" was prepared following the guidelines of the Cochrane manual 2019. 61 related systematic reviews were included. An overlap of 0.61% (slight) was found. The overall risk assessment indicated a 45% predominance for low risk of bias.
We found 61 comparisons of both pharmacological and nonpharmacological interventions with measures of effect that reached statistical significance. For biologic DMARDs, the intervention with infliximab stood out among all those in the anti-TNF group for ACR20, 50, and 70 outcomes, with an OR efficacy (95%CI) of 6.93 (3.52-13.66) for ACR50. For non-anti-TNF biologic DMARDs, the highest effect measures were for tocilizumab OR 7.22 (4.52-11.53) for ACR70. Methotrexate stands out for conventional DMARDs OR (95%CI) 4.54 (2.51-6.61) and tofacitinib RR 3.87 (2.44-6.668). For non-pharmacological therapy, all of them report measures of effect statistically significant for the DAS28 and ACR20 efficacy outcomes: For exercise, the percentage of change DAS28 was 34.6% with p=0.01. For psychological therapy mindfulness, the mean difference DAS28 was -0.29 p<0.00001, and for tripterygium supplementation RR 3.81 (1.79-8.09) for ACR20.
**Conclusion:** Of all the notable comparisons, those with the greatest clinical relevance are pharmacological interventions, and of these therapies with biological DMARDs, especially anti-TNF since their comparisons are against other DMARDs and not against placebo in the majority as well as they own reporting the highest effect measures among all.
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## P577

### MULTIPLE BROWN TUMORS IN A PATIENT WITH PRIMARY HYPERPARATHYROIDISM: A CASE REPORT

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**Objective:** Brown tumors are rare focal giant-cell lesions caused by hyperparathyroidism. Due to the lack of clinical and radiological hallmarks the diagnosis may be delayed. The differential diagnosis between brown tumors and odontogenic cysts, bone metastasis and other similar conditions may be challenging. We present a case of a 30-y.o. woman with multiple brown tumors due to primary hyperparathyroidism.**Case report:** A year ago, the patient started experiencing pain in the lower jaw, toothache, edema and hyperemia at the area of 38, 42-45 teeth. This condition was misdiagnosed as an odontogenic cyst and these teeth were extracted without significant effect. CT of the skull revealed multiple tumors 20x30 mm and 30x40 mm in the projection of 42-45 teeth. Histological sections showed osteoclast-like multinucleated giant cells, multiple hemorrhages and deposits of hemosiderin. 18F-FDG PET/CT showed a metabolically active tissue in the multiple solid areas of upper and lower jaw and osteolytic lesions of sternum, shoulders, Th7, Th12, L1, L5 vertebras and ribs. Labs revealed severe hypercalcemia (3.9 mmol/l), elevated PTH (1790 pg/ml) and AP (514 IU/I), low P (0.3 mmol/l), consistent with primary hyperparathyroidism (PHPT). US confirmed a tumor in the upper right parathyroid gland 20x18x13mm, nephrolithiasis. BMD Z-score was low - L1-L4 -3.4, neck -3.1, total hip -2.6, radius 33% -4.3. Due to a high risk of hypercalcemic crisis patient received denosumab 60 mg s.c. After parathyroidectomy the patient had a hypocalcemia due to hungry bone syndrome and discharged on alfacalcidol 1 mcg/d, cholecalciferol 10000 IU/d, calcium 1000 mg/d, with subsequent cancellation alfacalcidol and increase of calcium dose up to 3000 mg/d. After 1-y labs showed a normalization of serum Ca (2.15 mmol/l), PTH (21.3 pg/ml), P (1.02 mmol/l) and high levels of osteocalcin (55.18 ng/ml) and CTx (1.18 ng/ml), consistent with intense bone remodeling. DXA showed a significant increase in BMD: +65.6% at hip, +64.1% - lumbar spine, +32.3% - radius.**Conclusion:** Our clinical case shows the consequences of untimely diagnosis of PHPT and rare combination of multiple brown tumors of fascial and other bones. Despite low prevalence of PHPT with brown tumors, a systemic examination and careful differential diagnosis is required.

## P578

### SPORADIC RECURRENT PRIMARY HYPERPARATHYROIDISM CAUSED BY MULTIPLE ECTOPIC ADENOMAS

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**Objective:** Primary hyperparathyroidism (PHPT) is usually caused by sporadic adenoma typically located posterior to the thyroid gland. Multiple and/or ectopic adenomas are rare and present a severe challenge in parathyroid surgery.
**Methods:** We present a clinical case of the patient with sporadic recurrent PHPT with an unusual presentation of twice ectopic adenomas.
**Results:** A 49-year-old woman presented with dysmobility syndrome, the pains in the large bones, joints, in the epigastric, seizures. The PHPT complicated by severe hypercalcemia, osteoporosis with osteitis fibrosa cystica and recurrent nephrolithiasis was first diagnosed in 2010. The contrast-enhanced CT revealed an ectopic formation 25x19x25 mm into the anterior mediastinum. The patient was managed with video assisted thoracoscopic surgery, the histological examination confirmed the typical adenoma. Normocalcemia was achieved combined with a moderate PTH increase regarded as secondary hyperparathyroidism.
The PHPT recurrence had diagnosed since 2015, but 99mTc-MIBI scintigraphy and CT remained negative. Due to the osteoporosis and hypercalcemia progression, conservative therapy was prescribed (bisphosphonates followed by denosumab in combination with cinacalcet). In 2019 CT and 99mTc-MIBI showed the formation 7x14x12 mm nearby the right ventricular pericardium. In 2020 a sternotomy with parathyroidectomy was performed followed by hypocalcemia and PTH normalization. The histological characteristics corresponded to adenoma from chief cells. 3 months later, the patient underwent a gradual withdrawal of alfacalcidol and calcium supplements because of mild hypercalcemia, hypercalciuria and increased PTH, what evidenced the

persistence of the disease. A scintigraphy with SPECT/CT revealed a focus 4x3x6 mm in the same area without active accumulation. Mutations in *MEN1* and *CDC73* genes were excluded.

**Conclusion:** The multiple parathyroid adenomas in ectopic locations in the same patient are uncommon and lead to failure after the initial surgery. They can be difficult to identify and require combined imaging modalities and surgical approaches, that can improve the clinical decision making.

## P579

### A WORLDWIDE BIBLIOMETRIC ANALYSIS OF PUBLISHED LITERATURE ON TRABECULAR BONE SCORE

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**Objective:** Trabecular bone score (TBS), as a texture indicator of bone microarchitecture, predicts the risk of fracture from DXA, independently of BMD. This study aims to explore the bibliometric profile of literature published on TBS.

**Methods:** We searched Scopus for "trabecular bone score" or "trabecular score" from the beginning to the end of 2020 and related documents were included for bibliometric analysis. All extraction was done in one day, 26 March 2021. Excel, VOS viewer, and Science of Science (Sci2) software were used.

**Results:** From all 625 articles, 438 original and 90 review articles were included. These documents had 9192 citations and an H-index of 48. The first paper was published in 2008 and the numbers were increased to more than 90 papers in 2018. Top three countries were USA (n=130 documents), Switzerland (n=101) and Italy (n=67). "Osteoporosis International" (n=80), "Journal of Clinical Densitometry" (n=49), and "Bone" (n=38) had the highest participation in publishing. Keyword occurrence analysis showed that research hotspots on TBS were "TBS and BMD predict the risk of osteoporotic fracture", "TBS evaluates bone quality from DXA independent of BMD", and "TBS assesses a vertebral fracture risk in breast cancer, primary hyperparathyroidism, and diabetes". The most share of articles were on human studies (n=409) with the top three underlying diseases of diabetes (n=36), osteoporosis (n=20), and hyperparathyroidism (n=17). The bursting words of the titles and abstracts were shown in Figure 1a and Figure 1b, respectively. "Prevent", "Reproduct" and "Chronic" were the bursting words of the abstracts during recent years.

**Conclusion:** This study reported the most active countries and journals published on TBS. Although in the beginning, TBS were used to predict fractures, considering the bursting words, in the near future, it can be expected to be used in other areas of osteoporosis as well.
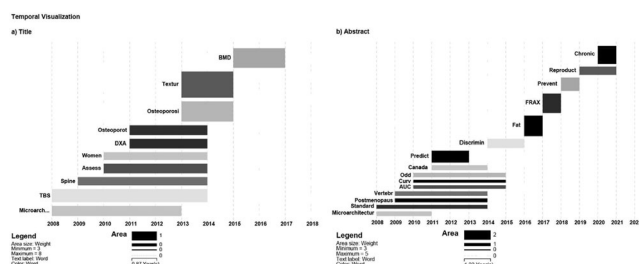


Figure. The bursting (emerging and fading) words of titles (a) and abstracts (b) of TBS articles. The area size of each word represents its weight which is affected by its frequency.

## P580

### OSTEOPOROSIS AND SARCOPENIA IN RHEUMATOID ARTHRITIS PATIENTS: ASSOCIATION WITH VITAMIN D STATUS AND CALCIUM INTAKE

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**Objective:** To assess vitamin D status and dietary calcium intake (DCI) in relation to BMD and sarcopenia (SP) in women with rheumatoid arthritis (RA).

**Methods:** 86 patients (pts) (mean age 58.1±8.5 y) with RA, confirmed by the criteria of ACR/EULAR (2010), were enrolled. The examination included assessment of the DCI and vitamin D level (25(OH)D), muscle strength (MS) tests (hand grip strength, "chair stand" test), DXA of lumbar spine, proximal hip and whole body. Osteoporosis (OP) confirmed according to WHO criteria, SP in the presence of low MS and reduced appendicular muscle mass (AMM) or appendicular mass index (AMI) – AMM/height$^2$ (kg/m$^2$).

**Results:** Low BMD was detected in 62 (72.1%) pts: OP in 24 (27.9%), and osteopenia in 38 (44.2%). Reduced MS was found in 74 (86.0%) pts - probable SP, but only 21 (24.4%) pts had also a low AMI and/or AMM confirmed SP. 26 (30.2%) pts had DCI accordingly with the recommended standards. The median of DCI was 737[539; 1073] mg/d, in pts with OP - 565[401; 853] mg/d, while in women with normal BMD - 870[783; 1204] mg/d (p=0.038) and with osteopenia - 720[539; 765] mg/d (p>0.05). Vitamin D insufficiency was found in 40 (46.5%) and deficiency - in 28 (32.6%) pts. 25(OH)D did not differ in pts with OP, osteopenia, and normal BMD and was 22.7[16.2; 29.6] ng/ml, 22.4[18.9; 27.8] ng/ml and 22.0[17.7; 26.9] ng/ml, respectively. Only 42 (49%) pts received supplements of cholecalciferol with/without calcium: 41% of pts with low vitamin D level and 78% women with normal 25(OH)D (p<0.01). Hand grip strength did not associate with 25(OH)D in RA pts. The median values of AMM/AMI in individuals who received vitamin D and calcium supplements were 17.4[15.9; 19.1] kg/ 7.0[6.2; 8.1] kg/m$^2$, comparing to pts without supplements – 19.5[18.0; 20.5] kg/ 7.5[6.6; 7.9] kg/m$^2$ (p>0.05). Pts with and without SP had 25(OH)D level 20.8[17.6; 26.8] ng/ml and 24.7[20.4; 33.8] ng/ml, respectively (p=0.039).

**Conclusion:** 79.1% of women with RA had low levels of vitamin D. 25(OH)D was significantly lower in RA pts with SP. No association was found between 25(OH)D and BMD. DCI was significantly lower in pts with OP compared to those with normal BMD. There were no significant differences in both AMM/AMI values and MS, depending on the additional intake of calcium and vitamin D.

## P581

### CLINICAL IMPACT OF FRAX-BASED INTERVENTION THRESHOLDS IN CHILEAN OLDER WOMEN

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**Objective:** To evaluate the clinical impact of age-specific FRAX-based intervention and assessment thresholds in older women of the Chilean population.

**Methods:** 1123 women aged 60-94 were selected from the 2016-2017 National Health Survey (ENS 2016-2017). We calculate the risk of major osteoporotic fractures and femur neck with the FRAX model specific to the Chilean population. And we calculate the proportion of women eligible for intervention and measurement of BMD.

**Results:** On average 3% of the population qualified for intervention and 59% for assessment with BMD. The proportion of the population

potentially eligible for intervention varied from 0.73-6.31% depending on age, and the proportion eligible for assessment with BMD varied from 42.50-62.46% depending on age.

Table 1. Women potentially eligible for Intervention and BMD assessment

| age (years) | | above an IT | | between an AT | |
|---|---|---|---|---|---|
| | N | n | % | n | % |
| 60-64 | 285 | 7 | 2.46 | 178 | 62.46 |
| 65-69 | 273 | 2 | 0.73 | 158 | 57.88 |
| 70-74 | 216 | 11 | 5.09 | 133 | 61.57 |
| 75-79 | 176 | 11 | 6.25 | 105 | 59.66 |
| 80-84 | 111 | 7 | 6.31 | 67 | 60.36 |
| 85-89 | 40 | 0 | 0 | 17 | 42.50 |
| 90-94 | 22 | 0 | 0 | 13 | 59.09 |
| ≥60 | 1123 | 38 | 3.38 | 671 | 59.75 |

IT Intervention threshold; AT assessment threshold

**Conclusion:** In Chilean older women, applying these intervention and assessment thresholds based on the FRAX model avoids unnecessary intervention in low-risk subjects and reduces the number of referrals to DXA scanning and the unnecessary cost of routine BMD measurement.

## P582
### OSTEOPOROSIS, FRACTURES AND FRACTURE RISK IN RHEUMATOID ARTHRITIS PATIENTS

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**Objective:** To assess the risk of major osteoporotic fracture (MOF) in rheumatoid arthritis (RA) patients (pts) based on the identification of individuals with osteoporosis (OP), previous fragility fractures (FF) and high 10-y probability of a MOF.
**Methods:** 295 postmenopausal women with RA confirmed according to ACR/EULAR criteria (2010) were included in the study (mean age 63±7 y). The median RA duration was 11[4; 16] y, and postmenopause - 13[6; 20] y. 121 (41%) pts were treated with glucocorticoids (GCs). A survey was conducted to identify pts with risk factors and a history of FF. All pts underwent DXA of the proximal femur and lumbar spine. The 10-y probability of a MOF was assessed using the FRAX tool. In pts treated with GCs at a dose >7.5 mg in prednisolone equivalent FRAX estimates of probabilities of a MOF were adjusted according to the recommendations [1].
**Results.** OP in at least one region of interest (ROI) was found in 97 (32.9%), osteopenia in 128 (43.4%), normal BMD in 70 (23.7%) pts. 83 (28.1%) pts had a prior FF: 44 (14.9%) – 1, 20 (6.8%) – 2, and 19 (6.4%) – 3 or more. 68 (23%) pts had vertebral fracture, 47 (15.9%) - distal forearm fracture and only 2 (0.7%) - hip fracture, among them OP in at least one ROI was found in 71 (85.5%) pts and normal BMD in 3 (3.6%) persons. The 10-y probability of a MOF was calculated in 198 RA pts without OP. The median FRAX value for these pts was 16% [9; 26]. 38 (19.2%) pts were at very high risk, 34 (17.2%) at low risk, and 126 (63.6%) at moderate risk. After recalculation of fracture risk with including femoral neck BMD in pts at moderate risk additional 27 (13.6%) became at high risk, 3 (1.5%) at very high risk, and 96 (76.0%) at low risk. Thus, 68 (34.3%) RA pts without low BMD were at very high or high risk and 130 (65.7%) at low risk of MOF assessed by FRAX. Additionally, 97 pts had OP, 3 persons with a history of FF after age of 40 years old had normal BMD and low risk of fracture according to FRAX.

**Conclusion:** Our study demonstrated that 165 (55.9%) postmenopausal women with RA had high risk of fractures and indications for anti-osteoporotic treatment based on the results of BMD measurement and a 10-year probability of MOF using FRAX tool.
**Reference:** 1. Kanis JA, et al. Osteoporos Int 2011;22:809.

## P583
### A FRACTURE LIAISON SERVICE IMPLEMENTATION AFTER TWO YEARS: A RETROSPECTIVE COHORT STUDY

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**Objective:** This study aims to evaluate the implementation of a Fracture Liaison Service (FLS), describing the profile and outcome of patients evaluated.
**Methods:** Retrospective study of patients, aged 50 or over, observed between 2019-2020, in a FLS in our hospital for a fragility fracture. A baseline questionnaire was made in the first visit. One year later, patients were asked about their functional disability, therapeutic compliance, and new fractures. Demographic, comorbidities, and clinical results were collected. Descriptive analysis used medians and interquartile range (IQR) for continuous data as frequencies and percentages for qualitative variables.
**Results:** A total of 297 patients were followed up and 85 patients were loss to follow-up over the period study. 83% were female with a median age of 79 (IQR 17.50) years old. Most of the patients (62.3%) who suffered a fracture were functionally independent before the fracture occurred. The types of fractures found in this study included: trochanteric fractures (103 patients, 48.6%), vertebral fractures (25 patients, 11.8%), malleolar fractures (16 patients, 7.5%), humeral fractures (10 patients, 4.7%) and other fractures (15 patients, 7.1%). 25 patients (11.8%) never had fracture but were evaluated for other osteoporosis (OP) risk factors. The OP risk factors founded in this study were corticotherapy (8.5%), history of parental hip fracture (9.0%), early menopause (23.2%), diabetes mellitus (23.6%), inflammatory rheumatic disease (2.8%), thyroid disease (10.4%), smoking (6.1%) and alcohol abuse (7.1%). Moreover, 2 patients (0.9%) were diagnosed with osteogenesis imperfecta. All patients received nutritional advice, lifestyle recommendations and fall prevention information and 63.2% of the patients started OP medication. In follow-up, 107 patients (50.4%) were functionally independent after the fracture, and 76 patients (46.3%) kept compliant with prescribed medication. Only 6 (2.8%) patients had a new fracture. 12 patients (5.7%) died over the period study. No incidence of osteonecrosis of the jaw was reported.
**Conclusion:** The implementation of a FLS has enhanced the identification and initiation of treatment in patients with high risk of OP. Further, it helps to evaluate pharmacological compliance, to prevent new fractures.

## P584
### CORRELATION BETWEEN THE AMERICAN SOCIETY OF ANAESTHESIOLOGY (ASA) SCORE AND THE NOTTINGHAM HIP FRACTURE SCORE (NHFS) IN ELDERLY PATIENTS WITH ACUTE HIP FRACTURE

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**Objective:** The American Society of Anaesthesiology (ASA) score is a well recognized, validated scoring tool for pre-operative physical status in surgical patients and has been used in risk stratification of hip fracture patients in the UK for decades. The Nottingham Hip Fracture Score (NHFS) is also a validated tool that predicts 30-d mortality post hip fracture surgery. It incorporates age, gender, mini mental test score, number of comorbidities, preoperative haemoglobin, living in an institution

and malignancy. Aims: To assess the relationship between ASA and NHFS in elderly hip fracture patients. To determine whether the presence or absence of frailty affects this relationship.

**Methods:** A retrospective, cross-sectional analysis was carried out on acute hip fracture patients 60 y and older admitted to a UK district general hospital. Data was extracted manually from the electronic records. Patients with incomplete data were excluded. Rockwood clinical frailty scale (CFS) was used to group patients into pre-frail and frail groups. Patients with a score of 1-4 (i.e., very fit, well, managing well and vulnerable) were considered pre-frail while those with a score of 5–9 (i.e., mildly, moderately, severely and very severely frail and the terminally ill) were considered frail. SPSS 27 software was used for statistical analysis. Descriptive statistics was used to portray baseline characteristics. Spearman correlation coefficient and linear regression was used to assess correlation.

**Results:** 263 patients were included in the analysis. Mean age was 82.2 y ±8.48. 73 (28%) of the patients were pre-frail and 190 (72%) were frail. There was statistically significant positive correlation between ASA and NHFS (r=0.490; p<0.001). This relationship was much stronger in the pre-frail than in the frail group of patients (r=0.521; p<0.001) and (r=0.282; p<0.001) respectively.

**Conclusion:** In our sample of elderly patients with acute hip fracture, the ASA score was positively correlated with the NHFS and the correlation was stronger in pre-frail patients compared to in the frail patients.

## P585
### SARCOPENIA SCREENING TOOL (SARC-F) SCORE AND ROCKWOOD CLINICAL FRAILTY SCALE (CFS) IN PATIENTS 60 YEARS AND OLDER WITH ACUTE HIP FRACTURE

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**Objective:** SARC-F is a well validated screening tool for identifying patients with sarcopenia. It has five components, which include strength, assistance with walking, rising from a chair, climbing stairs and falls. It is based on patients' or their carers' rating of their abilities. SARC-F has been shown to have high specificity (94.4-98.7%) but low sensitivity (4.2-9.9%). It is important to screen patients with acute hip fracture for sarcopenia, to detect those at risk for adverse outcomes. SARC-F can be used as a screening tool for these patients, as many of them are not mobile in the immediate peri-operative period. Sarcopenia and frailty overlap; with low grip strength and slow gait speed (in Fried phenotype of frailty) being characteristic of both, and treatment options overlap. Aims: Is there a correlation between sarcopenia and frailty in acute hip fracture patients?

**Methods:** A retrospective, cross-sectional analysis was carried out on consecutive patients, 60 y and older, admitted with acute hip fracture to a district general hospital in a 12-month period. Sarcopenia screening tool (SARC-F) was completed during interviews conducted by the occupational therapists. Rockwood Clinical Frailty Scale (CFS) was used to assess frailty. Data was manually extracted from anonymized electronic health records. Patients with incomplete data were excluded from the analysis. SPSS 27 was used for statistical analysis. Descriptive statistics were used to assess baseline characteristics of the patients studied. Spearman's correlation coefficient and linear regression was used to determine and quantify correlation.

**Results:** 310 patients were included: 83 men and 227 women. Mean age was 82.2 y±8.48. There was a strong positive correlation between SARC-F score and Rockwood CFS (r=0.835; p<0.001). When broken down by gender this relationship persisted (r=0.765; p<0.001 in males and r=0.864; p<0.001 in females).

**Conclusion:** SARC-F score is strongly positively correlated with Rockwood CFS in patients 60 y and older with acute hip fracture. This was not confounded by gender.

## P586
### LORECIVIVINT (SM04690), AN INTRA-ARTICULAR, SMALL-MOLECULE CLK/DYRK INHIBITOR THAT MODULATES THE WNT PATHWAY, AS A POTENTIAL TREATMENT FOR MENISCAL INJURIES

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**Objective:** Meniscal injuries are the most common knee pathology associated with pain, stiffness, and swelling. Meniscal damage is a frequent MRI finding in knee osteoarthritis (OA). Efforts to repair meniscal damage are largely unsuccessful and do not prevent progression of degenerative changes that lead to knee OA. Regulation of the Wnt pathway during meniscal development suggests that manipulation of this pathway may influence meniscal regenerative capacity. Lorecivivint (LOR) is an intra-articular (IA), small-molecule CLK/DYRK inhibitor that modulates the Wnt pathway. In preclinical studies, LOR was evaluated for its protective and anabolic effects in ex vivo explants and in a rat model of chemically induced inflammatory meniscal degeneration.

**Methods:** Effects of LOR (30 nM) on matrix metalloproteinase (MMP) expression in cultured rat menisci treated with IL-1β were measured by qRT-PCR. In vivo, a single IA injection of LOR (0.3 mg) or vehicle was given immediately after injection of monosodium iodoacetate (MIA). Knees were harvested on Days 1, 4, and 11 and menisci were isolated. Anti-inflammatory effects were evaluated by qRT-PCR for *TNFA* and *IL6* expression. Meniscal protection was evaluated by qRT-PCR for MMPs and aggrecanase. Anabolic effects were evaluated by qRT-PCR for collagens.

**Results:** In ex vivo meniscal explants, LOR inhibited expression of *MMP1*, *MMP3*, and MMP13 compared with DMSO (P<0.01). In vivo, LOR significantly decreased expression of MMPs and aggrecanase (P<0.05) and reduced expression of inflammatory cytokines TNFA and IL6 compared with vehicle in the rat model of inflammatory meniscal degeneration at Day 4 after MIA injection. Additionally, LOR increased expression of collagen types I, II, and III at Day 11 after MIA injection (Fig. 1).

**Conclusion:** LOR exhibited protective effects in the meniscus ex vivo and in vivo by reducing catabolic enzyme expression compared with control. Anti-inflammatory effects of LOR were demonstrated by inhibition of inflammatory cytokine expression. Compared with vehicle, LOR increased collagen expression in vivo, indicating potential meniscal anabolic effects. These data support further investigation of LOR as a potential structure-modifying treatment for meniscal injuries.
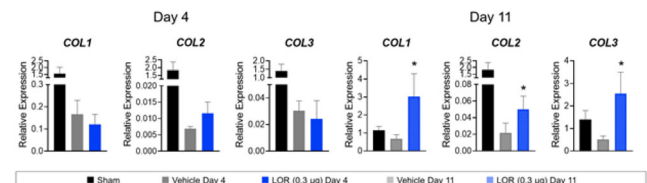


Figure 1. LOR increased collagen gene expression in vivo. A single IA injection of monosodium iodoacetate (MIA; 3 mg) was immediately followed by a single IA injection of LOR (0.3 µg) or vehicle at 10 weeks of age. Knees were harvested on Days 1, 4, and 11 after injection and menisci were isolated. Gene expression was measured by qRT-PCR. N=3, Mean ± SEM, *P<0.05, one-way ANOVA

## P587
### LORECIVIVINT (SM04690), AN INTRA-ARTICULAR, SMALL-MOLECULE CLK/DYRK INHIBITOR THAT MODULATES THE WNT PATHWAY, PROVIDED CARTILAGE-PROTECTIVE EFFECTS IN AN ANIMAL MODEL OF POST-TRAUMATIC OA

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**Objective:** Osteoarthritis (OA) is characterized by cartilage thinning, bone remodeling, and inflammation. Post-traumatic OA, which develops

after acute direct joint trauma, accounts for ~12% of OA cases. Current therapeutic options focus on alleviating symptoms and pain and not disease modification. Lorecivivint (LOR), an intra-articular (IA), small-molecule CLK/DYRK inhibitor that modulates the Wnt pathway, induced chondrogenesis, protected cartilage, and reduced inflammation in animal studies. A single IA LOR injection was evaluated in a rat model of knee instability to determine its protective and regenerative effects when injected after post-traumatic OA induction.

**Methods:** Post-traumatic OA was surgically induced in rats by combining anterior cruciate ligament transection with partial medial meniscus transection (ACLT+pMMx). LOR (0.3 μg) or vehicle was injected into the damaged knee IA space at 2, 3, or 4 weeks after OA induction. OA-induced (n=10/group) or sham-operated (surgery without ACLT+pMMx; n=5/group) rats were sacrificed at the injection timepoint (baseline) or 12 weeks after LOR/vehicle injection (study end). Histological grades were assessed using summed anterior and posterior medial femoral condyle (MFC) and medial tibial plateau (MTP) OARSI scores (cartilage damage stage and grade). Weight distribution was assessed at several timepoints with an incapacitance meter. One-way ANOVA with Dunnett's multiple comparison test was used for statistical analysis.

**Results:** ACLT+pMMx surgeries increased OARSI scores by 2 weeks compared with sham surgeries. LOR treatment at Weeks 2, 3, and 4 led to significant decreases (P<0.05) in total OARSI scores (Table 1) at study end compared with vehicle treatment. Rats treated with LOR for 12 weeks and rats at baseline had similar OARSI scores, suggesting that LOR treatment arrested cartilage damage progression. Significant improvements (P<0.05) were observed in the weight distribution of LOR-treated rats in the 3- and 4-week groups at 6 and 12 weeks after their respective IA injections compared with vehicle-treated rats.

**Conclusion:** LOR exhibited cartilage-protective effects and slowed disease progression in the ACLT+pMMx model in vivo. LOR has potential as a structure-modifying treatment for OA.

Table 1: OARSI scores

| Week-2 injection | Sham-operated (14 weeks after surgery) | Baseline (BL) (2 weeks after surgery) | Vehicle (12 weeks after injection) | LOR (12 weeks after injection) |
|---|---|---|---|---|
| **Total score** | 5.99 | 19.17 | 31.36 | 19.19 |
| **SEM** | 1.07 | 1.55 | 2.48 | 1.81 |
| **P value versus BL** | | | | 0.9999 |
| **P value versus vehicle** | | | | 0.0004 |

| Week-3 injection | Sham-operated (15 weeks after surgery) | Baseline (BL) (3 weeks after surgery) | Vehicle (12 weeks after injection) | LOR (12 weeks after injection) |
|---|---|---|---|---|
| **Total score** | 6.09 | 23.17 | 30.45 | 21.20 |
| **SEM** | 1.25 | 1.36 | 1.42 | 1.00 |
| **P value versus BL** | | | | 0.4522 |
| **P value versus vehicle** | | | | 0.0001 |

| Week-4 injection | Sham-operated (16 weeks after surgery) | Baseline (BL) (4 weeks after surgery) | Vehicle (12 weeks after injection) | LOR (12 weeks after injection) |
|---|---|---|---|---|
| **Total score** | 6.97 | 16.88 | 24.95 | 18.63 |
| **SEM** | 1.32 | 1.04 | 1.74 | 1.61 |
| **P value versus BL** | | | | 0.6257 |
| **P value versus vehicle** | | | | 0.0111 |

## P588
## IMPACT OF LONG-TERM SYSTEMIC CORTICOSTEROIDS ON BONE MINERAL DENSITY DURING DIFFUSE INFILTRATING LUNG DISEASE

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**Objective:** To assess the impact of systemic corticosteroid therapy (SCT) indicated in the treatment of diffuse infiltrating lung disease (DILD) on the BMD assessed by bone densitometry.

**Methods:** Prospective study conducted in the pneumology department of Mongi Slim-La Marsa Hospital for one year (2019), involving patients with DILD in whom SCT was indicated in association with preventive measures (calcium and vitamin D). After written consent, each patient had the first measurement of BMD before starting SCT and then a control measure between 6 and 12 months after the start of treatment.

**Results:** 28 patients were enrolled (medium age=55.8 y; sex ratio F/H=3.5). All had the first measure of BMD and only 12 had a control measure (interruption due to COVID-19 pandemic). In the remaining group, the DILD treated were related to sarcoidosis (n=4), idiopathic nonspecific interstitial lung disease (n=3), Gougerot Sjögren's syndrome (n=2), HSP (n=1), Myositis (n=1), and Systemic Lupus Erythematosus (n=1). The average dose of prescribed SCT was 0.75 mg/kg/d. Based on the measurement of the L1-L4 vertebrae, at the first measurement of the BMD, 4 patients had no abnormalities, 3 had osteopenia and 5 had osteoporosis while at the control measure, 3 patients had no abnormalities, 3 had osteopenia and 6 had osteoporosis. Based on the measurement of the right femur, at the first measurement of the BMD, 5 patients had no abnormalities, 5 had osteopenia and 2 had osteoporosis while at the control measure, 3 patients had no abnormalities, 6 had osteopenia and 3 had osteoporosis. This difference between initial and control BMD was significant for the measurement at the right femur (p=0.001). Age was correlated with the decline of BMD in the L1-L4 vertebrae (p=0.024).

**Conclusion:** SCT is responsible for a significant decrease in BMD despite preventive measures, hence the importance of routine osteoporosis screening and collaborative management with rheumatologists.

## P589
## EFFECTS OF ACUTE EXERCISE ON BONE TURNOVER MARKERS IN MIDDLE-AGED AND OLDER ADULTS: A SYSTEMATIC REVIEW

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**Objective:** This systematic review examines the effects of acute aerobic (AE), resistance (RE) and impact exercises on bone turnover markers (BTMs) in middle and older-aged adults.

**Methods:** We searched PubMed, SCOPUS, Web of Science and EMBASE up to 22 April 2020. Eligibility criteria included randomised controlled trials (RCTs) and single-arm studies that included middle-aged (50-65 y) and older adults (>65 y) and, a single-bout, acute-exercise (AE, RE, impact) intervention with measurement of BTMs. PROSPERO registration number CRD42020145359.

**Results:** 13 studies were included; 8 in middle-aged (n=275, 212 women/63 men, mean age=57.9±1.5 y) and 5 in older adults (n=93, 50 women/43 men, mean age=68.2±2.2 y). 11 studies included AE (7 middle-aged/4 older adults), and two included RE (both middle-aged). AE significantly increased C-terminal telopeptide (CTX), alkaline phosphatase (ALP) and bone ALP in middle-aged and older adults. AE also significantly increased total osteocalcin (tOC) in middle-aged men and procollagen I C-terminal propeptide and crosslinked C-terminal telopeptide of type I collagen in older women. RE alone decreased ALP in older adults. In middle-aged adults, RE with impact had no effect on tOC or BALP, but significantly decreased CTX. Impact (jumping) exercise alone increased procollagen type 1 N propeptide and tOC in middle-aged women. Quality assessment results identifies a lack of RCTs, low quality evidence, small sample sizes and large variance study protocols.

**Conclusion:** Acute exercise is an effective tool to modify BTMs, however, responses appear to be exercise modality-, intensity-, age- and sex-specific. Higher quality and larger RCTs are needed in this area.

## P590

### HIP FRACTURES: OSTEOPOROSIS AND REHABILITATION

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**Objective:** Regarding femoral fractures, in addition to the fracture of the femoral neck, fractures in the proximal part of the femur are more common. Pertrochanteric fractures are about four times more common than femoral neck fractures. This study aimed to evaluate the effects of physical therapy and rehabilitation with magnetic therapy vs. interference currents
**Methods:** The research included 90 patients, divided in two groups: study group - 45 patients, treated with kinesiotherapy and magnetic therapy and control group - 45 patients, treated with kinesiotherapy and interference currents. Measurement of the range of motion was performed at four time points.
**Results:** Regarding the functional status, the range of motion in all joints of the lower extremities, in our study was performed a measurement of the range of motion in the hip, knee and ankle at four time points, on admission, discharge, and controls after 6 and 12 months. Overall, there were improvements in the measurements at all time points, and a significant difference of the examined group, in relation to the control, was obtained for flexion with straight and bent knee, for extension, abduction of the hip, for flexion and extension of the knee on physical examination after 12 months. When measuring adduction, internal and external rotation, dorsal and plantar flexion of the ankle, there was no significant difference between the two groups at all measured time points.
**Conclusion:** Kinesiotherapy in combination with physical modalities leads to an increase in the range of motion of the joints in hip fractures.

## P591

### SEX DIFFERENCES IN THE ASSOCIATIONS BETWEEN CARDIOVASCULAR RISK FACTORS AND PHYSICAL FUNCTION: THE GAMBIAN BONE AND MUSCLE AGEING STUDY (GAMBAS)

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**Objective:** In sub-Saharan Africa, the prevalence of obesity, cardiovascular disease (CVD) and impaired physical function are increasing due to rapid urbanisation. We investigated the associations between cardiac-workload, arterial stiffness, peripheral vascular calcification (PVC) and physical function in Gambian adults.
**Methods:** We recruited 249 women and 239 men aged 40-75+ y. Supine blood pressure and heart rate were measured and used to calculate rate pressure product (RPP) and pulse pressure (PP). Presence of PVC was determined from tibia pQCT scans. Physical function was assessed by a force platform to measure muscle force (kN) and power (kW) during a chair rise test (CRT) and single 2-leg-jump (s2LJ); hand dynamometer measured hand grip strength (HGS). Body composition was assessed with DXA; body size corrections were made by dividing by height squared ($kg/m^2$) giving fat mass index (FMI) and appendicular lean mass index (ALMI). Sex-interactions were tested (denoted as p-int) after adjustment for age and height. Data are expressed as 10% percent difference in RPP or PP, per one-unit difference in physical functions measures. Values are ß-coefficients with 95% confidence intervals. Mediation analyses were performed with the mediator as ALMI/FMI.

**Results:** Mean age was similar in women ($61\pm13$ y) and men ($61\pm12$ y). BMI was higher in women vs. men ($21.9\pm3.7$ vs. $20.9\pm3.1$,p=0.0009). There was a greater negative association between RPP and s2LJ power after adjustments in men (-0.02 kW: -0.05,0.03) vs. women (0.04 kW: 0.004, 0.08), p-int=0.017; with no other significant interactions. In men, there were greater negative associations between PP and CRT power (-0.008 kW), s2LJ power (-0.03 kW) and HGS (-0.48 kg) vs. women (all p-int<0.01). In men, presence of PVC was associated with lower s2LJ power (-0.2 kW: -0.4,0.02, p-int=0.037) and HGS (-2.3 kg: -4.2, -0.4, p-int=0.016). In men, FMI mediated the association between RPP and CRT power (p=0.002), s2LJ force (p<0.001) and s2LJ power (p=0.001). There was no significant mediation by ALMI; there were no mediation by ALMI or FMI in women.
**Conclusion:** Multiple markers of CVD were associated with poorer physical function in men, and these were mediated by FMI. There is a need to identify preventative strategies to slow/prevent the rising burden of CVD and poor physical function in sub-Saharan Africa.

## P592

### APFFA PRIMARY CARE TOOLKIT: EMPOWERING FRAGILITY FRACTURE EDUCATION

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**Objective:** The Asia Pacific Fragility Fracture Alliance (APFFA) is a federation committed to reducing the burden of low trauma fracture throughout the region. Education on fracture prevention to those at the forefront of patient care is an important part of this effort.
**Methods:** APFFA has curated educational materials developed by others (https://apfracturealliance.org/education-directory/) and developed a Primary Care Physician (PCP) Education Toolkit (https://apfracturealliance.org/education-toolkit/). Here we describe the toolkit and report its introduction during the COVID-19 pandemic.
**Results:** The PCP Education Toolkit is designed as a half-day educational program together with supporting resources to highlight the role of primary care providers in this effort. The educational program includes a lecture focused on the burden of fracture, a lecture focused on clinical assessment of fracture risk, a discussion kit, and materials to assist with meeting planning. The discussion kit is designed to be adaptable to local practices and constraints. The supporting material features a patient handbook that gives practical advice on nutrition, home safety, and issues to be raised during medical encounters. COVID-19 hampered rollout of these materials. In addition, APFFA has relied on its constituent organizations to provide educational content to promote best practices in acute fracture management, rehabilitation, and secondary fracture prevention through the development of an education directory. The directory includes synopses and links to high quality materials from around the world.
**Conclusion:** The PCP Education Toolkit was designed with the expectation that the program would be presented as live meetings. The pandemic made this infeasible. Despite the restrictions, the PCP Education Toolkit materials have been enthusiastically received in New Zealand and disseminated by Osteoporosis NZ. As the world emerges from the pandemic, we are looking to present this material in more venues in 2022 and beyond. The toolkit is available free of charge at the above address.

## P593

### OSTEOGENIC POTENTIAL OF PHYSICAL ACTVITIES AND THEIR ASSOCIATIONS WITH BONE MASS IN YOUNG ADULTS: THE RAINE STUDY

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**Objective:** Physical activity questionnaires traditionally utilised in research only assess metabolic equivalents of task (METs). It is unclear whether mechanical loading intensity and rate during habitual physical activity is associated with skeletal health. We investigated how physical activity of high loading intensities and rates, assessed at ages 17 and 20 y, (1) compares with physical activity measured in METs, and (2) is associated with BMD at age 20 y.

**Methods:** A subset of 826 participants from the Raine Study Gen2 were assessed for physical activity energy expenditure over the past week via the International Physical Activity Questionnaire (IPAQ) at ages 17 and 20 y. Subsequently, loading scores were estimated from the IPAQ, reflecting the total loading intensity and application rate of physical activity. Whole-body, leg and arm BMD at age 20 y were assessed by DXA.

**Results:** Bland-Altman minimal detectable change for physical activity Z-scores at age 17 and 20 y were 1.59 SD and 1.33 SD, respectively; greater than the a priori minimal clinically important change of 0.5 SD. Loading score, but not IPAQ score, had a significant positive association with whole body and leg BMD after adjustment for covariates ($\beta$=7.52 and 24.80 mg/cm$^2$ and $\beta$=7.51 and 24.36 mg/cm$^2$ respectively for age 17 and 20 y loading scores). IPAQ score at age 20 y, but not loading score, had a significant positive association with arm BMD following adjustment ($\beta$=14.43 mg/cm$^2$). There was no significant association between 3 y change in IPAQ or loading score and bone mass.

**Conclusion:** This study revealed clinically important disagreement in associations of self-reported METs and loading scores estimates with bone health in young adults. Participation in physical activity with higher loading was significantly associated with whole body and leg BMD, while higher energy expenditure was significantly associated with arm BMD. Coupling traditional energy expenditure questionnaire outcomes with bone-loading estimates may improve understanding of the location-specific skeletal benefits of physical activity in young adults.

## P594

### LOW PLASMA 25(OH) VITAMIN D LEVEL AND COVID-19 IN PATIENTS OF THE OLDER AGE GROUP

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**Objective:** COVID-19 infection, which destroys the health of people and the economy of countries, is a serious challenge to world science and medicine. Global efforts to defeat this disease have identified a number of risk factors and prognostic markers, one of which is a deficiency of vitamin D in the blood serum. Vitamin D is known to stimulate innate immunity and modulate acquired immunity. In the UK, the Royal College of Physicians of London noted that patients who died from COVID-19 suffered from a serious vitamin D deficiency. According to research, older people are more at risk of vitamin D deficiency due to lack of sunlight (most of the time spent indoors) and malnutrition, so they may have worse outcomes of COVID-19 infection. Although there is no direct evidence of the effect of vitamin D status on COVID-19 infection, vitamin D deficiency may worsen the course of COVID-19, especially in the elderly patient group. This study aimed to evaluate associations of plasma 25(OH)D status with the likelihood of coronavirus disease (COVID-19) infection.

**Methods:** The study included 68 women who applied for an outpatient appointment in the Central clinical hospital № 7 (Ekaterinburg (RF) in the period from February 1 to April 30, 2021 who were tested for COVID-19 infection and who had at least one previous blood test for plasma 25(OH)D level. Low plasma 25(OH)D level was defined as plasma 25-hydroxyvitamin D concentration below the level of 30 ng/mL.

**Results:** Among 68 individuals, 23.5% were COVID-19-positive, and 76.5% COVID-19-negative. The mean plasma vitamin D level was significantly lower among COVID-positive patients in comparison with the negative ones (27.2 ng/mL (95%CI 19.29-31.55) vs. 29.1 (95%CI 26.0-32.2)). The women' age ranged from 52-87, the mean 67.9. Next, we divided the patients into two age groups: the first group was middle-aged and elderly (50 women), the second group was senile (18 women). The mean age in the first group was 64.1 y, in the second group-80.7. Among the senile group, vitamin D levels in the COVID-19 group were generally significantly lower than in the COVID-19 negative group (20.8 vs. 37.7 nmol/L), p<0.05. There were no statistically significant data on the relationship between COVID-19 and vitamin D deficiency in the first group. All patients with COVID-19 in the older age group were hospitalized due to their age.

**Conclusion:** Low plasma 25(OH)D level appears to be an independent risk factor for COVID-19 infection in patients of the older age group.

## P595

### APFFA-FFN HIP FRACTURE REGISTRY TOOLBOX: A RESOURCE TO SUPPORT REGISTRY IMPLEMENTATION

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**Objective:** Hip fracture registries provide a mechanism to benchmark care provided by hospitals against clinical standards. As of May 2021, registries have been established in approximately one tenth of countries worldwide. A hip fracture registry toolbox is intended to provide practical tools to support registry development.

**Methods:** The toolbox has been developed as a collaboration between the Asia Pacific Fragility Fracture Alliance (APFFA) Hip Fracture Registry Working Group and the Fragility Fracture Network (FFN) Hip Fracture Audit Special Interest Group.

**Results:** The toolbox summarises essential components of national quality improvement programmes for hip fracture care. This features best practice clinical standards, including quality indicators (e.g., measures relating to pain assessment, time to surgery, early mobilisation, secondary fracture prevention and multidisciplinary management). Hip fracture registries provide the technical infrastructure for hospital teams to benchmark the care they provide against quality indicators. The toolbox also focuses on practical aspects of registry establishment including clinical

leadership and engagement, getting buy-in from diverse stakeholders, building the case for change, registry planning and funding, piloting a registry, governance and ethics considerations, and a minimum common data set and data dictionary.

A summary of the extensive literature on multidisciplinary care of hip fracture patients is provided, in addition to detailed case studies of national registries in Australia and New Zealand, Spain and the UK. A series of short interviews published on YouTube complement the toolbox with experience from leaders of well-established registries.

**Conclusion:** The APFFA-FFN hip fracture registry toolbox provides a distillation of the global experience to date in establishing national registries. The toolbox is free for download from www.apfracturealliance.org/HFR-toolbox and is intended to support colleagues throughout the world who would like to establish a registry in their country.

## P596

### GENE SET ENRICHMENT ANALYSES REVEALED MULTIPLE GENE SET ASSOCIATED WITH STEROID-INDUCED OSTEONECROSIS OF THE FEMORAL HEAD

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**Objective:** Steroid-induced osteonecrosis of the femoral head (SONFH), which is caused by long-term and high-dose glucocorticoid use, has been accounting for 57% of the total femoral head necrosis. In our previous study, we collected femoral head sample from patients with SONFH and normal control, the followed KEGG pathway enrichment analyses identified several known and novel pathway associated with SONFH, but there are many pathways related to biological processes that are not included in the KEGG pathway database, in addition, In addition, KEGG pathway enrichment analysis does not use the information about the magnitude of gene expression changes. Gens set enrichment analyses could make up for above two shortcomings. The object of this project is to identify gene sets that involve in the pathogenesis of SONFH via gene set analyses.

**Methods:** Based on the 735 differentially expressed genes (DEGs, P≤0.05) identified between femoral head samples from patients with SONFH and those from normal control. Then, we ranked the DEGs according to the $\log_2$(Fold-change) from largest to smallest and stored the ranked DEGs list in a file with the suffix '.rnk'. Next, the human gene set annotation file (msigdb.v7.4.symbols.gmt), which contain all gene set, was downloaded from GSEA web set. Finally, the rank DGEs list file and the gene set annotation file were loaded to the GSEA desktop software and the "Run GSEApreranked" tools was used for the gene set enrichment analyses with the default parameters and the enrichment score(ES) and FWER p-Value were calculated by the GSEA software.

**Results:** The DEGs were significantly enriched in 11 gene sets (*FWER p-val* ≤ 0.01). The most enriched gene set was NABA_CORE_MATRISOME (ES=0.656, *FWER p-val* ≤ 0.0001). Other significantly enriched gene sets including HADDAD_B_LYMPHOCYTE_PROGENITOR (ES=0.749, *FWER p-val* ≤ 0.001), NABA_ECM_GLYCOPROTEINS (ES=0.690, *FWER p-val* ≤ 0.001) GOMF_EXTRACELLULAR_MATRIX_STRUCTURAL_CONSTITUENT (ES=0.632, *FWER p-val* ≤ 0.001), GOMF_STRUCTURAL_MOLECULE_ACTIVITY (ES=0.560, *FWER p-val* ≤ 0.000), GOCC_COLLAGEN_CONTAINING_EXTRACELLULAR_MATRIX (ES=0.489, *FWER p-val* ≤ 0.001), HAY_BONE_MARROW_STROMAL (ES=0.438, *FWER p-val*=0.002), HP_ABNORMAL_JAW_MORPHOLOGY (ES=0.509, *FWER p-val*=0.004), HP_APLASIA_HYPOPLASIA_INVOLVING_

THE_SKELETON (ES=0.484, *FWER p-val*=0.005), YTATTTTNR_MEF2_02 (ES=0.536, *FWER p-val*=0.005), GSE9509_LPS_VS_LPS_AND_IL10_STIM_IL10_KO_MACROPHAGE_30MIN_DN (ES=0.685, *FWER p-val*=0.008).

**Conclusion:** Overall, by performing gene set enrichment analyses, we identified 11 candidate gene sets associated with SONFH and this could provide new insights into the SONFH pathophysiology.

## P597

### ASSOCIATION BETWEEN HAND GRIP STRENGTH AND FRACTURE RISK FRAX-BASED IN ECUADORIAN WOMEN

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**Objective:** To assess the relationship between hand grip strength (HGS), age, BMI, waist-hip ratio (WHR), and 10-y fracture risk based on FRAX model Ecuador without BMD in Ecuadorian women.

**Methods:** 2288 women 60 y and older were selected. A questionnaire recorded demographic and anthropometric data, a personal and family history of frailty fractures, current smoking, alcohol intake, fall history, daily physical activity, glucocorticoids use, and causes of secondary osteoporosis. A portable dynamometer was used to measure HGS. For the statistical analysis, we use the Epidat 4.2 software. Pearson's coefficient was used to evaluate the association between HGS, age, BMI, and the 10-year fracture probability based on the FRAX model without BMD.

**Results:** The mean age was 70 (7.8), BMI 27.21(7.22), WHR 96.35(14.38), HGS 16.93(5.55), FRAX Major Osteoporotic Fracture and Hip Fracture score were 2.90(2.35) and 1.23(1.45) respectively. Table 1 presents the linear correlation analysis between HGS, age, BMI, WHR, and FRAX score of the patients studied.

Table 1. Pearson's correlation coefficient between HGS, age, BMI, WHR and FRAX score of study subjects

| Variables | r | CI 95% | p |
|---|---|---|---|
| Age (yr) | -0.07 | -0.111; -0.029 | 0.001 |
| WHR (cm) | 0,315 | 0.278; 0.351 | 0.000 |
| BMI | -0.014 | -0.055; -0.027 | 0.50 |
| FRAX MOF* | -0.378 | -0.413; -0.342 | 0.000 |
| FRAX HF* | -0.369 | -0.404; -0.333 | 0.000 |

*without BMD; MOF Major Osteoporotic Fracture; HF Hip fracture

**Conclusion:** Low HGS is associated with a high FRAX score and can contribute to fracture risk prediction. HGS measurement combined with FRAX can be used in osteoporosis screening before proceeding with costly measurement of BMD.

## P598

### MEASUREMENT OF TIBIA BONE MINERAL DENSITY AND STRUCTURE USING ULTRALOW DOSE MULTIDETECTOR CT SCANNER

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**Objective:** Lack of access to pQCT and HR-pQCT in our local area motivated us to examine the feasibility of whole body CT under hybrid iterative reconstruction (HIR) algorithms, ultralow dose setting, to quantify volumetric BMD (vBMD) and bone structure of the lower extremity.
**Methods:** 50 healthy volunteers, 28 women and 22 men, age 30-60 years old with T-score >-1, were recruited to be scanned with a Philips-Brilliance scanner. To minimize dose, tibial (38% distal) vBMD was quantified with either a liquid (50, 100 and 200 mg/cm$^3$ dipotassium hydrogen phosphate ($K_2HPO_4$)) or a solid (50, 100 and 250 mg/cm$^3$ calcium hydroxyapatite (CHA)) calibration phantom and we applied a crosscalibration equation between liquid and solid phantoms to obtain equivalent densities. Bone structure was analyzed by semi-automated segmentation using MATLAB software.
**Results:** After applying the crosscalibration equation, $BMD_{K2HPO4}$=1.34 $BMD_{CHA}$ + 13.43, the cortical vBMD were 1188.07±29.38 CHA mg/cm$^3$ and 1600.92±39.51 $K_2HPO_4$ mg/cm$^3$, which the CHA result is comparable to pQCT solid based measurements in the literature (1). The cortical thickness was about 5 mm. The effective dose was in the daily background level, about 10μSV.
**Conclusion:** In comparison with the existing literature, the results provide novel insight into peripheral bone quantification for this weight-bearing bone under ultralow dose setting in whole body CT, which might be an alternative to pQCT with an acceptable radiation dose. Improvement of acquired image resolution and control on delivered radiation doses have brought an opportunity to use an advanced clinical CT-Scanner to quantify vBMD and macrostructure of extremities. However, using advanced images acquisition set up and reconstruction algorithms are required to reach an acceptable level of sensitivity and specificity to identify patients at the risk of the fragility fracture. We strongly recommend a comparison of cortical vBMD from QCT HIR with BMD from pQCT and HR-pQCT in a community where these modalities are available.
**Reference:** 1. Darling AL, et al. Bone 2013;55:36.

## P599
### USE OF SALVIA OFFICINALIS MOUTHWASH IN THE TREATMENT OF PERI-IMPLANTITIS

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**Objective:** Peri-implantitis is a complication following an implant insertion in the maxillary or mandibular bone. Failure to stop the process can lead to loss of the implant. Salvia officinalis L. (Salviae folium) extract is recognized for its anti-inflammatory and antimicrobial effects. The aim of our study was to determine the effectiveness of mouthwash based on Salvia officinalis extract (SM) vs. commercial mouthwash (CM).
**Methods:** We used mouthwash with Salvia officinalis extract and commercial mouthwash in a group randomly divided of 32 patients with peri-implantitis. Patients were trained to ensure proper oral hygiene and use mouthwash. They were monitored at 24 h, 3 d and one week.
**Results:** There was an improvement in symptoms, at 24 h control (decreased pain, inflammation and local bleeding) at 10 patients (62.5%) in the CM group and 9 patients (56.2%) in the IM group. At 3 d, the onset of

the healing process was found in 11 (68.7%) patients in the CM group and 9 (56.2%) in the IM group. At one week the healing occurred in 14 (87.5%) patients in the CM group. 2 patients (1 from each group) needed surgery with implant removal. 3 patients (1 from CM group and 2 from CM group) need other surgical procedures.
**Conclusion:** There are no significant differences between the 2 groups in terms of therapeutic results. Due to their reduced side effects and therapeutic effects similar to commercial products, they can be an alternative to conventional treatments or an adjunct in therapy.

## P600
### PHYSICAL ACTIVITY DURING THE COVID-19 PANDEMIC IN COMMUNITY-DWELLING GREEK OLDER ADULTS

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**Objective:** To investigate the self-reported impact of the COVID-19 pandemic on physical activity (PA) amongst Greek older adults.
**Methods:** This was a cross-sectional study involving 350 adults, all over 60 y of age. Participants were recruited from community centers of Achaia (Open Care Centers for Older Adults), in Western Greek mainland during the period of January-March 2021. The information was gathered through telephone interviews. Questions on social demographics, health history, diagnosis, quarantine and hospitalization were asked, as well as impact of the pandemic health status and physical activity behavior. The level of PA was assessed via the International Physical Activity Questionnaire (IPAQ) questionnaire while anxiety and depression via the Hospital and Anxiety and Depression scale (HADS). The study protocol was approved by the Ethical Committee of the University of Patras.
**Results:** 350 older adults (265 women, 85 men; mean age of 72.28±6.73 y) completed the survey. About half of the sample (n=153; 43.5%) reported a decrease in physical activity due to the pandemic and social isolation restrictions. From the total sample, 211 older adults (59.9%) recorded fear of COVID-19 infection and 9 participants (2.6%) reported to have been diagnosed with the COVID-19 infection. The findings of this study demonstrated that PA was associated with place of living (r=0.55; p≤0.001), incidence of falls (r=0.45; p≤0.001), COVID-19 infection (r=0.6; p≤0.001), fear of COVID-19 infection (r=0045; p≤0.05) and anxiety (r=0.5; p≤0.001)..
**Conclusion:** In summary, a decline in PA due to COVID-19 pandemic was reported by the majority of Greek older adults. Results of the present study show that the COVID-19 pandemic may have induced PA behavior changes in many older adults, which may accelerate their risk of developing frailty, sarcopenia and disability. Interventions to improve PA in older adults should take account social and community factors and should be key components of current and future pandemic plans, particularly for vulnerable groups.

## P601
### FEMORAL NECK WARD'S TRIANGLE BONE MINERAL DENSITY: A FORGOTTEN INDICATOR OF BONE LOSS

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**Objective:** Cortical and trabecular bone are important for bone strength. Osteoporotic fractures are caused by both cortical thinning and trabecular bone loss. The hip is considered a cortical bone site but both cortical and trabecular bone contribute to femoral bone strength. We hypothesized that Ward's triangle BMD, assessed by DXA, can be an indicator of trabecular bone loss or increased cortical porosity and may predict risk of fragility fracture.

**Methods:** We conducted a retrospective study of 50 healthy participants, 28 women and 22 men, age 30-60 years old, with T-score >-1. The trabecular bone score (TBS) of $L_1$-$L_4$ and the longitudinal relaxation time ($T_1$) of cortical bone free water distal tibia (38%) were quantified using iNsight™ software and variable repetition time (VTR) technique and short echo time (STE) in a 1.5 T clinical magnetic resonance imaging (MRI), respectively.

**Results:** The mean Ward's triangle BMD and its area were 0.66±0.13 g/cm$^2$ and 1.19±0.09 cm$^2$, respectively. In women the BMD of ward's triangle were significantly correlated positively with TBS and negatively with cortical bone free water, r=0.46 and r=-0.46, respectively. The correlations between BMD of Ward's triangle and TBS and T1 were 0.62 and -0.57, respectively, and were higher in men compared with women (Table).

Table 1. The correlation between femur parts BMD and $T_1$ and TBS.

| BMD (g/cm$^2$) | | $T_1$ (ms) | TBS |
|---|---|---|---|
| Ward's | Total | -0.52** | 0.52** |
| | Male | -0.57** | 0.62** |
| | Female | -0.46* | 0.46** |
| Neck | | -0.36** | 0.31* |
| Troch | | -0.27 | 0.31* |
| Inter-troch | | -.038** | 0.38** |
| Proximal-Femur | | -.038** | 0.37** |

**Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

**Conclusion:** BMD of Ward's triangle could be a sensitive indicator for early detection of bone loss in the femoral neck. Further studies and improvement in DXA image analysis software would improve the sensitivity and specificity of Ward's triangle on prediction of fragility fracture.

## P602

### IN SILICO STUDY OF THE ACVR1-SMAD1 PROTEIN COMPLEX INVOLVED IN FIBRODYSPLASIA OSSIFICANS PROGRESSIVA (FOP)

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**Objective:** Fibrodysplasia ossificans progressiva (FOP) is a rare and aggressive disease caused by point mutations at the intracellular part of the ACVR1 receptor, that trigger extraskeleton bone growth replacing connective tissues. The ACVR1 protein is a transmembrane protein with kinase activity classified as a TGF-β factor receptor class 1. This receptor takes part in the skeleton development by BMP signaling through the activation of the SMAD1/5/8 transcription factors by phosphorylation. There are no structures for the protein complex ACVR1-SMAD1/5/8 which has been identified as a transient complex, thus, it is difficult to obtain its structure using X-ray diffraction or other experimental methods. For this reason, we aimed to obtain a molecular model of the ACVR1-SMAD1 protein complex using In silico methods.

**Methods:** The initial protein complex was predicted using molecular docking considering spatial restrictions over the interacting residues determined from published mutagenesis results. Molecular dynamics simulations were executed to explore the complex stability, interprotein interactions, and the feasibility of the phosphorylation reactions. Those simulations consider the wildtype (WT) ACVR1, and the mutant variants ACVR1 Q207D and R206H, which correspond to the most frequent FOP mutations.

**Results:** Docking results show that just one cluster of models can adjust restrictions. After 500ns of simulations, the complex preserves its general shape. In the WT complex we identified two different conformations where the phosphorylation reaction is highly probable. The mutant variants present changes in dynamic fluctuations of the GS domain with effects over the active site dynamics.

**Conclusion:** We obtained the first model for the protein complex ACVR1-SMAD1, which enables us to identify distinctive interactions of the complex. FOP mutations at the GS domain show long distance effects on the active site dynamics.

## P603

### SF-36 PHYSICAL FUNCTION AND GENERAL HEALTH DOMAINS ARE INDEPENDENT PREDICTORS OF ACUTE HOSPITAL LENGTH OF STAY AFTER HIP FRACTURE SURGERY

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**Objective:** Various premorbid demographics and co-morbidities may impact healthcare burden, but it is less understood how pre-fracture physical function and quality of life may modify these effects. The aim of this study was to determine which quality of life and physical function domains impact acute hospital burden, using length of stay (LOS) for patients after hip surgery as a proxy for healthcare resource,

**Methods:** We analyzed the association between 36-Item Short Form Survey (SF-36) domains, EuroQol-5D (EQ-5D) and Parker Mobility Score (PMS) vs. LOS, taking into account patient and hospital factors. This retrospective study examines hip fracture data from a large tertiary hospital in Singapore over the period of 2017-2020. Prefracture SF-36, EQ-5D and PMS based on recall at hospitalization were correlated with LOS using binary logistic regression on SAS. Age, gender, race, marital status, payer type, ASA score, TTS, type of surgery, fracture type, POD1 mobilization, and discharge disposition were analyzed as potential confounders.

**Results:** 1045 patients were included in this study with 704 females and 341 males. The mean age was 79.5±8.57 y (range 60-105) with an average LOS 13.64±10.0 d (range 2-114). On univariate analysis, PMS, EQ-5D and all domains of SF-36 except bodily pain, emotional role and mental health were associated significantly with LOS. Amongst the QOL and PMS scores, only the domains of SF-36 Physical Function (PF) (OR=0.993, p=0.0068) and general health perception (GH) (OR 0.992, p=0.0230) remained significant on the multivariate model.

**Conclusion:** After accounting for functional decline related to age and comorbidity, our study showed that premorbid scores of SF36 PF and GH domains remain independent significant factors associated with LOS in

hip fracture patients after surgery. PH and GH before a hip fracture impacts acute hospital LOS as recovery trajectories and needs for caregiving may differ. Together with demographics, co-morbidities and fracture patterns, premorbid SF36 physical function and general health may serve to predict health resource consumption, and better stratify resource allocations and rehabilitative programs.

## P604

### PHARMACODYNAMICS OF ORAL CHOLECALCIFEROL IN HEALTHY SUBJECTS WITH VITAMIN D DEFICIENCY: A RANDOMIZED OPEN-LABEL STUDY

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**Objective:** In the present study, we describe the results of this study focusing on the pharmacodynamic effects of these three different treatment regimens on vitamin D metabolites, regulators of calcium and phosphate homeostasis, bone turnover markers, and Wnt inhibitors.
**Methods:** This is an open-label, randomized, parallel group study in healthy vitamin D deficient subjects (baseline 25OHD <20 ng/mL) receiving cholecalciferol with three different schedules: 10,000 IU/d for 8 weeks followed by 1000 IU daily for 4 weeks; group A, 50,000 IU/week for 12 weeks; group B and 100,000 IU every other week for 12 weeks; group C. 1,25-dihydroxyvitamin D (1,25OH2D), 24,25-dihydroxyvitamin D (24,25OH2D), PTH, ionized calcium, FGF-23, C-terminal telopeptide of type I collagen (CTX-I), procollagen type I N-terminal propeptide (PINP), bone alkaline phosphatase (BALP), Dkk-1 and sclerostin were dosed at baseline, day 28, 53, 84, 112.
**Results:** Baseline characteristics of the enrolled subjects are reported in Table. The absolute changes of all the tested biomarkers are depicted in Figure. 1,25OH2D, increased at each time points. The increase was greater (p<0.05) for group A vs. B and C at day 28, and vs. group B at day 56. No significant difference among groups was seen for the other biomarkers. 24,25OH2D remained stable over time. PTH decreased at day 84. FGF-23 increased at all time points. CTX-I, PINP slightly increased at day 28. BALP, decreased from day 56 onward. Dkk-1 increased from day 56 onward, while sclerostin did not show significant changes.
**Conclusion:** The results of our study in healthy vitamin D-deficient subjects show relevant effects of vitamin D supplementation on multiple regulators of calcium, phosphate and bone metabolism, without any major differences among the three treatment schedules.
**Disclosures:** Davide Gatti has received advisory board honoraria, consultancy fees and/or speaker fees from Amgen, Celgene Eli-lilly, MSD-Italia, Organon, UCB.
Maurizio Rossini has received advisory board honoraria, consultancy fees and/or speaker fees from Abiogen, Amgen, Abbvie, BMS, Celgene, Eli-Lilly, Galapagos, Grunenthal, MSD, Novartis, Pfizer, Sanofi, Sandoz, Theramex, UCB.
Table. Subjects demographic at baseline. No statistical differences were observed among groups.

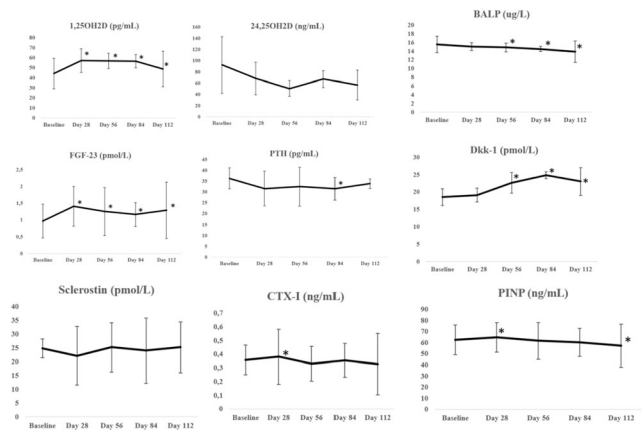| Baseline characteristics | | ALL subjects (n=75) | Group A (n=25) | Group B (n=25) | Group C (n=25) |
|---|---|---|---|---|---|
| Demographic | | | | | |
| Age - years | Years (SD) | 34.1 (10.2) | 30.2 (10) | 36.7 (8.8) | 35.4 (11) |
| Sex | | | | | |
| Male | N (%) | 31 (41.3%) | 12 (48%) | 7 (28%) | 12 (48%) |
| Female | N (%) | 44 (58.7%) | 13 (52%) | 18 (72%) | 13 (52%) |
| Weight (kg) | Mean (SD) | 66.7 (12.4) | 65.2 (13.5) | 67.4 (9.8) | 67.6 (13.7) |
| BMI (Kg/m2) | Mean (SD) | 23.1 (2.6) | 22.6 (2.9) | 23.4 (2.1) | 23.2 (2.8) |



Figure. Absolute changes of the overall cohort of 1,25OH2D, 24,25OH2D, PTH, FGF-23, BALP, CTX-I, PINP, Dkk-1 and sclerostin * p<0.05 with respect to baseline. Error bars show standard deviation.

## P605

### ASSOCIATIONS BETWEEN BONE HEALTH, AND OBESITY, SARCOPENIA, AND SARCOPENIC OBESITY IN INDIAN OLDER ADULTS

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**Objective:** Older adults with the comorbid sarcopenia and obesity, sarcopenic obesity have poorer BMD compared with obese counterparts in primarily Caucasian populations, but studies in diverse populations are currently unavailable. We investigated whether BMD was associated with obesity, sarcopenia and sarcopenic obesity in Indian adults.
**Methods:** 1057 adults aged >50 y were included. DXA measured fat and lean mass and BMD at the hip, spine and whole body. Obesity was defined by body fat percentage (cut points- men: >25%, women: >35%); sarcopenia was defined using the revised Asian Working Group for Sarcopenia definition with low hand grip strength (men: <28 kg, women: <18 kg) and appendicular lean mass index (ALMI) (men: <7.0 kg/m$^2$, women: <5.4 kg/m$^2$). Participants were classified into four groups as having one of the following: nonsarcopenic nonobesity (NSNO), obesity alone, sarcopenia alone or sarcopenic obesity. Linear regression analyses were performed and adjusted for confounders including age, sex and smoking status; data are presented as β-coefficients and 95% confidence intervals.
**Results:** Older adults with sarcopenia alone had significantly lower hip BMD (-0.069; -0.086, -0.051) and whole body BMD (-0.039; -0.061, -0.017) compared with those with NSNO, while those with sarcopenic obesity had significantly lower spine BMD vs. obesity alone and NSNO groups, after adjustments (all p<0.05). Although older adults with obesity had higher hip BMD (0.026; 0.007, 0.045), they had lower whole body BMD (-0.039; -0.061, -0.017) compared to the NSNO group, after adjustments.
**Conclusion:** Sarcopenic obesity is associated with poorer bone health in Indian older adults compared to those with obesity and NSNO. The protective effect of obesity maintaining BMD appears to be lost in Indian older adults with comorbid sarcopenia.

## P606

**THE IMPACT OF PHARMACOLOGICAL INTERVENTIONS FOR OLDER ADULTS WITH SARCOPENIA: A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS**

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**Objective:** Sarcopenia is a common clinical syndrome that can increase risk of adverse outcomes such as falls or fractures in older adults. Previous studies have shown that exercise or nutritional supplements can be an effective treatment for older adults with sarcopenia. However, the effect of pharmacological treatment on muscle mass, muscle strength, and physical function for older adults with sarcopenia is uncertain. The aim of this study is to investigate the effect of pharmacological interventions on muscle mass, muscle strength, and physical function for older adults with sarcopenia.

**Methods:** We systematically searched MEDLINE, EMBASE, and the Cochrane Central Registry of Controlled Trials from inception to February 2019 to identify randomized controlled studies (RCTs) examining the effects of pharmacological interventions on muscle mass, muscle strength, and physical function in older adults aged 65 years or older with sarcopenia.

**Results:** We screened a total of 2166 records and included six RCTs that investigated the effects of pharmacological interventions on muscle mass, muscle strength, and physical function in older adults with sarcopenia. Very low quality evidence suggests that vitamin D supplementation for 6 months may improve muscle mass as measured by Appendicular Skeletal Muscle mass in vitamin D deficient presarcopenic older patients (mean difference: 5.31 kg, 95%CI: 3.60 to 7.02). However, very low to low quality evidence suggests that there is no statistically significant change in muscle mass, muscle strength or quality of life with pharmacological treatment including testosterone, vitamin D, selective androgen receptor modulator, or angiotensin converting enzyme inhibitors at 5 and 6 months.

**Conclusions:** Our systematic review found pharmacological interventions might not improve muscle mass, muscle strength and physical function for older adults with sarcopenia, although the quality of the evidence is very low. Future high quality trials are required to establish the effects of pharmacological treatment for people with sarcopenia.

## P607

**PERFORMANCE OF THREE SCREENING QUESTIONNAIRES TO ASSESS VITAMIN D STATUS IN THE GENERAL POPULATION**

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**Objective:** Vitamin D deficiency is a major public health problem and should be detected. To date, the only reliable test to determine vitamin D status is a blood test for 25-hydroxyvitamin D determination, but this should not be used as a screening tool, especially in healthy subjects. Our objective is to evaluate the performance of several predictive simple, rapid, inexpensive questionnaires of vitamin D status and to determine whether they could be an effective alternative to blood testing in a general population.

**Methods:** This is a cross-sectional study involving a sample of 81 subjects recruited from the staff of the CHU and University of Liege, Belgium (50.6°N). All participants were asked to answer three questionnaires aimed to assess the vitamin D status. Blood sample was collected and serum 25(OH)D was measured by LCMS/MS and served as the reference. ROC curve analysis as well as sensitivity, specificity, positive and negative predictive values were determined for each questionnaire. Sensitivity analysis was performed on a subsample of nonsupplemented subjects only.

**Results:** 38.3% of the total sample was vitamin D deficient with a serum 25(OH)D level below 20 ng/mL and 50.6% of subjects were taking vitamin D supplementation. The median age was 35.0 [28.0 - 43.0] years and the mean BMI was 24.4±3.54 kg/m². Analyses on the whole sample showed that questionnaire 1, 2 and 3 had a sensitivity of 87.1%, 83.9%, 100%, a specificity of 78.0%, 20.0%, 4.00%, a positive predictive value of 71.1%, 39.4%, 39.2% and negative predictive value of 90.7%, 66.7%, 100%, respectively. Sensitivity analysis showed that questionnaire 1, 2 and 3 had a sensitivity of 96.4%, 82.1%, 100%, a specificity of 8.93%, 16.7%, 0.00%, a positive predictive value of 71.1%, 69.7%, 70.0% and negative predictive value of 50.0%, 28.6%, respectively.

**Conclusion:** This study could not demonstrate the effectiveness of questionnaires in predicting vitamin D status in a population of healthy adults.

## P608

**THE ROLE OF LOW FREQUENCY EXTRACORPOREAL SHOCKWAVE THERAPY IN CALCANEAL EXOSTOSIS**

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**Objective:** Calcaneal exostosis is a spinal bone proliferation on the plantar surface of the calcaneus bone. The present study aimed to determine the efficacy and safety of shockwave therapy (SWT) in patients with calcaneal exostosis.

**Methods:** We performed a prospective observational study on a group of 60 patients with the diagnosis of calcaneal exostosis established following the radiological examination, who performed the outpatient physical treatment. All patients included in the study received 2000 shocks 2 or 3 times a week, a total of 5 sessions, at a pressure of 3-4 bar and at a frequency of 10-15 Hz. We used the following evaluation models: morning pain on the first step and pressure on the heel were evaluated using a visually analogous scale (VAS), the comfortable walking time was also recorded, the score Roles and Maudsley, the evaluation of the quality of life were also recorded. The assessment of patients was performed at the inclusion in the study and after 14 d of treatment.

**Results:** VAS mean scores were statistically significantly reduced after rehabilitation treatment from 7.8±0.4 at baseline to 2.1±0.8 at 14 d. Regarding the evaluation of the comfortable walking duration, the patients started from an average comfortable walking duration of 2 h for 51 patients (85%) and 1 h for 9 patients (15%), which shows a statistically significant decrease compared to the initial values (p<0.001). For the Roles and Maudsley score, the starting value was 4 for both women and men; after 15 d of treatment 85% of patients reached a score of 1 or 2. The quality of life questionnaire shows that the end of the therapy sessions with low energy shockwaves, weather sensitivity, pain, muscle fatigue and sleep disorders decreased in almost all patients.

**Conclusion:** Extracorporeal SWT in patients with calcaneal exostosis has the advantage of efficacy, safety and noninvasiveness. This therapy has been shown to be effective in relieving pain and increasing patients' quality of life.

## P609

**ASSOCIATION BETWEEN GAIT DEVICES AND REHABILITATION PROGRAM IN HIP OSTEOARTHRITIS**

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**Objective:** To determine the role of association between daily use of cane and rehabilitation program in patients with hip osteoarthritis, using a randomized, controlled trial.

**Methods:** The study included two groups of patients (1- study group and 2- control group) either 32 patients, males and females, diagnosed with hip osteoarthritis. The inclusion criteria were: hip pain score between 3-7 (on a 0-10 visual analogue scale- VAS), stable doses of nonsteroidal anti-inflammatory drugs (NSAIDs), no regular physical-kinetic exercise or use of canes previous to the study. Each patient of the study group used a gait device daily (cane) and was instructed in how to use the cane on the contralateral side. The patients of the two groups followed the same rehabilitation program. Kinetic program was prepared with paraffin thermotherapy, massage with tonic and vasoactive effect on leg muscles and analgesic electrotherapy (TENS, interferential currents). Physical and kinetic treatment lasted 14 d.

The clinical and functional parameters assessed were pain, physical dysfunctions, disabilities, drugs consumption- NSAIDs, quality of life. We used the following scales: hip pain in a VAS, Tinetti Gait Scale, Tinetti Balance Scale, 36-Item Short Form Survey questionnaire (SF-36).

**Results:** The improvement of the pain score was 47.5% for group 1 and 38.4% for group 2, for physical dysfunctions- 30.2% for group 1 and 23.6% for group 2, for disabilities (gait disturbances)- 39.7% for group 1 vs. 31.5% for group 2; drug consumption (NSAIDs)- 45.4% for group 1 vs. 36.1 for group 2. The functional status evaluated using SF-36 questionnaire was improved with 43.8% for group 1 and 35.3% for group 2.

**Conclusion:** This study showed the effect of association between gait devices and rehabilitation program at the patients with hip osteoarthritis in improving clinical and functional parameters. We concluded that combination of gait devices and physical-kinetic program is more effective compared to single use of the rehabilitation tools in patients with hip osteoarthritis.

## P610
### MRI EVALUATION OF OSTEOCHONDRITIS DISSECANS OF THE KNEE

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**Objective:** Osteochondritis dissecans is a subchondral focal infarction limited to a small portion of the bone but may also include articular cartilage. It is a circumscribed aseptic necrosis with vascular etiology, but repetitive or limited trauma also plays an important role. The disease occurs frequently between 5-50 y with maximum incidence in adolescence, in the weight-bearing joints: medial condyle of the femur, talus, tibial plateau. Aim: MRI features of osteochondritis dissecans of the femur.

**Methods:** We evaluated 14 patients (9 males, 5 females, aged between 19-47 y) who underwent MRI examination of the knee in the Imaging Dept. of the County Clinical Hospital in Oradea. The examination revealed both articular cartilage lesions as well as subchondral lesions.

**Results:** The subchondral fracture associated with edema occurs hyposignal in the T1-weighted sequences and the cartilage defect with or without associated subchondral bone edema is visible on the fat-saturated sequences. We grouped the patients in 4 stages following the MRI examination, namely: in stage I - bone edema, in stage IIa - with subchondral cyst formation, in stage IIb with incomplete separate subchondral fragment; the lesions are considered stable. In stage III - fluid can be seen around a partially detached osteochondral fragment, the lesions are considered unstable, in stage IV - the osteochondral fragment is completely detached. In stage I we included 2 patients- 14%, in stages IIa and IIb we included 4 patients- 28%, in stage III we included 5 patients- 36% and in stage IV we included 3 patients- 22%.

**Conclusion:** MRI examination of the knee plays an important role in the evaluation of osteochondritis dissecans lesions providing excellent anatomical details; evaluates cartilage thickness, signal changes inside the cartilage, subchondral bone/bone cartilage interface as well as cartilage repair tissue.

## P611
### EFFECTS OF AN EXERCISE PROGRAM ON IMPROVING QUALITY OF LIFE AND FUNCTIONAL STATUS IN OSTEOPOROTIC PATIENTS

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**Objective:** Exercise programs were proven to have a significant role on decreasing back pain intensity and disability on osteoporotic patients. We conducted a randomized controlled clinical trial to determine the effects of physical exercises in reducing back pain, depression and improving physical function and quality of life to these patients.

**Methods:** All patients were diagnosed with postmenopausal osteoporosis using BMD evaluation and received bisphosphonates treatment for at least 6 months. The study included 64 women randomly assigned to a control group (32 patients) and an exercise group (32 patients). The patients in the control group received only bisphosphonates in stable doses. The patients in the exercise group followed the drug antiresorptive therapy and a standardized exercise program aimed to improve posture, spinal mobility and to strengthen spinal extensors, abdominal muscles and lower limbs muscles, exercises for improving gate and balance. The exercise program was performed for approximatively one hour, three times/week, 6 weeks. The patients were assessed baseline and after 6 weeks, using the following tools: a visual analogue scale for spinal pain (VAS), Beck Depression Inventory and Quallefo-41 for measuring the quality of life in patients with osteoporotic vertebral deformities.

**Results:** Spinal pain evaluated on a VAS reduced by 43.5% in the exercise group and by only 12.6% in the control group after 6 weeks of treatment. There also was a significant difference between groups regarding Beck Depression Inventory, the exercise group showing an improvement from 14.2 to 11.6 and the control group deteriorating from 13.9 to 14.3. The exercise group also showed significantly greater improvements for Qualeffo-41 scores compared to the control group, especially on pain and social function subscales. We also established a statistically significant correlation between the improving of spinal pain score and Beck Depression Inventory score in the exercise group patients.

**Conclusion:** The results support the benefits of a standardized exercise program in the clinical management of patients with osteoporosis, by reducing spinal pain, depression and improving their quality of life. The exercise pain was well accepted by all patients and no adverse events were reported.

## P612
### A PILOT STUDY OF THE EFFECT OF ARCH STIFFNESS ON LOWER LIMB JOINT KINEMATICS DURING UNEXPECTED GAIT TERMINATION

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**Objective:** The efficacy of the arch stiffness index as a criterion to evaluate injury susceptibility is well documented; however, the effect of arch stiffness on lower limb biomechanics, especially during gait termination, is poorly understood. Therefore, this study aimed to investigate how arch stiffness affects the kinematics of lower limb joints during unplanned gait termination.

**Methods:** A total of 67 asymptomatic male participants (mean age: 22.7 ±0.9) were recruited to complete the gait biomechanical tests. All were classified by calculating the arch stiffness index using three-dimensional arch morphological scanning and participated in unplanned gait termination tests to acquire kinematic data using a motion capture system. An inverse kinematics algorithm was performed in Visual 3D software to calculate the hip, knee, ankle, and metatarsophalangeal (MTP) joint

angles. Parameters were compared between stiff and flexible arches using an independent-samples T-test.

**Results:** During gait termination, compared with the stiff arch, the subjects with flexible arch had a significantly larger range of motion on the frontal plane of the knee joint (p<0.001). The stiff arch group showed a greater range of joint motion on the sagittal plane of the ankle joint (p<0.001). On the frontal plane, the joint range of motion in the flexible arch group was greater (p=0.044). For the MTP joints, the joint angle on the frontal plane of the stiff arch group was significantly greater than that of the flexible arch group (p<0.001).

**Conclusion:** The difference in biomechanical characteristics caused by different arch stiffness was mainly concentrated in the distal joints. During planned and unplanned gait termination, the arch needs to bear and disperse the impact load transmitted to the foot, and the flexible arch is more likely to be compressed to reduce the height of the medial longitudinal arch, resulting in the limited windlass mechanism. These results may add additional insights into the arch function and injury susceptibility during gait termination.

## P613

### ANTI-INFLAMMATORY AND CHONDROPROTECTIVE EFFECTS OF CELECOXIB AND GLUCOSAMINE SULFATE ON HUMAN OSTEOARTHRITIC CHONDROCYTES EXPOSED TO IL-1β

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**Objective:** To investigate the possible anti-inflammatory and chondroprotective effects of a combination of celecoxib and glucosamine sulfate (GS), currently included among the pharmacological strategies for osteoarthritis (OA) management, in human OA chondrocytes exposed to the negative stimulus of IL-1β. The mechanism of action underlying their repairing activities was also explored.

**Methods:** Chondrocytes were treated with celecoxib (1.85 μM) and GS (9 μM), alone or in combination, for 24 h and 48 h, in presence of IL-1β (10 ng/mL). After treatment, the gene expression and supernatant release of the main pro-inflammatory cytokines, metalloproteinases (MMPs), and type II collagen (Col2a1) were assessed by qRT-PCR and ELISA. Apoptosis and mitochondrial superoxide production were measured by flow cytometry, the anti-apoptotic marker, B-cell lymphoma (BCL)2, and the major antioxidant enzymes by qRT-PCR. The activation of NF-κB was examined analyzing p50 subunit by western blot. The implication of the pathway in celecoxib and GS-mediated effects was assessed by the use of a specific NF-kB inhibitor (BAY-11-7082, 2 h preincubation).

**Results:** Celecoxib and GS, tested alone or coincubated with IL-1β, significantly reduced the gene expression and supernatant release of cyclooxygenase 2, prostaglandin E2, IL-1β, IL-6, TNF-α, MMP-1, MMP-3, MMP-13, while increased Col2a1, in comparison to basal condition or IL-1β stimulus. Both drugs also reduced apoptosis and superoxide production, the transcriptional levels of superoxide dismutase, catalase, nuclear factor erythroid 2, increased BCL2 and limited p50 NF-κB nuclear translocation. The combination of celecoxib and GS demonstrated a more significant inhibitory effect on IL-1β stimulus on inflammation, apoptosis, oxidative stress and cartilage turnover, than was observed by each treatment alone. Furthermore, celecoxib and GS effects were potentiated by the preincubation of the cells with BAY-11-7082.

**Conclusion:** Our results demonstrated the synergistic effect of celecoxib and GS on OA chondrocytes metabolism, apoptosis and oxidative stress, probably through the modulation of NF-κB signaling pathway; these findings may provide a powerful rationale for the combined use of celecoxib and GS for the treatment of OA.

## P614

### DIVERSIFIED RISK FACTORS FOR RECURRENT FRACTURES, FALLS, AND MORTALITY AMONG PATIENTS WITH FRAGILITY FRACTURES PARTICIPATING IN A FRACTURE LIAISON SERVICE PROGRAM

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**Objective:** Significant gap exists regarding the care for patients with fragility fracture and osteoporosis, especially for different outcomes. We examined the influences of lifestyle interventions on risk factors of 1-y mortality, falls, and recurrent fractures of our fracture liaison service (FLS) program participants.

**Methods:** Totally 600 patients participated in our FLS program, whose protocol was adapted from the 13 best practice framework (BPF) standards published by the International Osteoporosis Foundation. We performed baseline assessments and provided follow-up care for 1 year, followed by classifying the entire cohort into 4 groups: those without lifestyle interventions from baseline to 1-y (Group 1), without interventions at baseline but with interventions at 1-y (Group 2), with interventions at baseline but without intervention at 1-y (Group 3), and with interventions throughout the study period (Group 4). We compared risk factors for recurrent fractures, falls, and mortality among different categories of lifestyle interventions including protein, calcium, vitamin $D_3$ supplementation, and exercise groups, using univariate and Cox proportional hazard regressions.

**Results:** The mean age of participants in our cohort was 77.5±10.5 y, with 72% female. The 1-y mortality and incidence of fall, recurrent fractures were 9.5%, 33.2%, and 3.0%, respectively. Cox regression revealed that for exercise intervention, group 4 exhibited a significantly lower risk of mortality (odds ratio 0.201, p<0.001), while group 3 had a lower risk of fall (odds ratio 0.466, p=0.026) compared to group 1.For protein supplement and calcium supplement interventions, groups 2 (odds ratio 0.83, p=0.003) and 4 (odds ratio 0.5, p<0.001) were both associated with a lower risk of mortality but remained comparable regarding other endpoints. For vitD$_3$ supplement intervention, groups 2 (odds ratio 0.084, p<0.001) and 4 (odds ratio 0.21, p<0.001) exhibited a significantly lower risk of mortality but higher risk of fall (groups 2 odds ratio 1.855, p=0.023; groups 3 odds ratio2.027, p=0.039; group 4 odds ratio 1.803,p=0.022) compared to group 1.

**Conclusion:** In this study, we identified that variations of different combinations of lifestyle interventions could be important risk factors for incident falls, recurrent fractures, and mortality among FLS participants.

## P615

### KNEE SYNOVITIS AS PROGRESSION FACTOR OF OSTEOARTHRITIS IN PATIENTS WITH SHORTER DISEASE DURATION

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**Objective:** Assessment of relationship between knee synovitis and progression risk of OA in patients with <5-y disease duration at 5-y prospective study.

**Methods**: At 5-y study enrolled 110 females with primary knee OA (according to ACR criteria), 52/110 had <5-y disease duration (mean age 59.11±8.95, mean disease duration 3.46±1.32). All patients had case report form and were checked by knee ultrasound (US) and X-ray (K-L classification). There are 22(42.3%) patients from 52 had 1 stage, 24(46.2%) had 2 stage, and 6(11.5%) had 3 stage at baseline.

**Results:** At 5-y follow-up period, the progression of knee OA was detected 1st group with progression by X-ray stage increasing (n=14) and 2nd no progression group (n=38). In both groups' patients were similar by ages (58.29±7.68 vs. 56.05±8.74 y.o., p>0.05) and disease duration (3.43 ±1.34 vs. 3.47±1.33 y, p>0.05). However, at 1st group knee pain while walking was more intensive (60.36±18.33 vs. 48.71±17.81 mm, p=0.043), higher BMI (34.45±4.60 vs. 28.92±4.92 kg/m², p=0.001) and more often was diagnosed synovitis by US (57.1% vs. 18.4%, RR=3.1, 95%CI 1.38-6.96, p=0.009). After 5-y (Visit 2) at 1st group patients had more intensive knee pain while walking (69.64±18.49 vs. 55.76±12.76, p=0.003), higher BMI (35.74±5.83 vs. 30.64±4.64, p=0.002), more often was diagnosed synovitis by US (50 vs. 13.2%, RR=3.8 (95%CI 1.4-10.0), p=0.009), statistically significant differences were established. In patients from 1st group more often was found out the irregularity of articular cartilage surface and heterogeneity - 100 vs. 50.5% RR=1.6 (95%CI 1.2-2.1), p=0.003) and 85.7 vs. 42.1%, RR=2.0 (95%CI 1.3-3.1), p=0.005), respectively. The Spearman test was used to analyze X-ray stage and OA progression associated factors. We found that most important factors were knee pain while walking (R=0.34, p<0.05), BMI (R=0.46, p<0.01) and knee synovitis by US (R=0.41, p<0.01). After multiple analysis was performed that significant factor of progression in knee OA is synovitis (p<0.05).



Visit 1



Visit 2
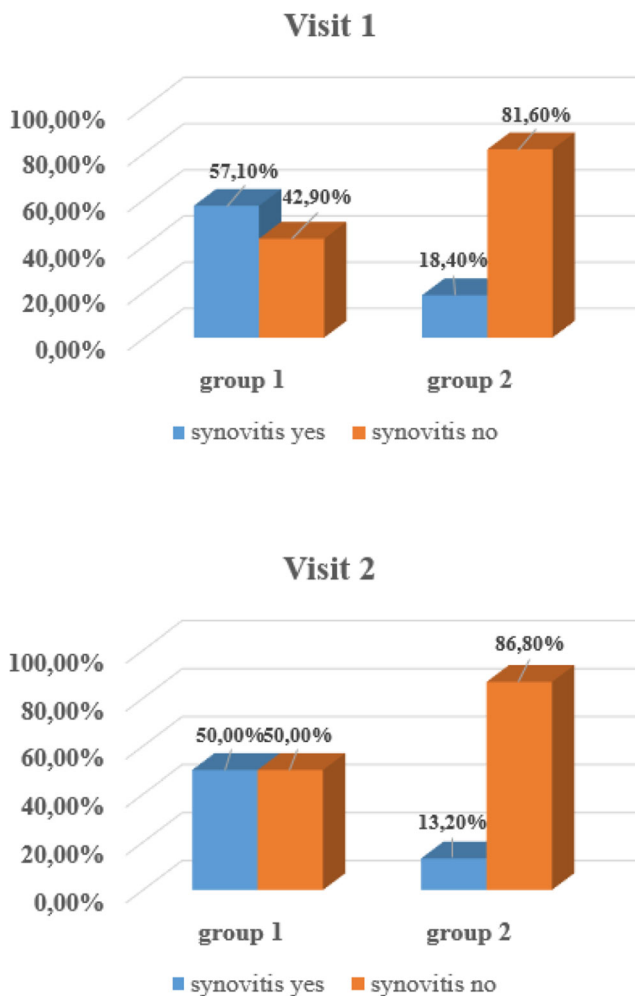
**Conclusion**: Synovitis was more often identified in patients with next progression of knee OA both at baseline and after 5-y follow up period. It is significance factor of knee OA progression.

## P616

## UNDERTREATMENT OF HIP FRAGILITY FRACTURES IN THE PRIMARY CARE SETTING: A 5-YEAR NATIONWIDE PERSPECTIVE FROM PORTUGAL

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**Objective:** To determine the treatment rate following hip fractures in the Primary Health Care (PHC) setting in Portugal from 2016-2020 and to characterize prescription patterns of antiosteoporotic drugs in this context. **Methods:** We conducted an observational, cross-sectional, retrospective study using data from the PHC database Bilhete de Identidade - Cuidados de Saúde Primários (BI-CSP). BI-CSP is a national primary care database (except Madeira and the Azores) presenting information on demographics, health indicators, drug prescription and primary care units' management and organization. Grouped and anonymized data on any prespecified variable over a period of time (for instance, diagnosis or treatment) can be obtained through the application of filters. The classification tool used is the International Classification of Primary Care, 2nd Edition. We included in our study all individuals registered in the PHC in Portugal who sustained a hip fracture after the age of 50 y. Treatment rates were determined after considering any prescription of an antiosteoporotic drug to these patients in the PHC, from 2016 (BI-CSP inception) to 2020. The frequency of prescription for each type of drug was also assessed. All outcomes of interest were extracted to a data extraction sheet created for this purpose. Descriptive statistics were generated using Microsoft Office Excel® 2016. This study was approved by the local ethics committee.
**Results:** We identified a total of 44725 hip fractures in Portugal between 2016-2020, 33668 (75.3%) in female patients. Most hip fractures were recorded in the North- (17387) and Lisbon- (14353) Regional Health Administrations (RHA). Only 6282 (14.0%) patients were treated with antiosteoporotic therapies following hip fracture. The RHA with the highest treatment rate was the Algarve (15.2%) and the lowest was Alentejo (10.9%). National and regional prescription patterns are shown in Table 1. Bisphosphonates were the most frequently used therapies, particularly alendronic acid (66.7%), ibandronic acid (18.8%) and zoledronic acid (8.7%). Denosumab, raloxifene and teriparatide were prescribed by family physicians in 5.1%, 1.1% and 1.0% of patients after hip fracture.

| RHA | RIS (%) | AL (%) | IA (%) | ZA (%) | Cal (%) | T (%) | D (%) | R (%) | SR (%) | Total (n) |
|---|---|---|---|---|---|---|---|---|---|---|
| N | 70 3,0% | 1500 65,1% | 359 15,6% | 230 10,0% | 0 0% | 19 0,8% | 99 4,3% | 27 1,2% | 0 0% | 2304 |
| C | 20 1,6% | 865 67,7% | 172 13,5% | 86 6,7% | 0 0% | 11 0,9% | 110 8,6% | 14 1,1% | 0 0% | 1278 |
| LVT | 66 3,1% | 1427 66,0% | 323 14,9% | 197 9,1% | 0 0% | 28 1,3% | 98 4,5% | 22 1,0% | 0 0% | 2161 |
| ALT | 2 0,8% | 177 72,8% | 45 18,5% | 12 4,9% | 0 0% | 3 1,2% | 2 0,8% | 2 0,8% | 0 0% | 243 |
| ALG | 3 1,0% | 224 75,7% | 30 10,1% | 24 8,1% | 0 0% | 1 0,3% | 12 4,1% | 2 0,7% | 0 0% | 296 |
| Total (n) | 161 | 4193 | 929 | 549 | 0 | 62 | 321 | 67 | 0 | 6282 |

Table 1: Prescription patterns following hip fracture in primary care in Portugal. RHA - regional health administration; N - north region; C - center region; LVT - Lisbon region; ALT - Alentejo region; ALG - Algarve region; RIS - sodium risedronate ; AL - alendronic acid; IA - ibandronic acid; ZA - zoledronic acid; Cal - salmon calcitonin ; T - teriparatide; D - denosumab; R - raloxifene; SR - strontium ranelate

**Conclusion:** Only a minority of patients received anti-osteoporotic treatment following fragility hip fractures in the primary care setting in Portugal. The most frequently used therapies were, by far, bisphosphonates namely alendronic acid.
**Disclosure:** Filipe C. Araújo has received speaker fees from Novartis and Amgen.

## P617

### RISK FACTORS OF OSTEOPOROSIS AND CRITERIA FOR HIGH RISK OF FRACTURES IN PATIENTS WITH CHRONIC HEART FAILURE BEFORE AND AFTER HEART TRANSPLANTATION

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**Objective:** To assess risk factors of osteoporosis (OP) and determine criteria of high risk of fractures in patients with chronic heart failure (CHF) before and after heart transplantation (HT).

**Methods:** 95 patients with CHF before and after HT (mean age 53.8±9.5 y) were enrolled. The period after HT ranged from 0-26 months (mean 8.5 ±8.9 months). After HT patients received mycophenolate mofetil (MMF) 1-1.5 g/d, tacrolimus with maintenance of target concentration, methyl-prednisolone 250 mg intravenously I-II days, from day III oral predniso-lone 1 mg/kg/d for 4 weeks, with further dose reduction until 0.1 mg/kg/d for 3 months. DXA, vertebral morphometry, spine X-ray were performed in 80 subjects. 10-y fracture probability was calculated using FRAX scale (Fracture Risk Assessment Tool). Laboratory diagnostics included lipid spectrum, total and ionized calcium, phosphorus, 25-hydroxyvitamin D, PTH, osteocalcin, β-CrossLaps.

**Results:** According to DXA normal BMD was observed in 35 (44%), osteopenia in 3 (3%), osteoporosis in 42 (53%) patients. Vertebral fractures were diagnosed in 18 (23%) of 80 patients with CHF before and after HT. Vertebral fractures in 10 (56%) out 18 patients developed with normal BMD. The patients with CHF before and after HT had hypocalcemia (20.5%), hyperparathyroidism (50.7%), as well as hypovitaminosis D in 85% of all patients. Increased level of bone resorption markers β-CrossLaps were observed in 1/3 of the examined patients. Statistically significant positive relationship was found between level of low density lipoproteins and β-CrossLaps, suggesting that bone resorption was higher in patients with high LDL.

**Conclusion:** We found that traditional risk factors of OP (hypertension, diabetes mellitus, thyroid disease) in the group of patients with CHF before and after HT were with the same frequency in persons with osteoporosis and in patients with normal BMD. The main risk factors of osteoporosis in patients with CHF before and after HT were: development of a graft rejection reaction in the postoperative period, low dose of mycophenolate mofetil (<1500 mg/d), plasma tacrolimus concentration >10 mg/ml, no loop diuretics, no statins.

## P618

### PREDICTIVE FACTORS OF FRAGILITY FRACTURES: ASSESSMENT OF PATIENTS OBSERVED AT EMERGENCY DEPARTMENT FOR FRACTURES

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**Objective:** To assess the predictive factors for fragility fractures (FF).

**Methods:** Retrospective monocentric study that included patients with FF (wrist, hip and vertebrae), observed at the emergency department (ED) in a tertiary center between 1 January 2017 and 31 December 2018. The search for fractures was performed through ICD9 codes and clinical data was collected. We excluded totally dependent patients or in palliative care, peri-prosthetic fractures and patients with osteometabolic diseases other than osteoporosis. We identified 1673 FF and after calculating a representative sample (90%CI) 457 FF were included. To identify predictors of FF we performed a multivariate analysis including variables with a significant association in univariate analysis and those with clinical relevance. SPSS was used for statistical analysis and significance level was defined as 2-sided p<0.05.

**Results:** 172 patients with hip fracture, 173 with wrist fracture and 112 with vertebral fracture were included. Most patients were women (79.9%) with a mean age of 77.6 (SD=10.3) years old at the time of the fracture. 16% of patients had a previous BMD test and 7.4% were on antiosteoporotic drugs. We found an association between the occurrence of a FF and previous visits to the ED due to falls (p<0.001), number of comorbidities (p=0.006), previous diagnosis of chronic pulmonary disease (p=0.002), hematologic disease (p=0.005) or malignancy (p=0.024) and previous diagnosis of osteoporosis based on BMD test (p=0.036). No associations were found between the number or type of medication taken daily, previous fractures and their localization nor the presence of other specific comorbidities other than those mentioned above. Multivariate analysis showed that previous visits to the ED due to falls (p=0.002) and malignancy (p=0.026) remained associated with the occurrence of new FF after the adjustment for comorbidities, smoking, alcoholism and corticosteroid therapy.

**Conclusion:** Our study showed that previous visits to the ED due to falls and diagnosis of malignancy are independent predictors of FF. In the presence of these comorbidities screening for osteoporosis must be considered and the need for treatment should be assessed.

## P619

### ADIPOSE TISSUE-DERIVED MESENCHYMAL STEM CELLS AS BIOASSAY TO CLEARLY UNDERSTAND THE EFFECTS OF CANNABINOIDS ON BONE MINERALIZATION

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**Objective:** To date, we are still not sure of the role of cannabinoids and of endocannabinoids system on several physiological processes, including bone mineralization. Therefore, in this study we developed a bioassay to evaluate the role of the endocannabinoid system and anandamide (AEA) in osteoblastogenesis.

**Methods:** Adipose-tissue derived mesenchymal stem cells (preadipocytes (PA)) are able to differentiate in several cellular lineages, and in particular to differentiate into osteoblasts, producing alkaline phosphatase (ALP), collagen, osteocalcin and hydroxyapatite (HA) deposits. To start studying the effects/role of the endocannabinoid system on the mineralization process we have evaluated the in vitro effects of a range of AEA concentrations on ALP activity and mineralization, of three primary PA lines.

**Results:** For the first time we have observed that all the tested AEA concentrations inducing a significant increase of ALP activity as well as an equal increase in the production of HA deposits during in vitro osteogenic differentiation.

**Conclusion:** For the first time, thanks to the established bioassay of PA lines, we reported that our findings indicate that cannabinoids and the endocannabinoid system play an important role in supporting bone mineralization. In relation to the obtained results, we are currently evaluating not only the expression levels of osteogenic marker genes and of the endocannabinoid system genes, but also the modulation of osteogenic microRNAs (miRNAs) during in vitro osteoinduction with the several concentrations of AEA. After that, we will proceed to evaluate the role of other cannabinoids which are important phytocomponents of *Cannabis sativa*. The main aim of all these future perspectives is to clarify the role of cannabinoids on mineralization, which is still unknown due to the lack of valid human in vitro models, but also to identify new natural components of cannabis that may in future, thanks to the results obtained in these studies, play a role in the regeneration of bone tissue in pathological states, such as osteoporosis.

## P620

### CARDIOVASCULAR RISK IN PATIENTS WITH OSTEOARTHRITIS: RESULTS OF THE ALL-UKRAINIAN STUDY "PARTNER"

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**Objective:** Osteoarthritis (OA) is extremely common in adults aged 60 and over and predicts cardiovascular diseases (CVD) [1]. 38% of people with OA have CVD compared to 9% of people without OA [2]. There are no studies on the prevalence of CVD among patients with OA in Ukraine. The aim of the study "PARTNER" was to study the prevalence of cardiovascular risk in patients with OA.

**Methods:** The multicenter PARTNER study (Prevalence of cardiovascular risk in newly diagnosed primary osteoarthritis patients) included 4769 patients with newly diagnosed OA who consulted medical center doctors in 22 regions of Ukraine in August 2019 - March 2020.

**Results:** Full data were collected from 3936 patients, including 65.9% women and 50% patients aged 50-59 y. A significant number of these patients (2946 - 75%) even without the calculation of SCORE were classified as people with high or very high risk of cardiovascular complications, as they already had atherosclerotic cardiovascular disease (55%), diabetes mellitus (21%), very high levels of blood pressure (15%) and/or cholesterol and chronic kidney disease (5%). According to the results of the SCORE calculation, we identified another 127 patients with very high cardiovascular risk. Total number of OA patients with high and very high cardiovascular risk reached 3073 (78%). So patients with newly diagnosed primary OA in Ukraine are much more likely to have cardiovascular pathology compared to data from other countries.

**Conclusion:** Among patients with newly diagnosed primary OA in Ukraine there is a significant prevalence of cardiovascular pathology and a high risk of developing serious cardiovascular events, according to the results of the "PARTNER" study. This must be taken into account when choosing NSAIDs in such patients especially when long-term therapy is required.

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## P621

### ORTHOGERIATRIC PATIENT BLOOD MANAGEMENT IMPROVES CLINICAL OUTCOMES: PRELIMINARY RESULTS FROM A CLINICAL OBSERVATIONAL STUDY

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**Objective:** Anemia is a common condition among orthogeriatric patients leading to RBC transfusions and poor outcomes. Compared to usual care (UC), we evaluated the impact of a patient blood management (PBM) on the transfusion rate, haemoglobin (Hb) levels at discharge and 1-month follow-up and their correlation with functional outcomes.

**Methods:** Prospective observational clinical study with historical controls conducted in a high volume trauma center, evaluating orthogeriatric patients aged ≥65 y with hip fracture. The PBM group includes patients who received ferric carboxymaltose (FCM) in combination with folic acid and vitamin B12. The UC group includes patients who had not undergone treatment with any component of the triple therapy. Main outcomes are Hb levels at discharges and at 1-month follow-up visit, RBC untis transfused over the hospital stay, and length of hospital stay. Both groups received orthogeriatric comanagement during the hospital stay, then orthopaedic and geriatric assessment at 1-month follow-up.

**Results:** Overall, 419 patients were included: 215 in the PBM group and 204 in the UC group. Groups were homogeneous with regard of age, prefracture comorbidities, and polypharmacy, in both groups women were predominant. The majority of fractures were trochanteric and femoral neck types. Compared to patients belonging to UC group, those in the PBM group had higher Hb levels both at discharge (p=0.0329) and at 1-month follow-up visit (p=0.0009), and tended to use lower RBC units during hospital stay. PBM group experiences similar length of hospital stay as compared with UC group. Hb levels were positively associated with pre-fracture functional state (p=0.014); a tendency was confirmed between higher Hb levels and functional recovery at 1 month-follow-up (p=0.065).

**Conclusion:** The PBM in the orthogeriatric setting may improve patients' clinical outcomes after hospital stay and until 1 month from surgery by possibly reducing the healthcare burden.

## P622

### ASSOCIATIONS OF MARKERS OF ADIPOSITY AND INFLAMMATION WITH BONE PHENOTYPE: RESULTS FROM THE MRC NATIONAL SURVEY OF HEALTH AND DEVELOPMENT

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**Objective:** To investigate associations of IL-6, adiponectin and leptin with DXA and pQCT-measured bone phenotypes at age 60-64 y.

**Methods:** The MRC National Survey of Health and Development (NSHD) is a prospective birth cohort study; 766 men and 820 women in these cross-sectional analyses had DXA (total hip, spine, whole body areal BMD (aBMD)) and pQCT scans (radius: 4% (total and trabecular volumetric BMD (vBMD)) and 50% (cortical vBMD, medullary area) sites) at age 60-64 y. Sex-stratified multiple linear regression was used to determine associations between standardised inflammatory markers (log(IL-6) and adiponectin) and bone, adjusted for sex-specific fat mass residuals (the residual of fat mass after adjustment for lean mass and height). For leptin, to avoid multicolinearity, leptin residuals were used (the residual of log(leptin) after adjustment for fat mass and height). Results are presented as standardised beta (95%CI); beta is standard deviation (SD) change in outcome per SD increase in inflammatory marker.

**Results:** IL-6 was not associated with aBMD in men, and in women there were positive associations (total hip: 0.09(0.02,0.17)). IL-6 was negatively associated with total vBMD in men (-0.09(-0.17,-0.01)) and positively associated in women (0.10(0.02,0.18)). Leptin residuals were not associated with aBMD in men, and in women associations existed at the total hip only (0.08(0.01,0.15)). Leptin residuals were positively associated with cortical vBMD (men: 0.10(0.01,0.18); women: 0.11(0.03,0.19))

and negatively associated with medullary area (men: -0.10(-0.18,-0.01); women: -0.14(-0.21,-0.06)) in men and women. In men and women, adiponectin was negatively associated with aBMD at all sites (total hip men and women: -0.21(-0.28,-0.14)) and with trabecular vBMD (men: -0.16(-0.24,-0.09); women: -0.17(-0.25,-0.09)). In women, adiponectin was associated with cortical vBMD (-0.11(-0.19,-0.03)) and total vBMD (-0.19(-0.27,-0.11)).

**Conclusion:** Overall, these results highlight differing associations between different markers of inflammation and adiposity and bone. They suggest that inflammaging may influence healthy bone ageing.

## P623

## ESTABLISHMENT OF A HUMAN PRIMARY CELL LINE FROM ECTOPIC CALCIFICATION FROM A PATIENT WITH TUMORAL CALCINOSIS WITH A NEW GALNT3 MUTATION TO STUDY MINERALIZATION AND THE PRESENCE OF STEM CELLS INSIDE THE LESION

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**Objective:** Tumoral calcinosis (TC) is characterized by ectopic calcifications which are lobulated, well demarcated and most frequently located in the soft tissues of the periarticular regions. In this study we have established a primary cell line from TC lesion from a patient with TC with a new GALNT3 gene mutation to perform functional studies on the mineralization process and to evaluate the presence of a stem cell subpopulation inside these lesions to understand the molecular and cellular mechanisms which lead to the progression of TC.

**Methods:** A tissue sample of TC ectopic calcification was collected at the Azienda Ospedaliero-Universitaria Careggi, Florence. TC primary cell culture, from the tissue sample of the calcification, has been set up after enzymatic treatment and mechanical dispersion. Using an assay, which is based on the capacity of cancer stem cells to grow in stressful conditions, we have evaluated the capacity of the isolated primary TC line to form spherical colonies.

**Results:** We have established a primary cell line of TC, marked as TC1 cell line for future functional studies on mineralization process. Since we have hypothesized that the ectopic calcifications could present a core of stem cells through the sphere formation assay we have tried to isolate this cellular subpopulation. In these months we have observed the capacity of TC1 line to form spherical colonies from which we have isolated a putative stem cell line of TC, called as TC1-SCs.

**Conclusion:** We have established a primary cell line directly from the calcified soft-tissue lesion from a patient with TC due to a new GALNT3 mutation to proceed with functional studies on the mineralization process, which are in progress. For the first time we have also observed the presence of stem cells inside the TC lesions. We are currently proceeding to confirm the stem cell phenotype of the isolated TC1-SCs line, to study the expression levels of osteogenic marker genes and of all the genes related to the FGF23 pathway during osteogenic differentiation.

## P624

## PHARMACY DISPENSING RECORDS FOR TOPICAL DICLOFENAC AND CONCOMITANT MEDICINES IN GERMANY: A RETROSPECTIVE ANALYSIS OF REAL-WORLD DATA

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**Objective:** To describe dispensing patterns of topical diclofenac alone or with other medications in real world.

**Methods:** This retrospective, cross-sectional study characterizes the journey of patients buying topical diclofenac (Voltaren Schmerzgel or Voltaren Schmerzgel forte) over a 12-month period (March 2019 - February 2020) in Germany. Data was obtained from a large pharmacy dispensing platform including data from 3,974,695 patients. Number of dispensing per patient and number of treatment switches were measured as the primary outcome. Percentage of patients that also fill prescriptions of other medications such as for cardiovascular (CV), gastrointestinal (GI), CV+ GI and other nonsteroidal anti-inflammatory drugs (NSAIDs) taken concomitantly with topical diclofenac were measured as secondary outcome.

**Results:** In Germany 95,085 patients were included in the analysis with at least one purchase for topical diclofenac. The mean age of patients who received topical diclofenac was 72 y and the majority were female (61%). However, the largest age group for topical diclofenac dispensing was 75-79 y (18%). Most of the patients received one dispensing of diclofenac (70.8%), 15.4% patients received 2, 5.8% patients received 3, and 8.0% received >3 dispensings of topical diclofenac during the 12-month period. Most of the patients did not switch treatment irrespective of when topical diclofenac was first dispensed - before Month 4 (77.3%) or before Month 7 (78.0%) of the year analysed. Patients who bought topical diclofenac, frequently received it in combination with CV drugs (74.3.0%), GI drugs (35.4%), or both (30.9%) during the same 12-month period. Hardly any patients bought both topical and oral NSAIDs at the same time (0.95%).

**Conclusion:** This retrospective study shows that topical diclofenac was mainly dispensed to older patients above 70 years and predominantly to females. Based on repurchasing, data suggests strong users' satisfaction with their topical diclofenac (low percentage of switches). A high proportion of patients buying topical diclofenac were also receiving drugs either for CV or/and GI conditions.

## P625

## PATTERNS OF PLASMA ANTI-THYROID HORMONE ANTIBODIES IN AUTOIMMUNE RHEUMATIC DISEASES WITH THYROID LESION

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**Objective:** Comprehensive study of interrelations between endocrine and immune functions over decades has provided a framework for paradigm of functional cohesion of these two systems. New field of innate immunity research regarding natural antibodies (NAbs), that can be produced without antigen exposure and can provide with several physiological functions, was developed. NAbs have considerable similarities with autoantibodies emerged in different systemic autoimmune disorders, and rheumatic diseases, among others. Anti-thyroid antibodies, including anti-T4 and anti-T3 autoantibodies, can also be referred to NAbs. Aim: Assessment of anti-thyroid hormone antibody spectra in various rheumatic diseases.

**Methods:** The research was performed in accordance with the Helsinki Declaration statements. 160 rheumatic patients with clinical signs of thyroid dysfunction and/or abnormal values of plasma TSH, T4, T3, or anti-TPO were included in the study. Further clinical, ultrasound, and laboratory survey was performed to establish type of thyroid lesion. Anti-T3 and anti-T4 antibodies were measured by ELISA in plasma samples.

**Results:** High prevalence of thyroid lesions was demonstrated as for RA (59.37%, n=95), SLE (26.26%, n=42), and systemic scleroderma (14.37%, n=23). The most common types of thyroid involvement were found to be hyperthyroidism and Hashimoto's thyroiditis. Patients with rheumatic diseases, including low TSH (34%) and low T3 (45%). Occurrence of antithyroid antibodies in RA, in SLE, and systemic scleroderma was found to be 35%, 42%, and 28%, respectively.

**Conclusion:** Diagnosis and immunological typing of thyroid involvement in systemic rheumatic diseases have major clinical importance as a result of strong interplay between efficiency of immunotherapy and altered thyroid function. Anti-T3 and anti-T4 antibodies can, in particular, neutralize hormones from medicines, and, therefore, decrease effect of basic treatment in autoimmune rheumatic diseases.

## P626
## THE NUMBER OF MEDICATIONS IS ASSOCIATED WITH FRACTURES IN A POPULATION OF DIALYZED OLDER PATIENTS WITH FRAILTY

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**Objective:** The use of multiple medications is frequently observed in older people, especially in those with multimorbidity. The so-called polypharmacy has been associated with adverse health-related outcomes. In particular, among the most serious consequences of polypharmacy the risk of falls and consequent fractures are well-established [1,2]. However, it is noteworthy that the frailest individuals are often excluded from clinical research, limiting the applicability of evidence to specific populations. Older persons with chronic kidney disease (CKD) undergoing hemodialysis indeed represent a growing population of patients characterized by high vulnerability but still marginally studied. Aim of the study was to explore the relationship between the number of prescriptions and fractures in older patients with CKD undergoing hemodialysis.

**Methods:** A retrospective, cross-sectional study was conducted on data coming from 107 older patients with CKD undergoing hemodialysis. Sociodemographic, clinical, and biological data were recorded. A 24-item Frailty Index (FI) was computed according to the model proposed by Searle and colleagues. Unadjusted and adjusted logistic regression models were performed to test the association of prescribed medications with history of fractures.

**Results:** A total of 107 older patients undergoing hemodialysis were included in the study. The mean patient age was 79.1 (standard deviation, SD=7.7) y; 38 (35.5%) participants were women. The mean number of prescribed medications was 9.94 (SD=3.87). The median FI was 0.25 (interquartile range, IQR=0.17-0.29). The number of prescribed medications was significantly associated with fractures (OR 1.18, 95%CI 1.06-1.32, p = 0.003), even after adjustment for potential confounders (OR 1.16, 95%CI 1.03-1.30, p = 0.016).

**Conclusion:** The number of medications is associated with fractures in a population of frail older people undergoing hemodialysis. Further studies are needed to clarify the cause-effect relationship between polypharmacy and fractures in older persons with severe CKD. If the number of medications will be confirmed as a risk factor for fracture, interventions based on deprescribing will become essential in older persons with CKD undergoing hemodialysis.

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## P627
## SCREENING FOR HIGH RISK OF FRACTURES IN PRIMARY CARE IN THE RUSSIAN FEDERATION

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**Objective:** Osteoporosis constitutes a major public health problem, through its association with age-related fractures, particularly of the hip, vertebrae, distal forearm, and humerus. Early identification of high-risk individuals for prevention is a priority in osteoporosis research. To reduce the burden of osteoporotic fractures, we need a system of medical care based on the interaction of primary care doctors and specialists.

**Methods:** All primary care physicians were trained in the calculation and assessment of fracture risk using the FRAX calculator. FRAX was assessed in men and women aged 40 and over, who applied for an appointment at the city polyclinic №25 of the Nevsky district of St. Petersburg for any reason. If a high risk of fractures was detected, primary care doctors prescribed antiosteoporotic therapy or referred the patient to the rheumatologist. A high risk of fracture was identified if the FRAX score above the threshold of therapeutic intervention, and in the case of an suffered low-energy fracture.

**Results:** In 2017-2020, 11013 residents were calculated risk FRAX. During this period, 2416 patients with a high risk of fractures were identified, which amounted to 31% of the total subject population. The incidence of osteoporosis increased more 10 times in 2020. So, in 2017, it was 28.3/100 000 of the population, and in 2020 - 316.7/100 000. As a result of the study, a cohort was formed for follow-up.

**Conclusion:** Screening for osteoporosis using the FRAX calculator is a simple and effective method for identifying patients at high risk of fractures. Long-term follow up is needed to determine whether these initial results are followed by actual reductions in osteoporotic fractures.

## P628
## VITAMIN D STATUS AND ASSOCIATED VDR GENE POLYMORPHISM IN BELARUSIAN POSTMENOPAUSAL WOMEN

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**Objective:** Vitamin D plays an important role bone diseases prevention, including osteoporosis (OP). The biological action of vitamin is realized through its receptor, coded by *VDR* gene. Therefore, *VDR* gene polymorphism can influence vitamin D supplementation effectiveness. The objective of this work was to reveal the effects of *VDR* gene ApaI rs7975232, BsmI rs1544410, TaqI rs731236, FokI rs2228570 and Cdx2 rs11568820 variants on 25(OH)D level in Belarusian women with OP.

**Methods:** Patients were recruited at 1st Minsk city clinic (Minsk, Belarus). In total, 602 women met inclusion criteria, of them 355 patients

with OP and 247 subjects from control group. BMD was evaluated by DXA (GE Lunar, USA), serum vitamin D was determined by electrochemiluminescence immunoassay (Cobas e411, Roche, Switzerland). *VDR* gene variants markers were determined using the quantitative PCR.

**Results:** We revealed significant association of rs1544410, and rs731236 gene variants with 25(OH)D level, which is gene/dose dependent: the lowest vitamin level was typical for reference genotype, intermediate – for heterozygotes and the highest – for the bearers of minor homozygous genotypes (P<0.01). The opposite gene/dose relationship was revealed for rs11568820 variant. We also assessed the distribution of each *VDR* variant genotypes in different groups of study participants according to vitamin D level (defined as sufficient, insufficient, deficient). Using $\chi^2$-test, a significant difference in genotype distribution between groups was revealed only for rs731236 variant ($\chi^2$=12.8, P=0.012, Figure). The G/G genotype was over-represented in group of participants with "sufficient" state, while A/A genotype was associated with vitamin D deficiency.
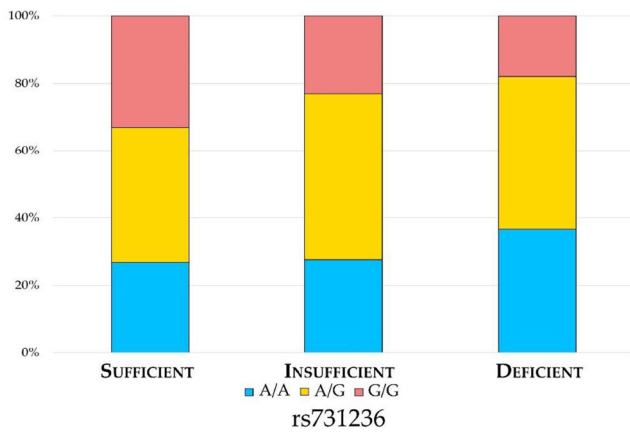


Figure. The association of serum 25(OH)D levels with VDR rs731236 genotype distribution in groups based on vitamin D status.

**Conclusion:** The data shows that the increased level of circulating 25(OH)D is observed in bearers of unfavorable VDR genotypes, associated with decreased receptor expression, possibly due to altered metabolic feedback loops or effectiveness of vitamin metabolism. VDR gene variants should be considered for personalized vitamin D supplementation.

## P629
### THE BURDEN OF ILLNESS RELATED TO OSTEOPOROSIS IS SIMILAR TO ARTHRITIS AND FIBROMYALGIA: THE CIMPACO STUDY GROUP

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**Objective:** Musculoskeletal Diseases (MSK) represent the largest illness burden in Europe. Osteoporosis is common, but the burden of illness associated with this disease is under appreciated by governments, health professionals and patients. Although Ireland has one of the highest fracture incidences worldwide, formal epidemiology studies addressing the illness burden are limited.

**Methods:** A multidisciplinary expert group of rheumatology, health economics and psychology professionals designed a multifaceted questionnaire to understand the burden of illness for 5 types of arthritis, fibromyalgia syndrome and osteoporosis. 2000 patients with a diagnosis of ankylosing spondylitis, fibromyalgia syndrome, gout, osteoarthritis, osteoporosis, psoriatic arthritis or rheumatoid arthritis were invited to complete a detailed 16-page questionnaire, following IRB approval and informed consent. Prevalence estimates for the Republic of Ireland (RoI) for each illness were estimated using 2016 USA and UK reports and national RoI 2016 census population statistics.

**Results:** Osteoporosis affects around 200,000 Irish adults and results in 30,000 to 40,000 clinical fragility fractures each year. 652 completed questionnaires were returned and available for analysis. Osteoporosis is associated with significant pain, disability, depression, limited activity and healthcare costs. Pain, disability and depression rates were similar to arthritis and fibromyalgia syndrome.

Table. Comparison of Age, Gender, Health Assessment Questionnaire (HAQ), Pain, Depression and Activity Limitations between Different Musculoskeletal Disorders.

| MSK | Number | Age (mean (SD)) | Gender (Female) | HAQ | Pain (mean (SD)) | Depression ≥50% of time | Limited Activity |
|---|---|---|---|---|---|---|---|
| Osteoporosis | 102 | 60.1 (14.9) | 63 (61.8%) | 1.1 (0.8) | 3.1 (1.1) | 45.1% | 67.6% |
| Ankylosing Spondylitis | 93 | 56.3 (14.0) | 52 (55.9%) | 0.9 (0.8) | 2.8 (1.1) | 41.0% | 49.5% |
| Fibromyalgia Syndrome | 99 | 59.9 (13.8) | 72 (72.7%) | 1.3 (0.6) | 3.6 (0.9) | 55.6% | 80.8% |
| Gout | 73 | 61.2 (11.7) | 39 (53.4%) | 0.7 (0.7) | 2.8 (1.2) | 35.5% | 38.4% |
| Osteoarthritis | 174 | 59.3 (14.9) | 103 (59.2%) | 1.1 (0.8) | 3.2 (1.1) | 45.4% | 69.0% |
| Psoriatic Arthritis | 114 | 55.2 (14.1) | 60 (52.6%) | 0.8 (0.8) | 2.8 (1.0) | 35.9% | 54.4% |
| Rheumatoid Arthritis | 309 | 57.7 (13.9) | 191 (61.8%) | 1.0 (0.8) | 2.9 (1.0) | 43.6% | 62.5% |

**Conclusion:** The burden of illness associated with osteoporosis is substantial, and similar to arthritis in our clinic populations. Studies addressing quality of life for people with osteoporosis is an important consideration in addition to fracture prevention.

## P630
### APPLICATION OF DIFFERENT APPROACHES TO DETECTION OF PATIENTS WITH A HIGH RISK OF FRACTURES IN THE RUSSIAN POPULATION

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**Objective:** To compare the clinical and cost-effectiveness of two approaches to identifying patients at high risk of fractures: ISCD recommendations for referral to DXA densitometry and the 10-y fracture risk assessment tool (FRAX).

**Methods:** We conducted a multicenter, cross-sectional study of postmenopausal women who did not receive anti-osteoporosis therapy. The sample included 4042 postmenopausal women aged 40 years and older, residents of 6 cities of the Russian Federation. Two approaches to identifying patients at high risk of fractures were analyzed: referral of patients to densitometry based on the 2019 ISCD recommendations, and identification of patients at high risk of fractures based on the calculation of the 10-year risk of fractures using the FRAX algorithm. Indicators of diagnostic value of the methods were evaluated: sensitivity, specificity, and accuracy of the test, and the cost of diagnosing one case of high risk of fractures.

**Results:** The analysis showed that the use of a strategy based on the recommendations of the ISCD leads to an unreasonably high number of densitometric studies and an increase in the cost of diagnosing high risk fractures. The use of the FRAX algorithm made it possible to identify a larger number of patients with optimal use of the DXA resource. The proportion of individuals who needed densitometry was 71.4% and 54.0% for ISCD and FRAX, respectively (p=0.0001). The sensitivity index of the method using the FRAX score was 86.3% and did not differ from that (85.1%) when detecting osteoporosis based on the ISCD recommendations (p=0.07). The FRAX method demonstrated higher specificity when compared with the ISCD recommendations approach (43.4% and 31.9%, respectively, p=0.002) and accuracy (55.4% for FRAX and 42.2% for ISCD recommendations, p=0.001). The use of FRAX reduced the cost of diagnosing 1 case of high-risk fractures by 1.9 times compared to the use of the ISCD recommendations.

**Conclusion:** So, when comparing the diagnostic value of methods for identifying patients with a high risk of fractures, it seems appropriate to use the FRAX questionnaire. With sensitivity indicators comparable to the ISCD recommendations, this method is characterized by higher specificity and accuracy, which minimizes the cost of diagnosing a high risk of fractures.

## P631
### COVID-19 AND CHRONIC INFLAMMATORY RHEUMATISM: RESULTS OF A SINGLE CENTER STUDY

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**Objective** to describe clinical and therapeutic characteristics of patients with chronic inflammatory rheumatism (CIR) contracting COVID-19

**Methods:** It is a single center observational study during May 2020-April 2021. We study the demographic data, body mass index (BMI), comorbidities, disease activity, DAS28 for rheumatoid arthritis (RA) and ASDAS for spondyloarthritis (SpA). We compare the disease activity before and after COVID-19.

**Results:** 43 patients with CIR and infected by the coronavirus were collected, 58, 14% were female. 48, 83% had RA and 51,16% had SpA, (ankylosing spondyloarthritis 39, 53%, psoriatic arthritis 6,97% and enteric rheumatism 4,65%). The mean age was 49, 41 ± 12, 25 years (30- 76 years), the mean BMI was 27, 93 ± 5.54kg / m2. 81, 39% of patients had at least one comorbidity, the most frequent was hypertension in 34, 88%. 74, 41% patients were on bDMARDs and 51, 16% were on csDMARDs alone or combined with bDMARDs. 30, 23% were on oral glucocorticoids, the medium dose was 5,76mg/ day of prednisone. The diagnosis of COVID19 was made with PCR, serological testing and / or chest CT. 2 patients had COVID19 after CD 20 inhibitor and one of them had a pulmonary embolism. No patient was transferred to intensive care unit and no deaths were noted. The mean DAS28 was 3,66 and the mean

ASDAS was 2,68.The disease activity before COVID 19 was low compared to activity after COVID-19 (p=0, 03 for SpA, p=0, 02 for RA)

**Conclusion:** Through this study, we find that patients were overweight, comorbidities were frequent and disease activity was low before contracting COVID-19.

No conflicts of interest

References
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## P632
### THE IMPACT OF COVID-19 ON POPULATION-LEVEL DRUG UTILIZATION OF ALENDRONATE

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**Objective:** Alendronate [ALN] is the most common osteoporosis medication prescribed in Europe. During the COVID-19 pandemic, non-urgent visits to primary care were restricted, affecting the initiation of new treatments. This study aimed to describe the effect of COVID-19 on the prescription of ALN to new users in three European databases.

**Methods:** We included patients aged ≥18 y and registered for ≥1 y in the following databases: Clinical Practice Research Datalink (CPRD, UK), Integrated Primary Care Information Project (IPCI, Netherlands), and Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària (SIDIAP, Spain). The number of new users of ALN was obtained from prescription records between March 2019 and September 2020 (June 2020 for SIDIAP, July 2020 for IPCI). New users were defined as patients without a prescription for ALN in the preceding year. Monthly incidence of use was calculated as incidence rate (IR), where the numerator was all new users of ALN in a given calendar month, and the denominator was person-years (PY) of people available in the dataset on that given calendar month, who were not users of ALN as of the last day of the prior calendar month and did not use ALN in the previous year. The IR was compared before and after March 2020, when lockdown was imposed due to COVID-19.

**Results:** The number of new users of ALN were 1582 in CPRD, 3898 in IPCI and 13,109 in SIDIAP. Prior to lockdown, there was a general upwards trend of new use in CPRD, with IR (per 10,000 PY) increasing from 21.8 to 33.3 between March 2019 and March 2020. Similar trends were seen in SIDIAP and IPCI. After March 2020, the start of lockdown, rates of new use of ALN rapidly decreased in all countries from 33.3 to 12.7 for CPRD, 30.7 to 20.9 for IPCI and 27.1 to 11.6 for SIDIAP. Recovery after the initial lockdown was observed with incidence of new use reaching prepandemic levels in IPCI (28.9) and CPRD (27.5) as of June and September 2020 respectively. As of June 2020, new ALN use in SIDIAP (13.9) had not reached pre-pandemic levels.

**Conclusion:** Following the COVID-19 pandemic lockdowns in March 2020, the initiation of ALN declined in the immediate months after in three European countries however recovery to pre-pandemic rates have been seen.

## P633

### OSTEOPENIC SYNDROME AND INDICATORS OF BONE MINERAL DENSITY IN ELDERLY WOMEN WITH OSTEOARTHRITIS OF THE KNEE JOINT

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**Objective:** To compare the incidence of osteopenic syndrome and BMD in older women with and without osteoarthritis (OA) of the knee joint.
**Methods:** The study includes 26 patients (average age $63.4\pm6.51$ y) with OA of the knee joint established according to the ACR criteria (1991). The control group was composed of 28 women without clinical signs of OA (average age $64.7\pm7.29$ y). The BMD ($g/cm^2$) and the T-score (standard deviation, CO) of the femur neck and lumbar spine (LI-LIV) were evaluated by DXA method (Lunar Prodigy Primo, USA). DXA data were interpreted using the following reference intervals: normal BMD (T-score -1 CO), osteopenia (OPe) (T-score -1 to -2.5 CO) and osteoporosis (OP) (T-score<-2.5 CO).
**Results:** OPe were statistically significantly more frequent in OA patients (46.2%) than in the control group (17.9%), p=0.024. In contrast, OP was significantly higher among women in the control group (78.6%), compared to OA patients (50%), p=0.036. The frequency of detection of a normal BMD was comparable in these groups (3.8 vs. 3.6%) p=0.077. In the analysis of BMD indicators depending on locale, the BMD of the femur neck in patients with OA was found to be 0.823 (0.758; 0.897) $g/cm^2$, corresponding to -1.60 (-2.00; -1.02) T-score CO, of the lumbar spine - 1.000 (0.864; 1.050) $g/cm^2$ and -1.70 (-3.00; -1.10) CO by T-score. For women in the control group, the following BMD values are recorded: 0.769 (0.710; 0.833) $g/cm^2$ and 0.922 (0.867; 0.950) $g/cm^2$, corresponding to -1.95 (-2.42; -1.50) CO and -2.20 (-2.60; -1.90) CO for the T-score of the femur neck and the lumbar spine, respectively. A comparative analysis showed that the BMD of the lumbar spine was significantly higher in women with OA compared to the control group (p=0.018). When comparing the BMD and the T-score of the femur neck, no significant difference is made between the study groups (p>0.05).
**Conclusion:** OPe was significantly more frequent in OA patients and OP in women's control group. The BMD in the lumbar spine is statistically higher among women with OA than in the control group.

## P634

### TREATMENT PATTERNS FOR OSTEOPOROSIS MEDICATIONS IN FIVE EUROPEAN COUNTRIES: A MULTINATIONAL REAL WORLD COHORT ANALYSIS

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**Objective:** Describe the patterns of use of different osteoporosis medications and the switching between osteoporosis medications in the 2 years after starting treatment in 5 European countries.
**Methods:** Routinely collected data from five European databases was used, Integrated Primary Care Information Project (IPCI, Netherlands), Health Search Database (HSD, Italy), Clinical Practice Research Datalink (CPRD, UK), Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària (SIDIAP, Spain) and Nationwide linked Danish registries (NDR, Denmark). Osteoporosis medications were categorised as alendronate [ALN], other oral bisphosphonates (ibandronate and risedronate), intravenous bisphosphonates (ibandronate and zoledronate), denosumab [DENO], teriparatide and selective estrogen receptor modulators (raloxifene, bazedoxifene and lasofozifene). Prescriptions (dispensations in SIDIAP) after 2018 (2016 in NDR) were identified in patients aged ≥18. Patients were new users when they were not prescribed the same drug class in 1 year prior to cohort entry, respectively. Proportions (number and percent) of each patient starting each medication, and key descriptive characteristics were identified. Sankey diagrams were produced depicting switching at 6 month intervals between each drug category including censoring and stopping for each database [results not shown].
**Results:** A total of 2738, 34,823, 11,039, 10,757 and 38,141 new users of osteoporosis medications were identified in CPRD, SIDIAP, IPCI, HSD and NDR respectively. In all databases the most common new prescription was ALN (~85% in CPRD and NDR, ~55% in SIDIAP, IPCI and HSD). Within 2 years, 3%, 4.3%, 6.2%, 2.3%, and 1.6% of ALN users switched (CPRD, SIDIAP, IPCI, HSD and NDR, respectively). Switching in DENO users was less frequent (range 0.6% in NDR to 1.7% in SIDIAP) than ALN. Switching of other medication use was similar. At 6 months, adherence to ALN was low with <80% of patients still reported to use the drug in all databases (range 44% in HSD to 71% in CPRD).
**Conclusion:** Switching of osteoporosis medications was uncommon in all databases and more common in ALN user than DENO users. Less than 80% of ALN users were persistent at 6 months.

## P636

### THE BURDEN OF ILLNESS ASSOCIATED WITH MUSCULOSKELETAL DISEASES IS PARTLY EXPLAINED BY MULTIMORBIDITY: THE CIMPACO STUDY GROUP

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**Objective:** Musculoskeletal Diseases (MSK) are associated with disability, reduced quality and quantity of life and significant healthcare costs. Epidemiologic studies usually focus on single diagnoses, though multimorbidity is common.

**Method:** A multidisciplinary expert group of rheumatology, health economics and psychology professionals designed a multifaceted questionnaire to understand the burden of illness for 5 types of arthritis, fibromyalgia syndrome and osteoporosis. 2000 patients with a diagnosis of ankylosing spondylitis, fibromyalgia syndrome, gout, osteoarthritis, osteoporosis, psoriatic arthritis or rheumatoid arthritis were invited to complete a detailed 16-page questionnaire, following IRB approval and informed consent. Prevalence estimates for the Republic of Ireland (RoI) for each illness were estimated using 2016 USA and UK reports and national RoI 2016 census population statistics.

**Results:** 652 completed questionnaires were returned and available for analysis. All diagnoses were associated with significant pain, disability, depression, limited activity and healthcare costs. A significant proportion of respondents reported at least 1 or more comorbidities. A strong association was noted between the number of comorbidities and disability, pain, reduced quality of life and healthcare costs.

Table. Age, gender, Health Assessment Questionnaire (HAQ), pain, depression and activity impairment of patients with 1, 2 or 3 or more musculoskeletal disorders.

| Number of MSK | Number | Age (SD) | Gender (%) | HAQ | Pain | Depression ≥50% of time | Limited Activity |
|---|---|---|---|---|---|---|---|
| Single Diagnosis | 394 | 56.9 (14.3) | 220 (55.8) | 0.7 (0.7) | 2.7 (1.1) | 35.8% | 55.6% |
| 2 Diagnoses | 178 | 58.7 (13.7) | 109 (61.2) | 1.1 (0.7) | 3.1 (1.0) | 46.6% | 68.0% |
| 3 or more Diagnoses | 65 | 60.0 (14.3) | 44 (67.7) | 1.3 (0.8) | 3.5 (1.1) | 52.3% | 66.2% |

**Conclusion:** Multimorbidity is common in musculoskeletal diseases and strongly linked to disability and reduced quality of life. This warrants further consideration in epidemiologic studies and patient management strategies.

## P637
### FRACTURE RISK ASSOCIATED WITH COMORBIDITIES AND MEDICATION USE IN PATIENTS SCREENED IN A FRACTURE LIAISON SERVICE

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**Objective:** Assess the risk of fracture associated with comorbidities and with chronic medication. Associate comorbidities and chronic medication as bone-related risk factors and risk factors related to falls. Determine the prevalence of risk factors related to bone and related to fall, in this population.

**Methods:** Observational, cross-sectional and retrospective study of consecutive patients followed at a fracture liaison service of a tertiary hospital between 1 January 2017 and 31 August 2020 with both comorbidities and chronic medication systematically assessed. Comorbidities were classified according to the International Statistical Classification of Diseases and Related Health Problems - 10 and chronic medication according to the Anatomic Therapeutic Chemical classification and were categorized as associated with decreased bone mass or risk of falling. Number of previous fractures and BMD were correlated with the number of risk factors analysed.

**Results:** Of the 189 patients referred to the fracture liaison service, 154 patients were included. 89% were female, with an average age of 77.4 ±10.0 y with 81.8% with ≥70 y. 91.6% have at least one bone risk factor, 92.2% at least one fall risk factor and only one patient without any risk factor (0.6%). 87% had at least one fall-related comorbidity and 77% were medicated with at least one fall-enhancing drug. 6.13±3.4 risk factors were identified in average. Patients with ≥2 fractures have more fall-related comorbidities (p-value=0.029).

**Conclusion:** Multiple risk factors were identified, with heterogeneous overlaps and a multitude of combinations. This points to the need for an integrated assessment of all risk factors related to falls, in addition to bone risk factors assessment in a fracture liaison service. It also reinforces the importance of including systematic assessment of fall risk in this population, and the subsequent implementation of fall prevention strategies.

## P638
### XANTHINE OXIDOREDUCTASE ACTIVITY IN BLOOD DEPENDING ON THE FUNCTIONAL CLASS OF RHEUMATOID ARTHRITIS PATIENTS

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**Objective:** The full life of RA patients depends on the preservation of their functional capabilities. The preservation of the patient ability to carry out professional, nonprofessional activities, self-service are estimated by the functional class. Obviously, it is associated with the severity of the clinical picture: RA activity, the presence of extra-articular manifestations, the severity of bone resorption. Xanthin oxidoreductase (XOR), which has prooxidant activity, can aggravate these processes. This study aimed to evaluate the changes of XOR interconvertible forms (xanthine oxidase (XO), EC 1.17.3.2 and xanthine dehydrogenase (XDG), EC 1.17.1.4) activities in plasma and lysed red blood cells (RBCs) depending on the functional class of RA patients.

**Methods:** Diagnosis of RA was verified using the ACR/EULAR criteria (2010). XO and XDG activities were measured in plasma and lysed RBCs by spectrophotometric method [1]. The results were expressed as Me ($Q_{25}$; $Q_{75}$). Spearman's correlation coefficient was used. Differences were considered significant when $p < 0.05$.

**Results:** 77 patients (57 females, 20 males) were enrolled in the study. Mean age of patients was 45 (37; 49) y, mean RA duration was 8 (6; 10) y. 16 (20.8%) patients had low disease activity (DAS 28), moderate and high disease activities were determined in 49 (63.6%) and 12 (15.6%) cases, respectively. Extra-articular manifestations were revealed in 32 (41.6%) patients. Most RA patients had II and III radiological stages (by Steinbroker criteria): 39 (50.6%) and 24 (31.2%), respectively. 30 (39%) patients were related to the second functional class, 40 (51.9%) to the third functional class, 7 (9.1%) to the fourth functional class. The XO and XDG activities of lysed RBCs as well as the XO activity of plasma were correlated with the functional class of RA patients (p<0,001). High functional classes of RA were characterized by more high XO activities in plasma and RBCs as well as lower XDH activities in RBCs.

**Conclusion:** Our results indicate that the deterioration in the functional capabilities of RA patients are accompanied by an increase activity of XO (oxidase form of XOR), which produces reactive oxygen species that have a damaging effect on body tissues.

**Reference:** 1. Zborovskaya IA, et al. Russian J Pain 2018;3:47

## P639
### SCLERODERMA SYSTEMIC: CLINICAL AND IMMUNOLOGICAL PROFILE OF 22 CASES

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**Objective:** Systemic sclerosis is an autoimmune connective tissue disease, arterioles and microvessels. It is characterized by fibrosis and

vascular obstruction may affect in particular the skin, gastrointestinal tract, lung and kidney. The purpose of our work is to clarify the clinical and immunological profile of 22 patients with systemic sclerosis (SS).

**Methods:** This is a retrospective study spanning from January 2009 to April 2019 on 22 cases (SS) hospitalized at University Hospital Rheumatology Dept. of Tizi-ouzou.

**Results:** These 03 men and 19 women whose average age was 49 y [25-81 y], the duration of progression of the disease is 6 y on average. The skin involvement was present in 19 sclerosus atrophy type patients in 17 cases (89%) with melanodermic appearance in 3 cases and presence of telangiectasia in 4 cases. It was a limited form in 16 cases, 1 case SC diffuse scleroderma sine 5 cases. Raynaud's phenomenon was present in 20 cases (91%) with pulp ulcers in 7 cases. 1 case of subcutaneous calcinosis was noted. The articular manifestations are noted in 17 patients (77%), they are the type of arthritis in 10 cases (59%), monoarthritis law 1 case knee, left hip 1 case, and inflammatory polyarthralgia in 10 cases (59%). Pulmonary involvement was found in 8 cases (36%) type interstitial lung disease in 7 cases and 1 case of precapillary PAH. The digestive involvement was noted in 6 patients (27%) dominated by esophageal involvement in all cases. Cardiac involvement was noted in 4 patients (18%) type of pericarditis in 3 cases, and 1 case of congestive heart failure. Renal involvement in turn was noted in 4 patients with type of transient proteinuria averaging 0.24g/24. Bone densitometry was performed in 09 patients showed osteoporosis in 6 cases. An immunological assessment was performed in 17 patients found positive FAN in 16 of them [anti-Scl-70 (50%), anticentromere (23%)]. 14 patients have inflammatory syndrome knowing that 2 patients had lupus partner, 2 other inflammatory myopathy, 2 other rheumatoid arthritis, 2 other Sjögren's syndrome and one patient with primary biliary cholangitis. The evolution was marked by the occurrence of joint deformities in 5 cases, acroosteolysis in one case and a cardiac decompensation in a case.

**Conclusion:** Our series confirms the predominance of female (SS) in its limited cutaneous form. It is characterized by its association with antitopoisomerase type I (anti-Scl-70) which are usually very specific diffuse cutaneous forms with a high frequency of joint damage (77%) source of functional and aesthetic damage.

## P640
### EFFECTIVENESS OF COGNITIVE BEHAVIOURAL THERAPY ON PAIN AND FUNCTION FOLLOWING TOTAL KNEE REPLACEMENT IN ADULTS WITH OSTEOARTHRITIS: SYSTEMATIC REVIEW AND META-ANALYSIS

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**Objective:** Total knee replacement (TKR) is a largely successful procedure, and 66% of patients who have undergone it report that "it feels normal". However, around 20% of patients experience chronic pain postoperatively without a clear reason, such as instability. Preoperative depression, pain elsewhere, and negative thoughts are related to poor outcomes following TKR. Cognitive-behavioural therapy (CBT) is short-term psychotherapy consisting of between 5-20 sessions used to improve outcomes for people at risk of prolonged postoperative pain. This study aimed to to investigate the effectiveness of CBT in addition to usual care, on pain and function following TKR.

**Methods:** A systematic search for randomised controlled trials (RCTs) was conducted up to August 2020 using the following databases: Cochrane Library, Medline, AMED, PubMed and EMBASE. Studies were assessed for quality using The PEDro scale. Searches and study selection, quality assessment and data extraction were carried out by two independent researchers. The primary outcome was pain, and physical function was a secondary outcome. Effect sizes were calculated using the standardised mean difference (SMD) and were pooled using the random-effects model in RevMan.

**Results:** 5 RCTs with 557 participants were included in the review. All studies were judged as high quality studies scoring ≥8 out of a possible 11 against the Pedro scale. Meta-analysis of all studies for pain between 3 and 6 months showed the pooled SMD was -0.25 (95%CI: -0.64, 0.14) with $I^2$=74% and p=0.20 (figure 1). Another meta-analysis of three of five included studies whose VAS and NRS results alone at 12 months showed that the pooled SMD was 0.01 (95%CI: -0.19, 0.21) with $I^2$=0% and p=0.91 for pain. Two studies reported effectiveness of CBT on WOMAC physical function at six months (pooled SMD=-0.48 (95%CI: -1.53, 0.58)) and two studies used the 6-minute walk test at 12 months (pooled SMD was 0.08 (95%CI: -0.16, 0.32)
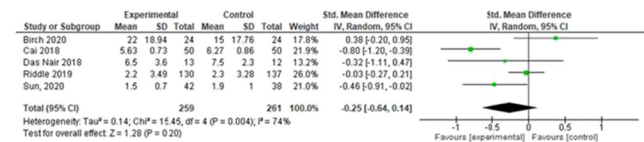


**Conclusion:** CBT added to usual care is slightly more effective than usual care alone on pain and physical function in the first 6 months. At 12 months, the effects on pain and physical function had disappeared. Overall, there was no statistically significant difference between groups.

## P641
### GENETIC MARKERS OF OSTEOGENESIS IMPERFECTA IN BELARUSIAN PATIENTS

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**Objective:** Pathogenic substitutions in the coding part of the type 1 collagen genes *COL1A1* and *COL1A2* negatively affect the formation of the quaternary structure of collagen protein, impairing bone strength. This can lead to various bone pathologies, including osteogenesis imperfecta (OI). This disease of the connective tissue manifests itself at an early age by curvature, shortening of bones, accompanied by difficulty in movement, frequent fractures, and more. The frequency of OI in the population is 1 per 10,000 - 20,000 people. In order to simplify the diagnosis of OI among the selected patients, an analysis of *COL1A1* and *COL1A2* mutations was performed.

**Methods:** To identify pathogenic mutations in the *COL1A1* and *COL1A2* genes, 92 samples of OI patients were sequenced using MiSeq (Illumina) custom panel. NGS results were verified using Sanger sequencing. Pathogenicity was assessed based on international guidelines for NGS data analysis.

**Results:** In total, 34 mutations were identified in the protein-coding sequence of the collagen genes *COL1A1* and *COL1A2* in 58 patients. The pathogenic mutations identified during the experiment are listed in the figure 1. Previously undescribed substitutions are highlighted in red, and already known pathogenic ones are highlighted in blue. In the COL1A1 gene, 9 previously undescribed mutations were found: c.G4123A, c.A4103G, c.C3982A, c.2550delA, c.2238delT, c.2114delA, c.G868C, c.G662A, c.G3653A. For the most severe immobilized patients were identified c.C3982A and c.G868C with phenotypic features of types I and III OI, respectively. Among 5 new mutations of the COL1A2 gene: c.1036-2A> G, c. G1856A, c.G2359A, c.G2387C, c.G2809T the carrier of the c.G2359A gene replacement moves with the help of a wheelchair, has OI type III.

**Conclusion:** The revealed mutations will help in the future to carry out a more accurate diagnosis of osteogenesis imperfecta and identify the type of this disease during molecular genetic testing.
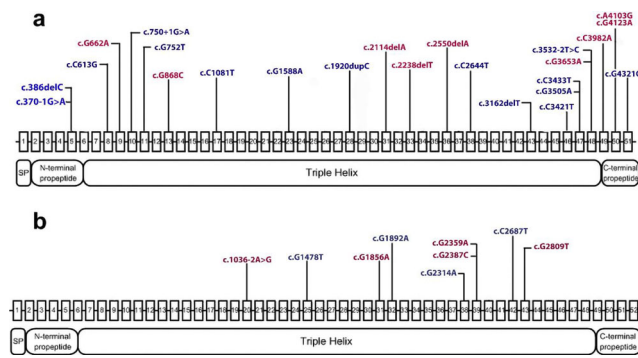
Figure. Identified mutations associated with osteogenesis imperfecta. a – COL1A1 gene; b – COL1A2 gene.

## P642

### THE COURSE OF OSTEOARTHRITIS DEPENDING ON DISEASE DURATION (PRELIMINARY DATA)

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**Objective:** To assess the effect of osteoarthritis (OA) duration on clinical manifestations and radiographic properties of the disease

**Methods:** 128 female knee osteoarthritis patients meeting the ACR osteoarthritis criteria were enrolled in this prospective study. Patients had varying radiologic stages (I-III according to Kellgren-Lawrence) and signed an informed consent. Mean patient age was 57.4±7.6 y (38-72), duration of the disease was 6.0 (4-8) y. An individual study card was filled out for each patient, which included anthropometrics, disease history and clinical examination data, visual analog scale (VAS) knee pain evaluation, WOMAC, KOOS, DN4 indices and concomitant disease information. All patients underwent plain knee radiography and knee ultrasonography. Most of the patients (72%) had stage II osteoarthritis, 16% had stage I, and stage III was detected in 12% of patients.

**Results:** Patients were divided into 2 groups: the first group included females with short disease duration (<5 y, n=38), the second group included patients with OA duration over 5 y (n=90). The patients in the first group were significantly younger in comparison to the other group (54 (46-58) vs. 62.5 (58-68) years old, p=0.003), had lower VAS knee pain when walking (43 (30-50) vs. 50 (40-57) mm, p=0.04), lower DN4 (1 (0-2) vs. 2 (1-3) points, p=0.0003), better global VAS patient health parameters (37 (30-46) vs. 45 (35-59) mm, p=0.008) and better KOOS index values (61 (53-83) vs. 47 (36-55) points, p=0.0001). When assessing weight and BMI, there were no significant intergroup differences (p>0.05), however, patients with short disease duration had lower waist circumference values (87 (84-95) vs. 92 (88-104) cm, respectively, p=0.003). When assessing knee radiograms, the shorter duration group had smaller median osteophyte values both in the medial and in the lateral condylar compartments of the femur (1.3 (1-4.5) vs. 3.3 (2.8-5.8) mm, p=0.05 and 1.4 (1-2.1) vs. 4.3 (2.5-7.1) mm, respectively, p=0.02); ultrasonography showed larger intact cartilage in the short duration group (medially 1.5 (1.3-1.6) vs. 1.2 (0.9-1.5) mm, p=0.02, laterally – 1.6 (1.4-1.7) vs. 1.4 (1.2-1.6) mm, p=0.03). There was also an intergroup difference in terms of glycated hemoglobin levels (5.3 (4.8-5.5)% vs. 5.7 (5.6-5.9)%, p=0.0003). The Spearman correlation analysis confirmed positive correlations (p<0.05) between short OA duration and higher intact cartilage values by US, better KOOS index. Moreover, negative relation was established between the disease duration (Table) and age, osteophyte size, waist circumference, hip circumference, glycated hemoglobin values, menopause duration, radiologic lateral joint space, VAS knee pain.

Table. Correlation coefficients between short disease duration and OA risk and progression factors.

| Parameter | OA duration less than 5 years | P value |
|---|---|---|
| HbA1c,% | -0.56 | <0.0001 |
| Age, years | -0.48 | <0.0001 |
| KOOS, points | 0.45 | <0.0001 |
| DN4, points | -0.38 | 0.0001 |
| Lateral femoral condyle osteophyte size, mm | -0.34 | 0.02 |
| Waist circumference, cm | -0.32 | 0.002 |
| Medial cartilage (US), mm | 0.3 | 0.02 |
| Lateral cartilage (US), mm | 0.3 | 0.03 |
| General patient health (VAS), mm | -0.29 | 0.005 |
| Lateral knee joint space, mm (X-ray) | -0.23 | 0.03 |
| VAS knee pain, mm | -0.21 | 0.04 |

**Conclusion:** Our data confirms that patients with short OA duration showed more favorable disease course: knee pain was less intense, KOOS index values were better, neuropathic pain descriptors were less frequent, instrumental means of evaluation showed a more intact cartilage and smaller osteophytes. In addition, in short duration group there were lower glycated hemoglobin levels, lower waist circumference with comparable weight and BMI, which may indicate more significant prevalence of metabolic syndrome in patients with longstanding OA.

## P643

### FALLS IN OSTEOPOROSIS: SARCOPENIA, A RISK FACTOR TO BE CONSIDERED

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**Objective:** To investigate the presence of sarcopenia and the sarcopenia-related parameters in women with osteoporosis who had 3 or more falls during the last year.

**Methods:** 20 women (mean age 77±10 years old) who referred to our Bone Unit from December 2019 to February 2020 were examined. They all were under treatment for osteoporosis and had 3 or more falls during the last year. Strength was measured using the hand grip dynamometer (HD). Body composition was estimated by Bioelectrical Impedance Analysis (BIA). The physical performance was evaluated by Short Physical Performance Battery (SPPB) and by Timed Up and Go test (TUG). Frailty was evaluated using the Selfy Multidimensional Prognostic Index (Selfy-MPI) that includes information about cognitive and functional status, nutrition, comorbidity, number of drugs and social factors; MPI 1 is for low, MPI 2 is for moderate and MPI 3 is for high risk of frailty. Only women with Selfy-MPI 1 were included.

**Results:** They all presented strength <16 kg with a media of 7.3 kg (dinamopenia). The BMI was 20.6 kg/m² (range 14-25.6 kg/m²) and the skeletal muscle mass index (SMI), as revealed by BIA, was under 6 kg/m² in all of them (sarcopenia). No correlation between strength, muscle mass (SMI) and BMI was found. Only 3 of them presented SPPB >8, whereas TUG was over 12 s in only one subject.

**Conclusion:** The assessment of sarcopenia in osteoporotic patients should be included in the evaluation of the risk of falls in order to prevent fractures, physical disability and functional impairment.

## P644
### THE EFFECTS OF STATIN USE ON BONE MINERAL DENSITY

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**Objective:** Statin use has been associated with greater BMD and reduced fracture risk in several studies. However, studies are conflicting and the potential mechanism by which it may impact on BMD is unknown, with the effect potentially limited to lipophilic statins. This study aimed to explore the relationship between statin use and BMD in older, Irish adults.

**Methods:** Study participants were derived from the Trinity Ulster Dept. of Agriculture (TUDA) patient cohort of over 5000 community-dwelling, Irish adults aged >60 y. Participants who were treatment naïve to osteoporosis medications and had BMD measurements of the spine and hip using DXA were included. The relationship between statin use and BMD was explored in multinomial regression models.

**Results:** We identified 3663 patients, mean age 73.4 y (range 60-98.8), 58.5% female with 55.6% (n=2,046) were using statins. Statin use was positively associated with BMD at the total hip (P=0.01) and spine (P=0.01), before and after adjustment for age, gender, BMI, smoking and alcohol use, steroid use, physical frailty (Timed Up and Go), cardiovascular disease history and serum CRP. We identified a non-significant difference (P=0.88) in BMD between users of lipophilic vs. hydrophobic statins. There was no association between statin use and bone turnover markers.

**Conclusion:** We identified that statin use was independently associated with greater BMD at the total hip and spine. Whilst there was no difference in BMD between different statin classes, the study may have been underpowered to detect this. The mechanism by which statins may affect BMD is unclear, with some studies suggesting both anabolic and anti-resorptive effects. Our findings were independent of cardiovascular disease and CRP, suggesting a mechanism not related to inflammation or endothelial/vascular dysfunction, Furthermore, statins appeared to have no effect on bone turnover markers. Given the widespread use of statins, any positive effect on BMD (albeit small) could have a big impact on bone health at a population level. More research is needed to better understand the mechanisms and effect of statins on BMD.

## P645
### DOWN SYNDROME: AN ACCELERATED UNDIAGNOSED MUSCULOSKELETAL AGING

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**Objective:** To evaluate the prevalence of low bone mass density and low muscle mass in adults with Down syndrome (DS).

**Methods:** 20 adults with DS (mean age 38 years old) were referred to our day hospital of the Geriatric Dept. of Galliera Hospital, Genoa, from October 2020 to April 2021. Information about nutritional status, comorbid conditions and pharmacological treatment were collected. BMI was calculated. Bone metabolism parameters were assessed by the laboratory. Strength was measured using the hand grip test. Body composition was estimated by Bioelectrical impedance analysis (BIA). BMD was assessed by DXA at the femoral neck and at the lumbar spine. X-rays were performed in patients with low back pain.

**Results:** Almost all patients were overweight (17 out of 20) with BMI=28 ±2.3 kg/m² and 16 of them had vitamin D deficiency (media 15.5 ng/ml). DXA revealed a low bone mass density in all of them with a z-score -1.5 ±0.6 and a T-score -2.5±0.6. They all presented low hand grip test; 6.7 ±0.5 kg for the women and 12.4±0.7 kg for the men. Skeletal muscle mass index was 9.4±1.2 kg/m² in men and 7.86±0.7 kg/m² in women. X-rays revealed vertebral fractures due to fragility in three of them.

**Conclusion:** DS individuals present low BMD, and dinamopenia rather than sarcopenia. Low muscle mass indexes were not strictly associated with reduced hand grip strength. The assessment of muscle mass and bone density should be included in the routine evaluation of this population so as to prevent fragility fractures and loss of autonomy in DS population.

## P646
### OSTEOPOROSIS IN PATIENTS WITH TURNER SYNDROME

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**Objective:** Turner syndrome (TS) is a rare disorder that affects female subjects with an incidence of 1/2500 to 1/3000 live female newborns, being the consequence of a numerical gonosomal distortion. Clinical semiology of patients with TS is: stature hypotrophy, late puberty/ovarian failure. Bone age is generally delayed compared to the chronological one, the progression is slow secondary being the consequence of an inadequate production of sex hormones. [1-10]. Craniofacial development is delayed with 2-3 y while dental development is early (6 months - 3.5 y). Typical modifications in the facial skeleton are: reduced development of the cranial base, hypertelorism, maxillary hypoplasia, micrognathia, high palatal arch, bilateral crossing with or without palatoschisis, open anterior bite, malocclusion class II. The identification cases with Turner syndrome with female phenotype, chromosomal studies, evaluation of BMD, study of dental morphology. [3,5,9-12].

**Methods:** The study was performed on 21 cases of TS, with age between 11.8-18.2 y. The karyotype study was performed, the BMD was assessed by DXA, the assessment of various craniofacial anthropometric variables was done by lateral cephalometry.

**Results:** On 68% of cases (14 cases) osteoporosis was highlighted, the karyotype study specified the diagnosis of TS. The craniofacial morphological characteristics of the group we studied showed a reduction of the posterior base of the skull, the reduction of the length of the mandible and maxilla, the retrognation of the mandible and maxilla. Even if our group included a small number of subjects, the values obtained by us fall into the craniofacial typology characteristic of children with growth hormone deficiency.

**Conclusions:** The initiation of growth hormone replacement therapy proves good therapeutic tolerance as well as a good recovery of stature deficiency by periodically evaluating anthropometric and developmental indices in dynamics under permanent growth hormone replacement therapy. It is necessary to increase bone mass to correct osteoporosis and reduce the incidence of fractures [13-16].

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## P647
## BASIC PRINCIPLES OF BONE CELL BIOLOGY

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Far from being an inert envelope surrounding the bone marrow, thus protecting hemopoiesis and the development of the immune system, bone is a complex organ, constantly changing under the control of hormones, cytokines, central and sympathetic nervous systems, and which itself functions as a endocrine organ. As in other complex organs, bone function is controlled by a range of specialized cell types; they are located on the bone surface or inside the mineralized matrix. [1,2-7].

Osteoblasts are those cells that form the bone matrix. However, cells on the osteoblast line have a wide range of functions and confusion has arisen when the term "osteoblasts" is used to describe cells in other stages of the osteoblast line that are not prepared to actively form a bone matrix.. Mature osteoblasts are easily recognized histologically as cuboidal cells, mononuclear cells that are found in groups on the matrix that synthesized them. [3,5,8-13].

They are full of alkaline phosphatase (ALP) and predominantly synthesize type I collagen and noncollagen proteins, including osteocalcin, osteonectin, bone sialoprotein, and bone proteoglycans I (biglycan) and II (decorin). They possess many receptors, including the receptor (PTH1R) for PTH and PTHrP, allowing them

to respond to growth factors and cytokines produced by osteoblastic line cells.

Osteocytes are terminally differentiated osteoblasts that have been trapped inside the bone matrix. They become embedded in gaps in the bone matrix, connect with each other and with the cell surface through their intercellular processes full of canalicular fluid content. Osteocytes are the most abundant bone cells (85-90%) and have a long lifespan. [7,9,14-16].

Osteocyte-derived sclerostin. Osteocytes have long been thought to function as sensors of pressure change and microaggression, but the new approaches have recently been adopted through studies of osteocyte function, largely as a result of the discovery of genes mutations in associated with either osteoporosis or syndrome of increased bone mass. Indeed,the ideas regarding the control of bone formation were significantly revised after the discovery of sclerostin, the protein produced by the sost gene. In bones, it is produced primarily by osteocytes and strongly inhibits bone formation by inhibiting Wnt signaling. [15-16].

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## P648
## OSTEOPOROSIS AND GINGIVAL INFLAMMATION

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**Objective:** The present study starts from the hypothesis that in chronic marginal periodontitis a major role is represented by general systemic factors, such as osteoporosis (OP), menopause being the most common. Although the involvement of osteoporosis in the alteration of the marginal periodontium is relatively little studied in the literature, some studies have shown that there are clinical and etiopathogenetic correlations between them, the presence of osteoporosis inducing severe forms of periodontitis, the most common form being dystrophic periodontitis. [1-9].

**Methods:** The case study is represented by 42 patients, with age between 42-75 y. These patients were divided into two groups: a group with osteoporosis and periodontitis comprising 25 patients and a control group with 17 patients without osteoporosis and periodontitis. On patients included in the study, the oral cavity examination was performed by a dentist. We assessed the gingival index inflammation (GI).Evaluation of BMD in order to establish the diagnosis of osteopenia/osteoporosis was performed by DXA and we evaluated the values of the T-score.

**Results:** Both osteoporosis and periodontal disease are destructive bone diseases. We calculated the correlation coefficients and the correlations between the parameters of osteoporosis and periodontal indices on the group with osteoporosis and periodontal disease, but also on the control group. Comparing the groups with osteoporosis and periodontal disease and without osteoporosis and periodontal disease we observed a highly significant correlation between BMD and GI, which means that the bone mass density is a predictor for the gingival inflammation index.

**Conclusion:** The association between osteoporosis and periodontal disease has been reported in several studies, but this association has not yet been confirmed, as these studies have contradictory results and the relationship remains unclear. Given that the study was limited and was conducted on a small group of patients for a good understanding of the correlations between the two systemic diseases, longitudinal studies on much larger groups are needed. [7-16].

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**P649**

**FRAGILITY FRACTURES ARE A LEADING REASON FOR EMERGENCY HOSPITAL ADMISSION AND A LARGE ILLNESS BURDEN IN IRELAND**

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**Objective:** Identify and compare total numbers of hospitalised patients, length of stay and annual bed days of patients diagnosed with osteoporotic hip and forearm fractures and other common diagnoses.

**Methods:** Data on the 17 most frequently coded diagnoses for emergency admissions to public hospitals in the Republic of Ireland between 2010-2016 were extracted using ICD-10 coding from the Hospital In Patient Enquiry system. Data was extracted by one author (BMcG). Extracted data included number of admissions, hospital bed days and mean length of stay.

**Results:** A total of 946,217 admissions accounting for 6,044,055 bed days occurred between 2010-2016. The most frequent diagnostic groups were cardiovascular disease, infection, regional pain, fractures and miscellaneous. The single most frequently coded diagnosis was pain in the throat and chest (13.4%), while fracture of the femur (3.1%) was the least frequent. Fracture of the forearm ranked 15th (3.6%). Femoral fractures had the longest mean length of stay at 17.6 d, followed by stroke at 17.4 d, while fracture of the forearm ranked 14th at 2.7 d. Femoral and forearm fractures accounted for 10% of total bed days.

**Conclusion:** Fragility fractures are a common reason for acute public hospital admission in the Republic of Ireland and account for a large proportion of hospital bed days.



Proportion of Bed Days for Main Diagnostic Groups

Fracture ■ Cardiovascular ■ Infection ■ Regional Pain ■ Miscellaneous
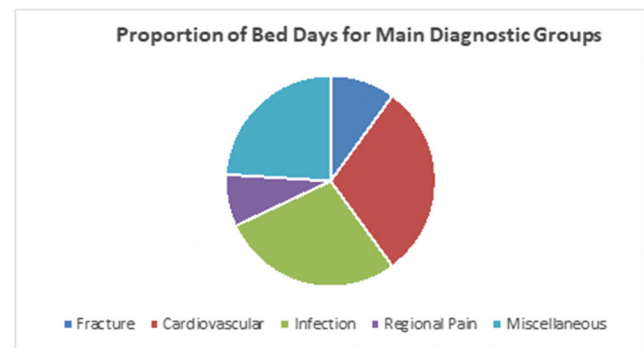
**Disclosure:** J Carey served on several committees for, taught courses for, and Past-President of The International Society for Clinical Densitometry, is a member of The Committee for Scientific affairs for The International Osteoporosis Foundation, and is a founding member of, and current president of The Irish DXA Society.

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**Y NEUROPEPTIDE AND BONE HOMEOSTASIS**

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NPY-immuno-reactive fibers were identified in bone tissue some time ago, associated with blood vessels. This anatomical location led to the presumption that the role of NPY in vasoregulation is inside the spinal cord. In its role as a critical mediator of homeostasis, NPY responds to serum leptin changes in hypothalamus. Thus, the identification of centrally mediated skeletal effects when leptin signaling changed indicated the possibility of central action of NPY and was the first investigated. [1-5].

The central actions of NPY on bone homoeostasis - The tightly integrated biology of leptin and NPY inside hypothalamus made NPY earlier a candidate for the central leptin pathway in the bone. Indeed, an experiment showed that intracerebroventricular infusion of NPY in wild-type mice produced a significant reduction in spongy bone volume after the NPY viral vector specifically limited to the hypothalamus. [4-9].

This bone loss was associated with a reduction the amount of minerals (up to seven times), indicating an inhibition of osteoblastic activity on the cortical and spongy surfaces, without a modification in the number of osteoblasts or markers of bone resorption. In hypothalamus, NPY acts to trigger responses to starvation; these include increased food consumption and reduced energy expenditure. Thus, the continuous production of NPY by the viral construct is perceived inside hypothalamus as a marker of significant calorie deprivation, which triggers responses to hunger. [10-13].

As a result, overexpression of NPY in mice led to a 60% increase in body weight over 3 weeks, while bone mass (such as the tibia) was significantly reduced. This result highlights the strong interactions between central perceptions of nutritional status, such as increased NPY expression and bone mass maintenance. Consistent with the central role of NPY in inhibiting osteoblast activity, NPY-null mice show skeletal bone growth. This increased bone mass results from an increase of mineral storage rate in the cortical and spongy surfaces. This increase in osteoblastic activity is supported by increased expression of osteogenic bone transcription factor, RUNX2 and Osterix in the bone of NPY-null mice [14-16].

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## P651
### INFECTIONS UNDER BIOTHERAPY DURING SPONDYLOARTHRITIS

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**Objective:** The use of biotherapies for almost 18 years has improved the prognosis of several inflammatory diseases especially spondyloarthritis. The tolerance of biotherapies depends on several factors including the type of molecule used and the patient's comorbitidies. Infection is one of main complications of these biotherapies. This study aimed to study the profile of infectious complications occurred in patients with spondyloarthropathy receiving biological treatment (antiTNF$\alpha$).

**Methods:** This is a descriptive retrospective study of patients with spondyloarthropathy put under biological treatment over a period of 14 y (2005-2019). Collection of patient demographics: gender and age; spondyloarthropathy type, type of biological therapy, duration of treatment. Identify the type, specify the frequency and determine the occurrence of interval infections in biological treatment.

**Results:** Of the 209 cases included, we found 25 infections in 21 patients (10%) presented with at least one infection. They are divided into 14 men

and 7 women, mean age 47 y (25 – 67 y). 19 of them had an axial spondyloarthritis, 16 mixed spondyloarthritis and one had psoriatic arthritis. The occurrence of infections was 16 cases under adalimumab, etanercept in 3 cases, 2 cases in infliximab. The patients were on biological treatment for 3.5 y on average and the infection appears after an average of 12 months (15 d - 36 months). The infection was bacterial (60%), viral (28%), fungal (12%). Infections have concerned the respiratory tract in more than half of the cases (64%) or 16 infections; integumentary apparatus in 20% of cases and less frequently the urinary and digestive systems. The treatment of infections was in all medical cases. No appeal to the final adoption of biological treatment.

**Conclusion:** Our series confirms the susceptibility of patients on biological therapy to infections. Officials infectious agents are primarily and essentially opportunistic bacterial origin, dominated by lung infections including tuberculosis and second skin infections. Decrease the risk of infection through stock pre-systematic therapy and doctor-patient vigilance imperative during treatment.

## P652
### DELAYED PERIAPICAL HEALING IN PATIENTS WITH ENDOCRINE DISEASES

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**Objective:** To highlight the coronoradicular and periodontal modifications that may occur over time in teeth that have undergone a history of endodontic treatment, and the identification of various risk factors that contribute to the healing of periapical lesions. Among the factors incriminated in the delayed healing of periapical lesions we can note the presence of endocrine diseases and diabetes [1-7].

**Methods:** In order to follow the dental and periodontal modifications of the teeth that underwent an endodontic treatment, a retrospective study was performed. Were analyzed 320 retroalveolar, isometric, orthoradial radiographs. Radiographs were analyzed by negatoscope. The teeth on these radiographs were divided into two groups. Group 1 includes 210 teeth in patients with endocrine diseases and diabetes, who have endodontic treatments, with a total of 306 channels. The radiographs were performed 6 months to 3 y after the canal fillings. Group 2 includes 110 teeth, with endodontic treatment, in patients without endocrine disorders. The teeth from both groups were evaluated in terms of coronoroot and apical periodontium modifications. During the coronoradicular modifications we followed the coronary and radicular fractures, the caries recurrences and the secondary caries, the radicular resorptions. In the apical periodontium changes we referred to the presence of widening of the periradicular space in a cap form (radiological image of chronic fibrous apical periodontitis), the presence of granulomas and cysts. Conventionally, the radiolucency image over 0.5 cm was considered a cyst, and below 0.5 cm granuloma. On the other hand, we also analyzed the correctness of the root fillings, with reference to their length and tightness. The canal obturation was considered incomplete if it ended more than 2 mm from the radiological apex, correct, at 0-2 mm from the radiological apex or with excess if the obturator material passed beyond the radiological apex (according to the criteria of the European Society of Endodontics). The root filling was considered tight if it had a uniform density, without porosity and free spaces.

**Results:** The dental status of endodontically treated teeth was both dental restoration by filling and prosthetic restoration by metal-ceramic microprostheses. In terms of the frequency of secondary caries, the difference between the two groups is not significant. Also, the coronary fracture did not show a significant difference in the two groups. With a

significant difference, it was found that periapical healing was much delayed in patients with endocrine disorders, but also diabetes.

**Conclusion:** The number of endodontically treated teeth that require endodontic reintervention is high. The quality level of endodontic treatments is low. The frequency of chronic apical periodontitis in teeth with endodontic treatment is high. Periapical healing has been delayed in teeth of patients with endocrine disorders. [8-16].

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## P653
## THE PREVALENCE OF NECARIOUS CAVITY LESIONS ON PATIENTS WITH ENDOCRINE DISEASES

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The loss of hard dental tissue in the absence of bacterial action is a multifactorial condition that causes dental wear, with one of its known forms of attrition, erosion or abrasion. Attrition is a physiological dental wear, caused by direct contact between the teeth, abrasion is wear caused by a mechanical/frictional process, and erosion is the dissolution of the tooth caused by a chemical process. [1-7].

In our study, there was an increased prevalence of gastroesophageal reflux disease in patients with endocrine diseases. As a result of gastroesophageal reflux, the teeth are continuously subjected to an acid action that causes a marked erosion of the tooth surfaces. [6-9].

We also noticed an increased prevalence of damage to the occlusal surfaces, as well as the teeth in the lateral area, characteristic of gastroesophageal reflux.

Erosive dental lesions were characterized either by a loss of surface gloss highlighted in clean and dry enamel, or by the appearance of typical yellow areas on the tooth surface, caused by exposure of the dentin underlying the enamel thinned by the action of acids. [10-14].

The management of these teeth involved coronary restoration with composite fillings, but also devitalization of teeth with increased hypersensitivity, followed by a prosthetic restoration.

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## P654
## HORMONAL FACTORS, RISK FACTORS IN THE APPEARANCE OF BRUXISM

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**Objective:** The etiology of bruxism is not fully known, most likely involving many factors in the mechanism of production. The risk factors are complex in nature, initially being incriminated morphological factors (occlusion modifications with premature occlusal contacts or occlusal interferences in maximum intercuspation).However, depressive states, vitamin D deficiencies or hormonal modifications can influence the appearance and treatment of bruxism. [1-5].The management of bruxism involves a multidisciplinary effort, based on the causal factors identification and the application of a targeted therapy, taking into account as many aspects of each individual. Among management possibilities is included occlusal adjustments (coronoplasty), orthodontic interventions (performed with occlusal splints, correction of malocclusions), restorative treatment (pulp therapy followed by coverage crowns), psychotherapy (due to frequent association with stress and depression), physiotherapy (when muscle pain and stiffness are associated), drugs (anti-anxiety agents, sedatives, tranquilizers, muscle relaxants), biofeedback (to lower muscle tension), electrical methods (electrogalvanic stimulation), behavioral changes. [4-9].

**Methods:** The study included a number of 146 patients with various hormonal disorders and 62 patients with vitamin D deficiency. The patients were consulted in a dental office during 2017-2020.Patients also benefited from an ENT, neurological, ophthalmological consultation.

**Results:** The oro-dental clinical examination highlighted the characteristic dental facets of wear, pain of the lifting muscles of the mandible, muscle tension, myofascial pain, clicks at the temporo-mandibular joint, trismus. ENT clinical examination showed an increased frequency of patients with tinnitus, ear pain, ear infections or apnea. From a neurological point of view, bruxism determined the appearance of constant headache, temporary pain, insomnia, with the consequent presence of anxiety, depression, vertigo and stress. Patients with bruxism showed hypersensitivity to light, orbital or periorbital pain, but also difficulty accommodating vision.

**Conclusion:** Hormonal factors and vitamin D deficiency can cause significant modifications in the body, which causes a combination of factors that promote the appearance of bruxism. [10-13].

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## P655
### COMPARISON OF THE INFLUENCE OF THE DISEASE ACTIVITY INDICES AND ULTRASOUND SIGNS ON RADIOLOGICAL PROGRESSION IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Rheumatoid arthritis (RA) is the most common chronic inflammatory arthritis. Its prognosis has improved substantially due to the appearance of biological therapies, and especially due to the improvement in the strategy and management of the disease. The goal in RA should be to achieve remission, as it is widely accepted, would prevent structural and functional damage. There is some debate and controversy as there are different opinions on the influence of disease activity used indexes, both clinical and by ultrasonography, on radiological progression. This study aimed to compare the influence of disease activity by indices (DAS28, SDAI, and CDAI) and ultrasound signs (greyscale (GS) and presents of power Doppler (PD) signal) on radiological progression in patients with rheumatoid arthritis

**Methods:** 85 RA pts, mean age 53,0 [44,0; 61,0] y, mean disease duration 8 [4; 24] months were treated by treat-to-target concept. After the first year of therapy, management was following real clinical practice rules until the termination of the study (4 y FUP). The wrist, MCP2 and MCP3, PIP2, PIP3, MTP2, and MTP5 joints of the clinically dominant side were examined by US (GS and PD). Clinical, laboratory parameters, and US examination were performed at baseline, at Mo 3, 6, 9, and 12. The X-ray was conducted before treatment, at 12 Mo, and the end of the study. Structural damage progression was evaluated by change in the Sharp van der Heijde score (its subcomponents, the erosion score) between baseline and 4 y. The effect of clinical indices and ultrasound signs determined at different follow-up times on radiological progression was analyzed. Descriptive statistical methods and the Cox regression model were used.

**Results:** 13% of patients had radiological progression by the first year of follow-up, 39% by the fourth year. Cox regression model showed that clinical disease activity accordingly DAS28 and SDAI at 3 months, associated with 4-y X-ray progression (HR 1.28 (95%CI 1.01-1.63), p=0.04, and 1.02 (95%CI 1.00-1.05), p=0.04, respectively). Ultrasound signs (GS, PD, and their combinations) had no independent predictor value. Ultrasound signs only in combination with clinical and laboratory signs had such an effect. Presence of activity according to PD at the baseline (HR 3.68 (95%CI 1.03-13.15), with SJC at the 9th month (HR 1.14 (95%CI 0.98-1.35) and ESR at the 6 months (HR 1.04 (95%CI 1.02-1.07) of follow up increase the chance of detecting progression. This model demonstrated acceptable significance: R2=0.60.

**Conclusion:** Thus, PD-synovitis with other US parameters had no independent predictor value. PD-synovitis with other parameters (clinical and laboratory) along with activity indices has a prognostic value for increasing destructive radiographic changes in patients with rheumatoid arthritis.

## P656
### STUDY ON THE INFLUENCE OF HORMONAL FACTORS AND SYSTEMIC OSTEOPOROSIS IN PERIODONTAL DISEASE PROGRESSION IN POSTMENOPAUSAL WOMEN

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**Objective**: The analyzing of the hypothesis that in marginal periodontitis general systemic factors play an important role, such as osteoporosis (PO), the most common being the postmenopausal [1-6].

**Methods:** The primary diagnosis of periodontal disease is based on clinical examination, but also on radiological examination. The cases included in the study were selected and monitored by the Endocrinology Outpatient Clinic and the private dental office during 2016-2019. The study was performed on 25 patients, with age between 45-79 y. These patients were divided into two groups: a group with osteoporosis and periodontitis (14 patients) and a control group without osteoporosis and periodontitis(11 patients).

**Results:** Our study proved that there are clinical and etiopathogenetic correlations between osteoporosis and altered marginal periodontium, the presence of osteoporosis inducing severe forms of periodontitis, the most common form being destructive periodontal disease. The clinical study showed a shiny, dry, pale or erythematous gum with bleeding at touch. Radiological examination revealed a representative loss of alveolar bone.

**Conclusion:** Hormonal modifications on postmenopausal women are involved in the onset and evolution of periodontal disease [7-11].

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## P657
### LONG TERM SYSTEMIC CORTICOSTEROID EXPOSURE:ADVERSE EFFECTS

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The use of systemic corticosteroids represents a common practice worldwide for the treatment of autoimmune diseases, including skin conditions. However, the potential benefits of these medications are offset by side effects that may occur after long-term use. Among the dermatological diseases, we mention pemphigus vulgaris, the most common and serious form of pemphigus. The classic skin rash consists of the presence of large blisters, containing a serocitrin liquid, located on the apparently healthy skin, without being preceded or accompanied by annoying subjective symptoms. The appearance at the beginning is monomorphic, the blisters converge, and later they break leaving large denuded areas. Subsequently, the appearance of the eruption becomes polymorphic, as the blisters are in different stages of evolution [1-3]. In the absence of treatment, the rash tends to generalize, the general condition of the patient worsens, associated with rapid weight loss, even cachexia, digestive disorders, fever and even death in less than a year. The main objectives of treatment are to stop the evolution of the disease, the healing of skin and mucous lesions. Subsequently, the goal is to prevent relapses and avoid side effects that may occur following systemic corticosteroid therapy. We will present the most common side effects following systemic corticosteroid therapy according to data from current literature, along with their management strategies. Systemic corticosteroid therapy currently remains the gold standard for the treatment of pemphigus vulgaris. The limitations of this therapeutic strategy are the common side effects, especially the negative impact on the bone, the treatment itself being a source of complications. Finding a replacement agent for long-term corticosteroid therapy remains a controversial topic in the literature [4,5].

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## P658
### SUBCHONDRAL BONE MINERAL DENSITY IN SUBJECTS WITH KNEE OSTEOARTHRITIS

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**Objective:** For a long period of time osteoarthritis (OA) was known as a primary disorder of articular cartilage, however more animal and human studies confirm the importance of changes in the subchondral bone structure. Development and progression of OA are associated with the increased subchondral bone remodeling manifested by the changes in BMD. The aim to study the subchondral BMD in patients with knee osteoarthritis (KOA).

**Methods:** 48 women aged 48-76 y were included being divided into two groups: 1st one of the subjects without OA of any localization or any other illnesses or conditions that may influence the bone (control group, n=24, average age 63.21±7.23 y), and 2nd group of patients with KOA (n=24, average age 62.40±7.26 y, Kellgren-Lawrence grades II-III). The women from both groups did not differ significantly in main anthropometrical parameters and postmenopausal period duration. BMD of the total body was measured using DXA. Subchondral BMD was analyzed on the areas of the proximal tibia and distal femur by regional measurements.

**Results:** Our study showed significantly lower BMD on affected with KOA compared to the intact lower extremity (LE) in patients with KOA

$(0.897 \pm 0.103$ vs. $0.928 \pm 0.087$ g/cm$^2$, p<0.05) however, in the control group there were no differences between right and left LE. In patients with KOA, the BMD of the intact LE did not differ from the control group at the same time BMD of the affected lower extremity was by 11.1% lower $(0.897 \pm 0.103$ vs. $0.997 \pm 0.132$ g/cm$^2$, p<0.05) compared to BMD of the lower extremity from the control group.

In patients with KOA, the subchondral distal femoral and proximal tibia BMD was significantly lower on affected LE $(0.735 \pm 0.119$ vs. $0.765 \pm 0.101$ g/cm$^2$, p<0.05, and $0.746 \pm 0.129$ vs. $0.802 \pm 0.121$ g/cm$^2$, p <0.05, respectively) unlike the control group where was no differences detected. The difference was more pronounced at the level of the proximal tibia and was equal to 7.5%.

**Conclusion:** The current study showed significant differences in LE BMD and subchondral BMD of the proximal tibia/distal femur between affected and intact LE in the patients with KOA that reflect the important changes in bone mineral parameters.

## P659
### PSEUDOTUMORAL SWELLING OF THE RIGHT SHOULDER RELATED TO RHEUMATOID SYNOVITIS

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**Objective:** Rheumatoid synovitis is an inflammation of the synovial membrane, often found in rheumatoid arthritis (RA), the management of which has been improved since the advent of biotherapy and new therapeutic strategies. However, certain clinical forms are potentially confused with osteoarthritis or a tumoral condition. In this case, we report a particular form of pseudo-tumoral synovitis of the shoulder in a patient with RA.

**Case report:** Mr B.F., 50 years old, has had rheumatoid arthritis for 15 y, treated by methotrexate at 15 mg/week with partial response. The patient presented with synovial hypertrophies affecting several joints (MCP, PPI, wrists and ankles) for which he underwent surgical management (synovectomies and tenosynovectomies). Clinical examination found a significant painful swelling on the anterior part of the right shoulder with limitation of movements, we note the presence of several surgical scars on the hands, wrists and ankles. General examination: no lymphadenopathy, no obvious infection or general signs. The biological assessment: without abnormalities, ESR=25 mmh1, CRP=14 mg/. The right shoulder X-ray: thickening of the soft parts next to the shoulder. Ultrasound of the right shoulder shows a heterogeneous mass measuring 35/173/154 mm corresponding to inactive synovitis. MRI of the right shoulder: significant hypertrophy of the synovium within the bursa under acromio deltoid in the form of hypertrophy of the synovial villi largely filling the lumen of the bursa giving an enlargement of the latter (35/173/154mm). The patient was referred to surgery for total synovectomy for which the histological study found an inflammatory infiltrate (lymphocytes, plasma cells, polynuclear neutrophils and monocytes) placed on a background of fibrin organized in the form of a body of rice. in connection with rheumatoid arthritis.

**Conclusion:** This observation highlights a particular form of synovitis seen during RA (pseudotumoral form) requiring surgical management.

## P660
### PEMPHIGUS VULGARIS: CASE REPORT

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Pemphiguses are autoimmune bullous diseases that result from the alteration and disappearance of interkeratinocytic cohesion following the action of autoantibodies on desmosomes. Pemphigus vulgaris is the most common and most serious form of pemphigus. It affects both sexes equally and is common, especially in people aged 50-70 y, but can begin at any age. The etiopathogenesis of pemphigus is a complicated process still under study [1-4].

We will present the clinical case of a 64-year-old patient who was hospitalized in the Craiova Dermatovenerology Clinic in June 2020 for a polymorphic itchy, painful rash consisting of multiple erosions and crusts, located on the scalp, back and submammary regions. The first presentation of the patient was in 2014, with multiple large bullous lesions, crusts and postbullous erosions spread throughout the body. Following the histopathological examination, the diagnosis of pemphigus vulgaris was established. The patient underwent treatment with methylprednisolone 250 mg/d, for 3 d, with good clinical response. Subsequently, the dose was progressively reduced to 8 mg/d as maintenance treatment. Over time, the patient suffered numerous relapses despite systemic corticosteroid therapy, relapses that received the same treatment with the progressive decrease of the dose as at the initial hospitalization. During this period (2014-2020) the patient developed asthma (2014), type 2 diabetes (2017), cataracts (2018), osteoporosis (2019) following systemic corticosteroid therapy. To be mentioned, the patient suffered from primary hypertension (2008) and glaucoma (2013). In 2020, a new episode of recurrence with rapid spread of lesions, and due to comorbidities it was no longer possible to use pulse-corticotherapy. Methotrexate 10 mg prefilled syringe was administered (3 administrations, 1 administration/week), with a favorable outcome. After this episode, the patient continued with the maintenance dose of 8 mg oral methylprednisolone/d.

Pemphigus vulgaris, requires long-term, low-dose corticosteroid therapy. Despite the low doses, the negative impact on patients persists. Moreover, in the case of these autoimmune diseases, where treatment options are limited, these treatment strategies appear to be ineffective. Thus, the risk/benefit ratio should be considered when approaching a systemic corticosteroid regimen and other therapeutic options are worth trying [5-6].

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**P661**

**HIGH TIBIAL OSTEOTOMY BY HEMICALLOTASIS USING DYNAMIC AXIAL FIXATOR: RADIOLOGICAL PRECISION AND FUNCTIONAL OUTCOME**

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**Objective:** Medial compartment osteoarthritis (OA) of the knee has been seen as the initial stage of OA in the majority of cases. Isolated cases of medial compartment OA do not warrant extensive surgery such as Total knee replacement but rather high tibial osteotomies. Conventional techniques using internal fixation may lead to overcorrection due to the dynamic component of malalignment. The long-term functional outcome following surgery depends on the precision of correction of alignment. This study has assessed the precision of correction of alignment using dynamic axial fixator along with a 3 y functional follow-up.

**Methods:** We report the outcome of 45 patients (50 knees) who underwent hemicallotasis with a dynamic axial fixator for medial compartment OA of the knee. The radiological assessment was done with the help of the hip-knee-ankle (HKA) angle. The functional scoring was done via IKDC, Oxford knee score, WOMAC, and KOOS score.

**Results:** The mean follow-up was 3 y. Preoperatively mean HKA angle was 173±3º, whereas postoperative mean HKA angle was 184±3º. Target correction of HKA angle was achieved in 45 of 50 patients (90%). Whereas, there was under correction in 3 patients (6%) and overcorrection in 2 (4%) patients. There was a significant improvement in the postoperative functional score as compared to the preoperative scoring. A positive correlation was seen between the HKA angle and the functional scores. Complications like superficial pin tract infection were seen in 3 (6%) patients, deep infection in 1 (2%), and early union of osteotomy in 1 (2%) patient leading to undercorrection.

**Conclusion:** Precision is of utmost importance while correcting the alignment in HTO. The presence of a dynamic component of malalignment may lead to suboptimal alignment postoperatively. The use of a dynamic axial fixator helps in achieving calculated correction with low complication rates along with no residual implant in the knee postcorrection.

**P662**

**CHARACTERISTICS OF IMBALANCE OF ANTIENDOTOXIN IMMUNITY IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS AND ITS INFLUENCE ON PERSISTENT SYSTEMIC INFLAMMATION**

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**Objective:** Systemic lupus erythematosus (SLE) is one of the most severe autoimmune inflammatory diseases of the connective tissue which causes mortality. This study aimed to study the imbalance of antiendotoxin immunity in patients with SLE and its influence on the persistent systemic inflammation

**Methods:** We have examined 48 patients who were diagnosed with SLE I-II degree with an average age of 36.4±1.8 y. And control group consisted of 40 healthy volunteers. According to the degree of disease activity patients were divided into two groups: I degree- 41.7%, II degree - 58.3%. The study of blood samples was carried out by means of blood cold chain and antiendotoxin antibody of classes A, M and G (anti-LPS-IgA, anti-LPS-IgM and anti-LPS-IgG respectively) was determined by ELISA. The amount of C-reactive protein (CRP) in the blood serum was determined by "sandwich" variant ELISA using biotin streptavidin system of signal amplification. To estimate the amount of endogenous intoxication (EI) we determined the average weight molecules which were evaluated by the ultraviolet absorption spectrum in protein-free fractions of blood serum. Circulating immune complexes (CIC) were determined by precipitation method in 4.2% solution of polyethylene glycol.

**Results:** Patients with SLE demonstrated a drastic increase in titer of specific anti-LPS-IgG index and EI, on the background values of the normative anti-LPS-IgA and IgM, which indicate the chronic endotoxic aggression. The observed correlations between specific anti-LPS-IgG on the one hand and CRP and CIC on the other hand, confirm the association

of imbalance of antiendotoxin immunity to systemic inflammation in patients with SLE. So we can assume that the imbalance of humoral antiendotoxin immunity has a significant role in maintenance of autoimmune lupus inflammation. The high levels of CIC, CRP, molecular average weight (EI) are the combined results of both autoimmune process and endotoxemia which contribute to the target organ damage which worsens the clinical course of SLE.

**Conclusion:** Elimination of LPS, the normalization of the intestinal bioflora and strengthening the barrier function of the mucous membranes is a new priority and pathogenetically recommended direction in treating SLE.

## P663

### FRACTURE RATES AND ECONOMIC OUTCOMES BY AGE GROUPS IN PATIENTS WITH OSTEOPOROSIS RECEIVING RISEDRONATE GASTRO-RESISTANT (GR) VS. IMMEDIATE RELEASE BISPHOSPHONATES (IRB): A CLAIMS DATA ANALYSIS

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**Objective:** To compare fracture rates and economic outcomes between women with osteoporosis treated with risedronate GR vs. IRB. Risedronate GR can be taken with food and has a higher oral bioavailability[‡] than IRB.

**Methods:** Women with osteoporosis were selected from a large US claims database (2009-2019). The index date was the first dispensing date for an oral bisphosphonate. Patients were classified into the GR or IRB cohort based on the treatment initiated on that date and matched 1:1 based on demographic and clinical characteristics. Patients were observed for $\geq 2$ y following the index date. Incidence rates (IRs) of fractures and healthcare resource utilization per 1000 patient-years were compared between the two cohorts using IR ratios (IRRs). Outcomes were assessed overall and by age group (< 65 y, $\geq$ 65 y and $\geq$75 y).

**Results:** The 2726 patients in each cohort (median age: 60.0 y) were observed for 4.5 y on average. The IR of fractures was significantly lower in the GR cohort vs. the IRB cohort for any fracture sites (GR: 34.65, IRB: 42.13; IRR=0.83, p<0.05) and spine fractures (GR: 10.84, IRB: 15.13; IRR=0.71, p<0.05). Results remained consistent across stratifications by age group (Table). At each time point considered over the observation period, the rate of incident fracture was lower in the GR cohort, reaching statistical significance at 36 months (fracture rate; GR=7.08%; IRB=8.67%, p=0.037). The IR of hospitalizations was lower in the GR vs. the IRB cohort (GR: 106.74, IRB: 124.20; IRR=0.86, p<0.05) leading to significantly lower hospitalization costs among GR patients (average per-patient-per-year; GR: $3,611; IRB: $4,603, p<0.05).

**Conclusion:** Women with osteoporosis had a lower incidence of fractures when they are treated with risedronate GR compared to IRB. These results are consistent with the hypothesis that the bioavailability and therefore the efficacy of risedronate GR is independent of food intake and is higher than IRB.

Table.

|  | N | IR GR | IR IRB | IRR (95%CI) |
|---|---|---|---|---|
| All | 2,726 | 34.65 | 42.13 | 0.83 (0.70 – 0.97) * |
| < 65 y | 1,896 | 23.69 | 24.37 | 0.96 (0.75 - 1.24) |
| $\geq$ 65 y | 830 | 58.65 | 80.79 | 0.74 (0.60 - 0.91) * |
| $\geq$ 75 y | 392 | 81.22 | 102.84 | 0.80 (0.61 - 1.05) |

## P664

### PLASMA RICH IN GROW FACTORS (PRGF) LONG TERM TREATMENT EFFECTS IN BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAWS

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Prevention and treatment modalities for the patients with, or at risk of bisphosphonate-related osteonecrosis of the jaws (BRONJ) are still controversial and it have been changing over last few years. Interrupting bisphosphonate therapy does not seem to be beneficial in terms of time and can be used mostly in patient with osteoporosis. The purpose of this presentation is to evaluate the long term therapeutical effect of plasma rich in grow factors on bone healing in cases with BRONJ after 18 months observation period after teeth extraction or others oral surgery interventions. Biostimulant effects of PRGF add into bone defects reduce the healing time and local pain immediately after oral surgery. They improve the final reparative process of bone and mucosa, increase inorganic matrix of bone and osteoblast mitotic index and stimulate lymphatic and blood capillaries growth in the affected area. PRGF could be one of the modality for BRONJ treatment, being safe and well tolerated, and it permits the minimally invasive surgical treatment like teeth extraction of early stages of the disease [1-8].

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## P665

### OSTEOPOROSIS IN PATIENTS WITH CHRONIC RHINOSINUSITIS AND NASAL POLYPOSIS

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**Objective:** To investigate the BMD in a group of patients with chronic rhinosinusitis with nasal polyposis (CRSwNP) with asthma [1-5].

**Method:** 24 adult patients with a diagnosis of CRSwNP, and a history of at least one course of oral corticosteroids (OCS) during the last year, were included in this study. The BMD of the patients was measured by DXA.

**Results:** During the last 12 months, the mean number of OCS courses was 1.32. According to the t-scores, 11 patients were measured to have ≤-1 SD t-score lumbar spine, which is considered to be osteopenia, and 3 patients had <-2.5 SD t-score, considered as osteoporosis.

**Conclusions:** This study shows that one moderate course of OCS annually may be used without high risk of causing osteopenia/osteoporosis in patients with CRSwNP [6-9].

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## P666
## CHRONIC RHINOSINUSITIS WITH NASAL POLYPOSIS: NEW THERAPEUTIC APPROACHES

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**Objective**: Chronic rhinosinusitis associated with nasal polyposis (CRSwNP) affects 4% of the general population. As a chronic condition, it requires chronic pharmacological treatment [1-6]. Intranasal and systemic corticosteroids (CS) represent the "gold standard" treatment for CRSwNP. The present study aims to evaluate two treatment methods in CRSwNP: topical corticosteroids and antistaphylococcal vaccine.

**Methods:** 28 adult patients with a diagnosis of chronic rhinosinusitis with nasal polyposis were included in this study. 14 patients received treatment with topical corticosteroid and the other 14 received antistaphylococcal vaccine. The results were evaluated at 3 and 6 months. SNOT-22 test results and nasal endoscopy were evaluated in all subjects.

**Results:** The group of patients who were treated with topical corticosteroids had a notably improved score on the SNOT-22 test, as well as a better endoscopic score compared to the group that received vaccine treatment.

**Conclusion:** This study shows that intranasal corticosteroids treatment in patients with chronic rhinosinusitis with nasal polyposis is more effective than administration of topical antistaphylococcal vaccine [4, 5, 7-13].

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## P667
## ADVANTAGES OF STANDARDIZED PREOPERATIVE NERVE BLOCK VS. CONVENTIONAL ANALGESIA IN ELDERLY PATIENTS WITH HIP FRACTURE

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**Objective:** To determine the advantages of preoperative nerve block vs. conventional analgesia during hospital stay in elderly patients with hip fracture. Additionally, to compare hospital opioid consumption between patients with blockade and those with conventional analgesia as well as to determine the risk factors associated with delirium.

**Methods:** A two-arm prospective cohort study was carried out with ambispective data collection in patients 65 y or older treated for a fragility fracture of the hip in two 4th level hospitals in Bogotá, Colombia.

**Results:** The study sample comprised a total of 218 patients of which 119 received conventional analgesic management and 99 fascia iliaca nerve block. There was no relationship between blockage and development of delirium, however, it was found that delirium was associated with older age (p=0.010), admission to the ICU (RR=1.20, p=0.021), urinary tract infection (RR=2.32, p=0.002) and respiratory failure (RR=3.05, p=0.001). Patients without blockade presented a greater opioid consumption compared to those who received blockade (27.61 vs. 16.34 mg, p=0.03), as well as a longer duration of surgery time (90.84 vs. 81.08 min, p=0.030) and hospital stay (6.06 vs. 5.41 d). Additionally, it was found that the blockage acts as a protective factor to present pressure ulcers (RR=0.76). **Conclusion:** In the present study, the cohort who received preoperative nerve block showed a lower opioid consumption, a shorter surgical time and hospital stay, which improves the outcomes of orthogeriatric management and can positively influence the functionality and future morbidity and mortality of these patients. On the other hand, delirium is an important complication in elderly patients with hip fracture that have multiple comorbidities, cognitive impairment, and severe physiological stress. In this study, the preoperative nerve block did not show a decrease in delirium, this may be associated with confounding factors due to its multifactorial etiology and the size of the sample collected.

## P668
## OSTEOPOROSIS RISK ASSESSMENT USING THE IOF AND FRAX QUESTIONS AND OTHER FACTORS

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**Objective:** Osteoporosis is a systemic metabolic disease of the skeleton, characterized by an increased tendency to slightly traumatic bone fractures due to a decrease in bone mass and impaired bone tissue quality [1]. Our

objective was to study the data of scientific research on calciuria, to create a questionnaire for questioning healthy and sick people with the aim of preventing and treating osteoporosis, to conduct testing on patients, and to study the prevalence of risk factors for osteoporosis in the population.

**Methods:** During the survey, in addition to the basic data, patients were asked to answer the questions of the International Osteoporosis Foundation (IOF) and fracture risk assessment tool (FRAX), and the author's questionnaire was also presented to identify other factors. 100 patients were interviewed and their average age were 63±25 y.

**Results:** As a result of the survey, it was found that all respondents are at risk by at least one criterion. 50% of the respondents noted a history of pathological fractures, 25% took glucocorticoids in high concentrations, and 11% suffered from rheumatoid arthritis, which significantly affects the condition of the bones. Also, among women, a high risk of postmenopausal osteoporosis was noted, as one in five women reported early onset of menopause, interruptions in the menstrual cycle for more than 12 months, and removal of appendages during their lifetime. Separate attention should be paid to the identification of a strong positive correlation (R=0.901; P <0.001) between the fracture suffered and regular walks or vitamin D intake with a low average value of the second indicator.

**Conclusion:** It may be advisable to identify a large risk group using an IOF survey, and then offer a BMD study and, therefore, a FRAX questionnaire. The questionnaire we have developed allows us to expand the range of identifying risk factors for osteoporosis and to identify high-risk groups for early initiation of preventive measures.

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## P669

### THE IMPACT OF POSTOPERATIVE HYPOPARATHYROIDISM ON FRACTURES IN A TERRITORY-WIDE COHORT OF ELECTIVE TOTAL THYROIDECTOMY FOR BENIGN DISEASES: A 10-YEAR FOLLOW-UP

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**Objective:** The low bone turnover state in hypoparathyroidism may have potential deleterious effects on bone. Little is known about its impact on fracture risk. As postsurgical hypoparathyroidism is the most common cause of hypoparathyroidism, we assessed its impact on incident fracture risk in a territory-wide cohort of patients who underwent elective total thyroidectomy for benign pathologies.

**Methods:** All elective total thyroidectomies performed in 14 major hospitals across the territory from 1995-2014 were analyzed using an electronic health database. Permanent postsurgical hypoparathyroidism (PPH) was defined by the requirement of oral calcium and calcitriol shortly postoperatively and continued for ≥6 months. Those with albumin-corrected calcium <1.90 mmol/L on ≥1 occasion beyond one year post-operation were considered suboptimally controlled. Fractures were identified by ICD9-CM codes 805 (vertebral), 812 (humeral), 813-814 (wrist and forearm), and 820 (hip). Each patient was followed up until an index fracture, death, or 31 May 2020, whichever was earlier. Multivariable Cox regression analysis was used to identify clinical predictors of fractures.

**Results:** Among 4123 eligible patients, 460 (11.2%) had PPH. Over a median of 10.3 y, 126 patients suffered from an incident fracture (2.77 per 1000 person-years). The median time from thyroidectomy to fracture was 7.2 y. Fracture incidence did not differ between those with and without PPH (2.89 vs. 2.76 per 1000 person-years, respectively, p=0.848). There were no differences in fracture rates over upper extremities, lower extremities and vertebrae between groups. Subgroup analyses according to the adequacy of PPH control did not reveal significant differences in

fracture events. Age, history of fall, diabetes and baseline anti-depressant use independently predicted post-thyroidectomy fractures.

**Conclusion:** PPH was not uncommon after elective total thyroidectomy. We did not observe a significant difference in fracture risk between patients with and without PPH. The impact of PPH control on fracture risk remained to be determined. Nevertheless, clinicians should still take care of the traditional clinical risk factors of osteoporosis which predicted fractures in this post-thyroidectomy cohort.

## P670

### A COMPARISON OF CHANGES IN BONE TURNOVER MARKERS AFTER ROUX-EN-Y GASTRIC BYPASS AND SLEEVE GASTRECTOMY, AND THEIR ASSOCIATION WITH MARKERS OF INTEREST: THE ABOS-OS STUDY

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Roux-en-Y gastric bypass (RYGB) but not sleeve gastrectomy (SG) increases the risk of major osteoporotic fractures (MOF). However, it remains unclear whether the same degree of high turnover bone loss is associated with SG, which is now more common than RYGB. The aim of this study was to compare changes in bone turnover markers (BTMs) after RYGB and SG, and to investigate their association with pre-defined markers of interest. An ancillary investigation of a prospective cohort was conducted at a tertiary care center in France. SG patients with severe obesity ≥40 y were matched one-to-one to RYGB patients (controls) for age, sex, BMI and menopausal status. Bone turnover markers, as well as predefined markers of interest (calciotropic hormones, total calcium, insulin, sclerostin and adipokines), were measured at baseline, 12 and 24 months after bariatric surgery. Sixty-four patients (66% women) had a mean (SD) age of 49.6 y (5.1) and a mean (SD) BMI of 45.0 kg/m² (6.0). From baseline to 12 months, a significant increase in BTMs was observed in both groups (p-values<0.001). Moreover, RYGB was associated with a greater increase in C-terminal telopeptide (CTX) and procollagen type 1 N-terminal propeptide (P1NP) compared to SG (p-values<0.0001). From 12 to 24 months, a significant decrease in BTMs was observed in both groups, but no significant differences were found between RYGB and SG. However, BTMs did not return to baseline levels. Thus, a high degree of bone turnover was maintained in both groups up to 24 months. The changes in P1NP and CTX at 12 months were independently associated with the type of surgical procedure, after adjusting for weight or each predefined marker of interest (all p<0.0001). In conclusion, RYGB was associated with a greater increase in BTMs than SG at 12 and 24 months. These findings may partly explain the higher risk of MOF observed after RYGB.
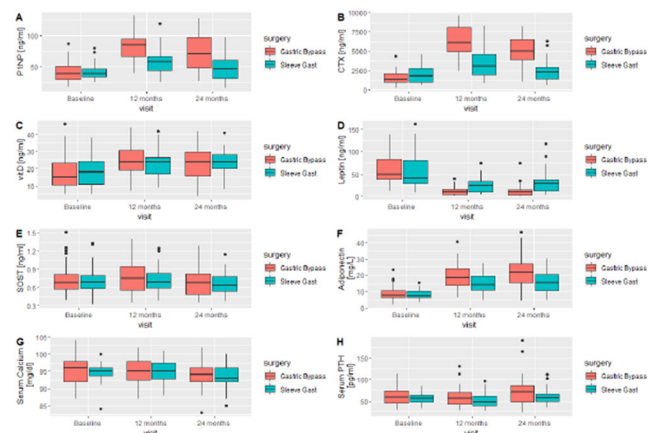
## P671

### FEATURES OF BLOOD COUNTS IN RHEUMATOID ARTHRITIS AND REACTIVE ARTHRITIS AND ADDITIONAL POSSIBILITIES FOR DIFFERENTIAL DIAGNOSIS

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**Objective:** Rheumatoid arthritis (RA) is an autoimmune rheumatic disease of unknown etiology, characterized by the development of chronic erosive arthritis (synovitis) and systemic inflammatory lesions of internal organs. Reactive arthritis (ReA) - nonsuppurative "sterile" inflammatory diseases of the musculoskeletal system, induced by infections of extra-articular localization, primarily of the urinary or intestinal tract. The differential diagnosis of rheumatoid arthritis with reactive arthritis (ReA) deserves special attention. This study aimed to study the features of blood counts in rheumatoid arthritis and reactive arthritis and its additional possibilities for differential diagnosis.

**Methods:** Study consist of 100 patients with two groups of 50 patients each with RA and ReA. The average age of patients were 45±28 y. RA is often accompanied by anemic syndrome. In the case of differential diagnosis of RA and ReA, when detecting low hemoglobin levels, one should think about rheumatoid arthritis. In addition, the phenomenon of thrombocytopenia is characteristic of RA.

**Results:** From our data low hemoglobin levels and thrombocytopenia were detected which is a characteristic of RA. Thee phenomena of leukocytosis, eosinophilia, monocytosis, as well as a shift of the leukocyte formula to the left were detected which is a characteristics of reactive arthritis. With the manifestation of RA and a short duration of the disease (up to 5 y), the level of A-CCP is low. The detection sensitivity of the A-CCP method increases with the duration of the disease and rarely reflects the presence of the disease, but rather determines the degree of its activity. In the differential diagnosis of these diseases, one should pay attention to the frequent synchronous and unidirectional increase in the levels of ESR, CRP and seromucoids in cases of ReA. The high value of RF and seromucoids in diseases accompanied by arthritis is more evidence in favor of the diagnosis of RA, and, accordingly, excludes the presence of reactive arthritis.

**Conclusion:** From the results, the features of the blood counts in the RA and ReA are almost similar. But our study gives special distinctive characteristics which provides a way for additional possibilities in differential diagnosis and early treatment with prevention of complications.

## P672

### HEALTH-RELATED QUALITY OF LIFE OF PATIENTS WITH A RECENT FRACTURE AT FRACTURE LIAISON SERVICE: A THREE-YEAR FOLLOW-UP STUDY

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**Objective:** To estimate the 3-y health-related quality of life (HRQoL) of patients with a recent fracture presenting at Fracture Liaison Service (FLS) and to explore factors associated with health state utility value (HSUV).

**Methods:** Data from a 3-y prospective observational study in patients attending the FLS was used. Patients' HSUVs were derived from the EQ-5D-5L and SF-6D and calculated at six time-points: baseline, 3, 6, 12, 24, 36 months. Multiple imputation was applied for missing data. Linear mixed-effects regression analysis with random intercept and slope was applied to compare mean HSUV between baseline and each time point, and to explore the course of HSUV over 3 y. A backward stepwise elimination was applied to identify factors associated with HSUV.

**Results:** A total of 499 patients were included. The yearly change of HSUV was not significant over 36 months (P=0.52) although the mean HSUV at 6 months (mean difference (MD): 0.015, 95%CI: 0.002-0.029; P=0.02) and 12 months (MD: 0.018, 95%CI: 0.004-0.032; P=0.01) were slightly but significantly higher compared to baseline. There was no significant difference in the course of HSUV between the predefined ten fracture categories (P=0.86), but the HSUV of the combined group of patients with femoral, vertebral or multiple fractures was 0.096 units (P<0.001) lower compared to patients with other fractures. Subsequent fracture, prevalent vertebral fracture, osteoporosis medication use, use of walking aid, previous falls and BMI were identified factors associated with EQ-5D HSUV. Comparable results were identified using SF-6D HSUV.

**Conclusion:** The 3-y change in HSUV was not statistically significant although significant improvements were observed at 6 and 12 months compared to baseline. Six factors were negatively associated with EQ-5D HSUV.

## P673

### ADMISSION OF HIP FRACTURE PATIENTS DURING COVID-19 PANDEMIC: A SYSTEMATIC REVIEW

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**Objective:** COVID-19 pandemic and measures taken to control the spread of virus led to changes that can potentially influence the disease incidence and health seeking behavior of people. This systematic review assessed the pattern of admission of hip fracture patients during the pandemic.

**Methods:** The study was done adhering to the PRISMA guidelines. A PubMed search was done on 17th May 2021 using keywords "COVID-19" or "SARS-CoV-2" and "hip fracture". Original studies published in English language, related to hospital admissions were selected by two authors independently. Discrepancies were resolved by consensus and data were collected using a predetermined datasheet.

**Results:** The initial search returned 147 publications and 39 were related to admission of incident hip fractures. Studies have compared admissions during 2020 with previous years; 2019 and 2018. In general, there was a significant reduction of admissions due to fractures/trauma but eight studies reported no change in hip fracture admissions during pandemic (Miranda,2021; Onizuka,2021; Nia,2021; Donovan,2020; Karia,2020; Ogliari,2020; Yu,2020 and Nunez,2020). While two studies reported a slight increase in the rate of hip fracture admissions (Dolci,2020 and Pintado,2020) three studies reported a decrease in hip fracture admissions during the pandemic (Zhong,2021; Vaishya,2021 and Park,2020). One study reported a longer gap between the time of injury and hospital admission (Jarvis,2021) while another found more males presenting with hip fracture compared to females (Nazemi,2021).
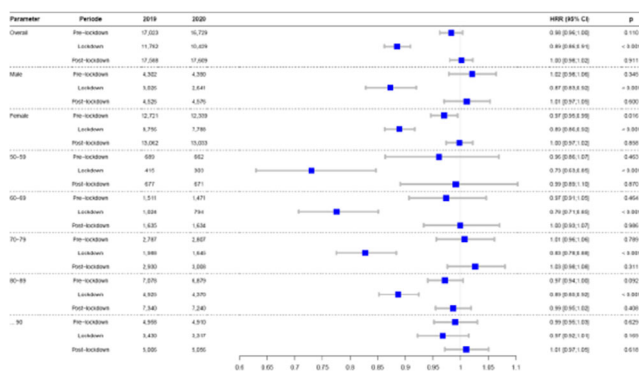
**Conclusion:** The reduction of the total number of fractures is probably related to less road traffic accidents and sport related injuries during

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estradiol 1.0 mg, norethindrone acetate 0.5 mg) reduced dysmenorrhea, non-menstrual pelvic pain (NMPP) and dyspareunia in premenopausal women with endometriosis-associated pain (EM). Rel-CT was associated with minimal BMD loss over 24 weeks (wks). To characterize safety in patients from different regions, we assessed if there was geographical variation in skeletal response to Rel-CT.

**Methods:** Premenopausal women (age 18–50 y) with moderate-to-severe dysmenorrhea and NMPP were randomized 1:1:1 to receive Rel-CT or placebo (PBO) for 24 wks, or Delayed Rel-CT (relugolix 40 mg alone then Rel-CT; both for 12 wks). Lumbar spine (L1–L4) BMD was assessed by DXA at baseline, Wk 12 and 24. Change in BMD from baseline was summarized by treatment group. Analyses were stratified by geographical region (Europe, North America [NA], Rest of World [RoW]).

**Results:** In the pooled SPIRIT studies (N=1251), mean% change from baseline at 24 wks in lumbar spine BMD were 0.12% for PBO, –0.72% with Rel-CT, and –1.94% with Delayed Rel-CT. By region, results with Rel-CT were similar at 12 and 24 wks in Europe, NA and RoW (Table). Similar results were seen at the proximal femur.

Table.

|  | N | Least squares mean (SE)% change from baseline in lumbar spine BMD | |
|---|---|---|---|
|  |  | Wk 12 | Wk 24 |
| Overall |  |  |  |
| PBO | 416 | 0.09% (0.16) | 0.12% (0.18) |
| Rel-CT | 418 | –0.49% (0.16) | –0.72% (0.17) |
| Delayed Rel-CT | 417 | –1.76% (0.17) | –1.94% (0.18) |
| Europe |  |  |  |
| PBO | 265 | 0.39% (0.59) | 0.42% (0.60) |
| Rel-CT | 270 | –0.33% (0.59) | –0.49% (0.60) |
| Delayed Rel-CT | 265 | –1.70% (0.59) | –1.94% (0.60) |
| NA |  |  |  |
| PBO | 89 | 0.00% (0.29) | 0.12% (0.33) |
| Rel-CT | 90 | –0.45% (0.29) | –0.85% (0.32) |
| Delayed Rel-CT | 91 | –0.97% (0.29) | –0.94% (0.32) |
| RoW |  |  |  |
| PBO | 62 | –0.29% (0.38) | –0.36% (0.38) |
| Rel-CT | 58 | –0.33% (0.39) | –0.69% (0.38) |
| Delayed Rel-CT | 61 | –2.20% (0.39) | –2.38% (0.39) |

**Conclusions:** Compared with relugolix alone, Rel-CT minimized BMD loss over 24 wks. Similar results with Rel-CT were observed among different geographic regions. Rel-CT is a potential option to provide therapeutic benefit while preserving BMD for women with EM.

**Disclosures:** Consulting fees: MM, SF (Myovant Sciences). Employee/stock: SJI, RBW (Myovant Sciences). This study was funded by Myovant Sciences.

**P677**
## HORTON'S DISEASE ABOUT A CASE

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**Objective:** Horton's disease or giant cell arteritis is the most common systemic vasculitis of large and medium caliber arteries, most often affecting people over 50 years old. This vasculitis is associated in 40% of cases with polymyalgia rheumatica. The definitive diagnosis is based on biopsy of the temporal artery. We report the case of a patient with giant cell arteritis.

**Case report:** Mr KA, 69 years old with no medical history, who consults for a recent onset of an inflammatory scapulalgia associated with diffuse headaches predominantly temporal and intermittent jaw claudication, all evolving in a context of fever, weight loss of 13 kg in 3 months and profound asthenia. A history of morning stiffness exceeding 1 h was found. Clinical examination revealed painless limited movements of the shoulders predominantly on abduction and flexion, an induration of the temporal arteries with decreased pulsation on the right side, and a recent reduction in visual acuity on the same side. Investigations: ESR=105 mmh1; CRP=65 mg/l. Ultrasound of the shoulders: tenosynovitis of the biceps brachii bilaterally. Vascular echo-doppler of the temporal arteries finds a diminished flow in both temporal arteries especially on the right side, without a halo sign. Biopsy of the right temporal artery: granulomatous arteritis made of intimal thickening with histiocytes in contact with the internal elastic limiter and an inflammatory giant cell infiltrate. The patient was put on corticosteroids at a dose of 0.7 mg/kg/d associated with adjuvant measures with a spectacular response after 5 d marked by a disappearance of clinical signs and a negativation of the biologic inflammatory features.

**Conclusion:** Horton's disease remains a rare condition whose functional prognosis can be threatened especially by the risk of blindness, hence early diagnosis and adequate management must be initiated.

**P678**
## THE RELATIONSHIP BETWEEN METABOLIC SYNDROME AND OSTEOARTHRITIS

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**Objective:** To evaluate the relationship between MS and its components and clinical and radiological manifestations of knee OA.

**Methods:** The prospective study included 125 women with Kellgren-Lawrence stage II-III knee OA (ACR). The average age of pts was 54.2 ±7.6 y.o., the average disease duration was 8(4-12) y. An individual map was filled out for each patient, including anthropometric indicators, anamnesis and clinical, instrumental examination data. MS according to the IDF.

**Results:** MS is diagnosed in 60% of pts. The pts were divided into 2 groups, according to the presence or absence of MS (Table). Pts with MS had a more severe clinical course of knee OA: higher levels of the total WOMAC, pain and functional failure; synovitis and pronounced cartilage defects and bone marrow edema (according to WORMS) were more often detected. The laboratory examination revealed higher concentrations of COMP, insulin, cholesterol, and TG in patients with MS. Spearman correlation analysis showed positive correlations between MS and knee pain according to VAS (r=0,35, p=0.02), dimensions of medial osteophytes of the femur (mm) (r=0.41, p=0.01), synovitis (r=0.23, p=0.05), CRP (r=0.31, p<0.0), COMP (r=0.49, p<0.01) and leptin (r=0.4, p<0.01).

Table.

| Parameter | Pts with MS (n=75) | Pts without MS (n=50) | p |
|---|---|---|---|
| Dimensions of medial osteophytes of the femur, mm, Me | 4.5 (2.3-5.7) | 2.1(1.3-3) | 0.01 |
| Knee pain (VAS),mm, Me | 47 (40-60) | 40 (33-51) | 0.07 |
| Leptin, ng/ml, Me | 33.9(25.5-48.2) | 24.7(15.1-32.1) | 0.008 |
| COMP, ng/ml, Me | 30.4(23.5-43.6) | 20.3(18.6-30.4) | 0.001 |

**Conclusion:** It has been demonstrated that the metabolic phenotype of OA has a more severe course. The correlation analysis showed significant positive associations between MS and knee pain according to VAS, sizes of osteophytes, synovitis, CRP, leptin, insulin, and COMP. The results obtained confirm that the therapy of this phenotype should include therapeutic interventions aimed not only at OA, but also at the components of MS.

## P679

### PREDICTION OF SUSTAINED BIOLOGIC AND TARGETED SYNTHETIC DISEASE MODIFYING ANTIRHEUMATIC DRUG FREE REMISSION IN RHEUMATOID ARTHRITIS PATIENTS

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**Objective:** To develop a prediction model of sustained remission following biologic or targeted synthetic disease modifying antirheumatic drug (b/tsDMARD) stop in rheumatoid arthritis (RA).

**Methods:** We conducted an explorative cohort study among b/tsDMARD RA treatment episodes courses stopped due to remission in the Swiss Clinical Quality Management registry (SCQM) [2008-2019]. The outcome was sustained b/tsDMARD free remission of ≥12 months. We applied logistic regression model selection algorithms using stepwise, forward, backward selection, and penalized regression to identify patient characteristics predictive of sustained b/tsDMARD free remission. We compared c-statistics corrected for optimism between models. The three models with highest c-statistics were validated in new SCQM data until 2020 (validation dataset).

**Results:** We identified 302 eligible episodes of which 177 episodes (59%) achieved sustained b/tsDMARD free remission. Two backward and one forward selection model with 8, 4, and 7 variables, respectively, obtained highest c-statistics corrected for optimism of c=0.72, c=0.70, and c=0.69, respectively. In the validation dataset (47 eligible episodes), the models performed with c=0.99, c=0.80, and c=0.74, respectively, and excellent calibration. The best model included the following 8 variables (measured at b/tsDMARD stop): RA duration, b/tsDMARD duration, other pain/anti-inflammatory drug use, quality of life (EuroQol), DAS28-erythrocyte sedimentation rate score, health assessment questionnaire (HAQ) score, education, and interactions of RA duration and other pain/anti-inflammatory drug use, and of b/tsDMARD duration and HAQ score.

**Conclusion:** Our results suggest that models with up to 8 variables may predict sustained b/tsDMARD free remission with good efficiency. External validation is warranted. Our results suggest that a model with up to 8 variables (identified at b/tsDMARD stop due to remission) may predict sustained b/tsDMARD free remission with good efficiency. External validation is warranted.

## P680

### OSTEOPOROTIC THORACOLUMBAR FRACTURE'S MANAGEMENT: A CASE REPORT

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**Objective:** As life expectancy increases so does elderly population and osteoporosis rates. Osteoporosis is defined as a decrease of the BMD witch clinically states on an increase of the bone fragility and subsequent fractures. The spine is the most common site for osteoporotic fractures and these can result in significant morbidity and potential mortality even though they are likely to heal without complication. Although conservative is the initial treatment option for most of these osteoporotic fractures, in some of them operative treatment is indicated as it was on the case we report. Our objective is to expose a case report of a patient who needed surgical treatment of an osteoporotic lumbar fracture after failure of the conservative treatment.

**Case report:** We present the case of a 77-year-old woman who came to our hospital with a lumbar back pain after she falling from a chair, she did not have any neurological focality, and she was immobilized with an orthosis. An X-ray test was taken (Figure 1) where we could see an osteoporotic L1 fracture which has lost more than 50% of the height and with a Farcy angle of 22º. We consider this fracture as unstable and we decided to do a posterior percutaneous transpedicular fixation including the superior and the inferior vertebral bodies, D12 -L1 -L2. (Figure 2) We decided not to do any augmentation technique. After 2 months of follow up, the patient is happy with the result, her back pain does not restrict her everyday activities and the L1 vertebral body has not shown any signs of increasing collapse.



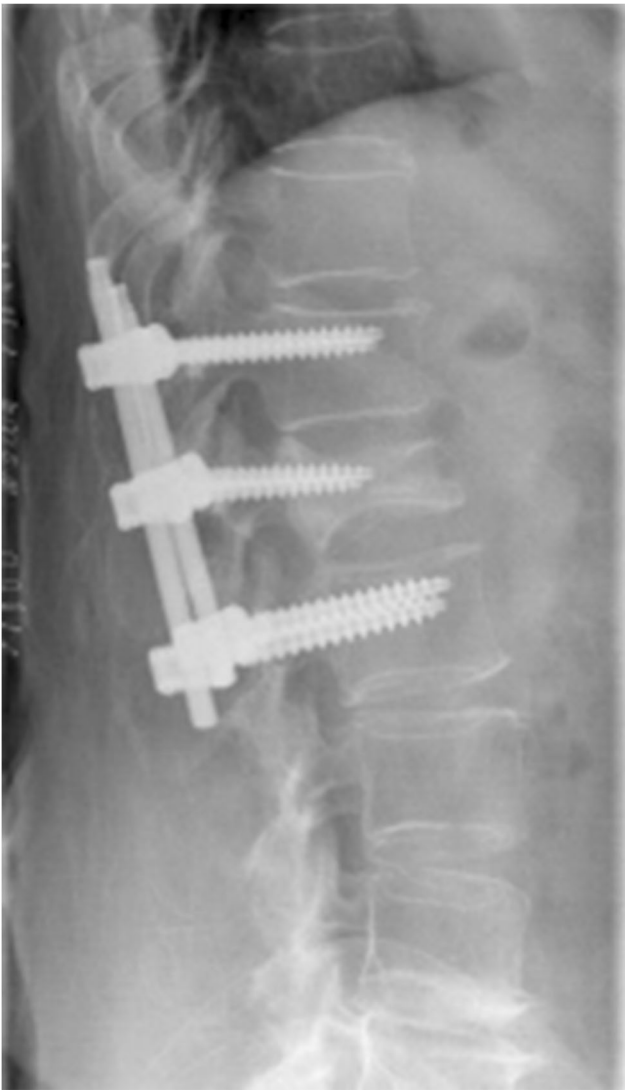Figure 1. Lateral X-Ray of L1 acute fracture

Figure 2. Percutaneous posterior instrumentation D12-L2, postoperative X-Ray

**Conclusion:** Elderly and female are two of the biggest risk factors for osteoporosis. It is important to diagnosis this fractures and to treat them, but above all it is essential to prevent these fractures.

**P681**

## MORTALITY RISK ASSOCIATED WITH OSTEOPOROTIC FRAGILITY FRACTURE

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**Objective:** To assess predictive factors of mortality occurring after a FF.
**Methods:** We performed a retrospective monocentric study that included patients with a FF observed at the emergency department (ED) in a tertiary center, between 1 January 2017 and 31 December 2018, with 2-4 y follow-up after FF (until 31 December 2020). 1673 FF were identified. After calculating a representative sample (90%CI), 172 hip, 173 wrist and 112 vertebral fractures were included. In multivariate analysis we included variables with a significant association in univariate analysis and those with clinical relevance.

**Results:** There was a total of 457 patients evaluated, out of these 79.9% (365) were woman with a mean age of 77.6 (SD=10.3) years old at the time of their FF. 120 patients (26.3%) died during the follow-up period, 35.9% of the men and 23.8% of women inserted in this study. Of these patients 46.5% had a hip fracture and 20.5% a vertebral fracture. We found an association between mortality and male gender (p=0.024), age (older patients had a bigger mortality, p<0.001), hip fracture (p<0.001), more daily different medications (p<0.001) and comorbidities (p=0.001), daily oral corticosteroid treatment (p=0.024), normal or low body index mass (BMI) (p<0.001), previous visits to the ED due to falls (p=0.022), type 2 diabetes (p=0.022), cardiac disease (p<0.001), neurologic disease (p<0.001), chronic kidney disease (p<0.001) and no osteoporosis treatment started after FF (p=0.007). No associations were found between mortality and previous fractures before the fracture included in this study, anxiolytic or antiepileptic treatment, arterial hypertension, dyslipidemia or other comorbidities. After adjustment for gender, daily medication, comorbidities, anti-osteoporotic treatment, previous visits to the ED due to falls and type 2 diabetes, the main predictors of mortality were age (p<0.001), hip fracture (p=0.004), daily corticosteroid treatment (p=0.009), normal or low BMI (p<0.001) and cardiac (p=0.041), neurologic (p=0.049) or chronic kidney disease (p<0.001).
**Conclusion:** Age, hip fracture and certain comorbidities seem to be associated with higher mortality after a FF. We need to consider these comorbidities and actively search for osteoporosis in these patients to prevent FF.

**P682**

## EFFECTIVENESS OF CALCIUM CITRATE IN COMPARISON WITH CALCIUM CARBONATE FOR THE MANAGEMENT OF CHRONIC HYPOPARATHYROIDISM

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**Objective:** Hypoparathyroidism(HypoPT) is characterized by a deficient secretion/action of PTH associated with low calcium level. It was clearly demonstrated that HypoPT managed with conventional therapy is strictly associated with increased risk of nephrolithiasis. Citrate salts are widely used in the treatment of nephrolithiasis, due to their inhibitory effect on kidney stone formation. Up to now, there are no studies aimed to assess the efficacy of calcium citrate(Ca Cit) for the management of HypoPT. This study aimed to assess the impact of Ca Cit vs. calcium carbonate (Ca Carb) on the nephrolithiasis risk, to investigate its ability to preserver normal calcium levels and its impact on quality of life (QOL) in HypoPT.
**Methods:** We designed a randomized, double-blind crossover study and enrolled subjects with postsurgical chronic HypoPT. From one week before randomization and during all study period, all patients were instructed to adhere to a specialized diet at home (low sodium and oxalate intake). Each subject was randomized to drug A (Ca Cit) or drug B (Ca Carb) for one month and then crossover to the other supplement for another month. At each visit, all participants underwent a clinical, biochemical examination including calcium-phosphorus metabolism and nephrolithiasis risk evaluation on 24-h urine specimens.

**Results:** After consecutive screening, 24 patients with HypoPT (mean age 54.7±12.5 y, 21 female) have been enrolled. No difference in baseline anthropometric characteristics and laboratory biomarkers was found between groups. While the serum calcium levels remain stable in both groups, a reduction of both urinary oxalate/creatinine ratio (-2.46±11.93 vs. 7.42±17.63, p=0.029) and potassium excretion (-5.66±14.36 vs. 5.00 ±14.90, p=0.013) was found in Ca Cit group compared with Ca Carb. At follow-up, seven patients (30.4%) suffered from constipation after Ca Carb supplementation compared to one (4.3%) after Ca Cit (p=0.047). No difference between groups was found for relative changes in SF-36 and fatigue score.

**Conclusion:** In HypoPT, Ca Cit was able to preserve normal calcium levels and even though it reduced oxalate/creatinine ratio, it did not reduce the overall lithogenic risk in comparison to Ca Carb. Ca Cit might have a positive impact on HypoPT QOL by reducing constipation.

## P683
### RHEUMATOID ARTHRITIS PATIENT CLUSTERS WITH FIRST-TIME BIOLOGIC OR TARGETED SYNTHETIC DISEASE MODIFYING ANTI-RHEUMATIC DRUGS IDENTIFIED THROUGH DEEP LEARNING

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**Objective:** To use deep learning to describe patient groups with first-time biologic or targeted synthetic disease modifying anti-rheumatic drug (b/tsDMARD) in rheumatoid arthritis (RA).

**Methods:** We conducted a descriptive study among RA patients with first-time b/tsDMARD use in the Swiss Clinical Quality Management registry (SCQM) between 1999-2018. The date of the fist-time b/tsDMARD use was the cohort entry. Patients with a DAS28-erythrocyte sedimentation rate (esr) record ≤6 months of first-time b/tsDMARD use were eligible. At cohort entry, patients were clustered using deep embedded clustering via an adaptive deep neural network. We defined the numbers of clusters in different runs to be 3, 4, and 5. We further performed the clustering process twice with differing specifications. Features were measured at cohort entry and included demographics, RA disease burden/duration, lifestyle factors, and conventional synthetic (cs) DMARD and prednisone use.

**Results:** A total of 24 identified clusters comprised 362-1481 patients per cluster among 3516 unique patients. Each cluster was similar to at least 1 other cluster based on patient characteristics. Thus, we could group all clusters into 6 distinct groups. First, clusters with highest frequencies of individual csDMARD and prednisone use and a tendency towards seropositive and no family history of rheumatic diseases. Second, clusters of men with highest frequency of smoking and BMI. Third, clusters of seronegative patients with lowest frequency of prednisone use. Fourth, clusters of women with high disease burden/duration. Fifth, clusters of younger patients with low disease burden/duration and a tendency towards seropositivity. Sixth, clusters of older patients.

**Conclusion:** This study suggests that deep learning can be used to identify different RA patient groups with first-time b/tsDMARD use.

**Acknowledgements:** Pharmaceutical industries and donors support SCQM financially (www.scqm.ch/sponsors). Rheumatology offices and hospitals contribute data to SCQM (www.scqm.ch/institutions).

## P684
### FALLS IN WOMEN WITH RHEUMATOID ARTHRITIS

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**Objective:** In a retrospective study, to identify the frequency of falls and the factors that affect them in pts with RA

**Methods:** 93 women (mean age 61.2±10.7 y) with RA, confirmed in accordance with the criteria of ACR/EULAR (2010), were enrolled. The median duration of the disease was 12.4 [4.0;18.0] y. Baseline assessments included socio-demographic, medical and lifestyle related risk factors: age, BMI (kg/m$^2$), fall occurrence in the last 12 months; ESR (mm/h); CRP (mg/l), creatinine (mkmol/l), uric acid (mmol/l), pain (VAS) ranging from 0-100 mm; disease activity, measured by the Disease Activity Score 28/ESR (DAS-28/ESR); anti-RA treatment, smoking, dizziness, visual impairment, physical function, assessed by the HAQ; risk of falling - the 5-time sit down-to-stand up test, hand grip strength and the Short Battery of physical performance.

**Results:** 44 (47.3%) pts with RA had at least one fall, among them 19 (20.4%) experienced multiple (>1) falls during the past year. Persons with falls were older and had a lower BMI. There was a significant positive correlation by Spearman between falls and age of RA pts (r=0.28, p<0.05), DAS 28 (r=0.29, p<0.05), pain on the VAS (r=0.33, p<0.05). Smoking (r=0.24, p<0.05), dizziness (r=0.22, p<0.05). In univariate logistic regression analyses age (OR 1.06; 95%CI 1.01-1.10; p=0.041), smoking (OR 3.6; 95%CI 1.01-13.6; p=0.032) and aseptic femoral head necrosis (OR 3.40; 95%CI 0.90-12.87; p=0.046) were associated with falls. Number of medications, duration of rheumatoid arthritis, functional capacity, and physical tests showed no associations with history of falls in the past year.

**Conclusion:** We observed that the frequency of falls is quite common in RA population. The occurrence of falls in our sample of RA pts bears relation to age, smoking and presence of aseptic femoral head necrosis. We found out no relation to disease activity, functional capacity, or physical performance tests.

## P685
### LOW TRABECULAR BONE SCORE AND INFLAMMATION IN CROHN'S DISEASE PATIENTS

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**Objective:** Bone impairment is a common complication in inflammatory bowel disease. Trabecular bone score (TBS) is a relatively new parameter in assessment of bone microarchitecture. The aim of the study was to provide its utility in patients with Crohn's disease (CD).

**Methods:** 48 patients diagnosed with CD were included in this study. Intestinal (fecal calprotectin) and blood inflammatory profile [erythrocytes sedimentation rate (ESR), protein C reactive, fibrinogen], were performed to all of them. BMD lumbar spine and hip were evaluated with DXA, with TBS calculation. A TBS value <1.35 is considered low TBS. We divided the patients into two groups in order to analyze the differences.

**Results:** The patients included in the study had a median age 44 (23) y, median BMI 24.4 (7.3) kg/m$^2$ and disease duration 7 (6) y. Mean TBS was 1.38±0.1 and nearly one-third of them had TBS <1.35 (35.4%). When compared between the groups, patients with low TBS had higher calprotectin level and ESR level (120 (284) vs. 30 (148) mcg/g, p=0.03, respectively 17 (20) vs. 8(11) mm/h, p=0.04). Although higher values in lower TBS group, protein C reactive and fibrinogen were not significantly different. Significantly lower BMD values at both lumbar spine and hip

sites were found in these patients (0.91±0.19 vs. 1.1±0.13, p<0.001, respectively 0.76±0.13 vs. 0.93±0.12, p<0.001)

**Conclusion:** TBS could represent a good tool for assessment of bone abnormalities in CD in active inflammatory state. Higher calprotectin and ESR levels are seen in patients with low TBS. Prospective studies should be conducted in order to see if TBS values improves with decrease of inflammation.

## P686
### DYSFUNCTION OF THE RESPIRATORY MUSCLES, EXERCISE TOLERANCE AND CHARLSON COMORBIDITY INDEX IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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**Objective:** To investigate dysfunction of the respiratory muscles, exercise tolerance and Charlson comorbidity index in patients with chronic obstructive pulmonary disease (COPD).

**Methods:** 76 patients with COPD were observed (34 patients with COPD 2 Stage, 33 patients with COPD 3 Stage, 9 patients with COPD 4 Stage). The investigated group was made by the patients having the long experience of smoking. The average age in this group was 61.01±5.05 y. Research of function of external breath was studied with multimodular installation "Master-Lab/Jaeger". Maximal inspiratory pressure (MIP) and maximal expiratory pressure measurements were performed, using a body plethysmography machine. The Respiratory muscle strength was assessed by measuring Pi max and Pe max mouth pressures (kPa,% Pred). Comorbidity was assessed by the Charlson Comorbidity Index, exercise tolerance test was evaluated by the 6-min walk (6MWD).

**Results:** Indicators Pi max of the strength of the respiratory muscles were in COPD patients with 2 stage 7.83±2.04 kPa (75.27±19.79%), in patients with COPD 3 Stage 6.85±2.03 kPa (65.86±19.25%), in patients with stage 4 COPD 5.61±1.59 kPa (53.77±15.19%). Indicators Pe max of the strength of the respiratory muscles were in COPD patients with 2 stage 12.19±5.22 kPa (92.29±27.56%), in COPD patients with 3 Stage 9.94±2.9 kPa, (74.3±21.97%), in COPD patients with 4 stage 9.02±1.99 kPa (67.88 ±14.83%). 6MWD in COPD patients with 2 Stage was 378.4±96.5 m, in patients with 3 stage was 351.4±114.16 m, in patients with 4 Stage was 224.28±123.4 m. Charlson comorbidity index in COPD patients with 2 Stage was 3.74±0.96 points, in COPD patients with 3 Stage was 4.21±0.99 points, in COPD patients with 4 Stage was 4.5±1.07 points.

**Conclusion:** Dysfunction of respiratory muscles in COPD patients with stage 4 was maximum, the significant decrease of Pi max, a reduction of exercise tolerance and the highest rate of comorbidity were detected compared with the parameters of patients with COPD stages 2 and 3.

## P687
### TRABECULAR BONE SCORE IN YOUNG CROHN DISEASE PATIENTS: CASE CONTROL STUDY

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**Objective:** Low BMD is a common complication associated with inflammatory bowel disease (IBD) patients. Multiple risk factors are linked, including chronic inflammation, glucocorticoid treatment, malabsorption. However, the impact in young adults in still on debate.

**Methods:** 52 premenopausal women and men <50 y IBD patients and 53 age, sex, BMI matched healthy subjects were included in the study. BMD (g/cm$^2$) of the lumbar spine and hip was analyzed using DXA and trabecular bone score (TBS) was calculated by each spine DXA examination. Low BMD was considered as Z-score<-2SD.

**Results:** 33 Crohn's disease (CD) and 19 ulcerative colitis (UC), with median age 33 (17) y and disease duration 5 (7) y, mean age at diagnosis 26.9±10.3 SD y, median BMI 22.2 (5.4) kg/m$^2$ were enrolled in the study. 53 age, BMI, gender matched healthy subjects comprised the control group. All DXA parameters were significantly lower in IBD patients than in controls: LS BMD (1.07±0.17 vs. 1.16±0.16, p=0.005), hip BMD (0.91±0.13 vs. 0.98±0.13, p=0.01) and TBS (1.40±0.1 vs. 1.45±0.099, p=0.01). Moreover, low BMD prevalence was higher in IBD patients when compared to controls. (χ=8.5, p=0.003).

**Conclusion:** Low BMD represents an important complication that can occur even in younger adults, and long term follow up should be offered in order to decrease the risk of fragility fractures.

## P688
### DXA-BASED BONE STRAIN INDEX IN NORMOCALCEMIC PRIMARY HYPERPARATHYROIDISM

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**Objective**: Normocalcemic hyperparathyroidism (NHPT) is a condition characterized by levels of albumin-adjusted total serum calcium and ionized calcium consistently within normal limits associated with constantly elevated PTH values after ruling out secondary causes of high PTH. Although few previous studies reported bone impairment in patients with NHPT, the largest recent cross-sectional evaluation showed no significant reduction of BMD and trabecular bone score nor increased number of fragility vertebral fractures compared to controls. No definitive data are available on the bone quality assessment in NHPT. Bone strain index (BSI) is a new tool to estimate bone strength. It applies the finite element analysis on lumbar spine and femoral neck DXA images. Higher BSI values indicate lower bone strength. This study aimed to assess the lumbar spine (LS), femoral neck (FN), and total hip (TH) BSI in NHPT compared to controls and PHPT

**Methods:** Design: cross-sectional study. Setting: Outpatient clinic. Patients: 40 NHPT, 50 PHPT and 100 age- and sex-matched control subjects. Main outcome measures: LS-BSI, FN-BSI, TH-BSI.

**Results:** LS-BMD, FN-BMD, TH-BMD was not different between NHPT and both PHPT and controls. TBS was not different between NHPT and both PHPT and controls. FN-BSI was lower in NHPT compared to PHPT (1.36±0.23 vs. 1.51±0.33, p=0.03), while there were no differences between NHPT and controls. TH-BSI was lower in NHPT compared to PHPT (1.52±0.3 vs. 1.72±0.41, p=0.028), while there were no differences between NHPT and controls. LS-BSI was not different between NHPT and both PHPT and controls.

**Conclusion:** In NHPT, BSI is not impaired showing a bone quality phenotype similar to controls.

## P689
### SEVERE OSTEITIS FIBROSA CYSTICA IN YOUNG PATIENT WITH PRIMARY HYPERPARATHYROIDISM AND THE RARE MUTATION OF MEN1

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**Objective:** Multiple endocrine neoplasia type 1 (MEN1) is a rare inheritable syndrome. None of the described *MEN1* mutations has been associated with peculiar symptoms, a genotype-to-phenotype correlation doesn't exist. In most cases, primary hyperparathyroidism (PHPT) is the initial manifestation of MEN1 in the 2 to 4 decade of life, that can be mostly asymptomatic.

**Methods:** We presented a clinical case of 23-year-old patient with severe bone complications of PHPT and *MEN1* mutation of uncertain significance.

**Results:** At admission his main complaints included severe pains in the knees limited his mobility, as well as in the left wrist, lumbar spine, polyuria and intensive headaches. There was no family history of endocrinopathies. Since adolescence, he underwent multiple low-energy fractures of the right tibia, left clavicle, humerus and femur. The histopathological examination assumed "brown tumors". Lab tests confirmed PHPT: albumin-adjusted calcium 2.96 mmol/l (2.1-2.55), PTH 208.8 pg/ml (16-65), osteocalcin 97.53 ng/ml (11-43), β-CTx 1.68 ng/ml (0.01-0.69), 24-h urinary calcium 8.22 mmol (2.5-8), GFR 120 ml/min/1.73 m$^2$. There was a significant reduction in BMD especially in femur neck to -3.0 SD using Z-score. US, CT scan and scintigraphy with 99mTc-sestamibi detected a formation (20×14×13 mm) of the left inferior parathyroid gland (PG). Hormonal tests and MRI excluded other pituitary and pancreatic pathology. A genetic test was performed. The exon 10 of *MEN1* (NM000244.3) had a rare heterozygous variant c.1609G>T,p.Gly537Cys (rs587780843) with an uncertain clinical significance. The surgical revision was carried out, left inferior PG in upper thymus horn was removed and PTH decreased to 1.22 pg/ml. On the sixth day after surgery hypocalcemia developed (total calcium 2.05 mmol/l) which was managed with oral calcium supplementation and alfacalcidol. Morphological examination revealed benign adenoma with atypical localization.

**Conclusion:** Low-energy fractures due to cystic bone transformations at young age requires an extensive diagnostics and checking hereditary forms of PHPT.

### P690
### ECHINACEA SP. IN THE PREVENTION OF OSTEOPOROSIS

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**Objective:** Numerous scientific studies have shown the effect of echinalkamide and echinacoside on inhibiting osteoclast differentiation and their mechanism as a potential therapeutic agent for osteoclast-associated diseases. In this regard, natural alternatives are being explored to prevent bone loss and the risk of fracture induced by osteoporosis and less desired side effects. Many osteoclast suppressants are associated with anti-inflammatory and antioxidant properties. *Echinacea purpurea* has already been studied for its effect on anti-inflammatory and antioxidant activity and has been found to be effective in inflammation-related osteoclastogenesis. Future research will focus on the potential signaling pathway in cocultures treated with echinacoside and echinalkamide.

**Results:** Analyzing the studies, echinalkamide has the greatest antioxidant and anti-inflammatory effects, and echinacoside causes significant increases in cell proliferation, alkaline phosphatase activity, collagen secretion, osteocalcin levels and mineralization, which indicates their inclusion in a potential treatment for osteoporosis, leading to improved mineral density and bone biomechanical properties. The data from the studies show that echinacoside promotes bone regeneration by increasing the ratio of osteoprotegerin and by stimulating signaling pathways in cells. The results suggest that echinacoside and echinalkamide stimulate cell proliferation, differentiation and mineralization by regulating osteoprotegerin and stimulating signaling pathways.

**Conclusion:** Therefore, Echinacea purpurea can be considered a promising medicinal plant product for the prevention and treatment of osteoporosis. Currently, on the pharmaceutical market there is a pharmaceutical preparation in the form of capsules, with Echinacea in combination with Gentiana which can be recommended for the prevention of osteoporosis.

### P691
### THE CASE OF IGG4 RETROPERITONEAL FIBROSIS IN A FEMALE PATIENT

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**Objective:** To show the difficulties in diagnosis of such rare clinical condition as IgG4-related retroperitoneal fibrosis and to illustrate the importance of the histological examination of small salivary gland.

**Methods:** Here we describe the case of IgG4 retroperitoneal fibrosis in a female patient.

**Results:** A 47-year-old female patient has presented with abdominal and back pain, oliguria, low-grade fever and weakness. Previously the patient was treated by urologist, neurologist and gastroenterologist without significant effect. On the abdominal and pelvic CT scan there were no pathological changes detected. But using CT angiography (CTA) we identified luminal narrowing of the abdominal aorta under the renal arteries by 20 mm till aortic bifurcation, due to the periaortic soft tissue mass with a thickness maximum - 14 mm. Due to the hypothesis about the autoimmune nature of the disease this patient was examined by a rheumatologist. Clinical data of rheumatological pathology were not identified. The patient underwent nailfold capillaroscopy – normal pattern was detected. Rheumatoid factor, antibodies to DNA, titers of antinuclear factor and anti-neutrophil cytoplasmic antibodies were within normal limits. The laboratory inflammatory activity wasn't also detected (ESR 9 mm/h, CRP 0,8 mg/l). Further, we investigated the level of the serum immunoglobulins G4. It was not elevated (0.32 g/l). We decided to perform the biopsy of small salivary gland. In histological and immunohistochemical analysis using monoclonal antibodies to human IgG and monoclonal antibodies to human IgG4 we revealed plasma cells infiltration with the expression of IgG4. Therefore, we considered retroperitoneal fibrosis as a IgG4-related disease. The patient resumed systemic steroid therapy with a positive effect. On the control CTA after 3 months, previously visualized formation of paraortic soft tissues was not detected.

**Conclusion:** Our case underlines the importance of histological examination of small salivary gland in patients with retroperitoneal fibrosis.

### P692
### SMOKING AND OSTEOPOROSIS IN THE MAXILLARY AND MANDIBULAR BONES

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**Objective:** Osteoporosis is a condition that occurs frequently in the elderly, mostly women, with a sedentary lifestyle, smokers, patients who avoid sun exposure, alcohol users or who have certain chronic conditions (diabetes, malignancies). of the maxillary bones is especially evident in the case of requesting patients to restore masticatory or physiognomic function with the help of dental implants or total prosthesis. was to identify the relationship between smoking patients and the existence of osteoporosis of the maxillary bones.

**Methods:** Between 12.04.2019-25.02.2020 we recorded 100 patients (75 smokers and 25 nonsmokers) aged 30-78 y, 50 women and 50 men. The diagnosis of osteoporosis in the jaw bones was made with DXA. Patients were randomized into 4 groups: I-smokers under 10 cigarettes/d, II- 10-20 cigarettes/d, III-over 20 cigarettes/d, IV-nonsmokers.

**Results:** Out of the 100 patients, 75 showed signs of osteoporosis in different degrees. Of these, 47 (62,2%) women and 28 (37,8%) men. The most frequent cases were highlighted in group III - smokers over 20 cigarettes/d - 21 patients (84%), 15 (71.4%) women and 6 (28.6%) men. The least cases were in the group of nonsmokers 7 - 3 women and 4 men (28%). In terms of age, 5 cases were 30-45 y, the remaining 95 are 45-78 y (68 women, 27 men).

**Conclusion**: Smoking has a definite effect on osteoporosis. Also the percentage of women was significantly higher than that of men. Age also has a significant effect, the presence of osteoporosis was highlighted almost exclusively.

## P693
### SPONTANEOUS RUPTURE OF BAKER'S CYST: CASE SERIES WITH TWO-YEAR FOLLOW-UP

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**Objective:** To describe a series of acute spontaneous rupture of Baker's cysts with 2-y follow-up.

**Methods:** 16 consecutive patients with symptomatic ruptured popliteal cyst were treated acutely with anti-inflammatory measures and physical therapy.

**Results:** All patients had good resolution with conservative treatment for an average period of one week, and there was no recurrence of cyst rupture in any case, in the 2-y follow-up period.

**Conclusion:** Spontaneous rupture of Baker's cyst in adult patients can be very symptomatic and disabling, but once diagnosed, it evolves well with conservative treatment and rarely relapses.

## P694
### RECURRENT FOCAL EPILEPSY SEIZURES AND BASAL GANGLIA CALCIFICATION AS THE MANIFESTATION OF PSEUDOHYPOPARATHYROIDISM

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**Objective:** Pseudohypoparathyroidism (PHP) is a rare heterogeneous group of disorders characterised by end-organ resistance to the PTH. We report on a 21-year-old male patient who presented with seizures and various other neurological manifestations due to sporadic PHP that was presumably caused by epigenetic changes.

**Case report:** Patient A. was admitted to our endocrine clinic at the age of 17 with complaints of intermittent cramps in the arms and legs, abdominal pain, headache, weakness, fatigue. At the age of 12, he developed focal epileptic seizures followed by confusion for few minutes. He was diagnosed with epilepsy and anticonvulsant therapy was prescribed, however his electroencephalography was unremarkable. Clinical examination revealed short neck, rare teeth, polythelia (four nipples), however, patient's vital signs and cognitive function were within normal limits. Trousseau's and Chvostek symptoms were absent. Height – 167 cm, weight – 63 kg. He had no family history of any endocrine or neurologic diseases. Laboratory test results revealed severe hypocalcemia (1.52 mmol/L; 2.08–2.65), elevated serum phosphorus (1.88 mmol/L; 0.78–1.65) and decreased magnesium concentration (0.59 mmol/L; 0.65–1.05),

elevated serum intact PTH level (34.5 pmol/L; 1.3–6.8) and thyroid stimulating hormone. In addition, hypocalciuria (0.27 mmol/24- h; 2.50–7.50) and hypophosphaturia (10.26 mmol/24-h; 12.9–42.0) were found. Computed tomography of brain showed bilateral basal ganglia calcification. Based on the medical history, laboratory tests a diagnosis of PHP was considered. Neither mutations nor copy number variations were detected in the *GNAS* during genetic analysis. Considering the absence of Albright's hereditary osteodystrophy and mutations in the *GNAS* gene, our patient was most likely affected by the PHP type 2 due to epigenetic changes. The patient was treated with calcium carbonate 2.5 g/d in divided doses and alfacalcidol 2 μg, normal level of calcium and phosphorus were achieved in the serum without hypercalciuria, as well as normalization of PTH level. We also plan to withdraw anticonvulsant therapy.

**Conclusion:** This case illustrates the clinical, biochemical and genetic challenges in the diagnosis of the PHP that should be considered in the diagnostic investigation of patients with hypocalcaemia and seizures.

## P695
### EFFECT OF ANGIOPOIETIN-LIKE PROTEIN TYPE 4 ON OSTEOPOROTIC DISORDERS IN RHEUMATOID ARTHRITIS PATIENTS WITH METABOLIC SYNDROME

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**Objective:** To evaluate the potential role of angiopoietin-like protein type 4 (ANGPTL4) on the risk of osteoporotic disorders in patients with rheumatoid arthritis (RA) and metabolic syndrome (MS).

**Methods:** 88 patients with reliable RA were included in the study. Determination of ANGPTL4 in serum was performed by enzyme immunoassay using a commercially available RayBio Human ANGPTL4 ELISA Kit test system (RayBiotech, USA). The presence of MS in RA patients was established using the criteria of the National Educational Program on Cholesterol (NCEP/ATPIII 2004) and the International Diabetes Federation (IDF). All RA patients underwent osteodensitometry (Lunar DPX, GE, USA) with estimation of bone tissue condition according to T-criterion.

**Results:** ANGPTL4 values in RA patients correlated with age of RA onset (r=-0.658, p<0.001), DAS-28 disease activity (r=0.449, p=0.001), C-reactive protein level (r=0.488, p=0.003), ESR (r=0.458, p=0, 002), serum vitamin D (r=-0.417), urinary calcium (r=0.797, p=0.032), triglycerides (r=0.42, p=0.018), and the presence of insulin resistance (by HOMA-IR index) (p=0.033) and osteopenia (r=0.439). Significantly high levels of ANGPTL4 (p=0.027 compared with RA without MS) and low indices of BMD (p=0.03 compared with RA without MS) were observed in RA patients with metabolic syndrome (MS) (n=36).

Multivariate analysis of variance revealed a significant increase in ANGPTL4 in the serum of RA patients with reduced BMD (p=0.007) and marked metabolic changes (p<0.001). These factors and their interactions can explain a significant proportion of the variability in ANGPTL4 ($R^2$=0.32, p<0.05).

**Conclusion:** Direct involvement of ANGPTL4 in the mechanisms of osteoporosis development in RA patients is possible, including effects on osteoclast differentiation and activation processes, which may lead to decreased periarticular BMD and increased risk of low energy fractures.

## P696
### CERVICAL SPINE INVOLVEMENT IN RHEUMATOID ARTHRITIS AND ANTI-CITRULLINATED PROTEIN ANTI BODIES

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**Objective:** To study a relationship between cervical spine involvement and anti citrullinated protein antibodies (ACPA) in rheumatoid arthritis.

**Methods:** We conducted a multicenter, prospective, descriptive, cross-sectional study in 300 patients with rheumatoid arthritis between 2013-2018. We collected demographic, clinical (Body mass index (BMI), disease duration, DAS28, HAQ), biological (CRP, ESR, the rheumatoid factor, ACPA) and radiological data. We study the relationship between cervical spine involvement (CSI) and ACPA

**Results:** 80, 3% were female), the mean age was 51, 17±12,68 years , the BMI was 26,11±5,25, 67, 66 % had comorbidities, the most frequent were osteoporosis (30%), obesity (24%), hypertension (21,7%). RA mean duration was 13±9 years, mean DAS 28 was 4,68±1,5 mean HAQ was 1,01±0,69, mean CRP was 15,50 ±12 mg/L, mean ESR was 41,89 ±26,8mm, rheumatoid factor was positive in 70,6% and ACPA were positives in 77,3%. The standard x-rays of cervical spine found 53 (17, 66%) patients with CSI The various lesions of the cervical spine were atlantoaxial subluxations 13% , 3,66% of lateral atloïdo-axoïd subluxations , vertical subluxations in 0,66%, C1C2 arthropathies in 2,33% spondylolisthesis in 2%, and 0,33% of spondylodiscitis . The results of the univariate and multivariate analysis did not find a relationship between CSI and ACPA (p=0, 71).

**Conclusion**: Cervical spine involvement in rheumatoid arthritis was common in our study. The anticitrullinated protein antibodies are associated with higher clinical activity of the disease. They are important predictors of radiological signs of erosion, which makes us think that we can find a relationship between ACPA and CSI in rheumatoid arthritis.

No conflicts of interest

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## P697
## BONE MINERAL DENSITY AND PROXIMAL FEMUR 3D-DXA ANALYSIS IN TYPE I DIABETES: PRELIMINARY STUDY

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**Objective:** Type 1 DM (T1DM) is associated with low BMD and increase fracture risk related to poor diabetic control or coexistent diabetic complications. BMD by DXA may be considered an inadequate predictor of fracture risk in DM. Using pQCT and HR-pQCT, a detrimental in the cortical compartment have been demonstrated in T1DM. This study aimed to evaluate BMD and cortical and trabecular compartment by proximal femur 3D-DXA analysis in T1DM.

**Methods:** Adults T1DM men and premenopausal women (n=27) and healthy subjects (n=27) as control group (CG) matched by age, sex and BMI. BMD (g/cm$^2$) was measured by DXA (Hologic) on lumbar spine (LS), right femoral neck (FN) and total hip (TH). The 3D analysis was performed with 3D-Shaper software (v2.9, Galgo Medical, Spain): cortical BMD (sDens - mg/cm$^2$) and trabecular volumetric BMD (trab vBMD - mg/cm$^3$). Data were expressed as mean±SD and p<0.05 was considered significant.

**Results:** 55.6% women (n=15) and 44.4% men (n=12) were included. Mean age: CG 30.2±9.3 y (range: 19-49) and T1DM 29.1±9.6 y (range:

18-49). The T1DM group had 13.8±8.6 y at DM diagnosis and the following biochemical parameter at the moment of BMD: glucemia 154.2±59.5 mg/dl (CI95 130.1-178.2); HbA1c 8.3±1.4% (CI95 7.6-8.8); calcemia: 9.3±0.4 mg/dl (CI95 9.0-9.4); 25OHD: 29.9±7.9 ng/dl (CI95 26.3-33.5); PTH: 29.9±7.9 pg/ml (CI95 26.3-33.5). Three T1DM patients had any coexistent diabetic complications (retinopathy or nephropathy); 59.3% were under multiple doses of insulin and 40.7% using an infusion pump. LS BMD=CG: 1.042±0.142 vs. T1DM: 0.988±0.131, p=ns; right FN BMD=CG: 0.873±0.130 vs. T1DM: 0.853±0.174, p=0.645; right TH BMD=CG: 0.979±0.115 vs. T1DM: 0.959±0.174, p=0.615; cortical BMD sDens: CG: 166.5±19.9 vs. T1DM: 163.0±26.8, p=0.589; trab vBMD: CG: 214.3±32.1 vs. T1DM: 214.2±53.7, p=0.991.

**Conclusion:** No differences between T1DM and CG were observed in BMD and cortical and trabecular compartment by 3D-DXA probably associated to good DM control and few previous DM complications.

## P698
## FORMATION OF THE SKELETAL BONES IN INFANTILE RATS AFTER 90-DAY EXCESSIVE CAFFEINE INTAKE

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**Objective:** To investigate growth rate of the femur, the hipbone, and the first lumbar vertebra in infantile rats after long-term caffeine intake.

**Methods:** 18 infantile rats were distributed into 3 groups with 6 animals in each. Animals of the first group (K-90i) were the intact controls; the second group (C-90i) comprised the animals that received caffeine daily at 120 mg/kg of body weight by oral gavage. Animals of the third group (CM-90i) received caffeine in the same way as group 2 did. Also these rats received treatment with subcutaneous injections of mexidol at 50 mg/kg of body weight daily. In 90 d after administration of both drugs animals were killed by anesthetized decapitation, The hipbone, the femur, and the first lumbar vertebra were excused and prepared for gross measurements. All data were analyzed with the use of standard software.

**Results:** In animals of the group C-90i by the 90th day length of both femur and hipbone were lower than those of K-90i by 7.10% and 4.18% as well as height of body of the L1 vertebra. – by 10.34%. Other gross sizes also decreased in comparison with the controls width of the hipbone – by 10.03%, width of the proximal femoral epiphysis – by 7.11%. Lateral and antero-posterior sizes of the femoral shaft both decreased by 4.72% and 4.92%. In animals of the group CM-90i (in comparison with C-90i group) length of the hipbone and the femur increased by 3.02% and 6.81% and height of body of the L1 vertebra – by 6.52%. Also width of the proximal femoral epiphysis and both cross sizes of the femoral shaft increased by 6.81%. 4.96%, and 4.60% respectively.

**Conclusion:** Excessive 90-d caffeine intake results in decrease of both longitudinal and appositional growth rate of the skeletal bones namely the hipbone, the femur, and the L1 vertebra. Administration of mexidol to animals taking excessive caffeine results in restoration of growth rate of the skeletal bones in infantile rats.

## P699
## ROLE OF ANGIOPOIETIN-LIKE PROTEINS TYPES 3 AND 4 IN PREDICTING AXIAL FRACTURE RISK IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Early detection of osteoporosis signs in rheumatoid arthritis (RA) patients at increased risk of osteoporotic fractures presents an

opportunity for timely lifestyle adjustments or prescription of drug therapy, which positively affects both the cost effectiveness of treatment and the quality of life of patients. This study aimed to investigate the role of ANGPTL types 3 and 4 in predicting the risk of fractures on axial support areas (lumbar vertebrae and femoral neck) in patients with rheumatoid arthritis.

**Methods:** 88 patients with reliable RA (mean age, 54.19±11.97 y, and duration of disease, 11.21±8.65 y) were included in the study. To determine ANGPTL4 in serum, we used the RayBio Human ANGPTL4 ELISA Kit test system (RayBiotech, USA), for ANGPTL3 determination - test system Human Angiopoietin-like Protein 3 ELISA (Bio Vendor, Czech Republic). All RA patients underwent osteodensitometry (Lunar DPX, GE, USA) with estimation of BMD.

**Results:** Significant positive correlation was found between the level of ANGPTL3 and the presence of osteoporosis (r=0.36, p=0.039) and between ANGPTL4 and the presence of osteopenia (r=0.44, p=0.028). There was evidence of a close association between ANGPTL3 and osteoporotic changes in the femoral neck (BMD $_{Total}$, r=-0.33, p=0.042; BMD $_{Troch}$, r=-0.36, p=0.038; BMD $_{Wards}$, r=-0.44, p=0.009), and ANGPTL4 and osteoporotic changes in the spine (BMD $_{L1-L4}$, r=-0.37, p=0.025). It was found that patients with elevated levels of ANGPTL3 (more than 445 ng/mL) had osteoporotic fractures in the femoral neck in 33.8% of cases, while those with decreased levels (less than 248 ng/mL) had 5.9% ($\chi^2$=5.257, p=0.022). In the group of RA patients with elevated levels of APPB4 (>3 SD), osteoporotic fractures in the spine were also observed in a higher percentage of cases ($\chi^2$=4.93, p=0.04).

**Conclusion:** Presumably the determination of angiopoietin-like proteins types 3 and 4 can be used in isolation to diagnose osteoporosis in RA patients at an earlier stage, contributing to independent and accurate prediction of fracture risk by axial support areas.

## P700
## OSTEOPOROSIS AND CARDIOVASCULAR DISEASE RISK SCORES IN THE ELDERLY POPULATION: RESULTS FROM BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** Previous research suggests BMD might be an independent predictor of cardiovascular disease (CVD) risk. This study aimed to investigate the correlation between BMD and well known CVD risk scores in the elderly population.

**Methods:** We used the data from the 2nd phase of the BEH program. BMD was measured using DXA method. The CVD risks were estimated for all participants using the original coefficients and variables provided by the ACC/AHA Pooled Cohort Equations CV Risk. Considering the nonnormal distribution of CVD risks, nonparametric tests were used. Spearman rank test was applied to assess the correlation between CVD scores and BMD in different sites including femoral neck, and spine. The estimated risks were compared in participants with and without osteoporosis.

**Results:** A total of 2405 participants (1160 men) with a mean age of 69.3 (±6.4) y were included. ACC/AHA risk score showed a significant

negative correlation with the femoral neck t-score in both men (Spearman's rho: -0.147, p-value: <0.001) and women (Spearman's rho: -0.269, p-value: <0.001). In women, a significant negative correlation was detected with the spinal t-score (Spearman's rho: -0.123, p-value: <0.001). The comparison of CVD risks in the osteoporotic and non-osteoporotic population are provided in Table. In all, individuals with both femoral neck and spinal osteoporosis showed a higher CVD risk than the non-osteoporotic population.

**Conclusion:** The results showed a significant correlation between the femoral neck and spinal t-scores with the ACC/AHA CVD risk score. The median risk scores of CVD were significantly higher in individuals with osteoporosis in different sites in both men and women.

Table. The median CVD risk scores in the osteoporotic and nonosteoporotic elderly population.

|  |  | Osteoporosis + | Osteoporosis - | P-value |
|---|---|---|---|---|
| Women | Femoral neck | 0.197 | 0.131 | <0.001 |
|  | Spinal | 0.172 | 0.143 | 0.0001 |
| Men | Femoral neck | 0.289 | 0.240 | 0.003 |
|  | Spinal | 0.221 | 0.252 | 0.005 |

## P701
## STRENGTH OF THE HUMERUS IN RATS AFTER IMPLANTATION OF OK-015 INTO THE TIBIA AND IV ADMINISTRATION OF MESENCHYMAL STEN CELLS ON THE 24TH DAY AFTER INTERVENTION

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**Objective:** To test strength features of the humerus in rats after implantation hydroxyapatite material OK-015 into the tibia and intravenous injections of allogenic mesenchymal stem cells (MSC) 24 d after intervention.

**Methods:** In the study 72 male rats were distributed into several groups. Group K consisted of intact animals. Group D comprised animals with fracture of the tibia modeled as a 2 mm round opening in the proximal part of the tibia. In animals of group OK the openings in the tibiae were filled with hydroxyapatite material OK-015. Animals of MSC24 group received IV injections of MSC (5E6 per injection) in 24 d after implantation of OK-015. Observation terms were 30, 60, and 90 d after implantation. MSC were obtained from the red bone marrow of donor animals. Phenotyping was performed with the use of indirect fluorescent immunoassay with the help of the markers to MSC of the cell culture. Strength features were tested with the help of three-point bending technique at loading speed of 0.25 mm/min up to destruction. Distance between support points of the loading device was 10 mm. Statistical analysis of the data obtained was performed y means of standard software.

**Results:** Fracture of the tibia resulted in decrease of strength of the humerus with manifestations peak registered by the 30th and the 60th days after intervention. In the OK group strength exhibited decrease in early terms of observation with faster restoration in later terms. In MSC24 group no significant changes as compared with the controls were found. Comparing data from MSC24 group with OK group we found out that specific sag values increased on the 30th and the 90th days by 6.30% and 5.16%.

**Conclusion:** Administration of MSC on the 24th day after implantation of OK-015 into the tibia slightly optimizes elasticity of the humerus on the 30th and the 90th day of the experiment. Hence administration of the stem

cell in order to reduce systemic effects of fractures and surgery on the skeleton must be started shortly after onset of adverse event.

## P702

### EFFECTS OF QUERCETIM AND THIOTRIAZOLIN ON BONE FORMATION IN PRESENILE DIABETIC RATS WITH TIBIA FRACTURE

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**Objective:** Improvement of bone formation in presenile diabetic rats with tibia fracture using thiotriazolin (TTZ) and quercetin (QU).
**Methods:** In the experiment we used 210 rats with body weight of 290-300 g aged 17-18 months. 1st group consisted of intact rats, 2nd group consisted of rats with tibia fracture made in the proximal part of the tibia. Diabetes mellitus (3rd group) was caused by a single intraperitoneal injection of streptozotocin (Sigma-Aldrich, USA) at 55 mg/kg. In 72 h we performed blood sugar test in these animals and picked those in which blood sugar level was 12 mmol/l or above. In animals of 4th group fracture of the tibia was modeled after diabetes development. Last two groups of diabetic rats with the tibia fracture received intraperitoneal TTZ (117.4 mg/kg daily) and intragastric QU (0.32 g/kg daily). The humeri (H), the hipbones (HB), and L3 vertebra (LV) were excised and prepared for gross measurements.
**Results:** In 3rd group growth also slowed in the same period yet restoration of growth rate was not observed, by the 90th days sizes of the H, HB and LV decreased in comparison with the controls by 4.67-7.74%. In 4th group in comparison with 2nd group growth deceleration even progressed by the 60th and the 90th days. In animals that received QU sizes of the bones grew in comparison with those of 4th group beginning from the 60th day yet stayed outside confidence interval. In animals that received TTZ width of the H shaft by the 60th and the 90th days increased in comparison with that of 4th group by 5.88% and 4.84%. Width of HB, width of LV body and antero-posterior size of the H shaft increased by 5.27%, 4.12%, and 4.76% by the 90th day.
**Conclusion:** Diabetes and fracture in rats result in inhibition of growth rate by the 60th and the 90th days. Fracture in diabetes has more adverse effects on bone growth in the same period. Administration of QU and TTZ to diabetic animals with fracture results in restoration of growth rate. TTZ is more effective than QU.

## P703

### PREDICTIVE VALUE OF TIP APEX DISTANCE IN INTERTROCHANTERIC FRACTURE MANAGED BY PROXIMAL FEMORAL NAILING

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**Objective:** Tip apex distance (TAD) is a well established method of prediction of outcome in intertrochanteric fractures managed by dynamic hip screw. This retrospective study was done to assess the significance of TAD in the management of intertrochanteric fractures by proximal femoral nail.
**Methods:** The study was done in a tertiary care center where 174 follow-up patients operated for intertrochanteric fractures with proximal femoral nail were included in the study. The radiological outcome of patients was assessed using the neck-shaft angle, neck length, and offset whereas the functional status was assessed using the Harris hip score and the Lower extremity functional scoring system. These functional and radiological outcomes were compared with the TAD for any significant findings.
**Results:** The tip apex distance on the postoperative X-ray was found to be 22.93 +3.88 mm. The Lower Extremity Functional Score was found to be 70.71+8.153. The Harris Hip Score was found to be 85.408+9.586. Change in the neck length as compared to the uninjured hip was found

to be 1.46+1.705. Change in the offset and neck-shaft angle was 1.38+1.567 and -2.61+1.27 respectively. There were 8 cases of screw cut out and 8 cases of superficial infection.
Conclusion: The Harris hip score and the LEFS increased with decreasing values of the TAD. The neck shaft angle, neck length, and offset all decreased with the increase in the TAD. The Harris hip score and the LEFS decreased with the decrease in the neck shaft angle, Neck length, and offset. On examining the 2 groups one with TAD <25 mm and the other with TAD >25mm it was seen that both functionally and radiologically, the outcome was better in the group having TAD <25 mm. This study indicates that the Tip Apex Distance can be used as a useful predictor of the outcome of the proximal femoral nail in intertrochanteric fractures.

## P704

### THE EFFECTS OF THIAZIDE USE ON BONE MINERAL DENSITY

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**Objective:** Thiazide diuretics are widely used drugs in the treatment of hypertension. Previous studies have described a positive influence on BMD and fracture risk. We aim to explore the effect of thiazide use on BMD in an older, Irish Population.
**Methods:** Study participants were derived from the Trinity Ulster Dept. of Agriculture (TUDA) patient cohort of over 5,000 community-dwelling, Irish adults aged >60 y. Participants who were treatment naïve to osteoporosis medications and had BMD measurements of the spine and hip using DXA were included. The relationship between thiazide use and BMD was explored in multinomial regression models.
**Results:** We identified 3663 patients, mean age 73.4 y (range 60-98.8), 58.5% female and 20.4% (n=747) were taking thiazides. Thiazide use was positively associated with BMD at the femoral neck (P=0.04), total hip (P=0.003) and spine (P=0.0001), before and after adjustment for age, gender, BMI, smoking and alcohol use, steroid use, physical frailty (Timed Up and Go) and dietary calcium intake. Thiazides were also associated with significantly lower bone turnover markers (P<0.0001) and a higher serum calcium level, independent of PTH (P<0.0001). The association with hip fracture was not significant (P=0.06).
**Conclusion:** We identified that thiazide use was independently associated with greater BMD at the femoral neck, total hip and spine. Thiazides reduce urinary excretion of calcium, and may also increase intestinal and skeletal calcium absorption, potentially explaining their impact on BMD. Thiazides can be considered for treatment of hypertension in older people who are at risk of osteoporosis or fracture. However, this needs to be balanced with the risk of orthostatic hypotension and falls, particularly in those with frailty.

## P705

### CHANGE IN KYPHOSIS DOES NOT AFFECT THE RISK OF FALLING IN POSTMENOPAUSAL OSTEOPENIC AND OSTEOPOROTIC WOMEN

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**Objective:** To examine the annual change in kyphosis and its influence on the risk of falling in postmenopausal osteopenic and osteoporotic women.

**Methods:** This prospective observational study included 498 postmenopausal Greek women exceeding the 50th year of age, suffering from either osteoporosis or osteopenia. Data on age, height, weight, and self-reported falls were collected. Additionally, we evaluated the degree of the kyphosis angle, the balance, the mobility, the functionality and the hand grip strength on both hands of each participant via the use of the Debrunner kyphometer, the Berg Balance Scale, the Timed-Up-and-Go test, the 30 Seconds Sit-to-Stand test and the Jamar Hydraulic Hand Dynamometer, respectively. All of the above mentioned data were recorded at the baseline visit and the 1year follow-up visit for each participant.

**Results:** All examined variables presented a statistically significant change at the 1 year follow-up visit. Nevertheless, the annual change in kyphosis did not show any association with the risk of falling in postmenopausal osteopenic and osteoporotic women.

**Conclusion:** No association was shown between the annual change in kyphosis and the risk of falling in postmenopausal osteopenic and osteoporotic women, nor bears any substantial prognostic value for future falls.

## P706
### INFECTIONS IN THE STRUCTURE OF COMORBID PATHOLOGY IN PATIENTS WITH INFLAMMATORY DISEASES OF THE JOINTS

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**Objective:** To evaluate the significance of infections in the structure of comorbid pathology in patients with inflammatory diseases of the joint (IDJ) during a single-stage retrospective study.

**Methods:** The study included 437 patients with IDJ (259 women, 178 men, mean age 45 y): 172 - rheumatoid arthritis, 169 - ankylosing spondylitis, 74 - psoriatic arthritis, 22 - undifferentiated spondylarthritis. The majority of patients (n=343) received immunosuppressive therapy (glucocorticoids, methotrexate, leflunomide, biological drugs). The patients were interviewed by a research doctor with the completion of a unified questionnaire. Additional information was obtained from medical records.

**Results:** The following comorbid pathology was documented in patients with IDJ: cardiovascular diseases - 30.1%, gastrointestinal diseases - 27.2%, respiratory diseases - 12.5%, endocrine system diseases - 10.9%, urogenital diseases - 9.1%, skin diseases, except for psoriasis - 4.2%. 653 cases of respiratory tract infections (RTI) and ENT organs and 537 cases of infections of other localization were diagnosed. RTI and ENT organs included acute nasopharyngitis (n=273), tonsillitis (n=110), pneumonia (n=69, including 29 caused by the SARS-CoV2 virus), acute bronchitis (n=54), sinusitis (n=52), influenza (n=47), otitis (n=41), tuberculosis (n=7). Infections of other localizations were represented by herpes-viral infections (n=184), mycoses (n=121), urinary tract infections (n=84), conjunctivitis and blepharitis (n=63), skin infections (n=26), intestinal infections (n=25), genital infections (n=22), osteomyelitis, purulent arthritis, nervous system infections (2 cases each), chronic hepatitis A, B and C, rubella, measles, HIV infection (1 case each). After the debut of IDJ, an increase in the frequency of acute nasopharyngitis, acute bronchitis, sinusitis, herpes-viral infections, and mycoses was noted. Serious infections requiring hospitalization and/or intravenous administration of antibiotics were diagnosed in 78 patients. Of these, 64% of cases were caused by RTJ and ENT organs (pneumonia, including those caused by the SARS-CoV2 virus, acute bronchitis, sinusitis, purulent otitis), 36% - by other infections (intestinal infections, purulent paraproctitis, acute salpingitis, purulent endometritis).

**Conclusion:** The problem of infections in patients with IDJ still remains relevant. Further studies are needed on large samples of patients with the aim of studying the prevalence of infections depending on the therapy (primarily, biological drugs), as well as the search for significant risk factors.

## P707
### COMPARISON OF MEAN A BLOOD PRESSURE AND HEART RATE AFTER A SUSTAINED ISOMETRIC CONTRACTION TEST FOR 3 MINUTES AT 30% OF MAXIMUM STRENGTH BETWEEN SUBACUTE POST-COVID-19 PATIENTS AND HEALTHY CONTROLS

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**Objective:** To compare autonomic blood pressure and heart rate response to isometric sustained contraction in patients in subacute SARS-CoV-2 infection.

**Methods:** Subjects in subacute SARS-CoV-2 infection (3 weeks after diagnosis confirmation), and healthy volunteers were invited. Autonomic function test was performed using grip dynamometry described by Ewing, 1973. Measure of grip force was performed using Jamar type hydraulic dynamometer (kg), maximum strength was obtained by mean of 3 repetitions of dominant arm, with 1-min interval between each one. Test consisted of performing voluntary isometric contraction of 30% of maximum strength for 3 min. A 2-min recovery period was granted. Blood pressure and heart rate was monitored with a digital baumanometer (Omron HEM-7322T), of the nondominant arm. Registration was done 3 times, at the beginning of the test, at the end of the test and after recovery. Registration of the research and ethics committee were obtained. Statistical analysis: For qualitative variables, frequencies and percentages were calculated. Quantitative variables were compared with central tendency and dispersion measures. Inferential analysis depending on parametric or non-parametric behavior (Shapiro Wilk) were calculated by means or medians differences. Repeated measures factorial analysis was adjusted for age and baseline mean blood pressure and heart rate as covariates.

**Results:** We analyzed 50 subjects, 25 in each group. Statistical significant differences between group ages (cases X=46.3, DS14.7; control X=36.8, DS 10; p=0.02), mean strength (cases X=29.1, DS 9.4; Control 33.1, DS 8.6; p=0.02), for mean arterial pressure in recovery (case 95.5, SD 10; control 88.1, SD 10; p=0.01) and heart rate in recovery (case X=78.6, SD 12.9; 71.6. 1, SD 11.8; p=0.05). Results of repeated measures factorial analysis adjusted for age a had significant statistical difference between the comparison of both groups in the three measurements (p=0.001; global significance p=0.07 with statistical power of 66% for mean arterial pressure and global significance p=0.089 with 65% statistical power for heart rate).

**Conclusion:** We found differences in blood pressure and heart rate in patients in subacute COVID-19. Autonomic cardiovascular response to sustained isometric contraction and recovery are affected. Muscle strength of post-COVID-19 patients is decreased compared to controls. Limitations of our study are sample size (statistical power of 65% and 66%) and age differences between groups.

## P708
### MEDITERRANEAN DIET ADHERENCE AND ITS ASSOCIATIONS WITH BONE QUALITY, CHRONIC INFLAMMATION, AND PHYSICAL FUNCTION IN SARCOPENIC OBESE OLDER ADULTS

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**Objective:** Sarcopenic obesity adversely impacts bone health of older adults. However, it is still unclear how diet, particularly Mediterranean dietary patterns, may exert favourable effects on bone quality and inflammation in sarcopenic obese older adults. This study aimed to determine associations between adherence to Mediterranean diet and high sensitivity C-reactive protein, physical function, bone turnover markers and bone quality in sarcopenic obese older adults.

**Methods:** 50 sarcopenic obese older adults with mean age 70.8±6.7 y were included in this cross-sectional study. Adherence to Mediterranean diet was assessed using MEDI-LITE (literature-derived Mediterranean diet) score which was obtained using a validated 3-d food record. Bone quality was determined using bone turnover markers as well as distal tibial volumetric BMD and microarchitecture which were assessed using HR-pQCT. Physical function such as gait speed, and hand grip strength were assessed by walking a 2.44-m course and using a dynamometer respectively. Serum samples were analysed for hs-CRP, C-terminal telopeptide of type 1 collagen (CTX), procollagen type 1 N-terminal propeptide (PINP), and 25-hydroxyvitamin D (25OHD).

**Results:** A higher MEDI-LITE score, indicating greater adherence to Mediterranean diet, was associated with lower cortical porosity ($\beta$: -0.010; 95%CI: -0.018, -0.001) in the fully adjusted model; and higher cortical cross-sectional area ($\beta$: 3.845 mm; 95%CI: 0.591, 7.100) in the unadjusted model. Sarcopenic obese older adults who had higher adherence to Mediterranean diet had higher cortical cross-sectional area ($\beta$: 14.282 mm; 0.691, 27.874); cortical volumetric BMD ($\beta$: 65.128 mg HA/cm$^3$; 95%CI: 15.438, 114.818); and cortical thickness ($\beta$: 0.168 mm; 95%CI: 0.002, 0.315); as well as lower cortical porosity ($\beta$: -0.010; 95%CI: -0.018, -0.001) compared with those who less adhere to Mediterranean diet. Those who greatly adhere to Mediterranean diet had lower hs-CRP ($\beta$: -1.182 mg/L (95%CI: -2.152, -0.212) in the sex-adjusted model. MEDI-LITE scores were not associated with physical function and bone turnover markers.

**Conclusion:** Greater adherence to Mediterranean diet is associated with better cortical bone quality, which may be an important target for fracture and falls risk prevention especially in sarcopenic obese older adults.

## P709
### MANAGEMENT APPROACHES OF MALE OSTEOPOROSIS
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**Objective:** With the aging of our society, the prophylaxis and management of osteoporosis has become a public health challenge.

**Methods:** A 80-year-old male patient presents to our department for: chronic pain in his right knee associated with limping gait. His past medical history is significant only for moderate renal failure. He takes no medication, other than OTC analgesics. He is a nonsmoker and denies alcohol consumption.

**Results:** Physical examination revealed: BP=110/80 mmHg, HR=70 BPM, SO2 on room air=98%, respiration rate=18 breaths/min, temperature=36.4°C. He is awake and alert. Locomotor system examination: bilateral paravertebral muscular contracture in the inferior dorsal and lumbar region, painful lumbar flexion, bilateral crepitus present during knee movement, increased sensitivity at right pes anserinus, severely limited right hip in all axis of movement, (+) Patrick on the right side, limping gait. ECG: normal sinus rhythm, without pathological findings. Lab work: altered kidney function, mild hypercholesterolemia, hypocalcemia, and decreased vitamin D levels. Multi-level X-ray results: lumbar L4/L5 and L5/S1 discopathy, lumbar spondylarthrosis, multiple spinal compressions, bilateral gonarthrosis, right hip pseudoarthrosis. DXA results indicate low bone density (T-score lumbar spine -3.5, T-score lef femoral neck=-2.8, the right one was excluded because of severe pathology). Abdominal US: right kidney atrophy. We initiated antiosteoporotic treatment, vitamin D and

Calcium supplements, antalgic electrotherapy, thermotherapy, therapeutic massage and physical therapy exercises, adapted to the current conditions. The patient was referred to an orthopedic specialist for hip replacement.

**Conclusion:** While evidence regarding the prophylaxis, diagnosis and treatment of osteoporosis has continuously expanded over the last few years, gaps in the literature still exist with the management of some particular cases, like the one we presented.

## P710
### IMPACT OF HOME CONFINEMENT DURING THE COVID-19 PANDEMIC ON WOMEN WITH OSTEOPOROSIS: RESULTS OF THE ECTO SURVEY
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**Objective:** The home confinement of the Spanish population for 2 months due to the COVID-19 pandemic could have a negative effect on women with osteoporosis and worsen their risk of fracture. This study aimed to analyze the impact of confinement due to the COVID-19 pandemic on the health and lifestyle of women with osteoporosis in Spain, as well as on adherence to treatment for fracture prevention.

**Methods:** Between April 14 and June 19, 2020, Spanish women diagnosed with osteoporosis and undergoing active treatment were invited to anonymously answer an online questionnaire of 19 questions using the Survey Monkey tool (https://www. surveymonkey.com/r/survey). The study obtained the approval of the CEIm and had the scientific endorsement of the SEIOMM (Spanish Society for Bone and Mineral Research) and the AEEM (Spanish Association for the Study of Menopause), and with the collaboration of AECOSAR (Spanish Association with Osteoporosis and Osteoarthritis).**Results:** 543 women (age 63±9.4 y) from 15 autonomous communities (52% from Madrid or Catalonia) answered the survey. 65% had been diagnosed with osteoporosis in the last 5 y and 31% had had a previous fragility fracture. 62% of the patients were receiving oral bisphosphonates, 27% denosumab, 4% selective estrogen receptor modulators (SERM), 4% teriparatide, 2% zoledronic acid, and 1% menopausal hormone therapy (MHT). 75% of the women decreased their physical activity during confinement, and only 7% increased it. 11% of women reported fewer falls, compared to 5% who reported having fallen more than before. 7% and 11% of the women increased their consumption of alcohol and tobacco respectively. Although 64% of the women did not perceive changes in their general health, 32% reported having worse health than before. 51% of the women felt sadder and up to 57% perceived that they had greater anxiety than before confinement. During confinement, a loss of adherence to the main treatment for osteoporosis was observed in 14% of the women (7% abandoned it and 7% confessed that they forgot more than usual), and this loss was significantly greater in women younger than 59 y (22% vs. 13% of those older than 59 y; p <0.05). Loss of adherence according to treatment was: MHT/SERM 46%, teriparatide 20%, zoledronic acid 14%, denosumab 6% and oral bisphosphonates 6%. Although 9% and 6% of women were non-adherent to calcium and vitamin D supplements respectively, it's remarkable that 20% of women increased their dairy products intake. A significant association was observed between the health perception and treatment adherence (p<0.05), being the women with worse health perception less adherent to osteoporosis treatment. No association was found between adherence and emotional state (anxiety or depression).

**Conclusion:** Home confinement during the COVID-19 pandemic had a negative impact on both some lifestyle habits and the health perception among women with osteoporosis, experiencing most of them a worsening of their emotional state. Although overall treatment adherence was good, younger women and/or those who received daily treatments had a higher proportion of treatment discontinuation.

## P711

### NEW PERSPECTIVES OF CHONDROITIN SULFATE: COMBINATION OF INTRAARTICULAR AND INTRAMUSCULAR ROUTE OF RECEIVING IN KNEE OA

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**Objective:** Assessment of effectiveness and safety of chondroitin sulfate intraarticular and intramuscular scheme of receiving in patients with knee OA in compare with intramuscular course

**Methods:** in study were enrolled 150 patients with knee OA (2-3 stages by Kellgren-Lawrence classification). After randomization patients were divided into two groups 1:1. 1st group got 5 intraarticular injection in target knee with 200 mg dose once every 3 d, next treatment was 16 intramuscular injection with 200 mg dose every other day. 2nd group got 25 intramuscular injection with escalation of dose: first 3 injection in dose 100 mg, from 4th injection dose was stable – 200 mg, every other day. All patients received NSAIDS (meloxicam 15 mg/d). Measurement of effectiveness was by WOMAC index, pain by visual analog scale (VAS), McGill Pain Questionnaire (MPQ).

**Results:** After compare of two scheme of Chondroitin Sulfate treatment at 1st group was lower intensity of pain by VAS that at 2nd group (16,81 ±13,49 vs. 21,88±13,24; p<0,0001, respectively). WOMAC index, pain, stiffness, and functional limitations and pain by MPQ questionnaire were similar. There was no significant difference between 1st and 2nd groups. No serious adverse events was identify. Adverse events in follow-up period were detected in 3.3% (5/150), all AEs were stopped by the end of study.

**Conclusion:** Chondroitin sulfate have significant analgesic effect in combination scheme of treatment, and it was anti-inflammatory action lead to docked of synovitis. Both schemes decreased pain, stiffness, improved function. This data opens new possibilities of chondroitin sulfate usage in knee OA with synovitis. Good safety profile of chondroitin sulfate might be special considerations for patients with comorbidities.

## P712

### SOFT BONE IS WEAK: PROSPECTIVE, BLINDED INTRAOPERATIVE ASSESSMENT OF BONE CORRELATES WITH T-SCORE

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**Objective:** Intuitively, intraoperative physician assessment (IPA) of bone would be an excellent measure of quality as surgeons gain insight into bone strength through haptic feedback while bone preparation is performed. However, no studies evaluate a surgeon's ability to do so. Our purpose was to investigate IPA of bone quality in patients undergoing total knee arthroplasty (TKA) with a) lowest T-score BMD b) custom regions of interest (ROI) in distal femur BMD.

**Methods:** Prospectively, 70 patients identified as primary TKA candidates by 3 surgeons received pre-operative DXA (spine, hip, wrist, VFA and TBS). Intraoperatively, the surgeon assessed bone quality on a 5 point scale based on tactile feedback to resistance with preparation: 1=excellent, 2=above average, 3=normal, 4=below average and 5=poor. This IPA was recorded in the operative note. Demographic data, DXA results and IPA scale between surgeons was compared by factorial ANOVA. Lowest T-score (L-spine, femoral neck/total hip and 3 radius) and custom regions were correlated to IPA using Spearman's correlation.

**Results:** Mean IPA was 2.74±1.2 with no statistical difference (p=0.284) between surgeons. Demographic data, BMD, and lowest T-score of patients (38 surgeon A, 25 surgeon B and 7 surgeon C) not differ between surgeons. Mean age was 65.8±7.6 y and BMI 31.4±5.1 kg/m². IPA directly correlated with lowest T-score (R=0.482) and ROI (R=0.587-

0.645). Based on lowest T-score, no patients with osteoporosis were classified as above average bone quality and none with normal BMD were classified as having poor bone

**Conclusion:** Novel IPA provides valuable information that can identify patients with below average/poor bone quality and expedite treatment ideally decreasing periprosthetic fracture risk. Reproducibility between three surgeons highlights potential for universal implementation and future studies may validate IPA in hip replacement aiding implant fixation selection.

## P713

### CARDIOVASCULAR DISEASES AND BONE MASS: TRADITIONAL RISK PROFILE

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**Objective:** Low BMD appear to be independent risk factor for cardio-vascular morbidity and mortality in both postmenopausal women and men.

**Methods:** We present the case of a 73 year-old-female patient, hospitalised in our department for persistent symptoms: progressive stiffness and moderate pain in her cervico-dorso-lumbar spine, associated with radicular pain, bilateral hip and knee pain and limping gait. Her past medical history is significant for left hip replacement, arterial hypertension (stabilized on antihypertensive medication) and dyslipidemia (treated with statins). She is a nonsmoker and denies alcohol consumption.

**Results:** Physical examination revealed: BMI=29.4 kg/m², BP-135/85 mmHg, HR=74 BPM, respiration rate=16 breaths/min, SO2=99% on room air, temperature=36.7°C. She is awake and alert. Locomotor system examination: moderate superior dorsal kyphosis, flattening of sagittal spinal curvature, painful lumbar flexion/extension, increased sensitivity at percussion of lumbar spinous apophysis, (+) Patrick on the right side, bilateral crepitus present during knee movement, limping gait. Lab work: nonspecific inflammatory response, hypocalcemia and decreased vitamin D levels. ECG: normal sinus rhythm with moderate ST-T changes and left ventricular hypertrophy. Echocardiography confirmed moderate left ventricular hypertrophy with preserved ejection fraction, without any cavity dilation or wall motion pathology. Multilevel X-ray results: lumbar discopathy, lumbar spondylarthrosis, severe L4 spinal compression, bilateral gonarthrosis, right coxarthrosis, and left hip prosthesis. DXA results indicate low bone density (T-score lumbar spine -3.5, T-score femoral neck=-3.5). Abdominal US: nephrolithiasis. After we completed the diagnostic workup, we established the following treatment: initiation of antiosteoporotic drugs, vitamin D and calcium supplements (close monitoring of calcium and vitamin D levels), antialgic drugs and rehabilitation program (consisting of–antalgic electrotherapy, thermotherapy, therapeutic massage and physical therapy exercises), adapted to the current conditions.

**Conclusion:** This particular case outlines the correlation between osteoporosis, cardiovascular diseases and lipid metabolism. Oxidized lipids have been suggested as a potential mechanism for low BMD and vascular calcification. Evidence based medicine suggests that abnormal lipid metabolism has detrimental effects on bone formation, especially in postmenopausal women. Still, the best way to counteract this complex processes is the preventive medicine, not well established by the available research today.

## P714

### CHALLENGES IN THE MANAGEMENT OF HEART FAILURE IN OSTEOPOROTIC PATIENTS

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**Objective:** Heart failure and osteoporosis are frequently associated conditions, particularly in elderly. Management of both conditions in period of exacerbations can be really challenging.

**Methods:** We present the case of a 50-year-old female patient. From her medical history we find out that she suffers from heart failure of an unknown origin, severe osteoporosis, right thyroid cyst and parathyroid adenoma that was surgically removed a few years ago. She reports chronic dyspnea with fluctuations, lightheadedness, reduced exercise tolerance and chronic generalized pain. She was on chronic medications for her heart failure and antiosteoporotic drugs. She is a nonsmoker and has no history of substance use.

**Results:** At presentation the patient has a normal BMI, BP=115/70 mmHg, HR=118 BPM, respiration rate=18/min, SO2=98% on room air, T=36.7°C. She is awake and alert, answers questions in full sentences. Cardiac examination reveals regular mild tachycardia with murmurs and gallops along with diffuse bilateral crackles. Her lower extremities are not edematous or tender. An ECG was performed: sinus rhythm, mild tachycardia, RBBB, a borderline PR interval and premature ventricular complexes. Bedside echocardiogram reveals a dilated left ventricle with reduced ejection fraction, severe mitral insufficiency, moderate tricuspid insufficiency with pulmonary hypertension, interventricular septum aneurysm and no pericardial effusion or intracardiac masses. Lab work: dyslipidemia, altered hepatic and renal function, mild hyperglycemia. After this findings we decided to adjust cardiac medication, to temporarily stop the antiosteoporotic drug and to refer her to a cardiac surgeon for severe valve pathology management.

**Conclusion:** Heart failure and osteoporosis are a public health issue of growing importance, because their impact on healthcare utilization, morbidity and mortality. We also know that a close relationship exists between heart failure and osteoporosis. In this particular case we intended to outline the challenges in the management of a young patient with two severe conditions that interfere.

**P715**

**LOW BONE MINERAL DENSITY IMPACT ON CARDIOVASCULAR DISEASES**
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**Objective:** Low BMD has been related to increased cardiovascular pathology and accelerated atherosclerosis.

**Methods:** A 63-year-old female patient is referred to our cardiology department with a chronic intermittent atypical chest pain. She also had vague joint aches and mild fatigue over the past few months. She has had no recent illnesses and specifically denies having fever, cough, dyspnea or syncope. Her past medical history reveals osteoporosis (on chronic treatment), mild dyslipidemia (with normal cholesterol values on statin medication) moderate arterial hypertension (stable on antihypertensive drugs) and mild/moderate depression (treated by psychological counseling only). She is a nonsmoker and has no history of substance use.

**Results:** At presentation: BMI=32 kg/m$^2$, HR=82 BMP, respiration rate=16/min, BP=120/80 mmHg. She has an oxygen saturation of 99% on room air. Her temperature was 36.5°C. She was awake and alert, and no apparent respiratory distress was present at the time. Cardiac examination reveals normal sinus rhythm without any murmurs, rubs or gallops. No wheezing, crackles or edema were found at the time of examination. Lab work: unremarkable. ECG revealed: mild nonspecific ST-T changes. Echocardiogram: left ventricular hypertrophy with a normal ejection fraction (LVEF of 62% estimated by modified Simpson method), no dilation of ventricle/atrium or wall motion abnormalities were present at that time. We performed a submaximal exercise stress test. We consider necessary to stop the test because of significant ST-T changes on stress ECG. We have to mention that stress test had no impact on patient chest pain. The vasopressor response at stress was normal with

medication. Coronarography indicated 90% left main vessel stenosis, with good response after stenting the lesion and pain free. After 3 months the patient was reassessed for osteoporotic treatment as well.

**Conclusion:** Evidence based medicine demonstrates that atherosclerotic calcification and bone mineralization share similar mechanisms and the two of them are highly organized processes that interfere. It is well recognized that arterial calcification is not a passive process of calcium/phosphate deposition, but instead a complex active plaque formation, similar in structure with inorganic bone matrix. This particular case outlines the importance of reconsider the management of such case even if the ischemic pre evaluation test is inconclusive.

**P716**

**CURRENT BUT NOT PAST, BONE-SPECIFIC PHYSICAL ACTIVITY LEVELS ARE ASSOCIATED WITH BONE MINERAL DENSITY IN RETIRED RUGBY PLAYERS**
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**Objective:** Regular participation in weight-bearing sports is osteogenic. However, it is not clear if the benefits are sustained after cessation of sport or if current exercise levels in later life are more influential. This study investigated differences in BMD and its association with past and current levels of physical activity in retired rugby players and retired noncontact athletes and nonathletes.

**Methods:** 88 retired male rugby players (46.1±10.5 y; 100±15.1 kg; 1.80±0.08 m; 42 elite, 46 community level) and 50 retired noncontact athletes and nonathletes (49.8±14.5 y; 86.5±14.5 kg; 1.77±0.06 m) received a DXA scan (GE Lunar iDXA, GE Healthcare, Madison, WI) for the measurement of femoral neck BMD. A bone-specific physical activity questionnaire (BPAQ) (Weeks and Beck, 2008) was used to derive scores for current (cBPAQ) and past (pBPAQ) physical activity.

**Results:** Retired rugby players had higher femoral neck BMD compared to the non-rugby group (1.102±0.169 gcm$^{-2}$ v 1.018±0.144 gcm$^{-2}$, p=0.004) but after adjustment for body mass, these differences were not statistically significant (p=0.096). The rugby group had higher pBPAQ scores (127.44±43.17 vs. 80.92±49.12, p<0.001) but there were no differences in cBPAQ scores (3.55±5.22 vs. 2.56±2.74, p=0.659). In the rugby group cBPAQ was moderately correlated with femoral neck BMD (r=0.40, p <0.001) but there were no associations with pBPAQ and BMD (r=0.06, p=0.581). No significant correlations between current or past BPAQ and femoral neck BMD were seen in the non-rugby group.

**Conclusion:** The long-term effects of rugby participation on bone density may be less important than current levels of bone-specific physical activity. It is important that former rugby players continue to engage in osteogenic physical activities post retirement from sport to support bone health.

**P717**

**BILATERAL DISTAL RADIUS FRACTURES IN ELDERLY PATIENTS WITH OSTEOPOROSIS: THE ROLE OF CALCIUM AND VITAMIN D IN THE PREVENTION OF REFRACTURES**
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**Objective:** Distal radius fractures represent 15% of all fractures and up to 90% of wrist fractures. They may occur in women over the age of 40 after low-energy trauma associated with underlying osteoporosis [1]. Osteoporosis is a "silent disease" and fragility fracture is a common presentation [2]. A correct approach to these patients should be followed by a secondary prevention of osteoporosis in order to reduce the risk of suffering new fractures.

Our objective is to review the incidence of bilateral distal radius fractures and refractures in elderly patients with osteoporotic bone that have been susceptible to conservative treatment.

**Methods:** We present a 82-year-old female patient with non-simultaneous bilateral dorsally displaced distal radius fracture (2009 and 2012) treated conservatively, as well as its subsequent evolution.

**Results:** After the first episode, treatment with calcium and vitamin D was started for underlying osteoporosis, diagnosed by bone densitometry. On two occasions, controls were carried out at 1, 2, 4 and 6 weeks until consolidation of fractures was observed in plain radiography (Figure 1). One year later, the patient was asymptomatic and had resumed normal activities.



Figure 1. PA and lateral right wrist radiograph (2012). Results after six weeks of conservative treatment.

Nine years after the last fracture, she fell from heights and was diagnosed with a right distal radius refracture (Figure 2A), without indication for surgical treatment. A closed reduction and immobilization with a below-elbow cast splint are performed (Figure 2B), and a subsequent follow-up similar to previous episodes was carried out. There have been no incidents to date.



Figure 2. A. AP and lateral right wrist radiograph (2021). Dorsally displaced distal radius refracture and distal ulna fracture. B. Right wrist radiograph after a closed reduction and immobilization with cast.

**Conclusion:** Low-energy wrist fractures are hallmarks of osteoporosis. Patients with osteoporosis who suffer fragility fractures have an increased risk of suffering both refractures and fractures in other locations due to their poor bone stock [3]. Adequate calcium intake, together with sufficient levels of vitamin D, have proven to be a good option to maintain a healthy bone state [4]. However nowadays it doesn't completely eliminate the possibility of future injuries.

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**P718**

**RETIRED RUGBY PLAYERS POSSESS SUPERIOR LEAN MASS AND STRENGTH BUT NOT MUSCLE QUALITY**

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**Objective:** The age-associated loss of muscle mass and strength, otherwise known as sarcopenia, represents a major health challenge. We investigated the impact of previous participation in rugby codes by assessing differences in lean mass, body fat percentage, muscle strength and quality in retired rugby players and retired noncontact athletes and nonathletes.

**Methods:** In this cross-sectional study, 88 retired male rugby players (46.1±10.5 y; 100±15.1 kg; 1.80±0.08 m; 42 elite; 46 community level) and 51 retired noncontact athletes and nonathletes (49.7±14.4 y; 86.7±14.5 kg; 1.77±0.06 m) were assessed for body composition using DXA. Appendicular lean mass (ALM) and appendicular lean mass index (ALMI) were calculated. Cohorts from the rugby group (n=59) and non-rugby group (n=42) underwent hand grip strength testing and muscle quality (hand grip strength per unit of arms lean mass; MQ) was calculated. Sarcopenia prevalence was determined, using the following cut-points: ALMI <7.23 kg/m$^2$; hand grip strength <37.2 kg.

**Results:** Total lean mass (68.3±9.1 kg vs. 57.9±8.0 kg), ALM (32.7±5.0 kg vs. 27.3±4.3 kg), and hand grip strength (51.7±8.8 kg vs. 44.1±7.6 kg) were significantly higher in the rugby group (p<0.001). There were no between-group differences in body fat percentage or MQ. The prevalence of sarcopenia was significantly higher in the non-rugby group, ALMI <7.23 kgm$^2$ (8% vs. 0%; p=0.017); hand grip strength <37.2 kg (19% vs. 3%; p=0.015).

**Conclusion:** Retired competitive rugby code players have superior levels of hand grip strength and lean mass in later life. It is not clear if this represents genetic influences on self-selection or a sustained effect of previous participation in a highly physical sport.

**P719**

**MULTIPLE MYELOMA SCREENING WITHIN A FRACTURE LIAISON SERVICE (FLS)**

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**Objective:** A key role of the FLS is screening for secondary causes of osteoporosis. Myeloma is a recognised secondary cause and early diagnosis improves survival. In 2019, the Royal Osteoporosis Society recommended that all patients attending FLS have universal screening for myeloma based on serum electrophoresis, serum free light chains and urine electrophoresis. This study aimed to examine the impact of universal myeloma screening within an FLS.

**Methods:** We sampled all patients seen by the Oxfordshire FLS between January-April 2018. Screening is only recommended in those who are recommended antiosteoporosis therapy. The completion rates and outcomes of screening were checked using the hospital and FLS databases.

**Results:** Of 950 patients identified by the FLS, 584 had some form of myeloma screening. Of these, 438 (75%) were female, 371 (64%) aged over 75 y and 178 (30%) sustained a hip fracture. Overall, 577 (99%) had serum electrophoresis measured, 525 (90%) had serum free light chains and 407 (70%) had urine electrophoresis. 327 (56%) patients had complete screening. Three patients had newly diagnosed myeloma and referred to Haematology services. Furthermore, 46 patients had a detectable serum paraprotein with a likely diagnosis of monoclonal gammopathy of uncertain significance (MGUS) requiring annual surveillance.

**Conclusion:** Addition of universal myeloma screening to laboratory testing, identified myeloma in 1 in 195 patients, and its precursor state MGUS in 1 in 13 patients, which may have otherwise been missed. Further analysis with long-term follow-up is needed to clearly define the value of diagnosing MGUS within the FLS setting, establish the benefits vs. costs and methods to improve screening completion rate.

Table.

| Outcome | n | % Female | % Aged over 75 y | % Hip fracture | % Complete Screen |
|---|---|---|---|---|---|
| Normal | 509 | 75% | 61% | 30% | 64% |
| Myeloma – New | 3 | 67% | 100% | 0% | 33% |
| Myeloma – Known | 1 | 0% | 100% | 0% | 0% |
| MGUS – New | 46 | 70% | 83% | 39% | 61% |
| MGUS – Known | 24 | 83% | 79% | 33% | 63% |
| Hypogammopathy | 128 | 70% | 75% | 43% | 78% |
| Polyclonal hypergammopathy | 41 | 71% | 63% | 29% | 76% |

## P720
## MANAGEMENT OF HIP FRACTURE DURING THE COVID-19 PANDEMIC

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**Objective:** The outbreak of coronavirus disease produced a significant impact in health care systems and led to changes in usual hip fracture (HF) care. In Argentina a nationwide mandatory and prolonged lockdown was implemented. HF is associated with a higher risk of new fractures and mortality. The impact of COVID pandemic on HF patients in Argentina is unknown. This study aimed to compare treatment and outcomes after HF during the pandemic vs. the same period in 2019.

**Methods:** Observational retrospective study comparing 2020 (03/20/2020 - 07/20/2020) and 2019 (03/20/2019 - 03/20/2019) cohort. Data were obtained from the institutional HF registry and the electronic medical record. Clinical Frail Scale and Charlson Index were assessed.

In 2020 in-hospital bisphosphonate (BP) use and telemedicine were implemented. Bivariate analysis of qualitative variables was performed with chi2 or Fisher and for quantitative variables, t-test or Wilcoxon. STATA 14 software was used.

**Results:** Both cohorts (2019 n:113, 2020 n:74) were similar in age (88 vs. 86.5), sex, BMI, previous fractures, osteoporosis treatment, fracture type, PTH and vitamin D, but 2020 cohort presented greater frailty (p<0.0001) and Charlson index (p<0.0001). Covid test was negative in all patients. Median time to surgery was 1 (1-2) d (p 0.9) and in-hospital endocrinological evaluation was performed in >80% in both cohorts (p 0.61). BP treatment was 30% in 2019 vs. 54% in 2020 (p 0.009). Zoledronic acid (ZOL) was used in 85% of cases without severe adverse effects. Endocrinological follow up was 25% in the 2019 cohort vs. 43.1% (telemedicine) in 2020 (p 0.01). No significant differences in hospital stay, new fractures, readmissions and 3-month mortality were found.

**Conclusion:** Surgical and in-hospital evaluation were similar during Covid pandemic. Postoperative ZOL was safe and increased access to treatment. Telemedicine improved follow-up. Length of hospitalization, readmissions and 3-month mortality were similar.

**Table 1. Secondary prevention after hip fracture during Covid-19 pandemic in 2020 vs 2019.**

| Variables | 2019 n: 113 | 2020 n:74 | p |
|---|---|---|---|
| Calcium + VD (I+HC) n,(%) | 20 (17.7) | 43 (58.1) | 0.0001 |
| BF treatment (I+HC) n,(%) | 35 (30.1) | 40 (54) | 0.002 |
| ZOL treatment (I+HC) n,(%) | 31 (27.4) | 34 (45.9) | 0.009 |
| Time from surgery to ZOL days* | 53 (41-88) | 2.5 (2-4) | 0.0001 |
| ZOL adverse effects n,(%) | 0/1 (0) | 2/32 (6.9) | 0.786 |
| Endocrinological follow up n,(%) | 28 (25) | 31 (43.1) | 0.010 |
| Face-to-face consultation n,(%) | 25 (22.3) | 1 (1.4) | 0.0001 |
| Telemedicine consultation n,(%) | 5 (4.5) | 30 (41.7) | 0.0001 |

I: in-hospital, HC: Home Care, ZOL: zoledronic acid, VD: vitamin D, *median-RIC

## P721
## FAMILY SPONDYLOARTHITIS: RESULTS OF A MONOCENTRIC STUDY

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**Objective:** To report our experience about observations of families of spondyloarthritic patients, followed in our department.

**Methods:** This is a retrospective study including patients with spondyloarthritis during a period from 2010 to 2020 with family history of spondyloarthritis. The diagnosis of spondyloarthritis was retained according to the New-York, AMOR and/or ASAS criteria. We have described the clinical, biological and therapeutic aspects of these patients.

**Results:** We identified eight families of spondyloarthritis composed of 12 men and 5 women. The mean age of onset was 28.56 y (14-58 y). There were 13 cases of ankylosing spondylitis, 1 case of enteropathic arthritis, 2 case of psoriatic arthritis, and 1 case of late onset peripheral spondyloarthritis. Thirteen patients had axial and peripheral form. Uveitis was associated in 5 cases. Sacroiliitis has been detected in 14 patients. All patients had at least one severity factor: onset before age 16 (1 case), dactylitis (1 case), increased CRP (7 cases), coxitis (9 cases), and NSAID failure (14 cases). Four patients were tested for HLA-B27 and three were positive. Among 17 patients, 11 required biotherapy and 3 required total hip replacement.

**Conclusion:** Our findings reveal that ankylosing spondylitis is the most common form of family spondyloarthritis. The majority of our patients required biotherapy and three benefited from a hip replacement.

## P722
### IMMUNOGENICITY AND SAFETY OF 23-VALENT PNEUMOCOCCAL POLYSACCHARIDE VACCINE IN PATIENTS WITH IMMUNO-INFLAMMATORY RHEUMATIC DISEASES

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**Objective:** To study the immunogenicity and safety of the 23-valent polysaccharide pneumococcal vaccine (PPV-23) in patients with immuno-inflammatory rheumatic diseases (IIRDs).

**Methods:** The open prospective study included 145 patients (96 women, 49 men, age 22-76 y). Rheumatoid arthritis was diagnosed in 79 patients, ankylosing spondylitis – in 31, systemic scleroderma – in 16, psoriatic arthritis – in 12, and dermatomyositis/polymyositis – in 7. At the time of inclusion in the study, most patients had high or moderate disease activity. Most patients had at least two cases of lower respiratory tract infections (bronchitis, pneumonia) in their immediate history, 2 patients reported a monthly exacerbation of chronic sinusitis, 1 patient – the development of otitis every 2-3 months, requiring the use of antibacterial drugs. PPV-23 was administered in an amount of 1 dose (0.5 ml) subcutaneously in the deltoid muscle against the background of anti-rheumatic therapy. The level of antibodies to pneumococcal capsular polysaccharide was determined using the EIA PCP IgG kit before vaccination, 1, 3 and 12 months after vaccination.

**Results:** At 1, 3 and 12 months after vaccination, the concentration of antibodies to pneumococcal capsule polysaccharide was significantly higher compared to the baseline values (p=0.01, p=0.005 и p=0.01, respectively). In 80.7% of patients, vaccination tolerance was good. Reactions at the injection site (pain, swelling and hyperemia of the skin up to 2 cm in diameter), resolved independently after 1-5 days, were observed in 26 patients. In 2 patients, a severe local reaction was registered in the form of pain in the arm, infiltration and hyperemia of the skin up to 8 and 15 cm in diameter, respectively, accompanied by low-grade fever in one patient for 2 days, and febrile fever in the other for 3 days. In both cases, these symptoms were completely stopped after administration of paracetamol and antihistamines. Exacerbation of IIRDs and the emergence of new autoimmune disorders were not detected. During the follow-up period, no patients developed lower respiratory tract infections. Patients suffering from frequent sinusitis and otitis reported the absence of these infections after vaccination.

**Conclusion:** The obtained data indicate satisfactory immunogenicity and good tolerability of PPV-23 in patients with IIRDs. Further studies are needed to better assess the immunogenicity and safety of vaccine, as well as to study of the influence of anti-rheumatic therapy on the effectiveness of immunization.

## P723
### RISK OF SUBSEQUENT FRACTURE ADMISSION IN MEXICO USING REAL WORLD DATA

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**Objective:** It is well recognised that patients admitted with a fragility fracture are at high risk of subsequent fracture. The expected rates of re-fracture in the first few years are essential when modelling the expected benefits and budget impact from Fracture Liaison Services to inform their prioritisation for policymakers. At present, there is a paucity of local re-fracture data for Mexico.

**Methods:** We compared the rates of re-fracture over a 1-y period using routine admission data from the Health Services Jalisco, one of the health systems in the western region of Mexico (state of Jalisco). Fracture sites were coded using ICD10 discharge codes into the hip, spine and other fracture sites, excluding the face, digits, skull and scaphoid. To exclude duplicate admission coding, subsequent admissions within 90 d of the index fracture admission date with the same ICD10 code were excluded.

**Results:** In 2017, there were 1,007 admissions with fragility fractures leading to occupancy of 7712 bed days. 69% of all fragility fracture admissions were for hip fractures (78.9% of all fragility fracture bed days). Of the admissions with hip fractures, men had a 2-d longer length of stay than women (p=0.042) even though they were 4 years younger (p<0.001). Women with hip fractures made up 46.2% of admitted fractures in adults aged 50 y and over, and 50% of total bed days. Men with hip fractures made up 22.8% of all admitted fractures and 28.2% of total bed days. Few patients (2.8%) were admitted with spine fractures. After excluding readmissions within 90 d with the same fracture site code, 43 patients (4.2%) had readmission for fracture within 12 months of the index fracture. 22 patients (3.3%) were readmitted with a second hip fracture and had a nonsignificant longer length of stay from first admission (7 vs. 8.5 median days (p=0.12)).

**Conclusion:** We have described the local refracture readmission rates at 12 months following index admissions for hip, spine and other fractures for one of the health system in the western region of Mexico. These findings will be critical for understanding the potential patient, clinical and economic benefits from Fracture Liaison Services.

Table. Index fractures in 2017:

| | Total Site | | | | Women Site | | | Men Site | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Hips | Spines | Other | Hips | Spines | Other | Hips | Spines | Other |
| n | 1,007 | 695 | 28 | 284 | 465 | 18 | 183 | 230 | 10 | 101 |
| Age (y) | 73.4 (13) | 77.6 (11.7) | 68.3 (12.9) | 63.6 (10.6) | 79.0 (10.9) | 72.4 (12.8) | 64.2 (10.5) | 74.7 (12.7) | 60.8 (9.6) | 62.6 (10.7) |
| Length of stay (median, IQR) | 7.6 (2-11) | 8 (3-12) | 4 (1- 10.5) | 2 (1-5) | 6 (3-12) | 3 (1-10) | 2 (0-4) | 8 (4-13) | 4 (2- 13) | 2 (1-5) |
| Number of bed days | 7,712 | 6,082 | 210 | 1,420 | 3909 | 135 | 813 | 2173 | 75 | 607 |

## P724

### "CHARCOT'S FOOT": A DIAGNOSIS NOT TO BE MISSED!

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**Objective:** Charcot's foot is a rare nervous osteoarthropathy; described by Charcot; it is an extremely serious complication of diabetic neuropathy leading to deformities of the foot by the non-infectious destruction of bones and joints. We report an observation. The interest of this observation is to show on the one hand the role of the education of diabetic patients in the early diagnosis of Charcot's foot, on the other hand the difficulty of management requiring a multidisciplinary team.

**Case report:** 32-year-old patient, type 1 diabetic, diagnosed 11 years ago, poorly balanced under insulin therapy and at the stage of degenerative complications: CKD stage 3, diabetic neuropathy of both lower limbs. He presented in consultation with a swollen right foot, melanodermal with enlargement of the anteroposterior diameter and lateral diameter, plantar flattening, associated with lymphedema extending to the leg, progressing for 1 year in total indolence and rendering the difficult walk. Standard radiographs reveal diffuse bone transparency, destructive lesions of the talocrural joint with multiple geodes. Biology: glycemia: 2.2 g/l, HbA1c: 9%, absence of inflammatory syndrome, Ca: 85mg/l, clearance: 58 ml/min. Charcot's foot affects 9% of diabetics with sensory neuropathy and the involvement of young people is rare. The average age of diagnosis of diabetic neuroarthropathy is 57 y, with an average duration of diabetes of 15 y (80% over 10 y and 60% over 15 y). This impairment was observed in our young diabetic patient with 11 y of development of diabetes due to chronic glycemic imbalance. Charcot's neuroarthropathy still suffers from delayed diagnosis due to the lack of specificity of the initial clinical signs. It can induce irreversible bone complications responsible for high morbidity and mortality. The prognosis depends on an early diagnosis and treatment with the aim of limiting the deformity through the immobilization of the cast and the discharge.

**Conclusion:** Regular and rigorous podiatry examination in diabetic patients allows early diagnosis and adequate treatment of any neurological or vascular complication.

## P725

### CLINICAL PROFILE OF OSTEOPOROTIC PATIENTS TREATED WITH ZOLEDRONIC ACID

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**Objective:** Prevention of fractures with bisphosphonates has been shown most clearly in patients with osteoporosis. Zoledronate is administered by intravenous injection at intervals of 1 year or longer, it is preferred over oral bisphosphonates by a majority of patients,[1] and it has had a satisfactory safety profile.[2][3] Zoledronic acid decreases the risk of vertebral and nonvertebral (including hip) fractures. The objectives of the study are to identify patients with osteoporosis treated with zoledronate.

**Methods:** Prospective study starting from July 2017 and ongoing involving osteoporotic patients (postmenopausal, postcortisonic and secondary) with or without fracture treated with zoledronic acid. A biological assessment (serum creatinine, calcium level and vitamin D), a BMD test and oral evaluation were performed before the infusion of zoledronic acid. Calcium 1000 mg/d and vitamin D 800 IU/d have been prescribed for these patients. We discussed with the patient the rare potential risks of atypical fracture of the femur or osteonecrosis of the jaw.

**Results:** We collected 14 patients treated with zoledronate, 11 women (cortisonic osteoporosis: 7 patients, postmenopausal osteoporosis: 3 patients and osteoporosis secondary to primary hyperparathyroidism: 1 patient) and 3 men (cortisonic osteoporosis), the average age is 59 y. The pathologies justifying corticosteroid therapy were rheumatoid arthritis in 6 patients, 2 cases of lupus and 2 cases of sarcoidosis. The mean T-score at the hip was -2.6 and the mean T-score at the spine was -2.9. The risk factors for fracture were age >60 (10 patients), BMI <19 (3 patients), history of fracture in 10 patients (hip: 5 patients, vertebra: 2 patients, wrist: 3 patients and ankle: 3 patients), history of prolonged corticosteroid therapy (10 patients), early menopause (2 patients), type 2 diabetes (3 patients), celiac disease (1 patient), Vit D deficiency (6 patients) and treatments promoting osteoporosis (proton pump inhibitors: 9 patients and levothyroxine: 2 patients).

**Conclusion:** Zoledronic acid once a year is an effective and generally well tolerated treatment option for patients with osteoporosis, its indication in our patients was severe osteoporosis with severe fracture.

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## P726

### POST-FRACTURE CARE PROGRAMMES START OFFSETTING INITIAL INVESTMENT TWO YEARS AFTER THEIR IMPLEMENTATION: PRELIMINARY FINDINGS FROM A MICROSIMULATION MODEL OF BENEFIT AND BUDGET IMPACT

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**Objective:** To describe the yearly incremental costs and quality-adjusted life years (QALYs) of a postfracture care (PFC) programme implementation in comparison to current practice in various countries.

**Methods:** A microsimulation model was developed where adult men and women aged 50 y and older with a fragility fracture of the hip, spine, or other major site transit through health states of subsequent refracture of any site, or refracture free taking into account imminent fracture risk. The model was run for five years over monthly cycles. Introduction of a PFC programme was compared to current practice for several countries. Hospital inpatient and outpatient, social care, and secondary fracture prevention costs were considered, with number of refractures and QALYs as primary outcomes. All main antiosteoporotic drugs were available to be recommended to patients, each characterised by a fracture site specific time-lag effect and relative risk reduction over baseline refracture rates. PFC performance for identification, assessment, treatment, and monitoring were built into the model reflecting achievable treatment and adherence rates.

**Results:** Cost levels and distribution over time were found to be highly sensitive to medication time-lag effects for vertebral, hip and other fracture sites. With many drugs taking 6-12 months after treatment initiation to reveal their full effect, 84% of the 5-y added costs of PFC over current practice were concentrated on the first year, due to the combination of PFC (especially medication) costs as well as hospital and social care for patients who still refracture. The second year reported 35% of the 5-y incremental costs, with the PFC alternative offsetting initial investment after that. QALY gains during the first year were 4% of the total 5-y gain over current practice, with the following years increasingly contributing between 17% and 30%. The figure shows the percentage of 5-y incremental costs and QALYs gained and their distribution over the first 5 y of PFC operation.

**Conclusion:** Our model shows that the investment necessary to implement a PFC programme not only generates significant and growing quality of life gains for patients, but also that its annual costs become lower than those under current practice after the second year of PFC implementation.

Yearly proportion of 5-year incremental costs and QALYs gained by PFC vs current practice
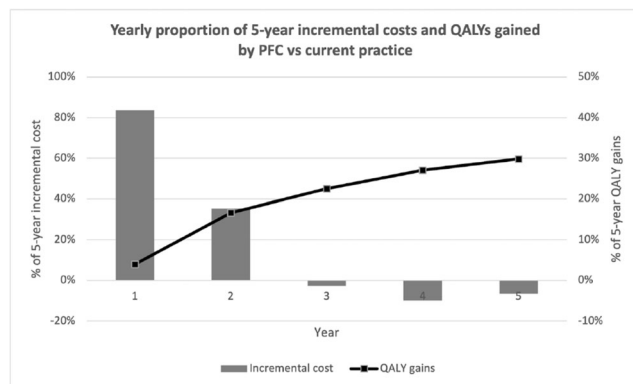
## P727

### UNIQUE ASSOCIATION: RHEUMATOID ARTHRITIS, LUPUS, SYSTEMIC SCLERODERMA AND GOUGEROT-SJOGREN SYNDROME

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**Objective:** Rheumatoid arthritis (RA) is an autoimmune disease, often associated with other diseases in this family. We report an exclusive observation of an overlap syndrome where RA is associated with lupus, scleroderma sine scleroderma and secondary Gourgeot-Sjögren syndrome.

**Case report:** 51-year-old patient with a history of hypothyroidism and hypertension, has presented an erosive and deforming RA for a dozen years, initially put on DMARDs then on anti-TNFα (Adalimumab), hospitalized for Raynaud's phenomenon, erythematous lesions infiltrated in the interarticular areas of the fingers, arms and anterior face of the thighs, erythema malar, telangiectasias in the neckline and upper face of the back with non-scarring alopecia associated with inflammatory polyarthralgia, a dry cough, dyspnea of exertion and dry eye syndrome. Biology: leukopenia 3000 e/mm³, ESR: 85 mm H1, CRP: 10mg/l, liver enzymes: 2 nle, renal function:normal and 24 h proteinuria: negative. Immunology: FAN positive with anti DNA 560 IU, anti-SSA / Ro (52/60) and anti-Scl70 Ab: positive. Bone and articular ultrasound: bilateral radio-carpal synovitis, Cardiac ultrasound: without abnormalities, thoracic CT: interstitial pulmonary fibrosis located in the basal segment of the lower lobes. Functional respiratory test: normal. Capillaroscopy: rarefying organic microangiopathy. Biopsy of accessory salivary glands: Chisholm grade 4 lymphocytic sialadenitis. Bone densitometry finds osteoporosis. The diagnosis of overlap syndrome: RA, scleroderma sine scleroderma, lupus, associated with secondary Gougerot-Sjögren syndrome was retained in this patient. Under plaquenil, mycophenolate mofetil, diltiazem, adalimumab, low-dose prednisone, the outcome was favorable

**Conclusion:** The coexistence of several autoimmune pathologies involves diagnostic and therapeutic difficulties. The pathophysiological mechanisms underlying these associations have not yet been elucidated, but a predisposing genetic ground is increasingly implicated.

## P728

### REYNOLDS SYNDROME: A CASE REPORT

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**Objective:** In systemic scleroderma (SS), the prevalence of liver damage is approximately 1%. Cholangitis is the most frequently described liver disease in association with scleroderma, constituting a rarely described entity: Reynolds syndrome. We report an observation.

**Case report:** 47-year-old patient, mother of 02 children after 02 early abortions and 07 premature deliveries; hospitalized for exploration of Raynaud's phenomenon associated with inflammatory polyarthralgia. The examination found a patient with a generalized melanodermal appearance, skin thickening of the fingers of the hands extending beyond the metacarpophalangeal joints; unilateral edema of the left foot painful, hot, keeping the cup with pulse present. A biological inflammatory syndrome, hepatic cytolysis, hepatic anicteric cholestasis. Immunological assessment: centromeric FAN> 1/1000, cytoplasmic 1/320: anti-centromere B antibodies, anti-mitochondria M2 antibodies positive with anti-cardiolipin IgM 23 MPL/ml and anti-prothrombin IgM 19 MPL/ml. Capillaroscopy: severe rarefying organic microangiopathy. A normal respiratory function test with FVC: 92%.
Computed tomography (high resolution): does not find signs of interstitial lung disease. Cardiac ultrasound without abnormalities. Esogastroduodenal fibroscopy: hatched appearance of the duodenal mucosa, the anatomopathological study of the biopsies of which shows total villous atrophy which may correspond to celiac disease. Arterial echodoppler of the lower limbs: occlusion of the distal left pedial artery. The diagnosis retained is Reynolds syndrome (limited cutaneous systemic sclerosis + primary biliary cholangitis) associated with secondary APS; celiac disease has not been confirmed. Under nonsteroidal anti-inflammatory drugs, diltiazem, ursodeoxycholic acid, Low molecular weight heparin then anti-vitamin K, the evolution was favorable.

**Conclusion:** The association SS-Primary biliary cholangitis constitutes a rare but not fortuitous pair, which imposes an increased monitoring in order not to ignore the impact of the hepatic damage on the overall prognosis of scleroderma and the possibility of association with other autoimmune pathologies.

## P729

### THE RELATIONSHIP BETWEEN HAND GRIP STRENGTH AND REGIONAL MUSCLE MASS IN ELDERLY ASIANS

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**Objective:** Although previous research has demonstrated a correlation between muscle strength and regional muscle mass, few studies have investigated the relationship between hand grip strength (HGS) and muscle mass in older Asian adults. This study aims to determine the relationship between HGS and muscle mass in older Asian adults.

**Methods:** We retrospectively reviewed the DXA records of older adults from one medical institution in Taipei, Taiwan, from January 2019 to September 2020. The inclusion criteria were: 1) aged 60 and older, 2) underwent a full-body DXA scan, and 3) performed hand grip measurements. Duplicate results, incomplete records, patients with a history of stroke, and patients with other neurological diseases were excluded. Regional skeletal muscle mass (upper and lower extremities as well as trunk) was measured using DXA. HGS was measured using a Jamar handheld dynamometer, with the maximum value of three attempts recorded for analysis. Sarcopenia was diagnosed according to the definition provided by the Asian Working Group for Sarcopenia (2019).

**Results:** Of the 907 healthy participants, the prevalence of sarcopenia was 33.89% in men and 13.77% in women. In both sexes, HGS and regional muscle mass showed a consistent decline after 60 y of age. The rates of decline per decade in upper extremity muscle mass, lower extremity muscle mass, trunk muscle mass, and HGS were 6.69%, 4.95%, 3.54%, and 12.30%, respectively, in men, and 3.35%, 4.44%, 1.81%, and 12.48%, respectively, in women. In men, HGS significantly correlated with upper ($r=0.576$, $p<0.001$) and lower extremity muscle mass ($r=0.532$, $p<0.001$). In women, the correlations between HGS and upper extremity muscle mass ($r=0.262$, $p<0.001$) and lower extremity muscle mass ($r=0.364$, $p<0.001$) were less strong, though also statistically significant.

**Conclusion:** Muscle mass and HGS decline with advancing age in both older men and women though the correlation is stronger in men than in women. HGS measurements are an accurate proxy of muscle mass in older Asian adults, particularly males.

## P730

### ASSOCIATION OF SPONDYLOARTHRITIS AND CELIAC DISEASE: A CASE REPORT

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**Objective:** Ankylosing spondyloarthritis is a chronic inflammatory rheumatism in which the general signs such as weight loss, anorexia, pallor are not very important and may be part of an associated condition. We report an observation where these signs are the result of an association with Celiac disease.

**Case report:** This is a 34-year-old young woman with a history of hypothyroidism, followed for 5 y for axial ankylosing spondyloarthritis with bilateral sacroileitis treated with a biological agent (anti-TNFα). Under treatment appear diffuse polyalgia, muscle wasting with weight loss leading to hospitalization. The clinical examination found a patient in general preserved condition, skin-mucous paleness, afebrile, weighing 47 kg. Cervical hyperlordosis, exaggerated dorsal kyphosis, without spinal stiffness; bilateral scapulalgia with slight limitation of abduction. Generalized atrophy with muscle weakness. A normal neurological exam. Biology: VS: 39 H1, CRP: negative, HB: 9.7g/dl (normochromic normocytic anemia), CA: 103mg/l ↑, Phos: 17mg/l ↓, 24-h calciuria: 38 mg/24-h ↓, PTH: 1447pg/ml ↑, albumin: 47 g/l, Vit D collapsed at 4 ng/ml

↓↓, renal and hepatic results are normal. Radiology: standard radiographs show: diffuse bone demineralization, funnel-shaped deformation of the thorax, several tiered vertebral compression (fish vertebrae), pelvis in the heart of a playing card; bone densitometry: objective osteoporosis with a spine T-score: -5, neck: -4. Signs in favor of deficiency osteomalacia. The etiological research concluded with celiac disease on the following results: positive celiac serology: anti-tissue transglutaminase antibody IgA: 258.7 IU/ml, esogastroduodenal fibroscopy with duodenal biopsy found: total villous atrophy stage 4 according to the Marsh classification. The treatment undertaken is: a gluten-free diet, calcium and vitamin D supplementation; further treatment with IV bisphosphonates. The short-term course resulted from complete pain relief with weight gain and normalization of biological indices.

Celiac disease is a dysimmune disease whose digestive symptoms are the best known, however, joint involvement (polyarthralgia, arthritis, osteoporosis) is often precocious and unrecognized. Anemia and chronic asthenia are all symptoms that should motivate the search for specific antibodies. The goal of early diagnosis is to prevent the onset of other systemic conditions and to avoid complications such as fractures or cancer, especially lymphoma. Celiac disease is associated with an autoimmune disease in almost a third of cases (rheumatoid arthritis, Gougerot-Sjögren syndrome). Knowing these potential associations makes it possible to make an earlier diagnosis in patients whose only manifestation is the associated disease. The association of spondyloarthritis and celiac disease is rare. Only a few observations have been reported in the literature.

**Conclusion:** The celiac disease-SPA association is rare, but it suggests the existence of physiopathological mechanisms common to these two pathologies.

## P731

### INFECTIONS UNDER BIOTHERAPIES

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**Objective:** Biotherapies are now part of the therapeutic arsenal of chronic inflammatory rheumatism such as rheumatoid arthritis, ankylosing spondylitis and psoriatic arthritis. Commonly used biotherapies are anti-TNF agents (infliximab, etanercept, adalimumab and certolizumab), an antibody targeting the B cell (rituximab), an inhibitor of lymphocyte co-stimulation (abatacept) and an antibody targeting the IL-receptor. 6 (tocilizumab). These biological agents are started up in a specialized hospital environment. These biotherapies obey initiation rules according to the data of the marketing authorization, national and international recommendations. These biological agents are highly effective in chronic inflammatory rheumatism.

**Methods:** This is a descriptive retrospective study including patients hospitalized in our rheumatology department between 2006-2018 undergoing biotherapy.

**Results:** Of the 265 files included, we found 23 infections in 18 patients (6.79%) who presented at least one infection under biotherapy: 13 women and 5 men, on average 39 years old. It was either rheumatoid arthritis (10 patients), ankylosing spondylitis (8 patients), or psoriatic arthritis (1 patient). All patients were on conventional treatment before switching to biotherapy. Infections occurred with adalimumab in 39%, etanercept in 39%, tocilizumab in 8.6% (there were no infections observed in patients on infliximab). The infection was of bacterial origin in 87.07% of cases: 5 pulmonary infections (2 under adalimumab and 3 under etanercept) including 2 tuberculosis (one under adalimumab and one under etanercept), 4 ENT infections (2 under etanercept, one under tocilizumab and one under adalimumab), 4 urinary tract infections (including 3 under adalimumab and one under etanercept), a digestive infection (under adalimumab) a soft tissue abscess (under adalimumab), 2 genital (one under adalimumab, one under etanercept), an ocular under

etanercept, 3 cutaneous (one under tocilizumab, one under etanercept and one under adilimumab). A viral origin of the infection was noted in 8.69% of cases: one under adalimumab and one under etanercept, while for mycoses it only represented 4.24% of the aetiologies identified. Treatment was medical in 100% of cases and the outcome was favorable in all patients without recourse to definitive discontinuation of biotherapy.

**Conclusion:** The infections reported in our series are clearly more frequent under adalimumab-type treatment and bacteria are the pathogens most implicated in our patients, which is confirmed by the data in the literature.

## P732
### RESEARCH ON THE DIAGNOSIS AND TREATMENT OF OSTEOPOROSIS IN DEPARTMENT OF RHEUMATOLOGY & IMMUNOLOGY IN CHINA

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**Objective:** To investigate the level of osteoporosis diagnosis and treatment among doctors in the Dept. of Rheumatism & Immunology in China.

**Methods:** From October 1, 2020 to March 31, 2021, 1000 rheumatology immunologists from 29 provinces nationwide were involved through Chinese Rheumatism Data Center (CRDC). The scanning tools, the diagnostic criteria, and the therapeutic regimens for osteoporosis were investigated.

**Results:** More than 60% (64.2%) of rheumatologists believe that rapid bone loss occurs within 6 months of glucocorticoids (GCs) use. However, half of the rheumatologists approximately (50.1%) were not familiar with the diagnostic criteria of osteoporosis. 72.7% of rheumatologists said that they will use DXA for osteoporosis diagnosis. Only 28.7% of rheumatologists said they will combine DXA and vertebral fracture assessment to screen osteoporosis in patients. Besides, the use of fracture risk assessment tool (FRAX) in rheumatology is about 25%. Among these physicians, merely 20.6% of them choose bisphosphonate, calcium, and vitamin D for patients at high fracture risk.

**Conclusion:** The screening, diagnosis and treatment of osteoporosis in rheumatology department has not attracted much attention. It is urgent to improve the management level of osteoporosis and grasp the algorithm for diagnosis and treatment leading to reduce the risk of osteoporosis fracture effectively.

## P733
### LEVELS OF 25OHD IN SUPPLEMENTED AND NOT SUPPLEMENTED SUBJECTS AND RELATION WITH AGE, BMI AND SEASONS

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**Objective:** To determine total 25OHD levels in supplemented and not supplemented patients during 2020 and to analyze the relationship between 25OHD with age, BMI and season in the not supplemented group.

**Methods:** total 25OHD was dosed in 446 subjects. 278 patients did not receive supplementation and 168 received it.

**Results:** Patients without supplementation were younger (51.9±14.9 vs. 62.5±11.1 y, p<0.0001) and had lower 25OHD levels (21.4±8.7 vs. 39.1 ±10.8 ng/mL, p<0.0001). Not supplemented group: 25OHD levels were

similar in all ages and no differences were observed between normal and overweight patients. Subjects with obesity had lower 25OHD than those normal and overweight: 19.3±7.6 vs. 21.8±8.8 ng/mL, p=0.049. A negative correlation was found between BMI and 25OHD: r:-0.13, p=0.03. No correlation with age was observed. 25OHD seasonal values were: winter (n:104) 18.6±7.0 ng/mL, fall (n:63) 23.4±9.0 ng/mL, spring (n:79) 20.6±8.0 ng/mL and summer (n:32) 28.3±10.3 ng/mL, with significant differences between winter and fall (p<0.01), winter and summer (p<0.001), fall and summer (p<0.05) and spring and summer (p<0.001). Supplemented group: 25OHD levels were: 100.000 IU/monthly (n:78): 43.6±11.2 ng/mL; 100.000 IU/bimonthy (n:20): 33.19±12.3 ng/mL; 100.000 IU/quarterly (n:17): 38.5±9.4 ng/mL; 1.000 IU//d (n:6): 34.33±7 ng/mL; 2.000 IU/d (n:22): 35.57±6 ng/mL; 3.000 IU/d (n:7): 35.67±11 ng/mL and 4.000 IU/d (n:5):39.76±8 ng/mL. A desirable value of 25OHD >30 ng/mL was found in 82.6% and in 15,1% of the supplemented and not supplemented subjects respectively.

**Conclusion:** Patients supplemented with vitamin D had better 25OHD values. In not supplemented subjects age is not a factor that influences 25OHD levels (maybe because older people have a lower level only when exposed to the sun in summer). Obesity is associated with lower values and a negative correlation between 25OHD and BMI was found. In summer the values are higher although with an average lower than the desirable levels. Supplemented subjects are older and achieved a desirable 25OHD level regardless of the treatment regimen.

## P734
### ANTIOSTEOPOROTIC TREATMENT AFTER HIP FRACTURE IS ASSOCIATED WITH LOWER ALL-CAUSE MORTALITY: A NATIONWIDE POPULATION STUDY

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**Objective:** Mortality after osteoporotic hip fractures is high. Postoperative care is as important as surgery itself to prevent a second fracture and improve outcomes, and the effect of anti-osteoporosis treatment after hip fractures on overall mortality is controversial. This nationwide population study aimed to determine whether anti-osteoporosis treatment might reduce overall mortality after hip fracture surgery.

**Methods:** We conducted this cohort study by using the National Health Insurance Research Database (NHIRD) of Taiwan to identify patients admitted for surgery because of hip fractures from 2008-2018. The subsequent use and duration of antiosteoporotic medication and other parameters were analyzed. The national death registration record was retrieved to identify mortality.

**Results:** A total of 59,943 patients admitted for hip fracture surgery were identified. The 22,494 patients (37.5%) who received anti-osteoporotic medication showed a lower all-cause mortality rate than the other 37,449 patients (62.5%) who did not receive further treatment (hazard ratio (HR): 0.69, 95% confident interval (CI): 0.67-0.70, p<0.0001). Patients who received antiosteoporotic medication for more than 1, 2, and 3 y had reduced all-cause mortality risk, by 0.57 (0.54-0.60), 0.42 (0.38-0.46), and 0.29 (0.26-0.33), respectively.

**Conclusion:** Antiosteoporosis treatment was associated with lower all-cause mortality after hip fracture surgery. A longer duration of treatment was also associated with lower mortality. Postoperative treatment for osteoporosis is crucial for patients with hip fracture.

**P735**

**ASSESSMENT OF THE RISK EXAMINATION AND THERAPY INITIATION USING THE RUSSIAN NATIONAL REGISTRY FOR THE PATIENTS ENROLLED INTO FRACTURE LIAISON SERVICES**

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**Objective:** Fracture Liaison Services (FLS) aimed to prevent secondary fragile fracture are established in many countries. For today 16 FLS have been established in Russian Federation. A common national FLS patients' database was created for the unified data to analyze of FLS effectiveness and reveal the main problems of their organization. This study aimed to evaluate the effectiveness of the risk examination and therapy initiation in several FLS in RF using the registry data.

**Methods:** In June 2019, the Russian Association on Osteoporosis started a project for the development of a registry of low energy fractures in patients recruited to FLS (PROMETHEUS Registry). Today 6 FLS enter the patients' data in it. To assess the effectiveness of patient evaluations and initiation of the therapy, we used the criteria of key performance indicators [1].

**Results:** As of 10.03.2021, data on 387 patients were introduced in the register, mean age is 71.95±10.23 y. Among them, 46.25% received a hip fracture, 20.41% vertebral fractures, 16.80% proximal humerus fractures, the rest had fractures of other localizations. The risk of fractures was assessed in all the patients (100%). FRAX assessment was calculated in 95,61%, a high risk was found in 160 (41.18%). DXA was performed in 152 (39,28%) patients. Among those patients who needed this examination to determine the risk of subsequent fractures after other assessment it was performed in 63,24% cases. The risk of falls was assessed in 100% of cases. It was determined to be high in 343 (88.63%) patients. Various measures to reduce this risk were recommended in 304 (88.63%) patients, educational programs were conducted in 299 (87.17%) cases. The appointment of antiosteoporotic treatment was performed in 241 (62.27%). In 12 (3.10%) patients the risk of subsequent fractures was determined as low. The most common reasons for lack of treatment recommendation were the presence of contraindications 70 (18.09%), among them the most common was hypocalcemia (63 (16.27%) persons), and the need for further examination 31 (8.01%).

**Conclusion**: The FLS Registry is a very important tool to improve care for patients with osteoporotic fractures and to reveal the problems in the organization of the medical care.Acknowledgements The PROMETEUS Registry has received support from Amgen Grant for Russian Association on Osteoporosis.

**Reference:** 1. Javaid MK, et al. Osteoporos Int 2020;31:1193.

**P736**

**STATE OF THE BONE TISSUE IN CHILDREN DURING THE GROWTH SPURT TAKING INTO ACCOUNT THE VDR GENE POLYMORPHISM**

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**Objective:** The research is aimed at establishing the specifics of the structural and functional state of bone tissue in children during the growth spurt with respect to the BSML polymorphism of the VDR gene.

**Methods:** 205 children aged 9-17 years were examined. They divided into three groups: group I 50 children whose height increased by 8-12 cm for the current year; group II included 46 children whose have grown to greater than 12 cm in present year; group III included 109 children with no growth spurt. All 205 children were evaluated with medical history, physical exam, and calcaneal bone density measurement with Sonost-2000. Bone density with DXA measured in 32 children. Z-score <-2.0 considered significantly low bone density in immature skeleton.

**Results:** A decrease in the BMD as observed through UD was diagnosed in 24 children (48.0%) of group I, the Z-score in the group was -1.8 [-0.7; -3.1];in 28 children (60.87%) of group II, the Z-score was-1.96 [-0.8; -2.4]; in 43 children (39.45%) of group 3, Z-score was -1.68 [0.4; -3.2] (p<0.05).DXA was used to examine 32 children with a decrease in BMD. In 18 of them (56.25%) a decrease in BMD was diagnosed as shown by ultrasound. The number of children with a decreased BMD in group I reached 38.9% while in group II it was 50.0% (p<0.05). The following variants of polymorphisms of BSML were found: a normal genotype variant was found in 48.76% of children; a heterozygous mutation was detected in 41.32% of children; and 9.92% of children showed a homozygous mutation. The most common heterozygous mutation of the BSML polymorphism of the VDR gene with a reduced BMD occurs in children of group 1 (43.48%) and group 3 (41.11%). The lowest percentage of heterozygous mutations was found in children of group 2 (37.50%).

**Conclusion:** In contrast to children of groups 1 and 3, the presence of mutations in the BSML polymorphism of the VDR gene is not the principal reason for a decreased BMD in the children of a school age in the period of an intensive growth spurt. Decreased BMD is mainly caused by a delayed bone mass accumulation against the background of an intensive linear skeletal growth.

**P737**

**VARIABILITY OF SARCOPENIA CUTOFF VALUES AMONG WOMEN: A SYSTEMATIC REVIEW**

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**Objective:** EWGSOP recommend country and gender specific cutoff values (2 SD below the mean of specific measure) derived from young healthy population to identify the sarcopenia. This systematic review was focused to identify the variability in sarcopenic cutoff values derived according to EWGSOP guidelines.

**Methods:** A systematic search was done following the PRISMA Statement in PubMed using the terms "Sarcopenia", "Cutoff values" or "Cutoff thresholds" and "Women" or "Females" and "EWGSOP". Original studies which were published up to April 2021 in English language were reviewed with the agreement of authors. Studies observed main three measures of sarcopenia; muscle mass as Relative

Appendicular Skeletal Muscle Mass (RSMI), muscle strength as Hand Grip Strength (HGS) and physical performance as Gait Speed (GS) were included. Review articles, meta-analyses and case-reports were excluded.
**Results:** Search strategy returned 37 studies published from year 2013. Of them only eight met all inclusion criteria. Only three studies identified cutoff values for all three measures while other studies investigated either one or two measures. Two studies determined the cutoff values for RSMI using DXA while five studies used BIA. Five studies found the HGS cutoff values and GS cutoff values were identified only in three studies. DXA measured RSMI cutoff values were 3.69 kg/m$^2$ and 5.03 kg/m$^2$ in Singapore and Sri Lanka respectively. BIA measured RSMI cutoff values ranged from 5.51-8.89 kg/m$^2$ in Turkey, Philippine and Poland. BIA measured RSMI cutoff values were greater compared to those measured with DXA. HGS cutoff values ranged from 9.66-16.8 kg in Philippine, South Korea, Sri Lanka, Turkey and Singapore while GS cutoff values ranged from 0.65-0.96 m/s in Philippine, Sri Lanka and Singapore.
**Conclusion:** A wide intercountry and intracountry variation of sarcopenia cutoff values in women was observed. The differences in the cutoff values depend on the body composition and height of the relevant subjects in the area in accordance with their genetics and socioeconomic background even the subjects belong to a same country or a region.

## P738
### EFFECTS OF ROMOSOZUMAB ON BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: A META-ANALYTIC SYNTHESIS OF RANDOMIZED CONTROLLED TRIALS

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**Objective:** Worldwide, osteoporosis in postmenopausal women remains a substantial public health burden. In postmenopausal women, normal bone turnover cycles are impaired, resulting in reduced BMD and increased risk of vertebral and non-vertebral fracture. Romosozumab has been indicated to be effective treatment and associated with increased BMD in postmenopausal women. However, the evidence of efficacy and safety of this new drug is not well documented. Therefore, we estimated the effect of romosozumab on changes in BMD and incidence of new adverse events using a meta-analytic approach.
**Methods:** A systematic search on PubMed/MEDLINE, Cochrane Library, Web of Science, and Clinical trial.gov was performed from the inception to April 2021. The outcome measures were changes in lumbar spine, total hip and femoral neck BMD, incidence of adverse events, and fractures. A random-effects model was used to calculate the weighted mean difference (WMD) and relative risks (RR) with a 95% confidence interval (CI).
**Results:** A total of 10 RCTs were included in this metanalytic synthesis. Results from meta-analysis showed that BMD was significantly increased at the lumbar spine (WMD=12.61, 95%CI 8.52-16.70, p<0.00001), total hip (WMD=3.71, 95%CI 2.42-5.01, p<0.00001) and femoral neck (WMD=3.21, 95%CI 1.75-4.68, p<0.00001). There was also significant difference in increasing BMD at lumbar spine (WMD=6.19, 95%CI 4.23-8.14, p<0.00001), total hip (WMD=3.15, 95%CI 2.66-3.64, p<0.00001) and femoral neck (WMD=3.08, 95%CI 2.59-3.57, p<0.00001) in patients with romosozumab compared to other therapies (teriparatide/alendronate). Romosozumab significantly lowers the risk of new vertebral and non-vertebral fracture compared with control group. Additionally, there was no significant difference in the incidence of overall adverse events in patients with romosozumab compared to placebo and other active treatment (RR 1.00, 95%CI 0.98-1.02, p<0.94) and (RR 0.98, 95%CI 0.89-1.07, p<0.64).
**Conclusion:** The current evidence suggests, romosozumab showed higher gains in BMD, and significantly lower the risk of fracture in

postmenopausal women with osteoporosis. Further, RCTs are required to confirm the present findings.

## P739
### QUALITY ASSESSMENT OF TRADITIONAL AND CONVENTIONAL MEDICINE CLINICAL PRACTICE GUIDELINES FOR OSTEOPOROSIS

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**Objective:** The aim of this study was to systematically assess the quality, methodology, and consistency of recently developed traditional and conventional medicine CPGs that focus on the management of osteoporosis and provide helpful recommendations for patients with osteoporosis.
**Material and Methods:** From June 2020 to July 2020, CPGs with osteoporosis targeting any age were systematically retrieved. All CPGs of traditional and conventional medicine related to the assessment and diagnosis, management, and clinical therapeutic and pharmacological recommendations with osteoporosis were eligible for inclusion in this study. The excluded documents included guidelines without recommendations, secondary publications derived from CPGs, consensus statements or consensus conferences based on the opinion of panelists, systematic reviews, editorials, clinical trials, and single- author documents. The quality of CPGs was independently examined by three assessors using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) instrument. AGREE II consists of six domains; scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability and editorial independence. Consequently, selected CPGs were graded as recommended (A), recommended with modifications(B), or not recommended (C), and the specific treatments and preventive recommendations in the CPGs were summarized.
**Results:** The quality of the 15 CPGs assessed varied across the AGREE II domains. The overall quality ranged from 3.0-6.0 out of 7. The domain that had the highest scores were ' clarity of presentation', with a mean value of 69.0 % (range 46-83 %); ' editorial independence' had the lowest score of 30.2% (range 0- 75%). The conventional CPGs focused on pharmacological treatments, calcium and vitamin D intake, and prevention, while the traditional CPGs consistently emphasized on herbal medicine and non-pharmaceutical treatment and management.
**Conclusions:** Further development of clinical practice guidelines will require improvement in domains where low i tem scores have been obtained in the quality assessment in this present study. Further research is needed on alternative modalities for osteoporosis, especially complementary approaches, and higher quality clinical practice guidelines are needed to facilitate evidence-based clinical practice.

## P740
### COMBINATION OF SCLERODERMA WITH COVID-19

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**Objective:** Systemic scleroderma is difficult against the background of COVID-19. Since systemic scleroderma is a severe autoimmune disease associated with ischemic disorders due to obliterating microangiopathy, the development of fibrosis of the epidermis and internal organs (lungs, heart, digestive tract, kidneys), this leads to hemodynamic disorders. The aim of the study is to describe the pathological material obtained as a

result of the death of a 53-year-old patient, a woman, from COVID-19 pneumonia associated with systemic scleroderma.

**Methods:** The resulting slides were stained with hematoxylin and eosin.

**Results:** A sectional study reveals signs of bilateral total pneumonia, with damage to both lungs. Histological examination revealed signs of massive death of type 1 alveolocytes and damage to the capillary endothelium (these signs contribute to the exudation of fluid and protein components into the intra-alveolar space, this leads to an increase in pulmonary edema). In the course of the alveolar passages, alveolar sacs, alveoli, hyaline membranes are formed, an accumulation of serous-hemorrhagic exudate, polymorphonuclear leukocytes is revealed in the alveoli, which are located along the interalveolar septa, in which rheological disorders in the form of erythrocytic sludges are determined (one). The signs of scleroderma with indurative skin changes were revealed. Histological examination: the dermis is sclerosed, atrophy of the skin appendages is revealed. In the vascular endothelium, there is a proliferation of smooth muscle cells, mucoid swelling of the intima, in some areas with fibrinoid necrosis, narrowing of the lumen of blood vessels, microthrombi. The heart showed signs of scleroderma lesions of the endo- and myocardium. Histological examination reveals interstitial edema, muscle fibers are unevenly fragmented, cardiomyocytes are hypertrophied in places, some of them with dystrophic changes; there is a diffuse fine-mesh proliferation of connective tissue. In places, there are foci of cardiomyocyte necrosis, marginal sclerosis and shortening of the chordae of the mitral valve with the development of its prolapse. In the brain and lungs, edema occurs with the accumulation of edematous fluid pericellular and perivascular.

**Conclusion:** It is likely that systemic scleroderma led to an aggravation of the course of viral pneumonia due to hemodynamic disturbances against the background of diffuse fibrosis in organs with the development of respiratory failure.

## P741

### MACRO-MICROSCOPIC APPEARANCE OF THE ADRENAL GLANDS AFTER IMPLANTATION OF HYDROXIAPATITE INTO THE TIBIA AND LOCAL INJECTIONS OF MESENCHYMAL STEM CELLS ON THE 10TH DAY AFTER INTERVENTION

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**Objective:** To investigate macro-microscopic appearance of the adrenal glands in rats after implantation of hydroxyapatite into the tibia and administration of mesenchymal stem cells (MSC) on the 10th day after intervention

**Methods:** 120 male rats with body weight of 190-225 g were used. Animals were distributed into five groups. Group 1 consisted of the intact controls. Group 2 consisted of the animals with tibia fracture modeled as 2 mm round opening in the tibia. In animals of the group 3 the same 2 mm opening was filled with hydroxylapatite material OK-015. Animals of the groups 4 and 5 underwent the same interventions as the animals of two previous groups but also received injections of MSC (5E6 cells per injection) into intervention area. MSC were obtained from donor animals. Phenotyping of the MSC was performed by means of indirect fluorescent immunoassay. Observation terms were 15, 30. 60, and 90 d after fracture modeling. Sections of the adrenal glands were HE stained and photographed using light microscope. Data analysis included variation statistics.

**Results:** In animals of the group 2 in the period from the 7th to the 90th day cross-section area of the adrenal gland increased due to increase of the cortex (observed mostly from the 7th to the 90th day). In the group 3 cross-section area with both cortex and medulla increased on the 7th day (in comparison with the group 2) and then decreased in the period from the 30th to the 90th day. In the group 4 total section area and cortical area narrowed in comparison with the group 2 decreased in the period from the

15th to the 60th day by 12.44%, 11.71%, and 5.86%, and by 13.67%, 13.18%, and 5.83% respectively. In that group 5 total area decreased in comparison with the group 3 in the period from the 15th to the 60th day by 5,23%, 7.52%, and 4.08% respectively. Cortical area also narrowed by 4,99%, 9.15%, and 5.03%. Also by the 15th day, medullary area decreased by 6.97%

**Conclusion:** Injections of the MSC into intervention area reduces hypertrophic reaction of the adrenal gland to surgical intervention in the tibia.

## P742

### SHOULD WOMEN BE TRAINED IN OSTEOPOROSIS PREVENTION?

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**Objective:** Lifestyle plays an important role in human health. It is possible to reduce the prevalence of functionally significant injuries and their associated health consequences by reducing the prevalence of osteoporosis in women. One way to accomplish this is through health education and health promotion programs. This study aimed to identify the educational requirements to help women prevent osteoporosis, based on the presence of modifiable risk factors for the disease in the age groups (16-30 years old; 31-64 years old; 65-75 years old).

**Methods:** The survey was conducted among 567 women in the city of Cheboksary (Chuvash Republic, Russia). The CINDI (Countrywide Integrated Noncommunicable Diseases Intervention) Health Monitor questionnaire was used. Women were divided by age into 3 groups: group 1 (16-30 years old), group 2 (31-64 years old) and group 3 (65-75 years old). In all three age groups, the prevalence of modifiable risk factors for osteoporosis (tobacco smoking, unhealthy diet, excessive alcohol consumption, low physical activity, extreme values for BMI) and the influence of these factors on the patients' assessment of their own health were monitored. The results were compared between groups of respondents. ANOVA Statistical Analysis - Version 2021.2 and Fisher's exact test was used for statistical evaluation.

**Results:** Significant differences were found in the frequency of tobacco smoking - group 1 smoked the most (16-30 years old; p<0.05); inappropriate eating habits were most pronounced in group 1 (16-30 years old; ANOVA statistical analysis test <0.05); excessive alcohol consumption was highest in group 1 (16-30 years old; p<0.05); insufficient physical activity was significant and increased with age (p<0.05). Smoking affected the patients' own health assessment only in group 1 (16-30 years old; p<0.05), inappropriate eating habits in group 2 (31-64 years old; p<0.05), excessive alcohol consumption did not affect any of the groups of respondents own health assessments (p>0.05). Physical activity affected all groups' own health assessment (16-30 years old, 31-64 years old, 65-75 years old; p<0.05), the extreme BMI values affected only group 3's (65-75 years old; p<0.05) and group 2's (31-64 years old; p<0.05) own health assessments.

**Conclusion:** The study found that risk factors for osteoporosis are most common in the group of young women who have low levels of health education regarding prevention of osteoporosis. Timely information and elimination of modifiable risk factors will help to delay the onset of the disease and prevent the occurrence of complications.

## P743

### THE EFFECTS OF IMPLANTATION OF CERAMIC HYDROXYAPATITE INTO THE TIBIA ON GROSS MORPHOLOGY OF THE SPLEEN

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**Objective:** To investigate dynamic changes of gross morphology of the spleen after implantation of ceramic hydroxyapatite material into a defect in the tibia.

**Methods:** In the experiment we used 90 male rats with body weight of 190-225 g. Animals were separated into three groups. Group 1 comprised intact animals, group 2 comprised animals with 2 mm opening in the proximal parts of both tibiae, and group 3 comprised animals with openings in tibiae filled with hydroxyapatite material OK-015. On the 7th, the 15th, the 30th, the 60th, and the 90th day after intervention, the animals were decapitated and the spleen were collected for further gross measurements with 0.05 mm precision. ANOVA and other tests were performed with the use of standard software.

**Results:** After defect formation relative weight of the spleen in the period from the 7th to the 90th day was greater than that of the controls by 8.88%, 8.53%, 11.65%, and 6.71% respectively. Volume values of the spleen exceeded those of the controls for the period from the 7th to the 90th day by 10.25%, 18.33%, 16.29%, 9.84%, and 7.07%. After OK-015 implantation, relative weight of the spleen increased in comparison with the values of the group 2 on the 7th and the 15th day by 5.87% and 6.12% and volume values in the same period – 10.20% and 11.89%. On the 30th and the 90th days relative weight of the spleen in the group 3 decreased by 6.41% and 7.96%. Also, volume of the spleen decreased in comparison with the values of the group 2 in the period from the 30th to the 90th day by 9.53%, 8.93%, and 8.02%.

**Conclusion:** Formation of a defect in the tibia results in compensatory hypertrophy of the spleen in the period from the 7th up to the 90th day after intervention. Implantation of OK-015 into both tibiae results in manifestations of alterations of the spleen in the beginning of the experiment (the 7th and the 15th days) with further faster restoration in later terms - beginning from the 30th day.

**P744**

**IDENTIFYING THE CURRENT TRENDS IN OSTEOPOROSIS RESEARCH: A REVIEW OF HIGHLY CITED PAPERS PUBLISHED IN 2016-2020**

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**Objective:** To compile a list of the recent highly-cited papers on osteoporosis across the Web of Science, determine their characteristics and identify the current research trends in the field.

**Methods:** We searched the Web of Science Clarivate Analytics database on February 18th, 2021. The search strategy included osteoporosis and associated keywords to identify all related papers published in 2016-2020. The highly cited papers were imported to an EndNote library and assessed by two independent investigators who further removed irrelevant articles based on titles and abstracts. The remaining papers were classified by document type, author, journal, affiliated institutions, and funding bodies. VOSviewer software was used for network visualization.

**Results:** Our search retrieved 160 highly cited papers. Reviewers removed 66 irrelevant articles. The remaining 94 papers had received 12748 total citations (135.6 citations per paper). Most were secondary studies (44.7%, including review articles, meta-analyses, and guidelines), followed by primary preclinical/animal (31.9%) and clinical/

epidemiological studies (23.4%). All papers excluding guidelines and preclinical studies were further classified based on their subject category: Osteoporosis/fracture risk factors (10.6% of total), interventions (26.6%), and epidemiology/burden (8.5%). Figure1 shows the keyword co-occurrence network, associated with the highly cited papers. Respectively, the total number (most frequent contributor) of associated journals, countries, and institutions were 55 (eight papers from Osteoporosis International), 37 (52 from the USA), and 426 (13 from the University of California System, 12 from the University of Sheffield). The papers were authored by a total of 787 independent investigators (an average of 10.4 authors per paper). "Cooper C" with seven and "Harvey NC", "Kanis JA", and "Lorentzon M" with six papers were the most prolific contributors. US governmental institutions and pharmaceutical companies were the most frequent funders.

**Conclusion:** Most highly cited papers in the field of osteoporosis published in 2016-2020 are secondary studies, carried out by the US institutions with Grants from the US government and pharmaceutical corporations. Excluding guidelines and preclinical studies, the hottest investigative topics were comparative intervention and risk factor assessments. The current research trends in osteoporosis highlighted in this study can guide the direction of future studies.
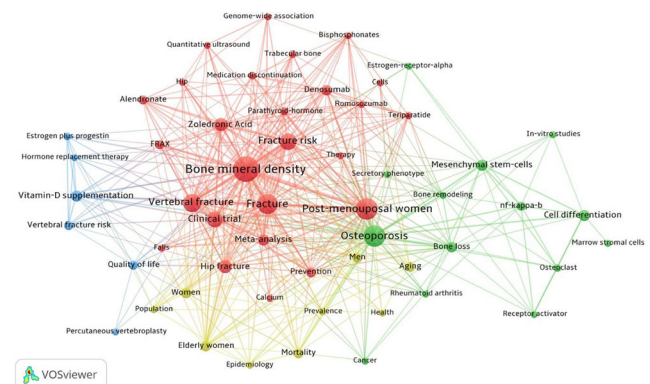


Figure 1. Keyword co-occurrence network, associated with the highly-cited papers in the field of osteoporosis (2016–2020).

**P745**

**TRANSITION RATE TO OSTEOPOROSIS AND FRAGILITY FRACTURES AT THE SPINE OR HIPS IN ELDERLY NONOSTEOPOROTIC ASIAN USING FRAX TOOL**

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**Objective:** The development of FRAX® has been validated and is used to estimate the risk of osteoporotic fractures worldwide. However, only a few studies determine the transition rate from normal BMD or low bone mass to osteoporotic fractures by FRAX. This study aims to evaluate the rate of transition to osteoporosis and fragility spine or hip fractures in elderly nonosteoporotic Asians on various 10-year probabilities of fracture.

**Methods:** We reviewed DXA medical records from one institution in Taipei, Taiwan between January 2010 and December 2020. We excluded those patients who had osteoporosis or vertebral compression fractures or hip fractures at the first time from the DXA records or of treatment for osteoporosis. Finally, we recruited 1639 consecutive patients (1218 postmenopausal women and 421 men; age 50 years or older) who underwent repeated BMD testing and mean follow-up duration of 3.2 ±2.0 ys. We used FRAX tool to assess the 10-y probability of a major osteoporotic fracture (MOF) and stratified participants into four groups:

Level 1 (MOF, <10%), Level 2 (10-15%), Level 3 (15-20%), and Level 4 (20% and higher). Outcome measures were estimated by any newly developed vertebral or hip fractures in follow-up exams.

**Results:** There were 197 participants (12.0%) having vertebral or hip fractures at the follow-up study. No significant differences were observed between women (12.7%) and men (10.0%) (p=0.140). The transition rates to osteoporosis by MOF of levels 1-4 were significantly different in both sexes (p<0.001). The transition rates to osteoporosis of level 1, 2, 3, and 4 were 19.0%, 31.5%, 47.2%, and 55.9% for women, respectively, and 14.4%, 31.1%, 46.2%, and 100.0% for men, respectively; whereas there were 4.2%, 12.2%, 14.7%, and 21.7% women, respectively, and 5.4%, 29.5%, 19.2%, and 100% men, respectively, having fractures in follow-up scans. There was no significant difference of incident fragility fractures between women and men in all groups, except for the Level 2 (p=0.001).

**Conclusion:** Our results demonstrate that 31% or higher of both sexes will develop osteoporosis, and over 15-% women and 27-% men will develop osteoporotic fractures using 10-y FRAX risk of MOF of 10% or higher in approximately 3 y, even though they are not osteoporotic at baseline DXA exam.

## P746

### PREVALENCE OF PROBABLE SARCOPENIA IN COMMUNITY-DWELLING OLDER GREEK PEOPLE: A CROSS-SECTIONAL STUDY

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**Objective:** To assess the prevalence rate of probable sarcopenia and to determine the factors associated with it in Greek older people.

**Methods:** A total of 402 Greek community-dwelling individuals participated in this cross-sectional study. Recruitment was targeted towards people 60 y and over, living independently at their own home. Probable sarcopenia was estimated based on cut-off values for hand grip strength as recommended by the EWGSOP2 (hand grip strength <27 kg in men or <16 kg in women). Reported determinants (age, height, weight, sociodemographic characteristics, chronic diseases, fear of falls and life style of the participants) were obtained through a questionnaire survey. The assessors were trained and experienced physiotherapists in all testing procedures. Grip strength was assessed in the seated position using a SAEHAN dynamometer. Calf circumference was assessed with inelastic tape. A logistic regression analysis was performed in order to determine associated risk factors.

**Results:** The sample comprised 402 participants (292 women, 110 men), with a mean age of 71.51±7.63 y. Overall, 25.4% of the elderly participants were identified with probable sarcopenia: 36.4% in men and 21.2% in women. The findings of this study demonstrated that probable sarcopenia was positively associated with age, gender, BMI, skeletal muscle mass index, calf circumference and comorbidities.

**Conclusion:** There was a 25.4% prevalence of probable sarcopenia in Greek elderly living in Western Greece. Results, highlights the importance of detection of hand grip strength and probable sarcopenia in older people in order to develop effective strategies of prevention and intervention of sarcopenia.

## P747

### HIP STRUCTURAL ANALYSIS AND INCIDENT FRACTURE OVER 20 YEARS OF FOLLOW UP: A TIME-UPDATING SURVIVAL ANALYSIS

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**Objective:** Hip structural analysis (HSA) uses DXA scans of the hip to calculate geometric variables of the narrow neck (NN), intertrochanter (IT) and shaft (S) which have the potential to complement BMD for assessment of fracture risk. This study aimed to determine whether HSA parameters were associated with risk for incident low trauma fracture.

**Methods:** Participants were women (n=1412, age 20-94 y) from the Geelong Osteoporosis Study. HSA was calculated using dedicated software from Lunar DPX-L hip scans. Low trauma incident fractures were self-reported and radiologically confirmed. Participants were followed from first DXA hip scan with HSA calculation to first fracture, death, or end of the study period (31/12/2016) for 21996.7 person years follow up. Time-updating Cox-proportional hazards modelling was used to investigate associations between HSA parameters and incident fracture.

**Results:** Incident fractures were reported for 348 participants. Adjusting for age, BMI, prior fracture, alcohol consumption, mobility and steroid use, NN BMD, cross-sectional area, cross-sectional moment of inertia, section modulus and cortical thickness were negatively associated with fracture. IT BMD, cross-sectional area, cross-sectional moment of inertia and section modulus were also negatively associated with fracture. Negative associations were seen at S BMD, cross-sectional area, section modulus and cortical thickness. Endocortical diameter of S was positively associated with fracture and buckling ratio at all three sites was similarly associated. After further adjustment for femoral neck BMD, the associations between fracture and buckling ratio at the IT (HR 1.04, 95%CI 1.00-1.08) and S (HR 1.15, 95%CI 1.01-1.30) were sustained.

**Conclusion:** A greater buckling ratio at the intertrochanter and shaft is associated with an increased risk for fracture, independent of femoral neck BMD, and may be useful for improving fracture risk prediction based on BMD alone.

## P748

### FUNCTIONAL FINDINGS IN PATIENTS WITH KNEE OSTEOARTHRITIS IN RELATION TO THEIR CURRENT/ FORMER PROFESSION

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**Objective:** Osteoarthritis (OA) of the knee is the most common osteoarthritis type and the factors influencing the functional status of the affected individuals are numerous. The aim of this study was to assess the functional status of patients with knee OA according to the work they perform or have previously performed.

**Methods:** This prospective cross-sectional study involved 30 patients of both sexes, aged ≥55 y, who were referred to the Special Hospital for Rheumatic Diseases Novi Sad, Serbia due to knee OA. All subjects had a radiographic finding of the knee that corresponded to the Kellgren-Lawrence score of 2 or 3 as well as a disease activity score of ≥3 determined on a visual analog scale (VAS), which was also used to assess their subjective pain level. All patients also completed the Lequesne functional index for knee osteoarthritis, which was analyzed according to the type of work patients currently or previously performed. Prior to commencing the study, consent of the Hospital Ethics Committee was obtained and all participants signed an informed consent. Statistical analysis was performed using the software package SPSS ver. 24.

**Results:** The study sample comprised of 30 individuals (27 women and 3 men) with an average age of 68.73±5.80 y. Majority (44.8%) of the participants currently or previously worked in professions that involved prolonged standing and hard physical work, while for 31% and 24% work activities mostly required standing still, and squatting and kneeling,

respectively. The average VAS score for pain was 6.83±2.00, and the VAS global assessment of the disease score was 7.40±1.54, with the mean Lequesne index value of 12.30±3.24. The Lequesne index value was statistically significantly different in subjects performing different tasks (F=6.51, p<0.01). The highest value was recorded in relation to professions that involved prolonged standing with hard physical work (14.27±2.44), followed by standing still (11.2±3.15), while the lowest average value of this index was associated with professions that mostly relied on squatting or kneeling (9.86±2.94).

**Conclusion:** Type of work significantly affects the functional findings in patients with osteoarthritis of the knee, especially if it is harder physical work that places significant load on knees.

## P749
### RELEVANCE OF DIAGNOSIS AND TREATMENT OF OSTEOPOROSIS FOR PHYSICAL AND REHABILITATION MEDICINE PHYSICIANS

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**Objectives:** There is a high prevalence of osteoporosis (OP) among patients of the older age undergoing rehabilitation. Therefore, it is obvious that physical and rehabilitation medicine physicians should be well oriented in this medical problem. This study aimed to study the relevance of the problem of osteoporosis (OP) for physical and rehabilitation medicine physicians, their awareness of the main methods of diagnosis, treatment and prevention of this disease, as well as the frequency of their use in daily clinical activity.

**Methods:** A cross-type study was carried out using a questionnaire survey. The study included 157 doctors (M-34, F-123) of 8 medical specialties working in 27 specialized medical institutions on the profile of "medical rehabilitation. The questionnaire for doctors consisted of 21 items of special questions.

**Results:** 90.45% of the surveyed doctors believed that the problem of OP is relevant for their clinical activities, 100% of the respondents indicated that the presence of OP significantly affects the rehabilitation prognosis and 95.54% on the degree of effectiveness of medical rehabilitation. According to the respondents, patients with OP make up on average 30.0% [20.0; 50.0] (0-90) of the total flow of patients. 92.36% (145/157) of doctors indicated that they know the risk factors for OP, 98.73% (155/157) - methods for diagnosing OP, 68.79% (108/157) - methods for treating OP, 80.25% (126/157) - methods of preventing OP, 47.13% (74/157) - what is FRAX. However, 35.01% (55/157) of the respondents considered their level of awareness of the problem sufficient for managing patients with OP. Diagnostic procedures for OP are recommended by the all endocrinologists (100%) and the majority of traumatologists (72.73%), gynecologists (66.67) and cardiologists (64.28%), as well as on average half (50%) neurologists and therapists. Endocrinologists (100%), gynecologists (66.67%) and therapists (60%) are mainly involved in the treatment of OP. 32.48% (51/157) of physicians have ever referred their patients to a BMD assessment.

**Conclusion:** The problem of OP is relevant for the clinical activities of physical and rehabilitation medicine physicians and there is the need for advanced training on the problem of OP among these specialists.

## P750
### THE EFFECT OF CALCIUM AND VITAMIN D3 ON CALCIUM HOMEOSTASIS AND FALLS INCIDENCE IN PATIENTS WITH HIGH FRACTURE RISK UNDERGOING MEDICAL REHABILITATION

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**Objective:** Vitamin D and calcium deficiencies is of particular importance in older patients undergoing medical rehabilitation and having a high risk of fractures. Preventing falls and fractures, including during the course of rehabilitation, is an important challenge that can be addressed in these patients, in particular through improved nutrition and vitamin D and calcium supplementation. This study aimed to evaluate the effect of long-term calcium and vitamin D3 intake on calcium homeostasis and fall's rate in patients with high fracture risk starting rehabilitation course.

**Methods:** The study enrolled 119 men and women aged 50-80 y.o. with high absolute fracture probability by FRAX who started medical rehabilitation. 41 patients have been receiving antiresorptive therapy already comprised group 1, other patients were randomized into groups 2 (n=39) and 3 (control, n=39). In groups 1 and 2, a food supplement containing calcium citrate 1000 mg and vitamin D3 600 IU was prescribed for 12 months. All patients undergo laboratory examination, food calcium intake and fall assessment at baseline, in 6 and 12 months

**Results:** Daily calcium intake in the study sample (n=119) was 782.9 ±243.4 mg. Vitamin D deficiency was detected in 38.4% of the examined. An increase in 25(OH)D level was noted in groups 1 and 2 after 6 and 12 months (p<0.01). Patients in group 1 showed an increase in serum osteocalcin and calcium levels after 6 and 12 months (p<0.05). In group 3, there was an increase of immunoreactive PTH levels after 6 (p<0.05) and 12 months (p<0.01), C-terminal telopeptide of type I collagen level and alkaline phosphatase activity after 12 months (p<0.05). In group 1, there was also a decrease in proportion of patients who fell after 6 months ($\chi2$=4.97, p=0.026) and a decrease in the total number of falls after 12 months ($\chi2$=4.89, p=0.027). Group 2 showed a decrease in the number of patients who fell after 6 and 12 months ($\chi2$=48.58, p=0.0034 at both stages of the study) and the number of falls in general after 6 months ($\chi2$=6.02, p=0.0142).

**Conclusion:** The obtained data allow us to recommend prescription of dietary supplements containing calcium and vitamin D3 as a part of complex rehabilitation of patients with high fracture risk.

## P751
### THE ROLE OF MACROPHAGE MIGRATION INHIBITORY FACTOR IN ACTIVITY AND PROGRESSION OF ANKYLOSING SPONDYLITIS

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**Objective:** Ankylosing Spondylitis (AS) is a chronic inflammatory form of arthritis that predominantly affects the axial joints and has a global prevalence of 1%. Disease progression is marked by osteoproliferation and bone fusion in the axial joints, causing considerable loss of mobility. Migration inhibitory factor (MIF) is a potent pro-inflammatory cytokine implicated in several diseases. Elevated serum MIF levels have been reported in AS the role of MIF in bone formation has been a subject of controversy. Aim: Detection of the level of MIF in AS patients and correlate the level with disease activity and progression.**Methods:** This cross-sectional case-control study was concluded on 70 randomly selected people from the internal medicine department in Kobry El-Kobba Military Hospital and from the rheumatology and rehabilitation department in El-Hussein university hospital. The population study was divided into two groups: Group A: (50) Patients with AS who met the European Spondyloarthropathy Study Group (ESSG) criteria for AS (30) and Group B: (20) Healthy controls. Serum MIF by ELISA was measured. X-rays cervical &lumbosacral vertebrae (dorsal, lateral) views were obtained. m-SASS scores (based on radiographic findings to detect progression) were assessed. MSK U/S on Tendo Achillesaffected in AS

patients were done. **Results:** The mean age of all patients was (38.2±8.4) y. Regarding the gender of the patients, the majority (65.7%) of patients were males, while (34.3%) were females. (88%) of AS patients had cervical erosion or sclerosis, (46%) had dorsal erosion or sclerosis, (92%) hadlumbosacral erosion or sclerosis, with m-SASS score of (11 ±6.1). Regarding musculoskeletal U/S, (72%) had evidence of inflammation and erosion. Highly significant increase in ESR, CRP, and MIF levels in the A group; compared to the control B group; with a highly significant statistical difference (p<0.01). the increase in smoking, ESR, and MIF level; had an independent effect on increasing the probability of progression occurrence; with a significant statistical difference (p<0.05 respectively). MIF level at a cutoff point (>51) predicted patients with progression, with fair accuracy (74%), sensitivity=53% and specificity=94% (p=0.0056).

Table 1. Radiological data among 50 AS subjects.

| Variables | | Frequency (%) |
|---|---|---|
| X-ray "vertebrae" | Cervical erosion or sclerosis | 44 (88%) |
| | Dorsal erosion or sclerosis | 23 (46%) |
| | Lumbosacral erosion or sclerosis | 46 (92%) |
| | m-SASS score | 11±6.1 |
| U/S | Effusion & Inflammation (U/S) | 36 (72%) |

U/S: musculoskeletal ultrasound.

Table 2. Comparison between the 2 groups as regards basic clinical and drug history data using Mann-Whitney's U and chi-square tests.

| Variable | Non-progressor group (35) Median (IQR) | Progressor group (15) Median (IQR) | Mann-Whitney's U test P value |
|---|---|---|---|
| Disease duration (y) | 13 (11.2-17.5) | 20 (16.5-23) | =0.0028** |
| BASDAI score | 4 (2-4) | 3 (2-4) | =0.9313 |
| Variable | Non-progressor group (35) | Progressor group (15) | Chi-square test P value |
| Smoking =0.012* | +ve | 10 (28.6%) | 10 (66.7%) |
| HTN =0.8114 | +ve | 6 (17.1%) | 3 (20%) |
| DM =0.7389 | +ve | 6 (17.1%) | 2 (13.3%) |
| NSAIDs =0.5812 | +ve | 18 (51.4%) | 9 (60%) |
| DMARDs =0.4520 | +ve | 30 (85.7%) | 14 (93.3%) |
| TNFi =0.9298 | +ve | 5 (14.3%) | 2 (13.3%) |

**Conclusion:** MIF ply an important role in the pathogenesis of AS and has a link between chronic inflammation, new bone formation, and disease progression and can be used as an indicator for activity and disease progression

**P752**

**THE BENEFITS OF COMBINING PHYSICAL THERAPY IN THE CONSERVATIVE TREATMENT OF MORTON'S NEURALGIA**
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**Objective:** Appreciation of the effects on pain and gait obtained by combining the physical therapeutic means in the 14-day conservative therapeutic program dedicated to patients diagnosed with Morton's neuritis.
**Methods:** We organized a prospective, observational, randomized study for a group of 42 patients with Morton's neuritis. The patients were randomly divided into a control group that received only specific medication and a study group in which the treatment also included physical therapy (ultrasound, laser, orthosis, massage). Patients were evaluated at baseline and after 14 d of treatment. The parameters we followed were: pain (assessed using a visual analogous scale for pain) and disability (ADL 24 and ability of walking).
**Results:** Score values for functional parameters have improved: the value of the VAS score for pain decreased by 45.3% in group 2 compared to 34.1% in group 1 (p=0.000053); ADL score improved (52.5% in group 2 vs. 41.1% in group 1) and locomotor capacity progressed more in patients in group 2 (43.3%) compared to group 1 (31.4%). The results had statistical significance (p<0.05).
**Conclusion:** The results highlight the improvement of pain and of functional parameters in the study group, which certifies the efficiency of the physical means of treatment applied within the non-surgical therapeutic program, to patients with Morton's neuritis. These findings motivate the continuation of the study over a longer period of time and a larger number of patients.

**P753**

**POLYMORPHISM OF THE RS12409277 PRDM16 GENE AND ITS RELATION WITH ANTHROPOMETRIC AND DENSITOMETRIC PARAMETERS IN POSTMENOPAUSAL WOMEN IN EASTERN SLOVAKIA**
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**Objective:** The *PRDM16* gene is generally studied in relation to white and brown adipose tissue. The aim of our work was to determine the possible association of the polymorphism rs12409277 *PRDM16* gene with selected anthropometric and densitometric parameters in postmenopausal women in eastern Slovakia.
**Methods:** The research group consisted of 96 postmenopausal women, which we divided according to the T-score into: osteoporosis (OP=31), osteopenia (OPE=50) and control group (CG=15). Genomic DNA was isolated from peripheral blood using a commercial NucleoSpin® Blood Macherey-Nagel kit according to a standard protocol. Real-time PCR and TaqMan® SNP Genotyping Assay according to the appropriate protocol were used for genotypic analysis. Densitometric measurement of postmenopausal women was conducted with a body densitometer DXA (DXA Hologic Discovery, Waltham, MA, USA). From anthropometric parameters, we measured body weight (DM – 117, Dimarson Elektroniks, Kyiv, Ukraine), body height (DIN 862, KINEX Measuring, Prague, Czech Republic), waist circumference and hip circumference.
**Results:** Based on the Chi-square test, we found statistical significance (p<0.008) in the representation of genotypes and also in the

representation of alleles (p<0.003) among the observed groups of postmenopausal women. In the CT and TT genotype, we found statistically significant differences in anthropometric parameters: body weight, BMI, waist and hip circumference, and densitometric parameters: T-score total left hip (p<0.004), Z-score total left hip (p<0.009), Z-score neck left hip (p<0.002) and BMD total left hip (p<0.005). Based on correlation analysis, we found a statistical dependence of BMI and CT genotype (p<0.013) and BMI and TT genotype (p<0.002) in the rs12409277 *PRDM16* gene polymorphism.

**Conclusion:** The rs12409277 polymorphism of the *PRDM16* gene as well as the gene itself has been little studied in terms of BMD and the risk of fractures. Our results provide initial information on the representation of genotypes and alleles of the rs12409277 *PRDM16* gene polymorphism in the East Slovak population of postmenopausal women.

## P754

### DIACEREIN POSTMARKETING ASSESSMENT: A PROSPECTIVE OBSERVATIONAL STUDY ON THE EFFECTIVENESS AND SAFETY OF DIACEREIN IN A REAL-LIFE SETTING

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**Objective:** To assess the effectiveness and safety of diacerein when used according to its marketing authorisation.

**Methods:** This prospective, open, non-controlled, observational trial in two Russian centres included patients with symptomatic knee or hip osteoarthritis (OA) who were about to initiate a treatment with 50 mg diacerein twice daily. WOMAC and pain on walking using a 100 mm visual analogue scale (VAS) were evaluated at baseline and three month visits. Patients assessed their overall well-being using a 0-100 point scale at baseline, three months and via a telephone survey at five intermediate timepoints. The rate of responders to treatment according to the OMERACT-OARSI criteria was calculated at three months. Adverse events were collected at each timepoint.

**Results:** In total 61 patients were enrolled, 57 of them completed the study. The trial population had a mean age of $61\pm9$ y and a BMI of 32 $\pm7$ kg/m$^2$; 90% were women. Most of the patients (98%) suffered from knee OA, 33% had hip OA (Kellgren-Lawrence graded II-III); concomitant hand OA was present in 38% of the trial population. 95% of patients had at least one comorbidity, mostly cardiovascular diseases. A significant reduction in pain on walking was observed under diacerein treatment (p<0.001) with a mean change from baseline at three months of -22.11 mm (95%CI: -25.82, -18.41). WOMAC pain, stiffness and function subscores were also significantly reduced after three months (p<0.001). The patient's assessment of overall wellbeing significantly increased compared with baseline from Week 4 (p=0.0034); change from baseline at three months was 17.78 mm (95%CI: -13.68, -21.89; p<0.001). The OMERACT-OARSI responders' rate was 61%. Interestingly, symptoms of concomitant low back pain and hand OA also improved during the study (p<0.001). The incidence of adverse reactions was 41%. Among them, the most common were diarrhoea and abdominal pain (49% and 34%, respectively). No occurrence of gastric/duodenal ulcer was observed, as well as no change in concomitant cardiovascular diseases.

**Conclusion**: Diacerein was shown to be an effective and safe symptomatic treatment of knee and hip OA in patients with various comorbidities.

## P755

### INSTRUMENTAL AND BIOCHEMICAL INDICATORS OF THE STATE OF BONE TISSUE IN OSTEOMALACIA AND OSTEOPOROSIS

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**Objective:** A decrease in BMD, which occurs in osteomalacia (OM) and osteoporosis (OP), is accompanied by a decrease in the strength properties of bone structures and an increase in the risk of fractures. Despite the same clinical outcome (fractures), the morphostructural, etiological, and pathogenetic characteristics of OP and OM differ qualitatively. The aim was to study the diagnostic criteria for osteomalacia and osteoporosis in postmenopausal women.

**Methods:** We examined 157 postmenopausal (PM) women aged 57.5 $\pm1.2$ y, of which 103 women were diagnosed with OP (group I) and 24 morphometrically diagnosed with OM (group II), control group (III) - 30 practically healthy women. X-ray densitometry was performed (osteodensitometer Hologic Discovery (USA)). The level of 25(OH)D in the blood serum was determined by the enzyme immunoassay on a EUROIMMUN analyzer (Germany). Bone resorption marker C-terminal telopeptide of collagen type 1 (CTx), osteocalcin (OC) and PTH - by immunochemiluminescent method, phosphorus level - by a spectrophotometric method using a Cobas 6000 analyzer (Roche Diagnostics, Switzerland). The level of osteoprotegerin (OPG) was determined by an enzyme-linked immunosorbent assay on an AxsymSystem apparatus (Abbot, Germany). Statistical processing was performed using Microsoft Office Excel and Statistica 10.0 software. Student's t-test was used for mathematical processing. When assessing the strength of the correlation coefficients, the Chaddock scale was used.

**Results:** Analysis of the data obtained showed a decrease in BMD (p<0.05) in groups I and II. However, BMD neck, T-test neck, Z-test neck in the group of women with OM were significantly reduced (p<0.05), in comparison with the group with OP. The levels of 25(OH)D, OC, OPG were also reduced (p<0.05) in the second group of women compared with the first group. We obtained higher (p<0.05) indices of PTH and STx in the group of patients with OM in comparison with the group with OP. Correlation analysis of the obtained results showed a relationship between the level of 25(OH)D and indicators of structural and functional changes in CT: 25(OH)D and CTx (r=-0.669; p=0.001), 25(OH)D, and BMD neck (r=0.736; p=0.002). There was also a direct relationship between BMD neck and CTx (r=-0.463; p=0.002).

**Conclusion:** In the PM of women with OM, in comparison with the PM in women with OP, significantly larger (p<0.05) changes in the structural and functional state of CT, biochemical markers of CT resorption and remodeling, as well as lower (p<0.05) content level 25(OH)D. The content level 25(OH)D is highly informative in terms of predicting and diagnosing a decrease in BMD and the risk of fractures. The biochemical marker of CTx resorption has a high informative value in terms of predicting, timely diagnosis, and the effectiveness of the reduction treatment.

## P756

### CLINICAL CHARACTERISTICS, TREATMENT AND REMISSION OF PATIENTS WITH BONE PAGET IN A TERTIARY HOSPITAL CENTER

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**Objective:** To evaluate the characteristics, administered treatment and its response in patients with Paget's disease treated in the last 5 y in our center.

**Methods:** Retrospective observational study of patients with bone Paget treated in the last 5 y in the Rheumatology Service of an urban tertiary hospital assigned to the care of 325,000 inhabitants. The histories of

patients with Paget who have attended our consultations at least once during the last 5 y were reviewed. Demographic data, type of affectation, established treatments, remission and duration of this were collected. Total remission was considered when the clinical reason for the indication remitted with treatment and/or serum alkaline phosphatase levels normalized. Partial remission was considered when symptoms and/or alkaline phosphatase were reduced by >50%. The statistical study was carried out with stata. The quantitative variables analyzed were described with mean and standard deviation. The categorical variables were expressed with absolute and relative frequencies. In the univariate analysis to study the factors related to the response to treatment, the chi-square and Pearson's test were applied. All tests were considered a significance level $p < 0.05$.

**Results:** A total of 105 patients (50.4% men) were seen with a mean age of 81 (DS10.49) years for men and 83 (DS 11.30) y for women. Of these, 29 (27.6%) had not required treatment throughout their disease, presenting a significantly higher percentage of monostotic involvement (72.5% vs. 27.5%), and a lower initial alkaline phosphatase 99, 5 IU/l [77-124] in relation to 195 IU [144-229] in patients who received treatment. The remaining 76 (72.38%) patients had received a total of 73 cycles of i.v treatment with zoledronate and 37 with oral aminobisphosphonates (oral BPP). In 91.11% of the zoledronate cycles, total remission and normalization of serum alkaline phosphatase levels were obtained with a mean duration of 48 months; and in 72.73% of those treated with oral BPP, complete remission was also obtained, with a mean duration of 96 months. During the follow-up period, 4 died in the untreated group and 5 in the treated group. No malignancy to osteosarcoma was observed. In the last 5 y, only 24 new patients were diagnosed

**Conclusion:** In our patients with active bone Paget with the iv administration of zoledronate 4-5 mg, we observed a prolonged total remission greater than 4 y in 91% of the treated patients. A higher percentage of patients in relation to those treated with oral bisphosphonates, but it is striking that the mean duration of this remission is longer.

## P757

### BONE QUALITY IN ADULT WISTAR RATS OFFSPRING IS ASSOCIATED WITH PRENATAL AND POSTNATAL NUTRITIONAL MANIPULATION

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**Objective:** The impact of nutrition on skeletal growth seems to begin in utero. The very early programming of bone development affects bone mass accumulation, growth and development from early on. Skeletal acquisition tends to be more rapid at the latter vs. earlier stage of the gestational period, while the process starts tapering from the 39th week of gestation. This study aimed to evaluate the impact of perinatal food manipulation on skeletal characteristics and insulin levels of Wistar rats at the age of 1 y.

**Methods:** 67 first-time pregnant rats were randomized, to receive either normal diet (control diet, CD), food-restricted (FR), or fat-enhanced diet (FF), from the 12th gestational day. The rats gave birth on the 21st day of

pregnancy. Pups born to FR-mothers were subsequently divided into: fetal growth restricted (FGR) and non-FGR, based on their birth weight. Manipulation of maternal diet continued through the lactation period. Following delivery, all neonates were cross-fostered until the 25th day postpartum. Pups born to normally fed mothers were lactated by FR-, FF- or CD-fed mothers. A similar process was followed for the pups born to mothers FF- or FR-during pregnancy. All pups were weaned to the diet of their foster mother, on the 26th day postpartum, and continued to receive the same diet until one year of age. Bone density was assessed by pQCT.

**Results:** CD/CD had higher values of total bone density and total/subcortical area compared to FF/FF rats. The FF/FF group had higher subcortical density when compared to the FF/FR group. Pups receiving CD throughout the experiment had higher values of all assessed skeletal parameters in comparison to pups FGR/CD. Pups food restricted postnatally had lower values of all assessed skeletal parameters compared to non-FGR/FF rats. Pups FGR/FF had higher insulin levels compared to rats FF/FR. Comparable levels of insulin were identified in rats receiving high fat diet postnatally, irrespective of prenatal food-restriction or high fat diet.

**Conclusion:** We observed distinct skeletal acquisition and insulin levels' profiles in Wistar rats who experienced perinatal food manipulation before birth and until their first year of life.

## P758

### IMPROVING COMMUNICATION OF FRACTURE RISK GLOBALLY: INSIGHTS FROM INTERVIEWS WITH PATIENTS. THE RISKCOMMUNICATION STUDY OR RICO STUDY

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**Objective:** Lack of or low quality communication between patient and healthcare provider may partially explain poor initiation and adherence to anti-osteoporosis treatment. In this study, we aimed to gain insights into patients' understanding and preferences for various approaches for communication of fracture risk, derived from a risk algorithm, with the goal of improving osteoporosis treatment and management.

**Methods:** Individual physical or online interviews with patients at risk for fractures were organized in 4 different countries (Belgium, The Netherlands, Unites States and Japan). A semi-structured workbook developed following a scoping literature review and experts insight was used to conduct interviews. Using an example of a personal risk of 21% for any fracture in the next 10 y, four main fracture risk presentations were used to guide these interviews: verbal/written presentation of the percentage fracture risk, various types of coloured graphs, icon arrays, and icon arrays with or without treatment effect on fracture risk. Patients were asked to critically reflect on the different framing presentations for fracture risk, to suggest alternatives for improvement and to rank their preference.

**Results:** A total of 26 women (mean age of 70.5 y) at risk for fractures participated in the study. Thirteen (50%) had an history of fracture, 18 (69.2%) were on antiosteoporosis medication and 4 (15.4)%, 11 (42.3%), 5 (19.2%) considered themselves at low, moderate and high risk of fracture respectively. Most patients (76.9%) preferred coloured graphs over other presentations. Icon arrays of baseline fracture risk were never a preferred method of risk communication. Most patients also reported

that presenting the risk of fracture with and without treatment would be more convincing to initiate a treatment. Participants also suggested that fracture risk communication should be supported with additional data, such as the consequences of fractures. Most patients would value the development of a visual tool to better understand fracture risk.

**Conclusion:** Insights from these interviews suggest the importance of a patient-centered approach to fracture risk communication. A larger global survey is currently being developed to provide additional insights into patients' understanding and preferences for fracture risk communication and assess potential cultural and geographical differences in the optimal way to communicate fracture risk.

## P759

## OSTEOPOROSIS AND PREVALENT VERTEBRAL FRACTURES ARE ASSOCIATED WITH INSULIN RESISTANCE IN NON-DIABETIC POSTMENOPAUSAL WOMEN

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**Objective:** Diabetes mellitus is a recognized risk factor of osteoporosis and low bone density, while recent data is suggesting a possible association between prediabetes and bone fragility. This study aimed to assess the possible link between the diagnosis of prevalent fractures of the lumbar spine (LS) and/or a diagnosis of osteoporosis and insulin resistance in a postmenopausal population.

**Methods:** A total of 322 postmenopausal consecutive outpatients were retrieved for this cross-sectional study. We included women without significant insulin resistance (homeostasis model assessment, HOMA-IR<5), no clinically overt cardiovascular disease, normal thyroid function, and no evidence of gynecological malignancy. We obtained fasting venous blood samples, for biochemical and hormonal assessment. DXA was used to estimate bone density at the lumbar spine (LS) and femoral neck (FN). The prevalence of vertebral fractures (VFs) was estimated using plain LS radiographs.

**Results:** VFs were prevalent in 7.5% of our women (24/322). Osteoporosis was evident at the LS in 8.8% of women (19/216), and at the FN in 14.8% (31/209) of women. Measures of bone density correlated significantly with age, menopausal age and HOMA-IR values (FN, BMD r-coefficient=0.143, p-value=0.040; LS, T-score r-coefficient=0.149, p-value=0.028; FN, T-score r-coefficient=0.147, p-value=0.033. The presence of LS- or FN-osteoporosis associated with lower values of HOMA-IR (HOMA-IR values, osteoporosis vs. osteopenia/normal density at LS, 1.2±0.4 vs. 1.7±0.9, p-value=0.018; at the FN: 1.3±0.6 vs. 1.6±0.9, p-value=0.091) as well as with higher follicular stimulating hormone (FSH) levels and age. Multivariable logistic regression models showed that the prevalence of VFs associated with HOMA-IR values (1st vs. 4th quartile, 2.5% vs. 7.5%, p-value 0.018 after bootstrapping for 1000 samples). A diagnosis of LS-osteoporosis associated with HOMA-IR values (1st vs. 4th quartile, 13.7% vs. 1.8%, p-value=0.030 after bootstrapping for 1000 samples) as well as menopausal age. A diagnosis of FN-osteoporosis associated with HOMA-IR levels (1st vs. 4th quartile, 16.9% vs. 4.5%, p-value=0.040 after bootstrapping for 1000 samples). All models were adjusted for age, BMI, FSH, and estradiol.

**Conclusion:** High normal insulin resistance is associated with lower rates of VFs, LS- and FN-osteoporosis, as estimated by levels of HOMA-IR, in a nondiabetic postmenopausal population.

## P760

## THE PATIENTS ON DENOSUMAB FOR TREATMENT OF OSTEPOROSIS GET SIGNIFICANT IMMUNITY AND PROTECTION FROM COVID-19

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**Objective:** To explain the importance of giving priority to denosumab while treating the older adults with osteoporotic fragility fractures as they are more prone to acquire COVID-19.

**Methods:** The principal investigator is a Consultant Orthogeriatrician having special interest in the prevention, diagnosis and treatment of osteoporotic fragility fractures. Since June 2018, he is using denosumab for avoiding fractures in senior citizens. The final selection is done on the basis of DXA Scan along other innumerable clinical risk factors considered in FRAX. Since then his 30 patients are on regular 6 monthly dose of denosumab. The very first patient was given first dose on 30 June 2018. She has completed total 5 doses. Those who have completed at least 3 doses are included in this study. Two patients are lost to follow up and one patient died due to non-COVID diagnosis. The beneficiaries are between 60-92 y of age. Except only one male, rest all are females. **Results:** The results of this 24 months follow up study are promising, result- oriented, cost-effective and prudent. Not a single patient suffered from COVID-19 like symptoms. Not a single patient required hospital admission or oxygen therapy at home. For very first time and then before giving next dose, every time CTX (BTM) was done. The beneficiaries are monitored regularly for calcium, vitamin D and other dietary supplements along-with the rest mandatory guidelines about exercising, pranayam, yoga, etc.

**Conclusion:** The clinicians and consultants in the field of osteoporotic fragility fractures should consider about initiating denosumab on priority basis to older adults who are otherwise more prone to acquire COVID-19.

## P761

## THE RELIABILITY OF MEASURING MUSCLE QUANTITY AND QUALITY WITH EXTENDED-FIELD-OF-VIEW ULTRASOUND AT NINE BODY SITES

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**Objective:** Loss of muscle mass is associated with physical disability and mortality. Ultrasound is a field-based method for the quantification of muscle quantity and quality. The extended-field-of-view (EFOV), as an ultrasound technique, makes it possible to measure muscle thickness (MT), cross-sectional area (CSA) and echogenicity (EG). EFOV seems to be reliable and valid at, particularly, the lower extremities. For the scope of regional and whole body composition the reliability of multiple measuring sites needs to be confirmed. For this reason, we wanted to assess the intra- and inter-rater reliability of EFOV ultrasound for measuring muscle quantity and quality at 9 different body sites.

**Methods:** 25 healthy adults (12 men, 13 women) were included in this study. The ultrasound measurements were performed using a Mindray M7 (Shenzhen Mindray Bio-Medical Electronics Co., Ltd.) with a linear probe (10 MHz). The MT, CSA, and EG of the tibialis anterior, gastrocnemius (caput mediale), rectus femoris, biceps femoris, rectus abdominis, erector spinae, biceps brachii, triceps brachii, and forearm extensor muscles were measured. Reliability analysis was performed with ICC (two way random). ICC values 0-0.20 were considered as poor, 0.21-0.4 slight, 0.41-0.6 moderate, 0.61-0.8 substantial, and ≥0.81 as excellent.

**Results:** The age of the participants ranged from 19-61 years old. The intra-rater reliability for the quantification of muscle quantity and quality was substantial to excellent, with ICCs varying between 0.79-0.98. The ICC's for the inter-rater reliability for all variables (MT, CSA, and EG) of the tibialis anterior, gastrocnemius, rectus abdominis, biceps brachii, and forearm extensor muscles ranged from 0.61-0.87. For the rectus femoris,

biceps femoris, erector spinae, and triceps brachii muscles, the ICC's ranged from 0.47-0.85.

**Conclusion:** The quantity and quality of tibialis anterior, biceps brachii, gastrocnemius (caput mediale), and rectus abdominis muscles can be reliably measured with EFOV ultrasound. The quantity of rectus femoris and forearm extensor muscles and the quality of biceps femoris and erector spinae muscles can also be measured reliably. The triceps brachii seems to be unreliable for ultrasound measurement.

## P762

### PHYSICAL ACTIVITY IN KNEE OSTEOARTHRITIS PATIENTS IN TIMES OF PANDEMIC COVID-19

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**Objective:** Knee osteoarthritis is a source of pain and functional disability. However, maintaining regular physical activity greatly contributes to the preservation of muscle strength, in particular the quadriceps, thus cushioning the loads on a knee. In times of COVID-19, this activity was abandoned following confinement dictated by the state of health emergency, which can affect the scalability of the degenerative process of the knee. This study aimed to evaluate physical activity in knee OA patients in COVID-19 time.

**Methods:** Cross-sectional study conducted with adult patients aged 15-69 followed for knee osteoarthritis selected according to the ACR or Kellgren-Lawrence criteria, seen in rheumatology consultation. The exclusion criteria were patients aged <15 y and >69 y. 50 patients participated in the study. The pain assessment was evaluated by the VAS. The assessment of knee osteoarthritis by WOMAC and physical activity by IPAQ short version.

**Results:** In the 50 patients included, the mean age was 54±6 y, with a predominance of women 88% (44). The mean BMI was 31±4. In our sample, 18% (9) of patients had hypertension and 6% (3) had diabetes. The involvement is bilateral in 72% (36) of cases, left unilateral in 18% (9) and right unilateral in 10% (5). The x-ray of the knees under load showed in 28% (14) a left knee osteoarthritis stage III and in 28% (14) a right knee osteoarthritis stage II. There was no difference between the pain VAS before and during the COVID-19 pandemic with a mean of eight. The mean WOMAC score was 49±13. The median total activity score of the IPAQ was 1975 metabolic task equivalent (MET) -min/week and the time spent sitting was 325 min/d. For the level of physical activity during the last 7 d at this COVID-19 time, 74% (37) had moderate activity, 26% (13) had low activity while no patient had an intense level. There is a statistically significant positive correlation (p=0.04) between the time spent sitting and the WOMAC score. A negative correlation between the MET level and the WOMAC was found, but which is statistically insignificant. For activity level, it was only influenced by age and pain VAS (p=0.05).

**Conclusion:** Our knee OA patients had moderate activity at the time of the pandemic and the level of pain; high WOMAC and age were the only factors limiting this activity.

## P763

### THE CALCIUM, VITAMIN D3 AND VITAMIN B12 (INSUFFICIENCY AND DEFICIENCY BOTH) ARE THE SIGNIFICANT RISK FACTORS FOR COVID-19

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**Objective:** To explain the significance of sufficient daily intake of calcium, vitamin D3 & vitamin B12 to prevent COVID-19.

**Methods:** The Principal Investigator is a Consultant Orthogeriatrician with Home Visit Practice since last 32 y. He has treated more than 100 COVID-19 patients by visits between Feb 2020 to April 2021. The SARS-CoV-2 detection was confirmed by RT- PCR. Comprehensive Geriatric Assessment (CGA) was the mandatory base before the initiation of treatment. CGA is based mainly on blood tests.

**Results:** The data of 15 months for 100 patients shown very conclusive results as follows: A) Sr calcium (8.10-10.4 mg/dl): Out of 100 patients, 56 were having calcium bet 8.1-8.9 mg/dl, 10 patients had <8.1 mg/dl calcium and two were extremely deficient (3 mg/dl & 7 mg/dl only). About 32=patients had calcium >9 mg/dl. Not a single patient had calcium >10.4 mg/dl. B) Vitamin D3 (30-100 ng/ml): out of 100 patients, 38 were having insufficient vit D3 between 10-30 ng/ml, 8 were having vitamin D deficiency (VDD: <10 ng/ml). Actually, 3 were severely deficient with only 5, 5.6 & 7.5 ng/ml. Around 36 patients were having vit D3 normal but on very lower side (bet 30-40 ng/ml). Only 16 were having it above 40 ng/ml. There was not a single patient having vit D3 toxicity i.e., >100 ng/ml. C) Vit B12 (120-914 pg/ml): out of 100 patients, 60 were having vit B12 between 120-200 pg/ml, 10 were deficient having <120 pg/ml. Actually, one was severely deficient (88 pg/ml). There were 20 patients between 200-300 pg/ml. Only 8 patients were above 300 pg/ml. Two had hypervitaminosis B12 ( >1500, >2000 pg/ml).

**Conclusion:** The recommended daily allowance (RDA) should be kept in mind to fight COVID-19. The diet rich in calcium, vit D3 and vit B12 is very important for maintaining and adding to the immunity in the fight against COVID-19.

## P764

### COMPARISON OF IL-17A LEVELS AND BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH AND WITHOUT PRIMARY HYPERPARATHYROIDISM

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**Objective:** Primary hyperparathyroidism (PHPT) is a common cause of secondary osteoporosis in postmenopausal women. Bone damage is characterized by greater involvement of cortical than trabecular bone, in contrast to postmenopausal osteoporosis. IL17A plays an important role in bone metabolism as it stimulates osteoclast differentiation and bone resorption. The aim of our study was to compare IL-17A levels with BMD and other serum markers of bone metabolism in postmenopausal women with and without PHPT, in order to estimate the possible role of IL-17A in PTH-induced bone remodeling.

**Methods:** The study included 161 postmenopausal women (mean age 61.9 (±8.19)) with biochemical data of PHPT and 54 age-matched postmenopausal women as controls in the absence of drugs or other diseases known to affect bone metabolism. Serum markers of mineral metabolism, RANKL, OPG and IL-17A were determined. BMD was measured at the lumbar spine (LS), total hip (TH), femoral neck (FN) and distal one-third of the nondominant radius (DR) by DXA.

**Results:** Women with PHPT had higher levels of IL-17A than the control group (31.85, 19.8-44.4 pg/ml vs. 13.9, 3.1-26.6 pg/ml, p<0.001). RANKL, OPG and RANKL/OPG did not differ between the two groups (p>0.05). LS BMD and DR BMD were lower in the PHPT group than in the controls (LS 0.92, 0.82-1.03 vs. 1.06, 0.92-1.19, p<0.001; DR 0.54, 0.45-0.57 vs. 0.58, 0.54-0.62, p<0.001), whereas there was no difference in FN and TH BMD (p=0.59 and p=0.63, respectively). IL-17A correlated positively with serum calcium and PTH (rho=0.36; p<0.001 and rho=0.19, p=0.04, respectively) and negatively with serum inorganic phosphate (rho=-0.31; p<0.001). We found no correlation between IL-17A and RANKL, OPG, RANKL/OPG or BMD at any skeletal site in the whole group. A positive correlation between IL-17A levels and FN T-score was observed in the women with PHPT (rho=0.3, p=0.04).

**Conclusion:** Higher levels of IL-17A in PHPT group suggest a possible role in the PTH-induced bone remodeling. The combined bone density

pattern is probably the effect of the constantly high PTH on the trabecular as well as the cortical bone.

## P765
### EFFICIENCY OF PHYSICAL THERAPY IN NONSURGICAL TREATMENT OF PATIENTS WITH CARPAL TUNNEL SYNDROME

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**Objective:** Appreciation of the usefulness of including in the conservative medical assistance of patients diagnosed with carpal tunnel syndrome of therapeutic means of physiotherapy, in order to control pain and to improve the functional parameters of the upper limb.

**Methods:** We organized a descriptive, retrospective study that included a number of 45 patients diagnosed with carpal tunnel syndrome. Patients were divided into two groups: group 1 included patients who benefited only from specific drug treatment and group 2 included patients in whom the association between medication and means specific to physical medicine was made (laser therapy, sonophoresis, ionization, orthosis). The therapeutic interval taken into account was 10 days. The evaluated parameters were represented by: pain (assessed using the visual analogue scale, VAS, for pain), joint mobility of the fist (assessed on the flexion-extension axis) and the Short Disability Assessment Questionnaire for Arm, Shoulder and Hand (Quick DASH).

**Results:** The values of the parameters appreciated in evolution improved: the value for VAS score for pain decreased by 43.1% in group 2 compared to 32.3% in group 1 (p=0.000054), the mobility for flexion increased (33.4% in group 2, 26.2% in group 1), the mobility for joint extension also increased (31.1% for group 2 and 23.2% in group 1), Quick DASH score improved (52.7% in group 2 and 41.3% in group 1). The results were statistically significant (p<0.05).

**Conclusion:** The results demonstrate effective pain control and improvement of functional parameters in the study group. This fact recommends the use of specific means of physical medicine and rehabilitation in the complex conservative therapeutic program addressed to patients with carpal tunnel syndrome.

## P766
### IMPROVING THE EFFECTIVENESS OF THE TREATMENT OF CHRONIC PAIN SYNDROME IN SPONDYLOARTHROSIS

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**Objective:** Back pain is an urgent and socially significant problem of modern healthcare. More than 90% of the world's population has been found to experience one or more episodes of back pain during their lifetime. According to various authors, in Russia, degenerative diseases of the spine, which in most cases are clinically manifested by pain, account for up to 76% of all cases and 72% of days of temporary disability in the outpatient network, and in neurological hospitals 56 and 48%, respectively. The above suggests that spinal pain is also an economic problem. The intensive development of surgical technologies has made it possible to significantly expand the possibilities for high quality treatment of patients with chronic pain syndrome. 1. Radiofrequency denervation of the facet joints (RFD) is one of the most effective treatments for chronic back pain. 2. Alternative invasive methods of treatment are ineffective and relieve pain for a short time. 3. Relief of pain in the lower back NSAIDs - can lead to complications of the gastrointestinal tract. 4. Radiofrequency denervation of facet joints (RFD) does not require a long stay in a medical institution and after its implementation the patient can return to work in the near future. Purpose of the study: 1. To study the clinical and neurological, emotional, cognitive status and the quantitative content of neopterin, NSE in the blood serum of patients. 2. Predicting the effectiveness of radioparticle denervation of facet joints at the preoperative level in patients with spondyloarthrosis

**Results:** All patients had severe pain syndrome before radiofrequency denervation of the facet joints at the L4-S1 level. The mean NSE levels in the serum of patients before surgery were significantly higher in spondyloarthrosis of the intervertebral joints before surgery (1.6 mg/ml) than after RFD (1.4 mg/ml). The study of neopterin in patients at the preoperative level showed an average value of 9.5 nmol/L, after surgery 10.1 nmol/L.

**Conclusion:** The results of the study showed that NSE in the serum of patients before and after RFA is associated with back pain and varies from patient to patient. The study of neopterin in blood serum before and after surgery did not show a significant decrease after surgery in individual patients.

## P767
### NUTRITION STATUS AND INFLAMMATORY POTENTIAL OF THE DIET AND RISK OF OSTEOSARCOPENIA: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** Osteosarcopenia is an increasingly recognized geriatric disorder with a considerable prevalence which increases morbidity and mortality. Inflammation and poor nutritional status are major risk factors for many age-related diseases. Specific nutrients and dietary patterns have been associated with inflammatory markers. This study aimed to investigate the association of inflammatory potential of the diet and daily nutritional intake with osteosarcopenia.

**Methods:** A total of 2426 Iranian adults aged ≥60 y, participating in stage II of the BEH program, a population-based prospective cohort study, were included in this study. Osteopenia/osteoporosis was defined as a T-score ≤-1.0 SD below the mean values of a young healthy adult. We defined sarcopenia as reduced skeletal muscle mass plus low muscle strength and/or low physical performance. Osteosarcopenia was considered as the presence of both osteopenia/osteoporosis and sarcopenia. Dietary nutrient intakes and dietary inflammatory index (DII) score were estimated from a 24-h recall method. Associations between DII score and osteosarcopenia were determined by linear and logistic regression.

**Results:** Among 2392 participants, 532 (22.2%) had osteosarcopenia with mean age 73.2±7.4 y. The mean of DII was 0.07±0.37 in osteosarcopenic group and -0.12±0.04 in normal group (P<0.001). Also, the medians of energy intake, intake of protein and carbohydrate were significantly lower in osteosarcopenic group. There were no significant differences in total fat and all types of fatty acids between the osteosarcopenic and normal groups. The DII score was positively associated with the risk of osteosarcopenia, even after adjusting for potential covariates [aOR: 1.11(1.03-1.20)]. Also, participates with the higher tertile of DII (pro- inflammatory diet) were more likely to have risk of osteosarcopenia [aOR: 1.51(1.12-2.03)].

**Conclusion:** Results demonstrated a diet with more pro-inflammatory potential was associated with high risk for osteoposarcopenia. Also, our results suggested an inverse association between daily protein, energy and carbohydrate intakes with osteosarcopenia in community-dwelling older Iranian adults. Further studies are required to confirm these findings.

## P768

### COGNITIVE FRAILTY: PREVALENCE ESTIMATES AND ASSOCIATION WITH BODY COMPOSITION IN OLDER MEN: CROSS-SECTIONAL, POPULATION-BASED DATA

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**Objective:** Cognitive frailty, the co-presence of physical frailty and cognitive impairment, is associated with adverse health outcomes. We examined the prevalence of cognitive frailty for Australian men and investigated the association of cognitive frailty with body composition.
**Methods:** This cross-sectional study involved 312 men ages 60-96 y from the Geelong Osteoporosis study. Frailty was identified by low hand grip strength (HGS, kg) measured by dynamometry, and slow gait speed using a timed 4-m walk (m/s). Cognitive function was assessed in four domains: psychomotor function, memory, learning, and executive function using a computer-based program. Cognitive impairment in each domain is scores beyond 2SD of poor performance; impairment at least in one domain with muscle slowness or weakness is cognitive frailty. Prevalence estimates were standardised to the Australian population. Appendicular lean mass and total body fat mass were measured by DXA and adjusted by height or BMI. Logistic regression analysis were applied to investigate the association between cognitive frailly and body composition.
**Results:** There were 48 (15.4%) men with cognitive impairment in any domain, and 4 (1.3%) and 93 (30.4%) with muscle weakness or slowness, respectively. Prevalence estimates of cognitive frailty was 8.6% (95%CI: 6.1-11.1). The prevalence of cognitive frailty increased across age groups (p<0.001) with 2.1% in people aged 60-69 y, 5.5% in aged 70-79 y, and 30.0% in aged 80+ y. Cognitive frailty was associated with age (OR 1.15; 95%CI 1.10-1.21; p<0.001). Cognitive frailty was associated with ALM/height$^2$ (OR 0.56; 95%CI 0.32-0.96; p<0.05) and ALM/BMI (OR 0.02; 95%CI 0-0.93; p<0.05) independent of age.
**Conclusion:** This is the first Australian study to report cognitive frailty prevalence. Future studies are warranted to explore the underlying pathophysiology and intervention programs to cognitive frailty.

## P769

### SKELETAL MANIFESTATIONS OF KLIPPEL TRENAUNAY WEBER SYNDROME: A CASE REPORT

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It is a congenital vascular disorder that consists of a "triad" of symptoms affecting either one or more limbs. This "triad" constitutes bone and soft tissue hypertrophy, varicose veins, and cutaneous hemangioma. Bony and soft tissue hypertrophy may lead to the affected limb becoming either very large or very small. Cutaneous hemangioma may present either as a port-wine stain or nevus. This is generally accompanied by varicose veins which are often very numerous. It is most commonly seen in childhood or adolescent age groups. This report describes the skeletal manifestation along with diagnostic signs of Klippel Trenaunay syndrome.
Case report: A 35-year-old man reported with the triad associated with Klippel Trenaunay syndrome. On clinical examination, substantial port wine stain was seen and radiographs showed multiple bony outgrowths whereas MRI showed multiple varicosities displaying heterogeneous hyperintense signals on T2 Weighted Images and T1 hypointensity with hypertrophy of soft tissue in the left lower limb. He was concerned with cosmetic issues caused due to the hypertrophy of the lower limbs. Due to the various vascular malformations and since the patient did not have any functional impairment it was deemed unwise to offer him surgical intervention. Hence, the patient was counselled regarding the nature of his condition and no intervention was done for this patient.

## P770

### LOW-LEVEL INFLAMMATION AND COMORBID PATHOLOGY IN OSTEOARTHRITIS

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**Objective:** The combination of osteoarthritis (OA) with metabolic disorders and diseases of the cardiovascular system leads to a significant deterioration in the quality of life and a high level of physical disability. Aim: Determination of the level of nicotinamide phosphoribosyltransferase (Nampt) in the serum of patients with OA without comorbid diseases (CR), with OA and cardiovascular diseases (CVD), with OA, CVD and metabolic syndrome (MS) to clarify significant risk factors for the production of pro-inflammatory cytokines in patients with OA.
**Methods:** 120 people were examined: 30 people - a group without significant diseases, 20 patients with OA, 40 - with OA and CVD, and 30-with OA, CVD and MS. The average level of Nampt in the blood serum was minimal and amounted to 24.3±2.86 ng/ml (M±SD), in patients with OA without significant comorbid diseases - 27.21±5.7 ng/ml (p=0.02), the highest in patients with OA, CVD and MS – 42.29±12.77 ng/ml (p<0.0001).
**Results:** There was no difference in the dependence of the level of circulating Nampt in patients with OA without CR and patients with OA and GB (p=0.08), there was a significant difference in the level of Nampt in patients with OA without CR and OA in combination with CHD, the maximum level of Nampt was detected in patients with MS. This group had the largest waist size (OT) - 105.13±13.39, the highest BMI - 33.6±4.99.
**Conclusion:** A significant positive correlation was found between Nampt, ESR, and CRP. A high association of Nampt with BMI was found in patients with OA without CR (rs=0.6803), and with OT in patients with OA and MS (rs=0.6395). Discussion. The main source of Nampt was thought to be abdominal fat cells. Nampt has been proven to synthesize monocytes, macrophages, dendritic cells, T cells, and B cells. Visceral fat is more active than subcutaneous and lean tissue. Normally, the level of Nampt correlates with BMI, in MS - with the volume of visceral fat, in acute damage - with the intensity of the inflammatory process. The level of Nampt in the serum of patients with OA increases with an increase in comorbid pathology, has a direct correlation with highly sensitive CRP, ESR, and simple anthropometric indicators - BMI and OT. OT most accurately reflects the severity of abdominal obesity and low level inflammation, companions of the metabolic syndrome. The positive correlation between laboratory markers of inflammation and OT confirms the role of Nampt as a proinflammatory cytokine in the pathogenesis of cardiovascular disease progression in patients with OA and MS. Abdominal obesity is the leading risk factor for maintaining low-level inflammation, and it is a modifiable factor in contrast to age and heredity. The study showed a link between laboratory markers of inflammation, anthropometric indicators, and Nampt concentrations. Overweight and increased waist circumference are the most significant predictors of low-level inflammation in patients with OA and comorbidity, and are positively correlated with higher concentrations of highly sensitive C-reactive protein and ESR.

## P771

### OSTEOSARCOPENIA AND BIOMARKERS OF BONE HEALTH IN IRANIAN OLDER PEOPLE: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** Osteosarcopenia is referred to as co-incidence of osteoporosis/osteopenia and sarcopenia which is defined as a geriatric syndrome with a significant prevalence that increases morbidity and mortality. There are some predictive factors that can show an increased risk of incidence of osteosarcopenia. This study aimed to consider the association of bone turnover markers and also some other risk factor like vitamin D deficiency with osteosarcopenia in elderly.

**Methods:** We carried out a cross-sectional study on a random sample including 400 elder participants of BEH study, in Iran. Osteopenia/osteoporosis was defined as a T-score ≤ -1.0 SD below the mean values of a young healthy adult. We defined sarcopenia as low muscle strength with reduced skeletal muscle mass. Osteosarcopenia was considered as the presence of both osteopenia/osteoporosis and sarcopenia. We estimated the age-standardized prevalence of osteosarcopenia for men and women, separately. We used multivariable logistic regression to address the factors associated with osteosarcopenia.

**Results:** The total prevalence of osteosarcopenia was 19.1%. The results showed that there was a statistically significant difference in osteocalcin (OC), C-terminal cross-linked telopeptide (CTX), and tartrate resistant acid phosphatase (TRAP) were between the normal and osteosarcopenia groups. No statistically significant difference was observed in bone alkaline phosphatase (BALP), vitamin D, calcium, phosphorous, and ALP between the compared groups. In the multivariable logistic regression model, OC and CTX were associated with increased likelihood of osteosarcopenia [adjusted OR=1.023(1.002-1.045 for OC, 4.363(1.389-15.474 for CTX]. Furthermore, TRAP increases the odds of osteosarcopenia in crude model [OR=1.333 (1.070- 1.660)].

**Conclusion:** We observed osteosarcopenia in around 19.1% of our elder population that is a slightly high prevalence for a developing country. Any change in the density of bone biomarkers particularly OC, CTX, and TRAP should be considered as a predictor of osteosarcopenia.

## P772
### IS THERE A RELATIONSHIP BETWEEN THE C174G POLYMORPHISM OF INTERLEUKIN-6 AND OSTEOPOROSIS?

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**Objective:** The Wnt signaling pathway and immune factors play an important role in the regulation of bone remodeling; therefore, the IL-6 gene is considered as a candidate gene for postmenopausal osteoporosis. The role of IL-6 in the development of osteoporosis has been determined; this cytokine activates bone resorption by increasing RANK activity. This study aimed to study the C174G polymorphism of the IL-6 gene in women with osteoporosis and osteoporotic fractures.

**Methods:** 162 women of the postmenopausal period, living in the Trans-Baikal Territory, of Russian nationality were examined (age from 60-76 years old). Verification of the diagnosis of osteoporosis was performed according to the current recommendations: with a high 10-y fracture risk according to FRAX, with a history of low-energy fracture, or with X-ray densitometry with T-score values of -2.5 SD and below. Osteoporosis was diagnosed in 76 patients, 86 women with coronary artery disease without osteoporosis made up the comparison group. Statistical analysis was performed using the $\chi^2$ test and the odds ratio. Our statistical analysis showed that the distribution of genotypes of the studied IL-6 gene polymorphism in the examined women obeys the Hardy-Weinberg law (p> 0.05).

**Results:** We did not find significant differences in the distribution of alleles in the comparison group and in the group of women with osteoporosis. When studying the frequency of occurrence of different variants of genotypes of C174G IL-6 polymorphism, no statistically significant differences were also found between the comparison group and the group of women with osteoporosis (Table 1). However, it should be noted that the C allele and CC genotype were more common in the group of women with osteoporosis, and the odds ratios were 1.21 and 1.36, respectively.

Table 1. Frequency of alleles and genotypes of the C174G polymorphism of the IL-6 gene.

| Polymorphism IL-6 gene C174G | Frequency | Control group, N=86 | Women with osteoporosis, N=76 | $X^2$, p | OR | 95%CI |
|---|---|---|---|---|---|---|
| Allele | C | 0,480 | 0,53 | 0,36 | 1,21 | 0,79-1,876 |
|  | G | 0,52 | 0,47 |  | 0,82 | 0,53-1,26 |
| Genotype | CC | 25,3 | 31,6 | 0,36 | 1,36 | 0,69-2,68 |
|  | GG | 28,6 | 25,0 | 0,69 | 0,83 | 0,41-1,66 |
|  | CG | 46,1 | 43,4 | 0,67 | 0,89 | 0,48-1,65 |

Table 2. Frequency of alleles and genotypes depending on the localization of osteoporotic fractures.

| Polymorphism IL-6 gene C174G | Frequency | Control group, N=86 | X2, p Women with osteoporosis, N=76 | | OR | 95%CI |
|---|---|---|---|---|---|---|
| Radial bone fracture | | | | | | |
| Allele | C | 0,49 | 0,55 | 0,32 | 1,26 | 0,789-2,038 |
|  | G | 0,51 | 0,45 |  | 0,97 | 0,789-2,038 |
| Genotype | CC | 25,3 | 33,9 | 0,25 | 1,28 | 0,842-1,958 |
|  | GG | 28,6 | 23,2 | 0,96 | 0,83 | 0,507-1,381 |
|  | CG | 46,1 | 42,9 | 0,69 | 0,92 | 0,606-1,398 |
| Vertebral fractures | | | | | | |
| Allele | C | 0,49 | 0,42 | 0,49 | 0,73 | 0,326-1,723 |
|  | G | 0,51 | 0,58 |  | 0,978 | 0,326-1,723 |
| Genotype | CC | 25,3 | 15,4 | 0,43 | 0,57 | 0,136-2,421 |
|  | GG | 28,6 | 30,8 | 0,87 | 1,096 | 0,365-3,289 |
|  | CG | 46,1 | 53,8 | 0,6 | 1,31 | 0,472-3,632 |
| Hip fracture | | | | | | |
| Allele | C | 0,49 | 0,5 | 0,96 | 1,0 | 0,345-3,036 |
|  | G | 0,51 | 0,5 |  | 0,978 | 0,345-3,036 |
| Genotype | CC | 25,3 | 14,3 | 0,51 | 0,514 | 0,065-4,046 |
|  | GG | 28,6 | 14,3 | 0,41 | 0,43 | 0,055-3,474 |
|  | CG | 46,1 | 71,4 | 0,019 | 5,5 | 0,65-43,8 |

As can be seen from Table 2, the association of the C174G polymorphism of the IL-6 gene with fractures of the radius and vertebral fractures was not established, although the carriage of the C and CC alleles of the genotype is accompanied by a slight increase in the risk of fractures of the radius (OR was 1.26 and 1.28, respectively). With regard to hip fracture, it was found that the presence of the CG genotype of the C174G polymorphism of the IL-6 gene is associated with a fivefold increase in its risk (OR - 5.5, 95%CI - 0.65-43.8).

**Conclusion:** Thus, the C174G polymorphism of the IL-6 gene is associated with an osteoporotic hip fracture: carriers of the CG genotype have a 5.5-fold increased risk of hip fracture. The association of this polymorphism with the presence of osteoporosis and other localizations of osteoporotic fractures has not been established.

## P773

### NAILFOLD CAPILLAROSCOPY IN EARLY STAGES OF MIXED CONNECTIVE TISSUE DISEASE IN EGYPTIAN PATIENTS

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**Objective:** Mixed connective tissue disease (MCTD) is a systemic autoimmune disease with a high titer of anti-U1RNP and a number of clinical pictures mainly Raynaud's phenomenon. Nailfold capillaroscopy (NFC) is a noninvasive diagnostic tool for patients with different connective tissue diseases (CTDs) that permit the detection of local microvascular changes that correlate with systemic vascular involvement. Aim of the study: comparing the results of NFC in patients with systemic sclerosis to determine the chief characteristics of skin microangiopathy in early MCTD and trying to describe a characteristic MCTD pattern in Egyptian patients.
**Methods:** This cross-sectional study included 40 patients diagnosed with mixed connective tissue disease according to Alarcón-Segovia and Villareal criteria and 20 patients with confirmed systemic sclerosis according to ACR and EULAR classification criteria for systemic sclerosis. Nailfold examination for study subjects was done describing architectural, derangement, capillary density changes, mega capillary and enlarged loops, microhemorrhages, and angiogenesis.
**Results:** Of the 60 patients studied, 49 (81.7%) patients were females and 11 were males with a mean age of 31 y. Three of the 20 patients diagnosed with systemic sclerosis had arthritis. Out of 60 patients, 53.3% had thickened skin, 19 patients exhibited puffy fingers, 6 patients showed rash and none had swollen joints. skin thickening was significantly higher in systemic sclerosis patients (85%) compared to 37.5% in the MCTD population. Patients presented with various comorbidities, the most common of which was Fatigue (26.7%) and myositis (23% of patients). There is a significant negative correlation of -0.508 (P=0.022) between the enlargement scores and illness duration in systemic sclerosis patients. Those patients also exhibited a statistically significant positive correlation of 0.520 (P=0.019) between hemorrhage score and the number of tender joints. Alternatively, patients diagnosed with mixed connective tissue disease exhibited a significant positive correlation between the architecture scores of their joints and both; the duration of their illness (0.347; P=0.028) and the number of swollen joints (0.424 P=0.006). Mixed connective tissue disease patients also showed a significant correlation of 0.423 (P=0.007) between their hemorrhage scores and their age at the time of the study.

Table 1. Capillaroscopy scores according to some clinical findings among the mixed type.

| Variables | Positive | Negative | #p-value |
|---|---|---|---|
| Skin thickening | | | |
| Architecture | 1.0 (1.0–1.0) | 1.0 (1.0–1.0) | 0.868 |
| Density | 2.0 (1.0–2.0) | 1.0 (0.0–2.0) | 0.094 |
| Enlargement | 0.0 (0.0–1.0) | 1.0 (0.0–1.0) | 0.562 |
| Hemorrhage | 0.0 (0.0–1.0) | 0.0 (0.0–0.0) | 0.244 |
| Neoangeogensis | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.543 |
| Total | 4.0 (2.0–5.0) | 3.0 (1.0–4.0) | 0.233 |
| Puffy fingers | | | |
| Architecture | 1.0 (1.0–1.0) | 1.0 (1.0–2.0) | 0.932 |
| Density | 2.0 (0.0–2.0) | 1.0 (0.0–2.0) | 0.360 |
| Enlargement | 1.0 (0.0–1.0) | 0.0 (0.0–1.0) | 0.588 |
| Hemorrhage | 0.0 (0.0–1.0) | 0.0 (0.0–0.0) | 0.100 |
| Neoangeogensis | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.441 |
| Total | 5.0 (2.0–6.0) | 3.0 (1.0–4.0) | 0.078 |
| Anemia | | | |
| Architecture | 1.0 (1.0–1.0) | 1.0 (1.0–2.0) | 0.799 |
| Density | 1.0 (0.0–2.0) | 1.0 (0.0–2.0) | 0.824 |
| Enlargement | 1.0 (0.0–1.0) | 0.0 (0.0–1.0) | 0.483 |
| Hemorrhage | 0.0 (0.0–1.0) | 0.0 (0.0–0.0) | 0.679 |
| Neoangeogenesis | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.949 |
| Total | 4.0 (2.0–5.0) | 3.0 (1.0–4.0) | 0.824 |
| Fatigue | | | |
| Architecture | 1.0 (1.0–1.0) | 1.0 (1.0–1.0) | 0.794 |
| Density | 1.0 (1.0–2.0) | 1.0 (0.0–2.0) | 0.842 |
| Enlargement | 0.0 (0.0–1.0) | 1.0 (0.0–1.0) | 0.724 |
| Hemorrhage | 0.0 (0.0–0.0) | 0.0 (0.0–1.0) | 0.346 |
| Neoangeogenesis | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.450 |
| Total | 2.5 (1.0–4.0) | 4.0 (1.0–5.0) | 0.379 |

Data presented as median (1st-3rd interquartile). #Mann Whitney test. *Significant

Table 2. Correlation between capillaroscopy scores and other variables.

| | | Arch | Dense | Enlarg | He | Neoang | Total |
|---|---|---|---|---|---|---|---|
| SSc | | | | | | | |
| Age | r | -0.004 | 0.221 | -0.219 | -0.098 | 0.280 | 0.035 |
| | p | 0.987 | 0.349 | 0.353 | 0.680 | 0.231 | 0.884 |
| Duration | r | -0.210 | -0.087 | -0.508 | -0.332 | 0.181 | -0.378 |
| | p | 0.373 | 0.715 | 0.022* | 0.153 | 0.445 | 0.100 |
| Tender | r | 0.215 | 0.040 | 0.171 | 0.520 | 0.355 | 0.409 |
| | p | 0.363 | 0.868 | 0.472 | 0.019* | 0.125 | 0.074 |
| Swollen | r | 0.128 | 0.342 | 0.145 | 0.202 | 0.293 | 0.369 |
| | p | 0.591 | 0.140 | 0.543 | 0.394 | 0.210 | 0.109 |
| Mixed | | | | | | | |
| Age | r | 0.201 | 0.190 | -0.135 | 0.423 | 0.020 | 0.216 |
| | p | 0.215 | 0.240 | 0.405 | 0.007* | 0.904 | 0.181 |
| Duration | r | 0.347 | 0.122 | 0.079 | 0.234 | 0.053 | 0.293 |
| | p | 0.028* | 0.454 | 0.629 | 0.146 | 0.744 | 0.067 |
| Tender | r | 0.171 | -0.027 | 0.260 | -0.054 | -0.138 | 0.082 |
| | p | 0.291 | 0.869 | 0.105 | 0.739 | 0.394 | 0.615 |
| Swollen | r | 0.424 | 0.287 | -0.040 | 0.041 | 0.149 | 0.306 |
| | p | 0.006* | 0.072 | 0.808 | 0.801 | 0.359 | 0.055 |

Spearman correlation. *Significant

**Conclusion:** NFC is a noninvasive, rapid, easy, cost-effective method for studying nailfold capillaries in MCTDs. In this study, the results obtained were qualitatively satisfactory for a clear delineation of the nailfold capillaries features in MCTD. Therefore, it aids in the recognition of alternations in nailfold capillaries making early diagnosis of MCTD possible and thus preventing morbidities and sequelae of the disease.

## P774

### THE ASSOCIATION BETWEEN MUSCLE INDICATORS AND BONE MASS DENSITY AND RELATED RISK FACTORS IN THE DIABETIC ELDERLY POPULATION: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** Decreased muscle mass and strength and bone mass density are one of the complications of the aging process. Studies show that the prevalence of sarcopenia and osteoporosis may be higher in patients with diabetes. Therefore, this study was aimed to investigate the relationship between muscle mass and strength indices and bone mass density in diabetic elderly.

**Methods:** This cross-sectional study was conducted based on the data collected during the BEH Program, stage II. Diabetes was defined as FPG $\geq 126$ mg/dl or HbA1C $\geq 6.5$ or taking antidiabetic medication. DXA (Discovery WI, Hologic Inc, USA) was used to measure BMD, fat mass, trabecular bone score (TBS) and muscle mass. Muscle strength was measured by grip strength. Osteoporosis were defined as the BMD of $\geq 2.5$ SD below the average value of young normal adults (T-score of $\leq$-2.5 SD) in the femoral neck, or lumbar spine (L1-L4) or total hip. To determine the relationship between skeletal muscle index (SMI) and strength on bone status in a continuous scale (BMD L1-L4, BMD total hip, BMD femoral neck, and TBS L1-L4) and estimate the effect of SMI and muscle strength on osteoporosis from linear regression and Pearson's correlation coefficient and modified Poisson regression was used for analysis, respectively.

**Results:** In this study, 759 diabetic elderly were included. SMI and muscle strength were related to BMD in the spinal L1-L4, femur neck, total hip, and TBS L1-L4 after adjusted in full models (P-value <0.001). Only, in model 2 (adjusted for age and sex effect), there was no significant relationship between muscle strength and BMD in spinal L1-L4 and TBS L1-L4. Also, increased SMI and muscle strength was associated with decreased osteoporosis in crude and adjusted models.

**Conclusion:** In this study, it was revealed that the reduction of SMI in elderly patients with diabetes was significantly associated with decreased bone mass density and TBS. Besides moreover, the muscle strength was also associated with BMD and TBS. So, muscle strength and muscle mass should be measured separately ever since both are independently associated with BMD.

## P775
### SOCIOECONOMIC INEQUALITIES IN OSTEOSARCOPENIA AMONG COMMUNITY DWELLING OLDER PEOPLE: FINDINGS FROM THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** Osteosacopenia is a common problem in elderly with the adverse outcomes. Although social inequalities in health have been recognized for centuries but it is unknown in osteosarcopenia. The aim of this study was to investigate the socioeconomic inequality of osteosarcopenia among the Iranian older people.

**Methods:** A total of 2426 adults aged $\geq 60$ y, participating in the stage II of BEH program, a population-based prospective cohort study; were included in this study. Osteosarcopenia was defined as having osteopenia/osteoporosis with sarcopenia. Socioeconomic status (SES) was measured by an asset index, constructed using principal component analysis, income, education level, and employment status. The Concentration Index and the Lorenz curve were used to illustrate the levels of inequality for osteosarcopenia.

**Results:** The prevalence of osteosarcopenia was 532 (22.2%). The results of study showed that the concentration index of osteosarcopenia which is respectively obtained 0.0293, 0.0435, and 0.0301 for total, women, and men, by indicating that the intended outcome is not equally distributed among different socioeconomic groups. Osteosarcopenia was statistically significant and more prevalent in the richest individuals compared to the other quintiles in our study. The positive concentration index of the variables such as men, individuals with high body mass, and those receiving greater daily protein indicated that had higher Scio economic status. However, the negative values of the variables such as the history of falling more than once and fracture after the age of 45 y, as well as disabled individuals showed that had lower socioeconomic status (lower economic quintile). The total contribution (%) of the variables considered in nonlinear model explained 91.65% of the economic inequality of osteosarcopenia, while 8.35% of total inequality cannot to be justified by the variables in our study.

**Conclusion:** It was concluded that socioeconomic status plays an important role in happening osteosarcopenia among Iranian older people. It seems to be necessary a focus on reducing the economic inequalities among osteosarcopenic people in Iran.

## P776
### IMMEDIATE EFFECT OF PILATES EXERCISE THERAPY IN YOUNG ADULTS WITH NONSPECIFIC LOW BACK PAIN

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**Objective:** Low back pain affects the person's ability to keep balance, especially in challenging conditions. This study aimed to study the immediate effect of pilates exercise therapy on pain and dynamic postural control in young adults with nonspecific low back pain (NSLBP).

**Methods:** A quasi-experimental study consisted of 30 subjects. The inclusion criteria was age 20-40 y, both genders, subjects with NSLBP since at least 3 months and 4-7 on Numerical Pain Rating Scale (NPRS). The exclusion criteria was neurological and respiratory disease, spine surgery, medication or condition affecting balance, regular practice of pilates or any specific exercise program in the last 6 months. The outcome measures were taken pre- and postintervention. They were SEBT (Star Excursion Balance Test) and NPRS. The exercise session composed of 4 exercises viz. The single leg stretch (level 1), the pelvic press (level 1), swimming (level 1), opposite arm and leg reach (bird dog) (level 1). Each set was performed with 10 reps.

**Results:** The p-value of pre and post treatment was significant.

Table.

| | | Pre Mean±SD | Post Mean±SD | P value | T value | Significance |
|---|---|---|---|---|---|---|
| | NPRS | 5.633±0.9643 | 4.433 ±0.9353 | < 0.0001 | 9.872 | Significant |
| SEBT | Anterior | 79.483±8.082 | 84.067 ±8.602 | 0.0377 | 2.127 | Significant |
| | Posterolateral | 53.367 ±11.031 | 58.4± 11.273 | <0.0001 | 11.850 | Significant |
| | Posteromedial | 47.967±8.181 | 52.867 ±8.089 | 0.0231 | 2.333 | Significant |

**Conclusion:** Pilates exercises immediately reduced the pain and improved dynamic postural control in young adults with NSLBP.

## P777
### RECOVERY OF QUALITY OF LIFE IS ASSOCIATED WITH LOWER MORTALITY 5 YEARS POSTFRACTURE: THE AUSTRALIAN ARM OF THE INTERNATIONAL COSTS AND UTILITIES RELATED TO OSTEOPOROTIC FRACTURES STUDY (AUSICUROS)

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**Objective:** To determine whether recovery of HRQoL 12-months postfracture is associated with lower 5-y all-cause mortality.
**Methods:** This prospective study included 524 older adults (mean age: 70.2 y; % female: 79.2) with a fracture (150 hip, 261 distal forearm, 61 vertebral, 52 humerus) recruited from 8 study centers across Australia. HRQoL was assessed using the EuroQoL questionnaire (EQ-5D-3L) at baseline (including recall of the patient's HRQoL prior to fracture), and at 4- and 12-months postfracture. Recovery of HRQoL was calculated as the difference between EQ-5D-3L utility scores at prefracture and 12 months and then dichotomized (a HRQoL change score >0 was categorized as 'recovered' and a score <0 was categorized as 'not recovered'. All-cause mortality data was ascertained from the Australian National Death Index. Linkage between AusICUROS participants and National Death Index data was undertaken using secure probabilistic linkage software. Overall survival was compared between the two HRQoL groups (recovered vs. not recovered) using a two-sided log-rank test. Cox proportional hazards models were used to assess the association between all-cause mortality within 5 y and HRQoL recovery (vs. nonrecovery). Analyses by fracture type was not undertaken due to insufficient sample size.
**Results:** Overall, 279 participants (53.2%) recovered to their prefracture HRQoL at 12-month follow-up. There were 70 deaths (13.4%) during the 5 y postfracture. Mortality rate was highest in hip fracture participants (24.7%), followed by vertebral (16.4%), humeral (13.5%) and distal forearm fracture participants (6.1%). After adjustment for age, sex, prefracture HRQoL, and fracture site, mortality risk was lower in participants who recovered their prefracture HRQoL at 12 months compared to those who did not (HR=0.56, 95%CI: 0.33-0.96, p=0.034).
**Conclusion:** This study provides evidence that HRQoL recovery postfracture is associated with improved 5-y survival in older adults. Our results suggest that current postfracture interventions known to improve HRQoL may also have the potential to prevent deaths in older adults after fracture.

## P778
### ASSOCIATION OF BONE TURNOVER MARKERS WITH TRABECULAR BONE SCORE AND BONE MINERAL DENSITY AMONG PRE- AND POSTMENOPAUSAL WOMEN: A STUDY FROM SRI LANKA

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**Objective:** Data on the association between bone turnover markers (BTMs) and BMD/trabecular bone score (TBS) are not available for Sri Lankans. This study evaluated the association of serum BTMs with BMD and TBS among pre- and postmenopausal women.

**Methods:** A descriptive cross-sectional study was conducted in Galle District, Southern Province, Sri Lanka. Community dwelling women aged 20-70 y (n=347) were recruited using multistage stratified random sampling technique. Menopausal status was defined as the presence of amenorrhea for more than 12 consecutive months due to natural causes. BMDs of hip (THBMD), femoral neck (FNBMD), lumbar spine (LSBMD) and total body (TBBMD) were measured by DXA (Hologic Discovery, Bedford, MA, USA). TBS was estimated by TBS iNsight® software. Serum crosslinked C-telopeptide of type I collagen (CTX; bone resorption marker) and procollagen type I N-propeptide (PINP; bone formation marker) were measured using ELISA. Partial correlation (adjusted for possible confounders) was used to assess the correlations.
**Results:** In premenopausal women, CTX showed significant negative correlations with LSBMD, TBBMD and TBS and PINP showed weak but significant negative correlation with LSBMD (Table). In postmenopausal women, CTX showed significant negative correlations with BMDs of all sites and TBS nevertheless, PINP did not show significant correlations with BMDs or TBS.

Table: Correlations of BTMs with BMD and TBS according to menopausal status.

| Variable | Premenopausal women (n=207) | | Postmenopausal women (n=140) | |
|---|---|---|---|---|
| | CTX (ng/mL) r (p) | PINP (pg/mL) r (p) | CTX (ng/mL) r (p) | PINP (pg/mL) r (p) |
| THBMD (g/cm$^2$) | -0.13 (0.06) | -0.09 (0.21) | -0.31 (<0.001)* | -0.03 (0.76) |
| FNBMD (g/cm$^2$) | -0.11 (0.11) | 0.03 (0.68) | -0.11 (0.028)* | 0.02 (0.80) |
| LSBMD (g/cm$^2$) | -0.24 (0.001)* | -0.14 (0.042)* | -0.28 (0.001)* | -0.01 (0.87) |
| TBBMD (g/cm$^2$) | -0.22 (0.001)* | -0.12 (0.10) | -0.34 (<0.001)* | -0.02 (0.79) |
| TBS | -0.21 (0.002)* | -0.04 (0.56) | -0.30 (<0.001)* | -0.12 (0.17) |

*Correlation was significant at 0.05 level

**Conclusion:** Bone resorption marker CTX has better association with BMDs and TBS in women regardless of menopausal status than bone formation marker, PINP. This may indicate the imbalance between bone resorption and formation in adult women even before the onset of menopause.

## P779
### ORAL CALCITRIOL USE, VERTEBRAL FRACTURES AND VASCULAR CALCIFICATIONS IN HEMODIALYSIS PATIENTS: RESULTS FROM VITIMIN K ITALIAN (VIKI) STUDY

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**Objective:** Chronic Kidney Disease patients are characterized by alterations in bone and vascular metabolism associated to adverse clinical outcomes such as fractures, cardiovascular events and mortality. Dysregulation of vitamin D hormonal system, in levels of calcium, phosphate, PTH, FGF23/Klotho are the main responsible of these changes. We want to evaluate if oral calcitriol use can play a protective role on fractures in hemodialysis (HD) patients.
**Methods:** We included 387 HD patients of the VIKI database, a multicenter cross-sectional study. Biomarkers measured: vitamin K, VKDPs, vitamin 25(OH) D, ALP, PTH, Ca, P. Spine radiograph performed to define the presence of vertebral fractures (VF) and vascular

calcification (VC). VF was indicated as >20% reduction of vertebral body height and VCs were quantified by measuring the length of calcium deposits along the arteries.

**Results:** 45.7% of patients were treated with oral calcitriol. No biochemical differences was observed between the treated and untreated patients. VFs were significantly lower in patients receiving oral calcitriol (48.6% vs. 61%, P=0.015), the presence of VCs was similar (aortic: 81.9% vs. 79.5% respectively, P=0.552; iliac: 52.0% and 59.5%, P=0.167). In a multivariable logistic regression analysis, after adjustment for all potential confounders, oral calcitriol was associated with a marked reduction (-40.2%) of the odds of fractures (OR: 0.598, 95%CI: 0.363-0.985, P=0.043).

**Conclusion:** We found a significant association between oral calcitriol use and lower VF rate in HD patients. Further prospective and interventional studies are needed to confirm these findings.
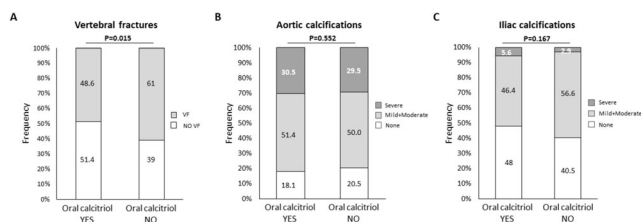


Figure. Frequency of vertebral fractures and vascular calcifications by oral calcitriol treatment (Yes/No). A. Rate of vertebral fractures. B. Rate and severity of aortic calcifications. C. Rate and severity of iliac calcifications.

**P780**

**THE EFFECTIVENESS OF FRAGILITY SCORE MEASURED BY RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS) FOR THE ASSESSMENT OF INCIDENT FRACTURE RISK**

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**Objective:** To evaluate the effectiveness of Fragility Score (FS) [1], measured by radiofrequency echographic multi spectrometry (REMS) technology, in identifying women with incident osteoporotic fractures within 5 y.

**Methods:** Caucasian women between 30-90 y were scanned with REMS and DXA at lumbar spine and/or femoral neck. During an up to 5-y follow-up, the occurrence of osteoporotic fractures was recorded. The ability of the FS to discriminate between patients with and without incident fragility fractures was subsequently evaluated and compared with the discriminatory ability of the T-score calculated with DXA and with REMS. In particular, the associations between lumbar spine FS and major osteoporotic fractures and between femoral neck FS and hip osteoporotic fractures were investigated.

**Results:** 583 couples of lumbar spine REMS and DXA scans and 524 couples of femoral neck scans were analysed. During the follow-up, 82 patients (14.1%) sustained a major osteoporotic fracture and 11 (2.1%) sustained a hip fracture. Comparing the areas under the curve (AUCs), the FS showed a statistically significant higher capability to discriminate between patients with/without fragility fractures with respect to T-scores (Fig.1): for lumbar spine, AUC was 0.80 for FS, 0.66 for DXA T-score and 0.70 for REMS T-score; for femoral neck, AUC was 0.84 for FS, 0.66 for DXA T-score and 0.69 for REMS T-score.

**Conclusion:** The Fragility Score, measured at reference anatomical sites by a nonionizing REMS scan, showed an ability to discriminate incident fractures at a higher rate than T-score values measured by DXA or REMS, representing an effective diagnostic tool for the early identification and treatment of bone fragility.**Reference:** 1. Pisani P et al. Measurement 2017;101:243.
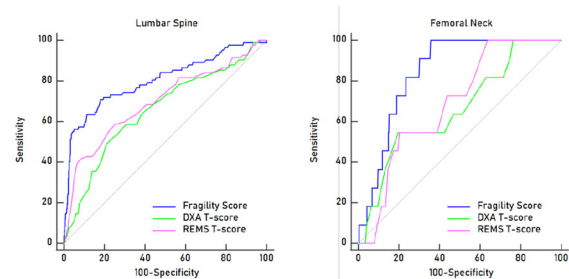


**Fig.1:** ROC curve analysis comparing the performance of Fragility Score, DXA T-score and REMS T-score in discriminating women with and without incident fragility fracture. In particular, the left graph shows the performance of parameters derived from lumbar spine acquisitions in identifying major osteoporotic fractures, whereas the right graph shows the performance of parameters derived from femoral neck acquisitions in identifying osteoporotic fractures at the hip.

**P781**

**THIRTY YEARS OF HIP FRACTURE IN AUSTRIA; IS THE WORST OVER?**

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**Objective:** Austria is among the countries with the highest hip fracture incidence worldwide, exceeded only by Sweden and Denmark (1). Nationwide hip fracture incidences over a period of 20 years (1989-2008) have shown an initial steep increase, followed by a levelling off during the last few years of observation (2). The purpose of the present study was to follow up on hip fracture incidences for another 10 y (2009-2018), and to analyze trends over the entire period of 30 y.

**Methods:** ICD-10 code classes S72.0, S72.1, and S72.2 were applied. For the entire population ≥50 y of age, all data were retrieved from the Statistics Austria database and its hospital discharge register. Annual absolute numbers, crude and age-standardized incidences were stratified by sex and 5-y age intervals, and calculated by using a correction factor for multiple registrations.

**Results:** Annual discharges due to hip fracture increased between 1989 (n=9572) and 2006 (n=15,941), followed by a sideways movement until 2018 (Fig.1). In women, numbers rose from 7528 (1989) to a maximum of 11,811 (2006), to drop to 11,105 in 2018. In contrast, number of hip fractures in men increased steadily from 2044 (1989) to a maximum of 4958 in 2018. Age-standardized incidence rates in women peaked at 689/100,000 (2003), and in men at 294/100,000 (2006). Thereafter, they decreased in women to 517/100,000 (2018), and to 242/100,000 in men (Fig.2). For both sexes, an incidence rate ratio (IRR) of 0.984 (95%CI 0.981-0.987) was observed, corresponding to an average annual decrease in age-standardized hip fracture incidence of 1.6% (1.3-1.9%) from 2009-2018.

## Fig. 1 — Annual hospital discharges due to hip fracture (1989-2018)



Fig. 1 Annual hospital discharges due to hip fracture (1989-2018)

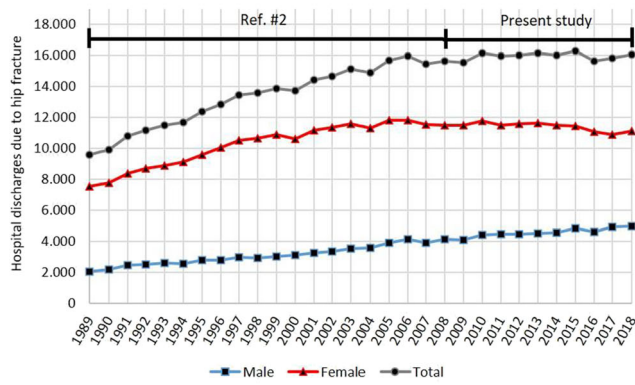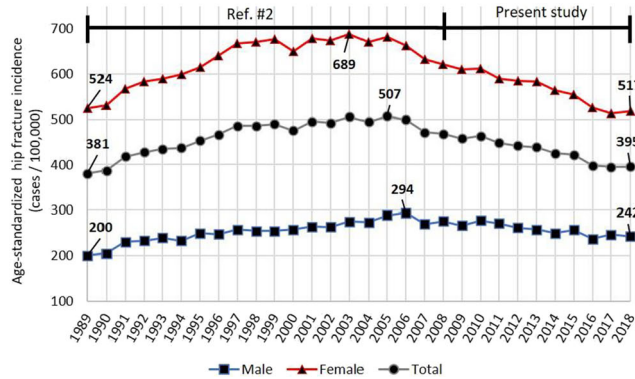## Fig. 2 — Age-standardized hip fracture incidence (1989-2018)



Fig. 2 Age-standardized hip fracture incidence (1989-2018)

**Conclusion:** While absolute numbers of hip fracture in women showed a slight decrease during the last 10 y of observation, numbers in men continued to increase since 1989, suggesting that at least in men the worst is not yet over. Age-standardized incidences nevertheless decreased in both men and women, and this may be interpreted as a trend into the right direction.

**References:**

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**P782**

# UNUSUAL BUT COMMON COMPLICATION OF OSTEOPOROSIS TREATMENT: A CASE SERIES OF BRONJ

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**Objective:** Bisphosphonates are commonly used in Malaysia especially in Borneo's tertiary hospital due to its easy availability and is cheap. Its act as bone resorption inhibitors in healthy individuals. Usage of bisphosphonate has risen to 73% in Malaysia compared to other mode of therapy, especially in postmenopausal group of women more than 50 years old. It has been known for subtrochanteric pathological fractures with its prolonged use. However, there has been increased reports of Bisphosphonate Related Osteonecrosis of Jaw (BRONJ) in the last decade. This case series highlights three patients with history of monthly bisphosphonate use for treatment of osteoporosis and pathological fracture, resulting in BRONJ with a very unfavorable outcome.

**Case report:** Initial presentation and chief complaints varied among the patients, from a referral of osteoporotic patient on bisphosphonate for BMD test to a patient on bisphosphonate treatment for pathological femur fracture. The other was referred from orthopaedic clinic to dental clinic for evaluation of loose tooth. She had an extraction of right mandibular molar and noticed poor healing of socket without pain. Although the presenting scenarios were different, all the patients were well on the path of osteonecrosis of the jaw with poor outcomes.

**Conclusion:** As BRONJ is a fairly new entity in medical literature, its incidence is low at 0.01-0.04% with oral bisphosphonates. BRONJ is thought to be caused by trauma to dentoalveolar structures that have a limited capacity for bone healing due to greater bone turnover in jaw and this explains why there are greater bisphosphonate deposition in the jaw vs. extra gnathic sites. The mechanism of injury is different for atypical fracture secondary to prolonged use of bisphosphonate as it has been suggested that prolonged suppression of bone turnover under long term administration may impair ability of bone to remodel. This leads to accumulation of microdamage and compromised bone strength ultimately progressing to a stress fracture. Bisphosphonates are a crucial weapon in our orthopaedic armory. Therefore, we should stress the importance of obtaining comprehensive oral/dental examination, prophylaxis, and treatment prior to starting bisphosphonate treatment in our clinic.
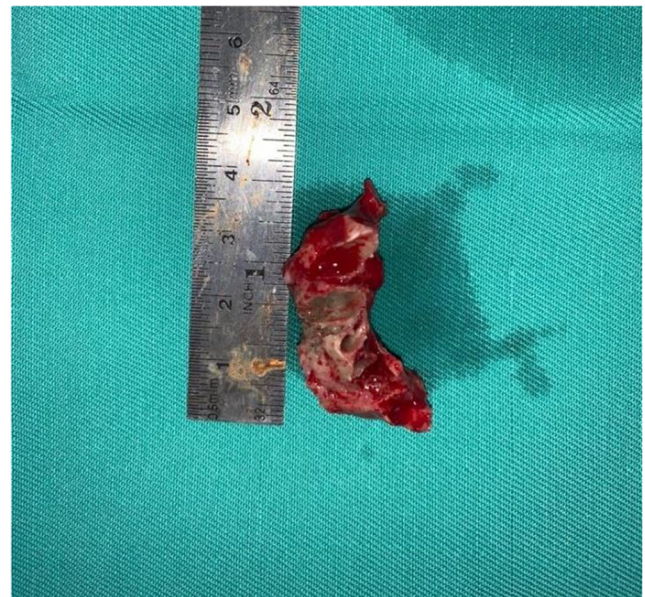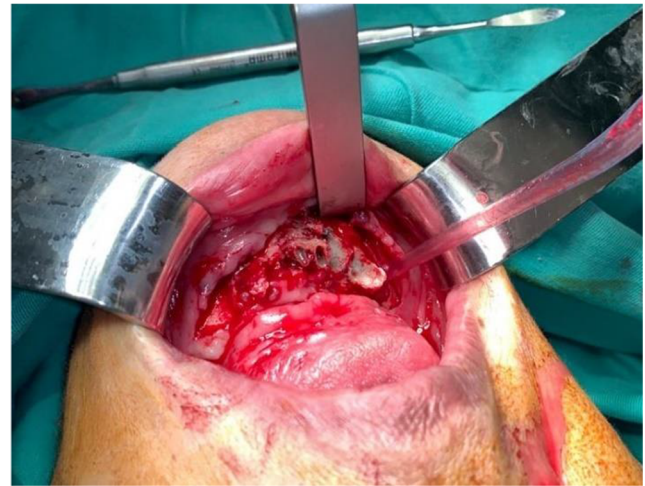
## P783

### SYMPTOMS OF MUSCULOSKELETAL DISORDERS AND ITS ASSOCIATION WITH PREVIOUS EXERCISE HABITS IN POST COVID-19 PATIENTS

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**Objective:** COVID-19 is a pandemic disease affecting a huge number of people all over the world. Regardless of the variety of symptoms and signs, recovered post covid patients complained of musculoskeletal symptoms which have been ignored since its first identification. This study aimed to find out the different types of the musculoskeletal disorder symptoms experienced by post COVID-19 patients and to explore the association among those symptoms and previous exercise habits before getting infected with COVID-19.

**Methods:** A descriptive type of cross-sectional study was conducted having 100 patients. Participants in study were selected using a purposive sampling technique. Inclusion criteria: patients with a history of positive COVID-19 test and received medical management prior to 4 weeks; patients complained of musculoskeletal symptoms; age 30-60 y. Exclusion criteria: positive COVID-19 test during study; age <30 and >60. Data collection was done by using a structured questionnaire comprised of demographic information, musculoskeletal related symptoms and physical activity related information using face to face interview. Statistical analysis was done using descriptive statistics by frequency and percentages and association were made by using the chi-square test and Karl Pearsons test.

**Results:** Among the 100 participants, 69 were male and 31 were female with a mean age of 48.24 y. In the location of pain status, 63 complained of pain in the head and neck, 18 in the upper limb, 45 in the lower limb and 36 in the back. Besides, 80% of patients complained of global weakness. A significant association was found between exercise before COVID and severity of post COVID musculoskeletal complaints ($p<0.001$)

**Conclusion:** Musculoskeletal symptoms are features of post COVID-19 syndrome and it is mainly believed to arise from the over-inflammatory response due to marked elevation in creatine kinase and lactate dehydrogenase levels. The patients who were regularly performing exercise before COVID-19 infection developed less musculoskeletal complaints compare to other sedentary post COVID patients.

## P784

### CASPASE-1 INHIBITION AFFECTS CD36 EXPRESSION AND RANKL/OPG RATIO IN DIFFERENTIATING CHONDROCYTES

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**Objective:** Caspases are cysteine proteases known particularly from apoptosis and inflammation but with emerging essential functions also beyond these processes, including chondrogenesis. General caspase inhibition in differentiating chondrocytes pointed to modulation of the fatty acid translocase Cd36. As a key candidate responsible for the effect appears caspase-1 due to its roles in inflammation but also lipid metabolism. Both molecules are considered to be involved in inflammation-related pathologies including osteoarthritis. Notably, engagement of fatty acids in bone homeostasis has been associated with the expression of Rankl and Opg, components of the master regulatory system in bone remodelling being present also in chondroblasts. The aim of this study was to challenge chondrogenic micromass cultures by a selective caspase-1 inhibitor to evaluate any modulations in Cd36 expression. Additionally, the expression of Rankl and Opg was followed.

**Methods:** The well established in vitro model of chondrogenesis, derived from mouse embryonic front limbs, was used for the research purpose. A pharmacological inhibitor of caspase-1 (Z-WEHD-FMK) was added to the experimental group which was cultured for 7 d in parallel with control micromasses. Samples were harvested, RNA isolated, cDNA prepared and expression levels of Cd36, Rankl, and Opg quantified by qPCR.

**Results:** In the Z-WEHD-FMK treated group, expression of Cd36 was significantly upregulated as well as expression of Opg, whereas Rankl was downregulated. Immunocytofluorescence confirmed these modulations on protein level. To determine if there is any association between Cd36 and Rankl/Opg expressions, Cd36 was silenced in micromass cultures. Cd36 silencing caused increased expression of Rankl and decreased Opg expression, which are opposing trends to caspase-1 inhibition (and Cd36 upregulation).

**Conclusion:** The presented results demonstrate novel functions of caspase-1 in chondrocyte differentiation and pathways connected with lipid metabolism through fatty acid transporter Cd36. The detected effect of Cd36 on the Rankl/Opg ratio is important in relation to bone remodelling and metabolism as well as pathologies such as osteoarthritis.

## P785

### PARTICIPATION OF NEUTROPHIL EXTRACELLULAR TRAPS IN AUTOIMMUNE RHEUMATIC DISEASES

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Neutrophil extracellular traps (NETs) are specific extracellular netlike structures which consist of interlaced nuclear chromatine strands decorated with various molecules of nuclear and cytoplasmatic origin, primarily histones, neutrophilic elastase, cathepsin G, azurocidin, myeloperoxidase, and peptidylarginine deiminase 4 (PAD4). NETs assembling process is now commonly referred as NETosis. It can proceed either with cell death, or in so called vital form, when the cells not only can be viable, but also retain some effector functions. Generation of NETs can be initiated by microorganisms, bacterial wall constituents, antibodies, cytokines, as well as phorbol esthers in vitro. Principal role in NETosis performance is attributed to ROS, especially NADPH oxidase and mitochondrial ROS generation pathways. PAD4 is another critical NETosis enzyme, essential for NET formation. Abundant citrullination of NETs constituents is a mandatory property, which means appearance of citrullinated neoepitopes accessible to immune system as a result of NETosis. NET formation is therefore a phenomenon of particular interest in the search for initiating antigen of anticitrulline autoantibodies in rheumatoid arthritis. Progression of the disease has been demonstrated to be associated with NET markers accumulation. Furthermore, fibroblasts from RA model were revealed to ingest NETs and stimulate production of antibodies to citrullinated histones. A number of NET-associated molecules, including modified dsDNA and histones, are known to be leading autoantigens in systemic lupus erythematosus. Preactivated low-density neutrophils from SLE patients can easier reveal NETosis and outthrow more autoantigens. Multiple studies regarding role of NETs in rheumatoid arthritis, systemic lupus erythematosus, vasculitides, gout, and thrombotic conditions, are under performance, and the information is continuously updated.

## P786

### BARRIERS AND EXPECTATIONS FOR PATIENTS IN POSTOSTEOPOROTIC FRACTURES CARE IN FRANCE: THE EFFEL STUDY

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**Objective:** To quantify the relative importance of barriers to better secondary prevention of osteoporotic fractures and of care expectations expressed by patients with osteoporotic fractures in France. The aim of this poster is to show how economic analysis techniques can be used to quantify the relative value that the patient attaches to the difficulties and facilities he/she has experienced in implementing a personal approach to secondary prevention of osteoporosis.

**Methods:** A qualitative exploration of potential barriers to care and expectations was undertaken through a systematic literature review and in-depth patients interviews. A list of 21 barriers and 21 expectations were identified. These were presented to 324 subjects with osteoporotic fracture, identified in a representative sample of the French population, in the form of best-worst scaling questionnaires. Patients rated the relative importance of the attributes and arithmetic mean importance scores were calculated and ranked. A Bayesian hierarchical model was also performed in order to generate a relative importance score. Latent class analysis was performed to identify potential subgroups of patients with different response profiles.

**Results:** Seven barriers were rated as the most important, relating to awareness of osteoporosis and coordination of care. The highest-ranked barrier, "my fracture is not related to osteoporosis", was significantly more important than all the others (mean importance score: 0.45 [95%CI: 0.33-0.56]. A similar ranking of attributes was obtained with both the arithmetic and the Bayesian approach. For expectations, no clear hierarchy of attributes was identified. Latent class analysis discriminated three classes of respondents with significant differences in response profiles (the educated environmentalists, the unaware, and the victims of the system).

**Conclusion:** The use of quantitative and qualitative approaches in combination provides a better understanding of research issues than either approach alone. Better quality of care of osteoporosis and effective secondary fracture prevention will require improvements in patient education, training of healthcare professionals and coordination of care. Further research for the sequential valuation of the patient's experience in the delivery of secondary osteoporosis prevention from the patients' perspective is needed.

## P787
## METABOLIC OSTEOARTHRITIS AND LEPTIN: RELATIONSHIPS IN PATIENTS WITH OBESITY THERAPY

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**Objective:** To evaluate the relationships between leptin and the clinical manifestations of OA and the components of the MS in the context of obesity therapy.

**Methods:** 50 female (mean age $56.5\pm5.8$ y) with Kellgren-Lawrence stage II-III knee OA and obesity (BMI >30 kg/m²). 62% of pts were diagnosed MS. Pts were divided into 2 groups. Group 1 (n=25) took orlistat 120 mg 3 times/d for 6 months. Group 2 (n=25) had a hypocaloric diet and exercise for 6 months. The clinical course of OA was determined by the WOMAC and VAS. All pts underwent a laboratory examination: a biochemical blood test, leptin was determined by PCR.

**Results:** High leptin levels (p<0.01) were determined in pts with more than 3 MS components. The correlation analysis showed positive correlations between leptin and WOMAC pain (r=0.36, p=0.02), and VAS pain (r=0.51, p=0.01), and weight (r=0.56, p<0.01), and waist circumference (r=0.38, p<0.01). Group 1 had a significant decrease of body weight by 10.07% (p<0.05), the indicators of the WOMAC index improved (p<0.05) after 6 months. Group 2 had a not significant decrease of body weight by 0.84% (p>0.05), and worse indicators of clinical manifestations of OA. 24% of pts from group 1 showed a decrease in the number of MS components. Group 1 had a significant decrease of the level of leptin (p=0.05). We found positive correlations between a decrease of leptin and a decrease of the total WOMAC (p=0.01). Pts with a decrease in the number of MS components had a significantly lower leptin levels (p=0.01).

**Conclusion:** Leptin is a predictor of a worse course of the metabolic OA. We observed a decrease in the level of leptin, in the number of MS components, and an improvement in the clinical manifestations of OA against the background of a significant decrease in body weight. Thus, the treatment of obesity in pts with the metabolic OA and other interventions aimed at reducing the level of leptin may contribute to reducing the progression of knee OA.

## P788
## ADRENAL CUSHING SYNDROME AND BILATERAL TUMOURS: BONE STATUS

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**Objective:** A challenging situation in adrenal tumours field is related to the presence of bilateral masses of similar dimensions with mild autonomous cortisol secretion and cardiometabolic, respective high osteoporotic fracture risk complications. The decision of adrenalectomy is delicate because adrenal arteries catheterise is not available in many centres while bilateral adrenalectomy, despite being feasible one time during laparoscopic approach due to recent progress in surgery, complicates the clinical picture with chronic adrenal insufficiency requiring lifelong substitution (1-5).

**Case report:** This is a 64-year-old female, who was accidentally detected in 2017 with bilateral adrenal tumours starting from a routine abdominal ultrasound. She has a history of controlled arterial hypertension, hyperlipemia, and a surgical removal of a mammary benign fibroadenoma a decade ago. The initial computed tomography showed a right adrenal tumour of 1.4x2 cm, and a left adrenal tumour of 2.2x1.6 cm. At that moment, a central DXA scan was also performed and a lumbar T-score of -2.5SD confirmed osteoporosis; she was offered denosumab every 6 months, and 3 y later she achieved a lumbar T-score of -2.1 SD (without prevalent fragility fractures). The adrenal hormonal profile was stationary: morning plasma cortisol of 19 μg/dL (normal: 6-21 μg/dL) and after 1 mg dexamethasone suppression test of 2.43 μg/dL (normal <1.8 μg/dL), morning plasma ACTH of 4.8 pg/mL (normal: 6-66 pg/mL), in addition to normal glucose profile, also 25-hydroxyvitamin D (under daily 1000 UI), and suppressed bone turnover markers. Adrenalectomy was postponed and she continued denosumab, In 2020, MRI showed a right adrenal tumour of 1.8x1 cm, and a left adrenal tumour of 2.2x1.8 cm and an additional tumour at the level of the same gland of 1 cm. Low-normal ACTH was of 7 pg/mL (normal: 6-66 pg/mL) in association with increased morning plasma cortisol of 744 nmol/L (normal: 66-327) and stationary BMD-DXA profile. Left adrenalectomy was recommended, but the patient refused it.

**Conclusion:** This case highlights the fact that bone loss might be expected in bilateral adenomas with potential cortisol overexpression, even a clear correlation between endocrine features, adrenal imaging and DXA, as gold standard in menopausal women for this particular topic, is difficult to establish.

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## P789

### REHABILITATION PROGRAM IN A YOUNG PATIENT WITH PRIMARY OSTEOPOROSIS AND SECONDARY ASEPTIC NECROSIS OF THE FEMORAL HEAD

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**Objective:** We present the case of a 32 years old woman that started having severe pain, stiffness in her left hip and disability in gait 3 years after she suffered a Garden III left femoral fracture, and was diagnosed with severe primary osteoporosis.

**Methods:** Physical examination showed shortening of the left limb by 1.5 cm, severe pain and limited range of movement in left hip joint. Weakness of the hip muscles was noted and the ability to stand and balance on left lower limb was diminished. MRI of left femoral hip joint revealed loss of sphericity, contour irregularities and flattening of the left femoral head, highlighting a subchondral area in hyposignal T1, T2 and STIR, located superior antero-externally, with dimensions of 3.4/1.5 cm, surrounded by lysereum in hyposignal T1, T2, hyersignal STIR and diffuse bone edema. BMD was measured by DXA and showed: L1–L4 BMD: 0.764 g/cm$^2$; T-score −3.2; Z-score −3. The laboratory tests revealed no abnormality.

Our patient was diagnosed with stage 2 secondary aseptic necrosis of the femoral head. The patient refused pharmacological treatment for osteoporosis, she received analgesics and followed a 6 months complex rehabilitation program: posture (activity modification), physical therapy (thermotherapy; electrotherapy TENS, laser, NMES), classic and special massage (Cyriax), kinetic and occupational therapy. We assessed the pain and functional status before and after the treatment using the visual analogue scale (VAS), 6-min walk test, Timed Up and Go test, Harris Hip Score and SF-36 scale, before and after the rehabilitation program.

**Results** VAS score was 8 before and 4 after the rehabilitation program; 6-min walk was 170 m before and 260 m after; Timed Up and Go=39 s before and 21 s after; Harris Hip Score was 34 before rehabilitation and 48 after, and the SF 36 score was 36 before rehabilitation and 50 after the rehabilitation program.

**Conclusion:** Taking into account that trauma is the most common cause of NACF, young patients should be monitored frequently, especially if they suffer from other conditions such as osteoporosis.

## P790

### SPONDYLODISCITIS ASSOCIATED WITH LUMBAR DISC HERNIATION IN A PATIENT WITH A HISTORY OF PENILE CANCER

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**Objective:** We present the case of a 75-year-old man with penile cancer history (12 y ago), who had several episodes of low back pain (LBP), in the last year, that improved at rest, and had in the last 3 weeks an intense LBP that severely affected his functionality.

**Methods:** The physical examination showed dorsal kyphosis, lumbar scoliosis, paravertebral muscle contracture, pain and increased sensitivity in the lumbar spine and paravertebral muscles, significant decrease in range of movement in the lumbar spine. Laboratory assessments revealed no abnormality, other than the value of ESR that was 37 mm/h, C-reactive protein value of 19 mg/L. Urine cultures were positive for E. coli. MRI of the penis, inguinal and pelvic area showed no abnormalities. Spine MRI with contrast administration revealed median and paramedian L4-L5 disc herniation with imprint on the dura mater; T2/STIR hyperintense and T1 hypointense signal L4-L5 intervertebral disc and adjacent vertebral bodies, extended high gadophilia in L4 and L5 vertebral bodies, L4-L5 disc and anterior and posterior vertebral ligaments; L3-L4 and L5-S1 disc protrusions. As the patient had difficulty urinating sometimes, he was referred to a urologist who found that the patient was suffering from a mild urethral stricture, for which he intervened noninvasively by gradually enlarging the urinary meatus during several treatment sessions.

**Results:** 6 months after the end of the urological treatment, antibiotic therapy for 12 weeks, bed rest and immobilization for 2 weeks, and then ambulation using a brace and physical therapy, a new MRI of the spine was performed and found a marked improvement of the previous imaging aspect, with a significant reduction of contrast enhancement, aspects correlated with the significant improvement of the patient's pain and functional status, assessed by visual analogue scale for pain and Short Form-36 Physical Functioning scale.

**Conclusion:** In this case the urethral stricture after the penile cancer removal surgery was incriminated in developing spondylodiscitis but sometimes an underlying malignancy can represent a risk factor as well. Surveillance after a penile cancer diagnosis is life-long because these patients have the potential to develop recurrent disease or a new primary tumor.

## P791

### RELATIONSHIPS BETWEEN MTOR EXPRESSION AND METABOLIC OSTEOARTHRITIS

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**Objective:** To evaluate the relationships between mTOR expression and the clinical manifestations of OA in pts with different BMI.

**Methods:** The study included 73 females with Kellgren-Lawrence stage II-III knee OA. The pts were divided into 2 groups: group 1 (n=50) with obesity (BMI >30 kg/m$^2$) and group 2 (n=23) with normal or increased body weight (BMI <30 kg/m$^2$). The average age of pts with obesity is 56.5±5.87 y, without obesity 58.7±5.43 y. Clinical manifestations were evaluated by a WOMAC. RNA was isolated from the pts' blood samples, which was used to determine the expression of mTOR.

**Results:** OA develops at an earlier age in obese pts, than in nonobese pts (p<0.001). Group 1 had a high BMI >30 kg/m$^2$ at the onset of OA. Obese pts had more severe knee OA is significantly more often detected: stage III was determined in 10% of obese pts and in 4.35% without obesity (p<0.001). Significantly higher values of the WOMAC index pain, stiffness, joint functional failure, and total WOMAC were observed in obese pts (p<0.05). Obese pts had higher VAS pain (p<0.05) compared to pts with a lower BMI. Obese pts had a higher mTOR expression (p<0.05), compared to non-obese pts. High mTOR expression was associated with VAS knee pain (r=0.78; p<0.05) and WOMAC pain (r=0.89; p<0.05) in obese pts.

Table. Correlation of mTOR.

| Parameters | mTOR (1 group, n=50) | mTOR (2 group, n=23) |
|---|---|---|
| Body weight | p>0.05 | p>0.05 |
| Pain VAS | r=0.78; p<0.05 | p=0.07; r=0.45 |
| Pain WOMAC | r=0.89; p<0.05 | p > 0.05 |
| Total WOMAC | p > 0.05 | p > 0.05 |

**Conclusion:** Our study showed that pts with obesity and knee OA have higher rates of mTOR expression, compared to pts with normal body weight. High mTOR expression correlates with the severity of knee pain in obese pts. Thus, the evaluation of mTOR expression in obese pts and knee OA plays an important role in predicting the severity of clinical manifestations of OA, and may influence the choice of personalized therapy tactics for such pts.

## P792
## EPIDEMIOLOGY AND ECONOMIC BURDEN OF FRAGILITY FRACTURES IN AUSTRIA

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**Objective:** Fragility fractures are frequently associated with long hospital stays, loss of independence and increased need for care in the elderly, with consequences often leading to premature death. The aim of this study was to estimate the number of fragility fractures and associated healthcare costs in Austria in 2018.

**Methods:** The number of in-patients with relevant ICD-10 diagnoses in all Austrian public hospitals was derived from discharge documentation covering all public hospitals in Austria; out-patient cases were estimated from trauma hospital data. Fractures resulting from falls from standing height in patients aged [3]50 years were used as a proxy for fragility fractures. The direct costs of these cases were calculated using the average cost of the corresponding in-patient hospital stay and the average cost for the out-patient stay. This study was approved by the ethics committee of the medical university of Vienna.

**Results:** The estimated number of fragility fractures for 2018 was 92,835 cases, corresponding to a prevalence of 2600/100,000 inhabitants aged ≥50 y. A constant increase in the proportion of fragility fractures among all fractures was observed with increasing age in both, men and women (Figure). These fractures amounted to direct costs of >157 million €.

**Conclusion:** Fragility fractures are a frequent and costly event in Austria. Due to the ageing of the population, the number of fragility fractures and their associated costs are expected to increase even further.

**Disclosures:** Financial support: Amgen GmbH, Vienna, Austria. MHe has received consulting fees from Amgen outside scope of the present work and holds Amgen equity. JG is scientific advisor, cofounder, and shareholder of TAmiRNA GmbH and Evercyte GmbH.



Percentage of fragility fractures among all fractures, all ages
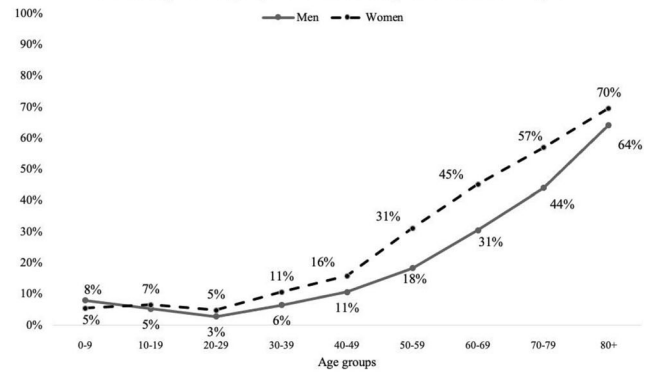


Fragility fracture cases by fracture site, age ≥50 years
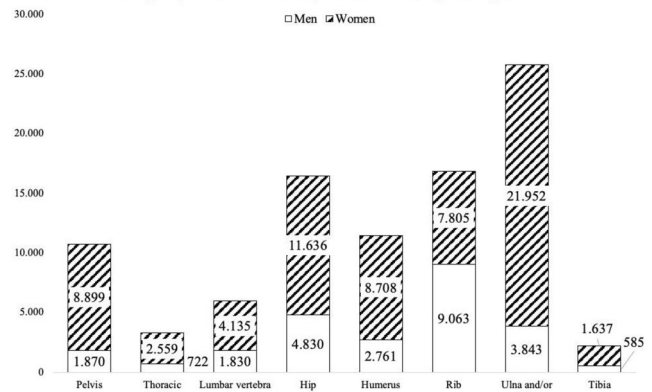
## P793
## PATIENTS' CHARACTERISTICS RELATED TO BONE MINERAL DENSITY EVOLUTION AT DENOSUMAB DISCONTINUATION: THE REOLAUS BONE PROJECT

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**Objective:** At denosumab discontinuation (DD) a relay by bisphosphonates (BPs) is needed to prevent the loss of the BMD gained under denosumab, and reduce the risk of spontaneous vertebral fractures. This study aimed to compare patients loosing BMD after DD and those with stable values.

**Methods:** Patients who received >2 injections and with a follow-up >1 y after DD at Lausanne University Hospital were included. BMD in T-scores was measured at DD, and 1 and 2 years after. BTMs were measured regularly, and expressed in% of the upper limit of the norm for premenopausal women. Losers (BMD loss >0.2 DS at lumbar spine (LS)) were compared to Non-losers.

**Results:** 161 postmenopausal women stopped denosumab after 8.0±2.9 injections: age 65.8±9.5 y, BMI 23.3±3.5, 47.8% had previous fractures, 19.0% were exposed to anti-aromatase. 38.5% received BPs before denosumab and 94.4% after DD. During the first year after DD patients lost LS BMD (mean ΔT-score: -0.25±0.39 SD), while it stabilized on the second year (ΔT-score 0.03±0.41 SD). During the first year after DD, 54.3% of patients were defined as Losers at LS (mean ΔT-score: -0.50

±0.24 SD), while 45.7% were Non-losers (ΔT-score 0.05±0.30 SD). Losers had a longer denosumab treatment, 9.08±2.55 vs. 7.55±2.60 injections (p<0.01), and shorter BPs treatment before it (40.5±22.6 vs. 65.9±50.6 months, p=0.05). During the first year, β-CrossLaps (CTX) were higher in Losers vs. Non-losers (AUC: 80.2±41.4% vs. 57.9 ±31.1%, p<0.01; highest reached value: 119.7±55.7% vs. 93.5±52.3%, p<0.01), and negatively correlated with LS BMD evolution (p<0.01). More Losers needed ≥3 zoledronate perfusions to control the rebound (41% vs. 10% of Non-losers; p<0.01). We obtained similar results on the whole 2 y of follow-up.

**Conclusion:** Shorter BPs treatment before denosumab, longer denosumab treatment, and higher post-denosumab CTX levels predict a greater loss of BMD on the two years following denosumab discontinuation.

## P794

### SEASONAL DIFFERENCES IN VITAMIN D LEVELS IN MEXICAN CHILDREN AND ADOLESCENTS

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**Objective:** Seasonal serum vitamin D (VD) level variability is a relatively well-described phenomenon. This means that for people living in greater latitudes, VD levels during summer tend to be higher than during winter. This phenomenon impacts VD deficiency reported in diverse populations. In contrast, seasonal variation tends to be milder or even nonexistent in populations located closer to the equator, where it is generally assumed that sun exposure is sufficient to prevent this deficiency. In Mexico, VD deficiency prevalence described in children goes from 10% to 20%. However, no seasonal variation has been reported. This study aimed to establish the seasonal differences in VD levels in Mexican 5-20 y.

**Methods:** Cross-sectional study, in a subsample of healthy subjects aged 5-20 y, from schools in Mexico City. The included subjects were evaluated during the period from fall 2016 to winter 2017. Subjects that fulfilled inclusion criteria were scheduled for assessment including pediatric, nutritional assessment and blood samples. Serum concentrations of vitamin D were measured through chemiluminescence assay by using the Liaison 25-hydroxyvitamin D total assay. We used descriptive statistics for demographic data. Then we looked for differences between groups by student T-test adjusted for multiple comparisons. We also explored the association of other variables like age and gender with the VD levels.

**Results:** We studied 816 subjects. The VD <20 mg/dl frequency was 42% (n=442). According with their BMI category 66% of the subjects had normal weight, 17% overweight and 13% obesity. The mean VD levels were lower during winter 2017 (17.04±5.1 mg/dL) in comparison with the other seasons (p<0.05). The risk of VD levels <20 ng/mL during winter in comparison with the other seasons was 2.9 (95%CI 2.2 to 3.9, P<0.001). This risk was similar in the multiple logistic model (β=2.8, 95%CI 2.05 to 3.8, P<0.001), adjusted for other variables as age, sex, BMI Z-score, milk consumption, physical activity and sedentarism.

**Conclusion:** In Mexican children the VD deficiency was 42%, there was a lower level of VD during winter in comparison with the other season, other risk factor associated was age, sex (female) and higher BMI.
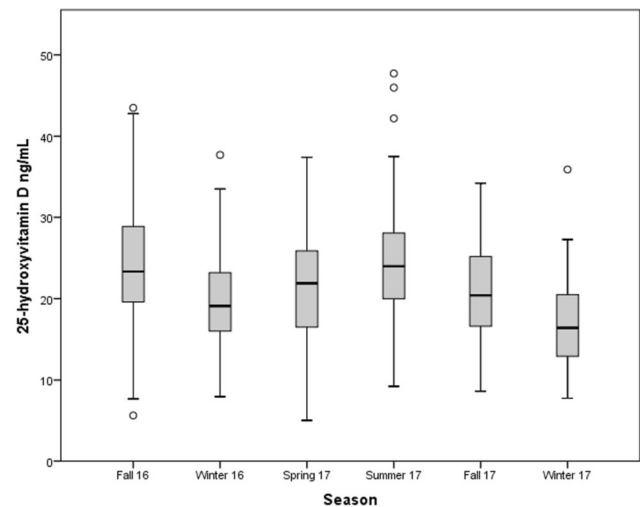


Figure 1. Box plot of seasonal variation in serum 25-hydroxyvitamin D (25OHD) level. The mean VD level during winter17 was significantly lower than that during summer spring and fall 2017.

## P795

### 68 GA-DOTATATE FOR TUMOR LOCALIZATION IN TUMOR-INDUCED OSTEOMALACIA

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**Objective:** Tumor-induced Osteomalacia (TIO), whose surgical resection is curative, represents a diagnostic challenge. Anatomical identification is generally not viable both for conventional methods and for traditional metabolic markers such as FDG PET. Therefore, we explore the utility of 68Ga DOTATATE positron emission tomography (PET)/computed tomography (CT) for localization of TIO.

**Methods:** Between December 2019 and March 2021, PET CT studies with 68Ga DOTATATE were performed in 5 TIO patients aged between 42-67 y who had several previous inconclusive conventional morphometabolic studies.

**Results:** In all patients the presence of a nodular soft tissue lesion was detected with intense avidity for uptake by the radiotracer, obtaining SUV max values between 8.3-19.8. These lesions were located in the head and neck (n=3) and in the appendicular system (n=2). Four (80%) of the lesions presented bone involvement of the adjacent structures and all with the uncharacteristic enhancement of the intravenous contrast. At the time of this work, 2 of the 5 patients underwent surgery, both presenting histological confirmation of the resected lesion.

**Conclusion:** As previously described in the literature, according to our series of cases, 68Ga DOTATATE could be the tool of choice for the

detection and topographic localization of mesenchymal tumors producing TIO. This new possibility brings hope to patients and families with this condition that causes a catastrophic impact on quality of life.

**Disclosure:** This study was funded by Ultragenyx as an Investigator Sponsored Trial.
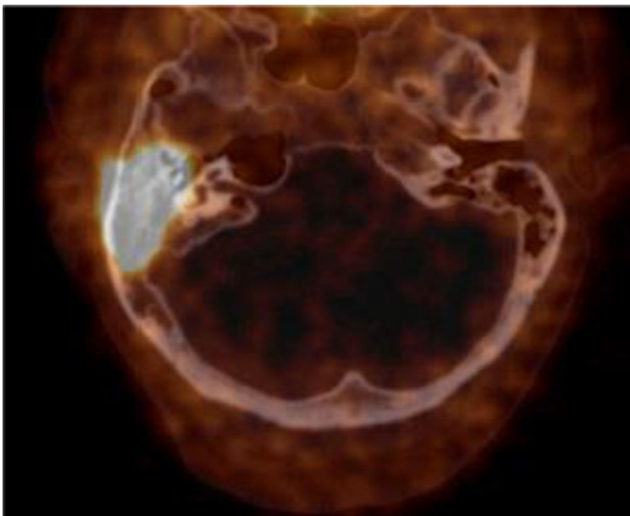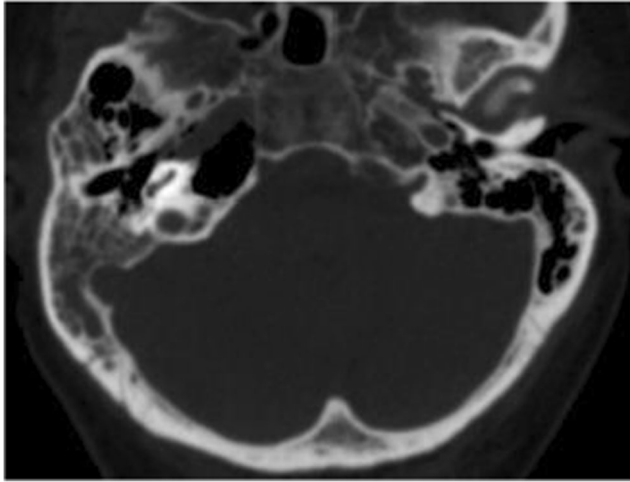




Figure 1. Mastoid cells on the right side without the corresponding pneumatization, showing occupancy by tissue of intermediate hypercaptant density that reaches SUV max 9.4.

## P796

### DIFFERENCES BETWEEN LATERAL AND ANTERIOR-POSTERIOR DEVELOPMENT OF THE HUMAN FIBULA AS A FUNCTION OF ACTIVITY LEVEL AND USE OF THE FOOT: A CROSS-SECTIONAL STUDY

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**Objective:** To evaluate the lateral (L) and anterior-posterior (AP) structural stiffness of the fibula in men subjected to different regimes of physical activity with different use of the foot.

**Methods:** Crude or cortical-area adjusted cross-sectional moments of inertia for L (LMI) and AP bending (APMI) and the corresponding Bone Strength Indices (LBSI, APBSI) of the whole fibulae (pQCT, 18 scans/bone at 5% bone length increments) and the maximal dynamometric force of foot rotation/eversion and one-leg jump (Ff, Fj) were determined in groups of 18-30 y healthy males who were untrained sedentary (SC, 15), moderately active (AC, 15), runners (Run, 15), soccer players (Soc, 30) and rugby players (Rug, 15), and in 10 males with spinal cord injury (SCI) and 9 anthropometrically-paired, active controls (sciC).

**Results:** Along a wide range of bone sites, all LMI and LBSI values were significantly higher in Rug and Soc and lower in Run and SC than in AC (BSI: +412%, +12%, -18%, -24%). All APMI and APBSI values were significantly higher in Rug, similar in Run and lower in SC compared with AC (BSI: +47%, +14%, +1%(ns), -9%). The LMI/APMI ratio ('shape index') increased in the order: SC -32% < Run -28% < Soc -7% < Rug +3% and was lower in SCI than in sciC (-25%, $p<0.01$). Both LMI and LBSI correlated more closely with Ff than with Fj ($p<0.001$, $p<0.05$), with Ff increasing in the order SC<Run<Soc<Rug.

**Conclusion:** The progressive values of the L-related (not AP-related) indicators and shape index suggest that the development of fibula stiffening was stimulated in Soc and Rug (which train foot rotation/eversion) but strikingly unaffected or even impaired in Run (which do not) with respect to AC, in consonance with results in SC and SCI and with the lower-left shift of their data in the correlation graphs with Ff. This foot-related behavior of the fibula associated with specific muscle strength points out the high relevance of directionality in the mechanical control of bone structure.

## P797

### OSTEOPOROSIS IN MIDDLE-AGED WOMEN: WHAT IS THE IMPACT OF MULTIMORBIDITY AND MEDICATION USE? A CROSS-SECTIONAL POPULATION-BASED STUDY

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**Objective:** Osteoporosis is a multifactorial disease influenced by many clinical factors. Some of these factors are nonmodifiable, while others can be avoided, ameliorated and prevented. From the perspective of the middle-aged women and their physician, this is of importance since longevity and aging process is associated to chronic conditions, medication use and multimorbidity that may affect bone health. Many of these chronic diseases may affect women during the menopause transition. Therefore, it is important to know which medications are most used by middle-aged women and which ones can potentially have adverse skeletal effects. This study aimed to evaluate the association between self-reported osteoporosis and multimorbidity and medication use, in Brazilian middle-aged women.

**Methods:** A secondary analysis of household survey data from a previous cross-sectional, population-based study conducted with a sample of 749 women of a population of 257,434 female urban residents in the age bracket of interest (45-60 y). Associations between selfreported osteoporosis and chronic diseases, multimorbidity, and medication use were evaluated. Simple and multiple Poisson regression analyses (with a forward stepwise selection of variables) were performed to evaluate the significance of the factors associated with selfreported osteoporosis (95%CI for the prevalence ratio). The level of statistical significance was set at 5%.

**Results:** Mean age of participants was 52.5±4.4 y. Mean age at menopause was 46.5±5.8 y. About 79% of women reported having some kind of chronic disease. The most prevalent morbidities were hypertension (36%), depression (34%), anxiety (27%), osteoarticular diseases (27%), dyslipidemia (22%), asthma (10.5%), and diabetes

mellitus (10.4%). Only 21.6% denied having morbidities. The prevalence of self-reported osteoporosis was 7.3%. Among those women with osteoporosis, 67.3% reported using specific drugs to treat bone loss. The specific intake of drugs for osteoporosis treatment correspond to 7.6% of the overall prevalence of medication use. Only 6% of the entire studied population reported using calcium and vitamin D supplementation. The overall prevalence of medication use was 68.8%, with the drugs predominantly consisting of those used for cardiovascular diseases (34.6%), oral lipid-lowering agents (13%), anxiolytics (12%), treatment of osteoarticular diseases (12%), and treatment of diabetes (9.6%). Only 19.5% of the participants reported previous or current use of hormone replacement therapy. The overall frequency of polypharmacy was 23%. After multiple regression analysis, the main factors associated with selfreported osteoporosis were having osteoarthrosis/osteoarthritis (PR=2.86; 95%CI: 1.58-5.17; p≤0.001), multimorbidity (PR=2.61; 95%CI: 1.43-4.75; p=0.002), and treatment for ischemic heart disease (PR=3.28; 95%CI: 1.02-10.56; p=0.046). Strength & limitations: This observational study provides an epidemiological contribution. The meticulous methodology and the representativeness of the population sample permit these conclusions to be extrapolated to the entire population of middle-aged women residing in the metropolitan region of Campinas, Brazil. Some limitations of this study must be considered, particularly bearing in mind that much of the data was selfreported, which may lead to biases.

**Conclusion:** The prevalence of morbidities and medication use among middle-aged women was high in a relatively young population. Osteoporosis was reported by approximately 8% of women, highlighting the importance of menopause transition. However, only 2/3 of the osteoporotic women reported using specific drugs for its treatment. Furthermore, it was observed a low prevalence of calcium and vitamin D supplementation. Women with selfreported osteoporosis were more likely to use medicine for ischemic heart disease, to have osteoarticular disease, besides having multimorbidity. Our findings reinforce the need to address women earlier, preferably in the period before the menopausal transition, to promote health through lifestyle modifications, thus preventing the onset of chronic degenerative diseases at earlier ages. Furthermore, clinicians should be aware to select drugs for the treatment of chronic conditions in this specific group of women, considering the potential side effects on bone health.

## P798
### RESULTS OF THE ASSOCIATION BETWEEN ULTRASOUND THERAPY AND PHYSICAL EXERCISE PROGRAM IN KNEE OSTEOARTHRITIS

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**Objective:** Ultrasound therapy is chosen as a thermal agent for knee osteoarthritis because it penetrates selectively into deep structures, increasing their mobility, reducing muscular spasm and decreasing pain. The aim of this study is to show the effect of association between ultrasound therapy and kinetic program for reducing pain, stiffness and improving knee motion.

**Methods:** We conducted a prospective randomized study that included 52 patients with knee osteoarthritis, randomly assigned in two groups: the study group formed of 26 patients treated with ultrasound therapy and kinetic program (group 1) and the control group (26 patients) that followed an exercise program, without ultrasound therapy. The assessment was made at the beginning of the study and after 14 d of therapy using the next parameters: pain evaluated on a visual analogue scale (VAS), 6-min walking distance test (6MWD), WOMAC.

**Results:** In group 2 (with physical exercise treatment), the pain in the knee was reduced from 70.2 to 51.4 mm on VAS scale. The 6MWD test recorded an average improvement of 15.6 m. The WOMAC scale recorded a score drop from 74.2 to 41.4. Group 1, with kinetic program and ultrasound therapy, presented better results: the VAS scale improved from 71.3 to 34.5, the 6MWD test proved a growth in the walking capacity with 23.4 meters, the WOMAC scale recorded a significant drop, from 78.4 to 32.3. The results showed a better improvement in the study group compared to the control group and were statistically significant (p<0.05).

**Conclusion:** The patients with knee osteoarthritis showed improvement of all the tested parameters, in the general group, but in the group with exercise program combined with ultrasound therapy the results were better. We concluded that combination of ultrasound therapy and kinetic program is more effective compared to single use of physical exercise in patients with knee osteoarthritis.

## P799
### SINGLE VERTEBRA BMD VALUES IN DIAGNOSIS OF OSTEOPOROSIS AND PREDICTION OF COMPRESSION FRACTURES

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**Objective:** For diagnosing osteoporosis, the ISCD official position on spine region of interest suggests that BMD based diagnostic classification should not be made using a single vertebra. The guidelines do not mention whether only a single vertebra is still effective in diagnosing osteoporosis or predicting vertebral compression fractures (VCFs). This study aims to compare the ISCD rule with single vertebra method in diagnosing osteoporosis or predicting VCFs.

**Methods:** We retrospectively evaluated 14285 consecutive cases (5236 men over aged 50 and 9049 postmenopausal women) with DXA exams at a single institution from 2007-2020; 2939 cases (female 2089) had more than two follow-up exams. Of these 2939, 385 patients (13.1%; 82 males, 303 females) had newly developed vertebral fractures in follow-up exams.

**Results:** The inconsistency between the two diagnostic methods was 17.3% (p<0.001). In baseline studies, 1270 patients (1071 females) with low bone mass were reclassified as osteoporosis. In follow-up examinations, there was significant difference between the ISCD rule and the single vertebra method in diagnosing osteoporosis (p<0.001). In 385 cases with VCFs, in men, there was more osteoporosis with use of the single vertebra method (26.8%) than that of the ISCD rule (8.5%); similar results were found in women (51.2% vs. 24.8%, respectively). These two methods offered different ability to distinguish with or without VCFs (p<0.001). In men, sensitivity in prediction of VCFs was 0.09 (ISCD rule) vs. 0.27 (single vertebra method), specificity 0.96 vs. 0.89, positive predictive value 0.18 vs. 0.21, and negative predictive value was 0.91 vs. 0.92, respectively; whereas in women, sensitivity were 0.25 (ISCD rule) vs. 0.51, specificity 0.90 vs. 0.71, positive predictive value 0.29 vs. 0.23, and negative predictive value was 0.88 vs. 0.90, respectively.

**Conclusion:** Single vertebra method offers simple rule in analysis spine BMD T-score and detects more osteoporosis than that of ISCD rule, thereby providing early intervention on osteoporosis management to patients and potentially reduce VCFs if these patients would have been treated in our cohort. Our findings demonstrate less specificity in predicting VCF, especially in females, using single vertebral method in our originally untreated non-osteoporotic population in Taiwan.

## P800
### TOLERANCE OF INJECTABLE BISPHOSPHONATES IN THE TREATMENT OF MALIGNANT OSTEOLYSIS

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**Objective:** Injectable bisphosphonates (BP) have a great contribution in the treatment of malignant osteolysis. The aim of this work was to evaluate the short- and long-term tolerance of these drugs.

**Methods:** A retrospective study has been conducted over a 12-y period [2000-2012] at the rheumatology department of Mongi Slim Hospital. 57 patients followed for malignant osteolysis and treated with injectable BP were integrated into this study. Tolerance was judged by the occurrence of side effects.

**Results:** In the studied population, there were 16 women and 41 men with an average age of 64 y. 19 patients were followed for multiple myeloma while 38 patients were followed for bone metastasis. The most commonly used injectable BP was zoledronate: 45 patients were treated by zoledronate and 15 patients by pamidronate. In the pretherapy blood test, hypocalcemia was reported in 5 cases and renal failure in 7 cases. The stomatological examination was performed in half of the cases and did not disapprove injected BP. The average number of cures per patient was 9. As immediate adverse effects, after the first infusion, flu-like syndrome appeared in 9 cases (3 on pamidronate and 6 on zoledronate) and febrile mental confusion in 1 case (zoledronate) which regressed spontaneously. Hypocalcemia (up to 1.57 mmol/L) has been reported in 14 cases (3 on pamidronate and 11 on zoledronate) and persisted in half of the cases. A decrease in creatinine clearance of 20 mL/min has been noted in one case and was not attributed to other treatment or disease activity. Anterior uveitis has been diagnosed after the second cure of zoledronate in one patient. Bone side effects including osteonecrosis of the jaw (following the fourth cure of zoledronate) and pathological fractures have been reported in two patients. The average follow-up in our study was 13 months. The reason for stopping BP was its adverse effects in 4 cases and fatal progression of the underlying disease in 9 cases. Meanwhile, half of the patients were lost of sight.

**Conclusion:** BP seem to be well tolerated however our weak follow-up and the large number of patients lost of sight do not allow us to have definitive conclusions. A pretherapeutic assessment as well as a rigorous follow-up are necessary in order to improve the safety profile of these products.

## P801
### A NEW ELASTIC BAND STRENGTH TEST FOR CORE STABILITY MUSCLES IN PEOPLE WITH CHRONIC LOW BACK PAIN

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**Objective:** To identify the test-retest reliability of a submaximal rowing strength test using elastic bands to evaluate the CORE stability muscles force in people with chronic low back pain who underwent or not a surgery process (arthrodesis and discectomy).

**Methods:** 18 people (age 50±13 y; weight 81.8±11.2 kg; 44.4% women) with chronic low back pain and unfamiliar with the test completed two testing sessions in two separate days (48-72 h between). Participants performed two unilateral elastic band exercises (Rowing and Palov's press) with dominant and non-dominant hands. Force (N) was monitored in real time using a portable sensor anchored to the wall. The test consisted of a 5-s unilateral sustained contraction. Participants increased the load progressively until moderate muscular failure was noticed (i.e., loss of >10 N within the last 3 s). The best record was considered for the analysis. Reliability was examined by computing standard error of measurement (SEM), coefficient of variation (CV%) and intraclass correlation coefficient (ICC).

**Results:** The tests were highly reliable with low errors and high correlation coefficients, both with dominant hands (rowing: SEM=18.8 N, CV=12.0%, ICC > 0.901; Palov's press: SEM=12.9, CV=8.4%, ICC=0.960) and non-dominant hands (rowing: SEM=14.0 N, CV=8.8%, ICC=0.947; Palov's press: SEM=18.8, CV=12.2%, ICC=0.961). No discomfort or pain was reported during or after the tests.

**Conclusion:** A new, easy to implement and reliable test is provided to evaluate the strength of CORE stability muscles in people with low back pain using elastic bands. Coaches and practitioners may benefit from this practical tool both to evaluate the strength and to design tailored exercise prescriptions for people with chronic low back pain who underwent or not a surgery process.

## P802
### KNOWLEDGE, ATTITUDES AND PRACTICES OF POSTMENOPAUSAL WOMEN REGARDING VITAMIN D AND OSTEOPOROSIS

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**Objective:** Vitamin D has a direct influence on musculoskeletal health, and vitamin D deficiency is related to lower bone density and greater bone resorption and to a higher incidence of fractures. To assess knowledge, attitudes and practices regarding vitamin D and osteoporosis in postmenopausal women.

**Methods:** This was a cross-sectional study carried out with 260 postmenopausal women who underwent routine consultations at the menopause outpatient clinic of Campinas State University-São Paulo. Women aged 50 y or older with amenorrhea for at least 12 months were included. From an interview, sociodemographic information and health data were collected, and knowledge about vitamin D, habits related to vitamin D, and knowledge about osteoporosis were evaluated using the Facts on Osteoporosis Quiz (FOOQ) questionnaire.

**Results:** A total of 67.31% of women answered less than half of the questions about knowledge of vitamin D, 58.85% performed their day-to-day activities mostly outdoors, and 53.85% said they did not expose themselves sufficiently to the sun in their daily lives. The average knowledge score on the FOOQ was 15.83 (±3.75). The variables education level, number of correct FOOQ answers and total self-care score were associated with the highest score for knowledge of vitamin D.

**Conclusion:** Knowledge about vitamin D and osteoporosis in this group of postmenopausal women was limited. High levels of education, knowledge about osteoporosis and selfcare were factors associated with knowledge about vitamin D.

## P803
### POTENTIAL ROLE OF RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY TO ASSESS BONE STATUS IN WOMEN WITH LUMBAR SPINE OSTEOARTHRITIS

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**Objective:** BMD measured by DXA represents the gold standard for osteoporosis diagnosis. However, osteoarthritis lesions lead to an overestimation of spine BMD and explain part of the discrepancies in

BMD results. Recently, an innovative echographic approach for osteoporosis diagnosis, defined as radiofrequency echographic multispectrometry (REMS), has been introduced and clinically validated. This new technology could represent an innovative diagnostic tool which seems to be able to investigate bone quality and to provide an estimation of fracture risk independently of BMD by the analysis of bone microarchitecture. This study aimed to evaluate whether the use of the REMS technique may improve the identification of osteoporosis in subjects with osteoarthritis at lumbar spine.

**Methods:** In a cohort of 110 consecutive postmenopausal (63.2±11.3 y) women with lumbar osteoarthritis we measured BMD at the lumbar spine, at femoral neck and total hip using a DXA device; In all women, an echographic scan of the same anatomical sites was performed with the REMS technique was also carried out. The presence of lumbar osteoarthritis was evaluated on baseline radiographs by using Kellgren-Lawrence classification.

**Results:** The mean values of BMD at different skeletal sites, expressed as T-score, obtained by DXA and REMS technique showed that BMD T-score by REMS were significantly lower than those obtained by DXA technique both at lumbar spine (p<0.01) and at all femoral subregions (p<0.05). Moreover, the percentage of women classified as "osteoporotic", on the basis of BMD by REMS was markedly higher with respect to those classified by DXA (35.1% vs. 9.3%, respectively). On the contrary, the percentage of women classified as osteopenic or normal by DXA was higher with respect to that by REMS (67.4% and 23.3% vs. 60.4% and 4.5%, respectively).

**Conclusion:** Our study shows that lumbar spine osteoarthritis, a common finding in postmenopausal women, affects the results of spine BMD leading to its overestimation. REMS technology by the analysis of native raw unfiltered ultrasound signals appears to be able to recognize and overcome the most common artifacts, such as osteoarthritis, which affect the value of the BMD by DXA.

## P804

### A SURROGATE FRAX MODEL FOR ETHIOPIA

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**Objective:** FRAX models are frequently requested for countries with little or no data on the incidence of hip fracture. In such circumstances, the International Society for Clinical Densitometry and International Osteoporosis Foundation have recommended the development of a surrogate FRAX model, based on country-specific mortality data but using fracture data from a country, usually within the region, where fracture rates are considered to be representative of the index country. This abstract describes the development and characteristics of a surrogate FRAX model for Ethiopia.

**Methods:** The FRAX model used the ethnic-specific incidence of hip fracture in coloured men and women living in South Africa, combined with the death risk for Ethiopia.

**Results:** The surrogate model gave somewhat lower 10-y fracture probabilities for men and women at all older ages compared to the model for coloured from South Africa, reflecting a higher mortality risk in Ethiopia. There were very close correlations in fracture probabilities between the surrogate and authentic models (r≥0.998) so that the use of the Ethiopia model had little impact on the rank order of risk. It was estimated that 10,862 hip fractures arose in 2015 in individuals over the age of 50 y in Ethiopia, with a predicted increase by almost 4 times to 41,962 in 2050.

**Conclusion:** The surrogate FRAX model for Ethiopia provides an opportunity to determine fracture probability within the Ethiopia population and help guide decisions about treatment.

## P805

### SELF-CARE AGENCY AND ASSOCIATED FACTORS IN POSTMENOPAUSAL WOMEN

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**Objective:** The ageing process in women is marked by several changes, including the transition to menopause. The evaluation of self-care management is essential and has great relevance for public health. The aim of the present study was to evaluate self-care management and associated factors in postmenopausal women.

**Methods:** This study was a cross-sectional study performed with 260 postmenopausal women who attended routine consultations at the Menopause Outpatient Clinic of the Hospital of the State University of Campinas-SP. Women aged 50 years or older with amenorrhea for at least 12 months were included. The women were interviewed by a researcher during the routine consultation, and the self-care agency assessment was performed using the Appraisal of Self-Care Agency Scale-Revised (ASAS-R) questionnaire.

**Results:** The average total self-care score for the women in this study was 62.27 (±9.64). Higher ASAS-R scores were associated with performing outdoor activities, better self-perceived health, and a higher score on knowledge about vitamin D. Active smoking was associated with a lower self-care score.

**Conclusion:** We observed that the self-care management of postmenopausal women was satisfactory and was associated with lifestyle, self-perceived health, and knowledge about vitamin D.

## P806

### RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY AS A NONINVASIVE AND COMPLEMENTARY TOOL FOR OSTEOPOROSIS DIAGNOSIS IN ELDERLY WOMEN WITH TYPE 2 DIABETES

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**Objective:** Patients with diabetes mellitus (T2DM) present higher BMD values from DXA compared with nondiabetic subjects. This paradox could be explained by the fact that BMD, even if it represents a major determinant of bone strength, does not take into account other factors which influence bone strength. Recently, an innovative echographic approach for osteoporosis diagnosis, defined as radiofrequency echographic multispectrometry (REMS), has been introduced and clinically validated. This study aimed to evaluate whether the use of the REMS technique may improve the identification of osteoporosis in T2DM patients.

**Methods:** In a cohort of 90 consecutive postmenopausal elderly (70.5±7.6 y) women with T2DM and in 90 healthy age-matched controls we measured BMD at the lumbar spine (LS-BMD), at femoral neck (FN-BMD) and total hip (TH-BMD) using a DXA device; In all women, an echographic scan of the same anatomical sites was performed with the REMS technique.

**Results:** DXA measurements were all higher in T2DM than in non-T2DM women; instead, all REMS measurements were lower in T2DM than in non-T2DM women. Moreover, the percentage of T2DM women classified as "osteoporotic", on the basis of BMD by REMS was markedly higher with respect to those classified by DXA (47.0% vs. 28.0%, respectively). On the contrary, the percentage of T2DM women classified as osteopenic or normal by DXA was higher with respect to that by REMS (48.8% and

23.2% vs. 38.6% and 14.5%, respectively). T2DM women with fragility fractures presented lower values of both BMD-LS by DXA and BMD-LS by REMS with respect to those without fractures; however, the difference was significant only for BMD-LS by REMS (p<0.05).

**Conclusion:** BMD by DXA values, as expected, were higher in women with T2DM than in controls, whereas REMS-estimated BMD values were lower in women with T2DM than in controls. Therefore, our data suggest that REMS-estimated BMD could be a good diagnostic tool in demonstrating the diabetes-associated bone disease and that REMS technology may represent a useful approach to enhance the diagnosis of osteoporosis in patients with T2DM.

## P807
### FIBRODYSPLASIA OSSIFICANS PROGRESSIVA: CASE REPORT OF A TERMINAL PATIENT

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The patient was a 29-year-old woman, with a history of type 1A diabetes and primary amenorrhea secondary to cervical agenesis. At the age of 10 y, she was examined because she had developed a tumor in the cervical region, with no previous injury; she underwent a radiological study and bone biopsy that was compatible with myositis ossificans. Over the years, large ectopic ossifications developed in her shoulders, hips, knees, ankles and paravertebral muscles, which produced a marked secondary thoracolumbar scoliosis and a considerably generalized functional limitation. A plain radiology study of the affected areas showed the existence of exuberant bone bridges at different stages of maturation, that provoked the locking and ankylosing of a number of joints, including a knee (Fig. 1), the spine and a shoulder. The patient was treated with bisphosphonates and calcium supplements with vitamin D for 5 y, while she was also being followed by the rehabilitation service; however, none of these measures was capable of arresting the course of the disease, which led to the physical disability of the patient.



**Fig. 1**. Radiograph of left knee showing ankylosis secondary to bone bridges

Fibrodysplasia ossificans progressiva is a rare disease of unknown origin that is characterized by a progressive heterotopic ossification of the muscles and other structures in which connective tissue is abundant[1]. In recent years, there has been an advance in our knowledge of the etiological and pathogenic mechanisms of this disorder, which implicates the receptor of bone morphogenetic protein (BMP), the so called activin A type I receptor/activin-like kinase 2 (AVCR1/ALK2)[2,3]. Some authors have suggested that blocking the activity of the AVCR1/ALK2 receptor through the development of therapeutic agents that behave like signal transduction inhibitors that encode these proteins may be useful[4]. In this respect, we know that dorsomorphin, a small molecule produced by the zebrafish, inhibits BMP type I receptors (including ALK2—implicated in the etiology and pathogenesis of the disease—and other activin-like kinases like ALK3 and ALK6)[5]; however, given the lack of specificity of this molecule, further studies are needed in this line of research, as well as the development of in vivo models to determine the potential efficacy of this molecule in the prevention of the flares of ossification that occur in this serious disease.

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## P808
### A SURROGATE FRAX MODEL IN ZIMBABWE

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**Objective:** FRAX models are frequently requested for countries with little or no data on the incidence of hip fracture. In such circumstances, the International Society for Clinical Densitometry and International Osteoporosis Foundation have recommended the development of a surrogate FRAX model, based on country-specific mortality data but using fracture data from a country, usually within the region, where fracture rates are considered to be representative of the index country. This abstract describes the development and characteristics of a surrogate FRAX model for Zimbabwe.

**Methods:** The FRAX model used the ethnic-specific incidence of hip fracture in Black men and women living in South Africa, combined with the death risk for Zimbabwe in 2015-2019. The number of hip fractures in 2015 and 2050 were estimated based on United Nations predicted changes in population demography.

**Results:** The surrogate FRAX model gave somewhat lower 10-year fracture probabilities for men and women at all older ages compared to the model for Black men and women in South Africa, reflecting the competing higher mortality risk in Zimbabwe. There were very close correlations in fracture probabilities between the surrogate Zimbabwean and the Black South African models (r≥0.998) so that the use of the Zimbabwe model had little impact on the rank order of risk, i.e., a person

at the xth percentile of risk with one model will be at the xth percentile of risk with the other. It was estimated that 1023 hip fractures arose in 2015 in individuals age 50 years and older in Zimbabwe, with a predicted 3.8-fold increase expected by 2050, when 3900 hip fractures are expected nationally.

**Conclusion:** The surrogate FRAX model for Zimbabwe (https://www.sheffield.ac.uk/FRAX/tool.aspx?country=81) provides an opportunity to determine fracture probability within the Zimbabwean population and help guide decisions about treatment. Research is underway to derive novel Zimbabwean hip fracture incidence data with which to refine this FRAX model.

### P809

**BONE VESSEL RELATIONSHIPS: ASSOCIATION BETWEEN CALCIFICATIONS OF THE ILIAC ARTERIES WITH VERTEBRAL FRACTURES IN HEMODIALYSIS PATIENTS RESULTS FROM THE VIKI STUDY**

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**Objective:** Vascular calcification and fragility fractures are common age-related disorders and associated with high morbidity and mortality especially in endstage renal disease. Skeletal disorders occur in dialysis patients. Few studies have provided data on the prevalence of vertebral fractures (VFs) and their association with large artery calcifications. We evaluated the relationship of iliac arteries calcifications (IACs) and abdominal aorta calcifications (AACs) with the risk for VFs in hemodialysis (HD) patients.

**Methods:** The VIKI Study is a cross-sectional study involving 387 HD patients from 18 Italian dialysis centers. Biochemical data included bone health markers such as vitamin K levels, vitamin 25(OH)D, alkaline phosphatase, PTH, calcium, phosphate, osteocalcin and Matrix Gla Protein. The presence of VF, IACs and AACs were determined through standardized spine lateral radiographs. A >20% reduction of vertebral body height was considered a VF. We quantified vascular calcifications by measuring the length of calcium deposits along the arteries classifying the degree of severity for the IACs and AACs with a specific score (mild: 0.1–3 cm; moderate: 3.1–5 cm; and severe >5 cm) previously validated for AACs.

**Results:** The prevalence of IACs was 56.1%, and of AACs 80.6%. After adjusting for confounding variables, the presence of IACs was associated with 73% higher odds of VF (p=0.028), whereas we found no association (p=0.294) for AACs. The presence of IACs associated with VF irrespective of calcification severity. Patients with IACs had lower levels of the vitamin K2, menaquinone 7 (MK7) (0.99 vs. 1.15 ng/ml; p=0.003), and deficiency of this marker became greater when adjusting for triglyceride levels (0.57 vs. 0.87 ng/ml; p<0.001).

**Conclusion:** The presence of IACs, regardless of their extent, appears to be a clinically relevant risk factor for VFs. The association is further enhanced by including vitamin K, a main player in bone and vascular health, in the model. Prospective studies are needed to confirm these findings both in chronic kidney disease patients and in the general population.
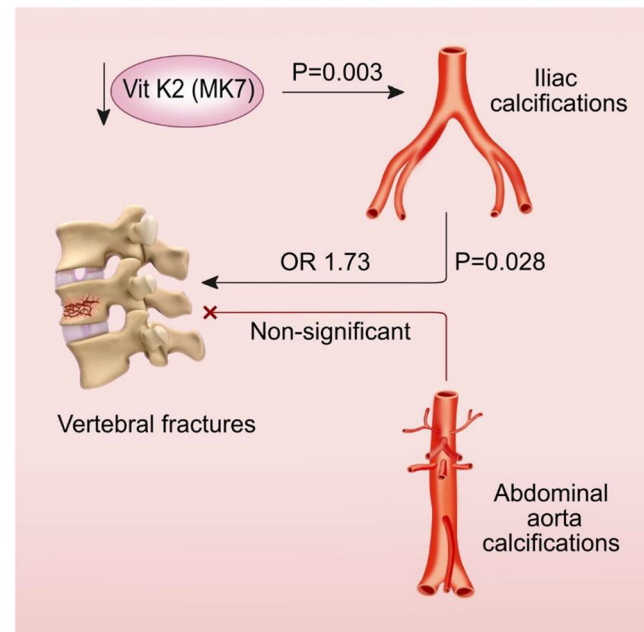


Figure. Graphical representation of the main results of our study

### P810

**WHAT TO DO AFTER REBOUND-ASSOCIATED VERTEBRAL FRACTURES FOLLOWING DENOSUMAB DISCONTINUATION? A REAL LIFE STUDY**

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**Objective:** To investigate BMD and bone turnover markers (BTM) changes after restarting osteoporosis treatment with denosumab (Dmab), zoledronate or teriparatide, in postmenopausal women who had sustained rebound-associated vertebral fractures (RAVFs) following Dmab discontinuation.

**Methods:** We performed a retrospective observational study. We examined lumbar spine (LS), femoral neck (FN) and total hip (TH) DXA scans (Lunar Prodigy Advance, software 13.6) and assessed C-telopeptide (CTx) (normal value 74-550 pg/mL) and osteocalcin (BGP) (normal value 11-43 ng/mL), at the time of the reinitiation treatment (RT) and after one year of follow-up.

**Results:** We included nine women (mean age 66 y, range 52-84) that came to our center after RAVFs occurrence. The duration of Dmab treatment before the RAVFs was 24 months (range 11-77). 78% had received bisphosphonates before Dmab and 33% had suffered prevalent vertebral fractures. Median number of RAVFS was 2 (range 1-5). None of them had received bisphosphonates after stopping Dmab. After one year of the RT with Dmab (n=4), teriparatide (n=3) and zoledronate (n=2) there were no significant gain or loss in any of the DXA regions. Figure shows de 12-month percentage changes from BMD RT according to the different treatment used. CTx and BGP levels significantly decreased with Dmab (p=0.030 and p=0.002, respectively) and did not shown a significant change with zoledronate or teriparatide. However, we observed an increasing trend in CTx and BGP levels with teriparatide (CTX +117.6%, p=0.524) (BGP+186.9%, p=0.443). No patient suffered additional vertebral fractures.
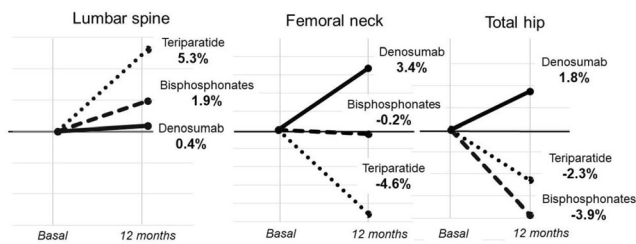
Figure. 12-month % of changes from BMD baseline according to reinitiation treatment.

**Conclusion:** In this group of patients with RAVFs after Dmab discontinuation there were no significant changes with all treatment regimens after 1 y and BTM significantly decreased with Dmab. However, we observed tendencies and probably in the future we will be able to provide additional information on the BMD and BTM behavior after RAVFs using different treatment regimens. It is important to note that no patient suffered additional fractures. Nevertheless, the sample is small and larger studies are needed to reach stronger conclusions regarding what treatment to use after RAVFs.

## P811
### FRAX BASED INTERVENTION THRESHOLDS FOR PAKISTAN

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**Objective:** The fracture risk assessment algorithm FRAX® has been recently calibrated for Pakistan, but guidance is needed to apply fracture probabilities to clinical practice.
**Methods:** The age-specific ten-year probabilities of a major osteoporotic fracture were calculated in women with average BMI (25 kg/m$^2$) to determine fracture probabilities at two potential intervention thresholds. The first comprised the age-specific fracture probabilities associated with a femoral neck T-score of -2.5 SD. The second approach determined age-specific fracture probabilities equivalent to a woman with a prior fragility fracture without BMD. The parsimonious use of BMD was additionally explored by the computation of upper and lower assessment thresholds for BMD testing.
**Results:** When a BMD T-score $\leq$ -2.5 SD was used as an intervention threshold, FRAX probabilities in women aged 50 y were approximately 2-fold higher than in women of the same age but with an average BMI and no risk factors. The relative increase in risk associated with the BMD threshold decreased progressively with age such that, at the age of 80 y or more, a T-score of -2.5 SD was actually protective. The 10-y probability of a major osteoporotic fracture by age, equivalent to women with a previous fracture, rose with age from 2.1% at the age of 40 y to 17%, at the age of 90, and identified women at increased risk at all ages.
**Conclusion:** Intervention thresholds based on BMD alone do not effectively target women at high fracture risk, particularly in the elderly. In contrast, intervention thresholds based on fracture probabilities equivalent to a 'fracture threshold' target women at high fracture risk.

## P812
### A SURROGATE FRAX MODEL FOR NEPAL

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**Objective:** FRAX models are frequently requested for countries with little or no data on the incidence of hip fracture. In such circumstances, the International Society for Clinical Densitometry and International Osteoporosis Foundation have recommended the development of a surrogate FRAX model, based on country-specific mortality data but using fracture data from a country, usually within the region, where fracture rates are considered to be representative of the index country. This abstract describes the development and characteristics of a surrogate FRAX model for Nepal.
**Methods:** The FRAX model used the ethnic-specific incidence of hip fracture in Indian men and women living in Singapore, combined with the death risk for Nepal (UN, 2015-2019).
**Results:** The surrogate model gave somewhat lower 10-y fracture probabilities for men and women at all older ages compared to the model for coloured from Singapore Indians, reflecting a higher mortality risk in Nepal. The surrogate model for Nepal was similar to the Indian surrogate model using the same fracture risk. There were very close correlations in fracture probabilities between the surrogate and authentic models, so that the use of the Nepal model had little impact on the rank order of risk. It was estimated that 6711 hip fractures arose in 2015 in individuals over the age of 50 y in Nepal, with a predicted increase by more than 3 times to 22,768 in 2050.
**Conclusion:** The surrogate FRAX model for Nepal provides an opportunity to determine fracture probability within the Nepal population and help guide decisions about treatment.

## P813
### EPIDEMIOLOGY OF HIP FRACTURES IN SAUDI ARABIA: DEVELOPMENT OF A COUNTRY SPECIFIC FRAX MODEL

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**Objective:** To describe the epidemiology of hip fractures in Saudi Arabia, which was then used to develop the country-specific fracture prediction FRAX® tool.
**Methods:** Hip fractures (ICD 10: S72.0, S72.1, S72.2) were identified occurring in years 2017 and 2018 in representative hospitals from various regions (Riyadh, Dammam, Makkah Al Mokaramah, Jazan, Al-Jouf, Al-Baha, Tabouk, Najran and Hail). A total of 15 hospitals that admit and operate on patients with hip fractures were selected, representing approximately 12.8% of the country's population. Age- and sex-specific incidence of hip fracture and national mortality rates were incorporated into a FRAX model for Saudi Arabia. Fracture probabilities were compared with those from neighbouring countries having FRAX models.
**Results:** The incidence of hip fracture applied nationally suggested that the estimated number of hip fractures nationwide in persons over the age of 50 y for 2015 was 2949 and is predicted to increase to 20,328 in 2050. Hip fracture rates were comparable with estimates from Abu Dhabi and

Kuwait. By contrast, probabilities of a major osteoporotic fracture or hip fracture from the age of 70 y were much lower than those seen in Abu Dhabi and Kuwait due to higher mortality estimates for Saudi Arabia. The remaining lifetime probability of a hip fracture from the age of 50 y was 4.6% in women and 3.7% in men. These probabilities were lower than those in Abu Dhabi (8.9 and 8.1%, respectively).

**Conclusion:** The FRAX model should enhance accuracy of determining fracture probability among the Saudi Arabian population and help guide decisions about treatment.

## P814
### ASSESSMENT OF FRACTURE RISK TOOLS IN CARE HOME RESIDENTS: A MULTICENTRE OBSERVATIONAL PILOT STUDY

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**Objective:** Fragility fractures are common in care home residents but established tools have not been tested in this population. Aim: To identify the most practicable tool for use.

**Methods:** Design: Multicentre prospective observational cohort pilot study. Setting: 18 care homes in Boston, UK. Assessments: Fragility risk score at baseline with FRAX, QFractureScore, Garvan nomogram, BMI and TUGT for each participant. Outcomes: falls, fractures, combined falls & fractures. Follow-up; 12 months.

**Results:** 217/618 (35%) residents in the 18 care homes were enrolled. 147 (68%) had mental capacity, 70 (32%) did not. There were 325 falls and 10 fractures in participants during the study. At the same time there were 1671 falls and 103 fractures in residents not participating in the study. Multiple regression analyses showed that only age had a statistically significant association with falls ($\chi^2(1)=5.7775$, p=0.0162), fractures ($\chi^2(1)=4.7269$, p=0.0297) and combined falls & fractures ($\chi^2(1)=4.7269$, p=0.0297). C-statistics were: falls; FRAX 0.544, BMI 0.610, QFractureScore 0.554, Garvan nomogram 0.579, TUGT 0.656, fractures; FRAX 0.655, BMI 0.708, QFractureScore 0.736, Garvan nomogram 0.712, TUGT 0.590, combined falls and fractures, c-statistics were same as for fractures. Fifty-four participants (25%) died during follow-up. Charlson comorbidity index predicted mortality, R²=0.021 (p=0.034).

**Conclusions:** QFractureScore, BMI and Garvan nomogram were good predictors of fractures and combined falls and fractures, Of these BMI is the easiest to use and therefore most suitable for this population. Only age had statistically significant association with the outcomes. Thus using BMI, age and CCI, an algorithm was designed for fragility risk assessment for care home residents

**Disclosure:** This study was for a Doctor of Medicine degree at Keele University. It was privately funded.

## P815
### FROM OSTEOPENIA TO OSTEOPOROSIS DURING COVID-19 PANDEMIC LOCKDOWN

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**Objective:** COVID-19 pandemic and associated rules including lockdown periods of time associate limited physical activity which otherwise is boost of bone formation, increased risk of sarcopenia and developing vitamin D deficiency, as well as depression requiring medication. Any of these or together might increase the risk of osteoporotic fracture (1-5). We aim to present the aggravation of bone profile after first 15 months since pandemic emerged.

**Case report:** This is a 59-year-old, nonsmoker, menopausal female, who was admitted for non-specific bone and joints pain since last months, also associating persistent lumbar pain. She associated treated hypothyroidism of post-thyroidectomy type (for a benign multinodular goiter), controlled arterial hypertension, hyperlipemia. Prepandemic bone assays showed a 25-hydroxyvitamin D of 27 ng/mL (she started vitamin D supplementation with 1000 UI/d of cholecalciferol), normal PTH and bone turnover markers, normal profile X-Ray (screening) of the thoracic-lumbar spine; central DXA (GE Lunar Prodigy device) showed L1-4 BMD of 0.953 g/cm², T-score of -2.3SD, Z-score of -1.1SD, neck BMD of 0.796 g/cm², T-score of -1.7 SD, Z-score of -0.7 SD, total hip BMD of 0.951g/cm², T-score of -0.4SD, Z-score of 0.2 SD. Current evaluation, after limited physical activity and lockdown periods, she showed normal serum calcium, high CrossLaps of 0.75 ng/mL, normal osteocalcin of 31 ng/mL, high P1NP of 91 pg/mL (normal:15-65 pg/mL), and PTH of 31 pg/mL, 25OHD of 32 ng/mL (under supplements), normal TSH under daily 50 µg of levothyroxine. The profile X Ray of the spine showed a new T4 vertebral fracture while DXA-BMD at L1-4 decreased to 0.814 g/cm², with a T-score of -3 SD, Z-score of -1.9 SD, neck BMD of 0.745 g/cm², T-score of -2.3 SD. In the meantime, she was diagnosed with depression and started therapy with SSRIs. She also needed several stomatological interventions, thus daily 20 µg of teriparatide was recommended in addition to vitamin D 1000UI/d.

**Conclusion:** This aspect of real life medicine during pandemic is an argument for serial checking the bone status after first year of pandemic even in patients who were not at high fracture risk.

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## P816
### BMD ACCURACY ERRORS IN PHANTOMLESS CALIBRATION OF CT SCANS: A SIMULATION STUDY

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**Objective:** For opportunistic screening, internal calibration is one option to convert measured CT values to BMD. CT values of two internal calibration materials (ICM) must be determined. In this study, we simulated the impact of accuracy errors of the measured CT values of selected ICMs on BMD.

**Methods:** Simulations used the base-material decomposition approach to obtain BMD of bone-equivalent hydroxyapatite (HA) from combinations of two ICMs, namely subcutaneous adipose tissue (SAT)/blood, SAT/skeletal muscle (SM) and SAT/SM including 20% fat. Errors in measured CT values were assumed to originate from an inaccurate water calibration of the CT scanner or an impact of plaques on blood, edema on SAT and unknown fat content on SM. Realistic CT accuracy errors were estimated from a cohort of 121 elderly women (age 71.5 5.2 y) and were used by the simulation to calculate the resulting percentage BMD accuracy errors.

**Results:** It was assumed that the ICM CT value distribution arises from a convolution of the true population variance with CT variations due to scanner instabilities characterized by the CT value distribution of air. Then the population variance $\sigma_{pop}$ can be obtained from a deconvolution of the measured CT value distribution of a given ICM with the distribution of air (Table (top)). Lowest BMD errors $\Delta BMD_{HA}$ were obtained for the combinations SAT/blood or SAT/SM, whereas an increased fat content in muscle also increases the BMD error (Table (bottom)). There was no impact of the water miscalibration.

**Conclusion:** The use of SM as ICM may result in larger BMD errors due to unknown fat content. The combination blood/SAT produced the lowest BMD accuracy errors. The important effect of contrast agents and longitudinal precision errors on internal calibration still needs to be evaluated.

Table. The population dependent standard deviation obtained by deconvolution (top) was used in the simulation as input for the accuracy error of the ICM CT value, yielding the percentage BMD error when using different ICM combinations for internal calibration (bottom).

|  | SAT | Blood | SM |
|---|---|---|---|
| $\sigma_{pop}$ [HU] | 3.09 | 1.70 | 6.75 |

|  | Blood/SAT | SM/SAT | Fatty SM/SAT |
|---|---|---|---|
| $\Delta BMD_{HA}$ [%] with $\sigma_{pop}$ | 6.94 | 14.22 | 18.18 |

## P817
### ARE LOCAL POPULATION CHARACTERISTICS RELATED TO ANTIOSTEOPOROSIS MEDICATION (AOM) DISPENSED IN ENGLAND? AN ECOLOGICAL STUDY

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**Objective:** Determine whether population characteristics of Clinical Commissioning Group (CCG) areas are associated with prevalence of AOM dispensed via community pharmacies in England.
**Methods:** This ecological study used the Open Prescribing database, to analyse items of AOM dispensed via community pharmacies in England in 2019. CCG areas were mapped to Health Authority (HA) areas by population numbers from the Office for National Statistics. Characteristics of the local HA population which coincided with a CCG area were analysed to explore association with rate of AOM/1000 people aged over 65 y. CCG and HA areas with population and geographical discrepancies were excluded. Linear regression analysis of population characteristics was carried out to see if they were individually related to rate of AOM/1000 people aged over 65 y. This was followed by entry of population characteristics into a multilinear regression model. Outliers were identified, removed and the multilinear regression model repeated.
**Results:** 94 CCGs were included in the analysis. Linear regression analysis showed percentage of population aged over 65 y, Male Healthy Life Expectance (MHLE), Female Healthy Life Expectancy (FHLE), percentage Smoked, percentage Active adults and Alcohol related Hospital admissions/100,000 for a CCG area were all significantly associated (p<0.05) with the rate of AOM/1000 people aged over 65 y. Multilinear regression (n=94) was conducted, outliers identified and removed and the multilinear regression model repeated for 85 CCG areas. B values of -0.256 (percentage population over 65 y), 0.286 (MHLE), -0.228 (FHLE), -0.021 (percent smoked), -0.71 (percent Active adults) and 0.386 (Alcohol related Hospital admissions/100,000) were obtained. Percentage population aged over 65 y and Alcohol related Hospital admissions/00,000 were significant predictors of rate of AOM/1000 population aged over 65 y (P≤0.05).

**Conclusion:** In England, the rate of AOM/1000 population aged over 65 years is significantly associated with the percentage of people over 65 y and rate of Alcohol related hospital admissions/100,000 for a CCG area (n=85). Population characteristics of MHLE, FHLE, percentage people who Smoke, and percent Active adults are also associated, although not significantly (p≥0.05).

## P818
### CORRELATION BETWEEN FREE RADICALS AND REACTIVE OXYGEN SPECIES (ROS)

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**Objective:** A free radical is an atom or group of atoms that have one or more unpaired electrons. Radicals can have positive, negative or neutral charge. A prominent feature of radicals is that they have extremely high chemical reactivity, which explains not only their normal biological activities, but how they inflict damage on cells.
**Methods:** Persistent oxidative stress is one of the major causes of most lifestyle-related diseases, cancer and the aging process (1-2). Oxidative stress arises from the strong cellular oxidizing potential of excess ROS (3). There are many types of radicals, but those of most concern in biological systems are derived from oxygen, and known collectively as ROS.
Many antioxidant supplements could not prevent cancer, myocardial infarction and atherosclerosis, but rather conversely increase mortality (4-5).
**Results:** It is well known that it is important to be aware of side effects when developing an effective antioxidant for the prevention of oxidative stress-related diseases. ROS are generated inside the body throughout our daily lives, such as during hard exercise, smoking, exposure to ultraviolet rays or air pollution, aging, physical or psychological stress (6-7). Inside every aerobic organism, ROS are generated when breathing consumes oxygen.
**Conclusion:** ROS are one of the major causes of acute and chronic diseases. Acute oxidative stress arises from various different situations: inflammation, cardiac or cerebral infarction, organ transplantation, heavy exercise, cessation of operative bleeding and others (8).
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## P819
### BUROSUMAB TREATMENT IN ADULT PATIENTS AFFECTED BY SEVERE X-LINKED HYPOPHOSPHATEMIC RICKETS

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**Objective:** X-linked hypophosphatemia (XLH) is a rare disease caused by *PHEX* gene mutations. The objective of this study is to report clinical, biochemical results and effects on motor function and quality of life in two adult XLH patients treated with burosumab. They have been

previously treated with standard therapy and had severe clinical complications.

**Methods:** Two adult male patients (Caucasian; aged 59 and 52), with XLH diagnosis in childhood, have been treated for 6 months with burosumab (1 mg/kg: 90 and 60 mg respectively) subcutaneously every 28 d. Blood and urinary exams were performed at baseline and then monthly. Questionnaires (Quality of Life: 36-Item Short Form Survey) and tests (Brief Pain Inventory, 6-Min Walk Test, Time Up & Go Test and Grip test) were performed at baseline and after 6 months.

**Results:** Serum phosphate levels, below the normal range (1.6 and 1.7 mg/dl; normal range: 2.5-4.9) at baseline, quickly increased and normalized as early as 2 weeks. In the first patient, normal phosphatemia level was maintained for all period, while in the second patient phosphatemia level reduced to just below the normal range (2.2-2.4 mg/dl) from 3 to 6 months. No severe adverse events were reported. In both patients, a statistically significant increase (p=0.02) of serum procollagen 1 N-terminal propeptide was described at 6 months. The questionnaire on quality of life showed an improvement trend at 6 months compared to the baseline for some scores (perception of general health and vitality) and all tests on joint-bone pain and motor function also showed a tendency to improvement.

**Conclusion:** These case reports contribute to establishing efficacy of burosumab treatment (1-4) also in adulthood with severe musculoskeletal manifestations. In addition, our results suggest that the currently recommended burosumab dosage (1 mg/kg) may not always be optimal for all patients and perhaps some minor adjustments may be needed. Furthermore, in the future, quality of life questionnaires and specific muscle function tests could be used on a large scale in XLH patients treated with burosumab.

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## P820
## PROGNOSTIC FACTORS IN A RAPIDLY PROGRESSIVE DERMATOMYOSITIS

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We present the case of a 49 year-old female patient admitted to the emergency department after developing severe muscle weakness of the arms and thighs, marked oedema extending along the proximal segments of the limbs, erythematous rash of the face, chest and arms. Patient history included bilateral surgical removal of cystic formations of increased size, which were not labelled as malignant. The patient's general state altered since one week, she became bed ridden, with muscle weakness involving also the neck flexors.

Laboratory tests based on the clinical suspicion of dermatomyositis revealed very high muscle enzymes – creatinkinase, aspartate transaminase, lactate dehydrogenase. The autoimmune panel for antinuclear antibodies was positive for anti-Ro52, but a myositis antibody panel was not available. Electromyography and muscle biopsy confirmed the diagnosis of inflammatory myopathy. Further evaluation by musculoskeletal ultrasound detected a marked subcutaneous oedema and typical features of acute myositis which include loss of "starry sky" appearance, hyperechoic muscle tissue and also a proximally increased degree of stiffness on elastography.

The patient showed partial clinical response after three day course of methylprednisolone 1 g/d and was further maintained on a dose of 0.5 g/d. Although subcutaneous oedema receded and the patient gained some muscle strength, a major concern was the persistent and progressive dysphagia. Immunosuppressive therapy with methotrexate 7.5mg/week was initiated along with maintenance of high dose corticosteroid. The patient developed severe dysphagia, with need of parenteral nutritional support and repetitive tracheobronchial aspiration. A major concern at this point was the risk of aspiration pneumonia. Lack of clinical improvement prompted also the use of intravenous immunoglobulin which was administered in two doses of 0.5 g/kg. Three weeks from admission, the patient develops acute respiratory failure and dies after cardiorespiratory arrest.

This case report describes a severe form of dermatomyositis in which presence of multiple prognostic factors was linked to a very poor outcome. These factors include corticosteroid resistance, acute presentation with extensive subcutaneous oedema and upper dysphagia. Although immunosuppressive therapy should be added in refractory cases, initial response to high dose corticosteroid is crucial in clinical forms with rapid progression.

## P821
## SHORT- AND LONG-TERM PROGNOSTIC FACTORS ASSOCIATED WITH FUNCTIONAL RECOVERY IN ELDERLY PATIENTS WITH HIP FRACTURE: A SYSTEMATIC REVIEW

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**Objective:** To identify short and long-term factors (biological, clinical, and sociodemographic) associated with functional recovery of elderly hip fracture patients after hospital discharge; and assess the use of the hip fracture core-set and key-performance indicators for secondary refractures reduction. (Javaid-MK-2020)

**Methods:** A search was performed in seven electronic databases. Observational studies reporting predictors after usual care of elderly patients with hip fracture diagnoses receiving surgical or conservative treatment were included. Primary outcomes considered were part of the domains corresponding to functional capacity. The protocol was registered in PROSPERO (CRD42020149563).

**Results:** Of 3873 references identified, and after the screening and selection process, 43 studies were included. Forty-nine functional measures were identified for ten functional outcomes, including BADLs, IADLs, ambulation and, mobility. Biological characteristics such as age, sex, comorbidities, cognitive status, nutritional state, and biochemical parameters are significantly associated. Determinants such as contact and size of social network and those related to institutional care quality are relevant for functional recovery at six and 12 months. Age, prefracture function, cognitive status, and complications continue to be associated five years after discharge. We found 74 associated factors to functional recovery of elderly hip fracture patients. Ten of the studies reported rehabilitation programs as suggested in KPI 9; none used the complete hip fracture core-set.

**Conclusion:** Most of the associated factors for functional recovery of elderly hip fracture were biological, sociodemographic, or inherent factors to patients' baseline characteristics, including their pre-facture functional capacity. For the core-set and KPIs, we found an insufficient

use and report. This study reports 49 different instruments to measure functional capacity.

## P822

### EFFECT OF MODIFIED SURYA NAMASKAR ALONG WITH PRANAYAMA ON BALANCE AND QUALITY OF LIFE IN GERIATRIC PATIENT WITH OSTEOPOROSIS

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**Objective:** Osteoporosis is a systemic skeletal disease characterised by a low BMD and increased risk of fractures. While the quality of life of an individual is affected by fall accidents, management of post-fall disability in the elderly could be a huge economic burden to the society. Treatment of these patients has to be comprehensive and include both, pharmacological and nonpharmacological interventions. This study aimed to investigate how modified surya namaskar (modified sun salutations using a chair) along with pranayama in the duration of 6 weeks can impact the balance and quality of life in geriatric patient with osteoporosis.

**Methods:** This quasi experimental study was conducted on 33 patients both male and female with diagnosed osteoporosis, ages between 60-75 y, having no mobility problems, 27 of whom completed the 6 week exercise sessions program. Patients with asymmetric gait pattern, use of an assistive device for walking, evidence of neuromuscular illness, major orthopedic diagnosis in the lower back, pelvis, or lower extremities were excluded from the study. Session included warm up (seated shoulder circles, wrist rolls, sit to stand, standing heel and toe raises, abduction, and heel walking.), pranayama (breathing exercises), modified surya namaskar (modified sun salutations using a chair) followed by relaxation. Before and after treatment protocol the patients balance was assessed using Timed Up and Go Test (TUG), Patients quality of life was evaluated using Nottingham Health Profile. Statistical analyses of the data was carried out by comparing of the values obtained before and after treatment protocol by using paired parametric t test.

**Results:** The mean age of the participants with osteoporosis were 66.00 ±3.87 y. After sessions, there was a statistically significant decrease in their TUG mobility scores (p<0.05) and their quality of life scores were better than scores obtained before sessions (p<0.05).

**Conclusion:** This study concluded that modified surya namaskar along with pranayama has the potential to alleviate problems related with balance and quality of life in geriatric patient with osteoporosis.

## P823

### A META-ANALYTIC SYNTHESIS OF DPP4 INHIBITORS COMPARED TO SULFONYLUREAS AS ADD-ON THERAPY TO METFORMIN AND RISK OF FRACTURES IN PATIENTS WITH TYPE 2 DIABETES: EVIDENCE FROM RANDOMIZED CONTROLLED TRIALS

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**Objective:** Type 2 diabetes mellitus (T2DM) affects bone metabolism and increased risk of fracture among elderly population. There is no consensus on the selection of specific drug therapies when metformin not adequately responsive in T2DM. Evidence from the published clinical studies suggested inconclusive results regarding effect of anti-diabetic medications on the fracture risk. Therefore, this study aimed to determine effect of DPP-4 Inhibitors compared to sulfonylureas as add-on therapy to metformin in inadequately controlled patients with T2DM.

**Methods:** A systematic literature search on PubMed/Medline was conducted to identify randomized controlled trials (RCTs) in patients with T2DM. RCTs comparing DPP-4 Inhibitors vs. sulfonylureas as add-on therapy to metformin in T2DM patients were included. We calculated Peto odd ratio with 95%CI with fixed effect model to compare DPP-4 Inhibitors vs. sulfonylureas as add-on therapy to metformin. Meta-analysis was performed by using RevMan 5.3 software.

**Results:** A total 7 RCTs including 8584 patients with 48 fracture cases. From the included studies patient age, fasting blood glucose level, HbA1c, BMI, and duration of diabetes were ranged from 54.30-72.60 y, 8.9-9.2 mmol/L, 7.5-8.1%, 30-32.5 kg/m$^2$, and 5.5-7.6 y respectively. Duration of trials were ranged from 30-104 weeks. Results from meta-analysis showed nonsignificant association between overall risk of fracture and DPP-4 inhibitors compared to sulfonylureas as add-on therapy to metformin in inadequately controlled patients with T2DM (Peto odd ratio: 1.45, 95%CI: 0.82-2.57; p=0.21). There was no significant heterogeneity amongst the studies ($I^2$=0%; p=0.86).

**Conclusion:** The current result suggests no detrimental effect of DPP-4 inhibitors on fractures risk compared to sulfonylureas in patients with T2DM. The DPP-4 inhibitors and sulfonylureas can be considered as options for add-on therapy to metformin in inadequately controlled T2DM patients. Further long term follow-up RCTs and real world studies are required to confirm the present findings.

## P824

### COEXISTENCE OF SARCOPENIA IS MORE WITH SEVERE OSTEOPOROSIS: A STUDY IN A TERTIARY LEVEL HOSPITAL IN BANGLADESH

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**Objective:** Sarcopenia is decline of muscle mass leading to impaired gait, significant disability which is strongly associated with osteoporosis(OP). Bone–muscle unit development and deterioration maintains a linear relationship at various ages. Severe sarcopenia is low muscle mass plus low muscle strength with low physical performance. This observational study was done to see the coexistence of severity of sarcopenia with severe OP in small population of Bangladesh.

**Methods:** Total 498 osteoporosis patients were included in this study. Study place was medicine and Orthopaedic Dept. of Central Medical College Hospital, Cumilla, Bangladesh in the period between January-December 2020. OP was assessed by BMD estimation with DXA using GE Healthcare Lunar Prodigy densitometer, considering T-score < -2.5 and -1 to -2.5. Fracture was determined by X-ray. Sarcopenia was determined by relative skeletal muscle index (RSMI) by DXA (≤7.26 kg/m$^2$ for men and ≤5.45 kg/m$^2$ for women) hand grip strength (HGS) (<30 kg in males, <20 kg in females) by Jamar dynamometer. Other aspects of sarcopenia was assessed by walking speed (<0.8 m/s), Timed Up and Go test (TUG) (>20 s).

**Results:** Among 498 patients, 467(93.78%) were female and 31(6.22%) were male with average age 63±10 years ranging 32-100 y. 111(22.29%) patients had severe OP with vertebral compression fracture 87(17.47%) and femoral neck fracture 24(4.82%) and remaining 387(77.71%) patients were osteoporotic without fracture. In severe OP group T-score of lumbar spine was -4.08±1.19 and femoral neck -4.03±1.49 respectively with average RSMI 5.21±1 kg/m$^2$, HGS- right 15.01 ±5.08 kg and left 13±5.1 kg, Walking speed 0.58±0.12 m/s and TUG-15.51±3.96 s having p value 0.0004. On other hand in OP without fracture T-score of lumbar spine was -3.35±0.94 and femoral neck -2.96±1.07 respectively with average RSMI 5.41±0.89 kg/m$^2$, HGS- right 17.35±4.32 kg and left 15±4.2 kg, Walking speed 0.64±0.1 m/s and TUG 13.46±2.05 s having p value 0.007.

**Conclusion:** Sarcopenia is very much prevalent in osteoporotic patients and severe sarcopenia is more coexistent with severe OP as assessed with

multiple parameters with statistical significance in small section of Bangladeshi population.

## P825
### MAGNETIC RESONANCE IMAGING VS. MUSCULOSKELETAL ULTRASOUND IN DETECTING MENISCUS LESIONS

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**Objective:** Musculoskeletal ultrasound (MUS) is an important imaging method useful in detecting both degenerative and inflammatory changes in peripheral joints [1]. MRI is considered the gold standard in assessing musculoskeletal lesions [2]. The detection of meniscus tears is of great importance in determining the cause of acute knee pain [3]. The aim of our study is to determine the value of MUS in detecting meniscus lesions compared to MRI.

**Methods:** The study included 32 patients with mean age of 58.6 y and a male:female ratio of 23:9. The mandatory criteria for inclusion in the study were the presence of mechanical knee joint pain, lasting for more than 2 weeks with suspicion of a post-traumatic meniscus lesion, with positive clinical maneuvers for meniscus tears. The patients underwent clinical evaluation, laboratory tests, MUS examinations and MRI of the affected knee. MUS scans of knee were performed using a MyLabSix machine with a multi-frequency array probe. The patients also underwent arthroscopy of the affected knee.

**Results:** The laboratory tests performed excluded other inflammatory pathologies of the knee. Clinical maneuvers were positive for medial or lateral meniscus lesions in 59.37% of patients. MUS assessed the presence of meniscus tears in 71.87% of patients with the visualization of meniscal cysts in 25% of patients. The MRI of the painful knee demonstrated the presence of meniscus tears in 87.5% of patients, while the meniscal cysts were evidenced in 25% of patients. The sensitivity and specificity of MUS compared to MRI in detecting meniscus lesions were 89% vs. 94% and 48% vs. 51%.

**Conclusion:** Although MRI remains the gold standard in assessing musculoskeletal lesions, MUS may be useful in the initial assessment and fast diagnosis of meniscus lesions, being able to provide a faster, dynamic and cost efficient examination.

**References:**

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2. Musetescu AE, et al. Rev Chim (Bucharest) 2019;70:1067.

3. Florescu A. Life-Basel 2021;11:218.

## P826
### COVID-19 AS A HISTORIC EVENT AND AS A COLLECTIVE TRAUMA

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Pandemics have always been a driving force in human history. From mythology and the Iliad to Thucydides' clinical description of the Athenian plague in the second book of the History of the Peloponnesian War and, of course, the recent outbreak of COVID-19 in December 2019, pandemics disrupt the flow of history; they appear as multifaceted crises that destabilize the social and political status quo. The threat of a plague, the threat of contagion and death, weakens social, economic, and political ties. The state struggles to maintain the validity of its power; its authority is shaken by the appearance of the epidemic. Social inequalities become more and more obvious. Isolation and fear dominate.

However, even if pandemics shake us to our core as a collective, if we want to truly understand the social and political gravity of epidemics, we must turn our attention in the way they affect the psyche of the individual. This effect, multiplied, creates a seismic shift that forces a nation and, in the case of COVID-19, possibly the first true global pandemic, humanity to redefine itself after every epidemic. Plagues challenge above all the individual, who is the pillar of the social contract; they force her to rethink her place in the community, her identity. They constitute crises that hinder communication which is vital for human beings. And, crucially, as COVID-19 proved to humanity, pandemics obstruct our ability to give meaning in everyday rituals, through which the individual forms bonds with others and comprehends the world around her. The feeling of futility that spreads in the social web, and the inability to define the self in a fluid and uncertain environment, work as catalysts for the chain reactions that follow a health crisis.

## P827
### ASSESSMENT OF OSTEOPOROSIS IN ANKYLOSING SPONDYLITIS

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**Objective:** Osteoporosis is a common complication of inflammatory rheumatic diseases such as ankylosing spondylitis (AS) [1]. The studies regarding the incidence of osteoporosis are controversial since AS is also marked by new growth of bone leading to the development of syndesmophytes and subsequent vertebral ankyloses [2, 3]. The aim of our study is to assess the incidence of osteoporosis/osteopenia in AS patients compared to a healthy control group.

**Methods:** The study included 26 patients with AS with mean age of 38.9 y and a male:female ratio of 23:3 and 26 age and sex-matched controls with no risk factors for osteoporosis. The mandatory criteria for inclusion in the study diagnosis of ankylosing spondylitis according to the The assessment of Spondyloarthritis International Society (ASAS) criteria for axial spondyloarthritis with duration of disease activity of minimum 2 y. The BMD of the forearm and hip were assessed using DXA scanner.

**Results:** Patients with AS had significantly lower T-score at the forearm and neck of femur than controls (T-score p=0.03 and p=0.015, respectively). We also assessed the inflammatory markers and diseases activity scores such as ASDAS and the (Bath Ankylosing Spondylitis Disease Activity Index) BASDAI. Lower T-scores at the neck of the femur were associated with ASDAS (p=0.0032), BASDAI (p=0.0045) and C reactive protein levels (p=0.0037).

**Conclusion:** In our study group, the incidence of low T-scores was more prominent in patients with AS than healthy controls and were also associated with disease activity and inflammatory markers.

**References:**

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3. Florescu A. Life-Basel 2021;11:218.

## P828
### THYROID HORMONE REPLACEMENT AND OSTEOPOROSIS IN EUTHYROID POSTMENOPAUSAL WOMEN: EXPERIENCE FROM A SINGLE CENTER

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**Objective:** To evaluate the BMD and number of fractures in osteoporotic postmenopausal women treated with thyroid hormone replacement

therapy (THR) in a cross-sectional study. Long term THR has been suggested to be inversely correlated with BMD and increased risk of fractures. It is still unclear if THR has a negative effect on bone remodeling even in sustained euthyroid patients.

**Methods:** Data regarding 49 postmenopausal osteoporotic women with ongoing THR treatment was collected from a single Portuguese center orthopedic ward between 2019-2021. Patients treated for at least one year with thyroxine, regardless of the dose, due to primary or secondary hypothyroidism and with normal thyroid hormone levels (T4 and TSH) were included. Patients with a potential secondary osteoporosis risk factor were excluded. BMD was measured using a DXA scanner if considered clinically appropriate. History of fragility fractures was questioned. Patients were compared with a control comprised of postmenopausal osteoporotic woman without thyroid pathology, using the Mann-Whitney U Test. The level of significance was chosen as <0.05.

**Results:**

| Feature | Intervention Group (n=49) | Control Group (n=164) | p-value |
|---|---|---|---|
| Age | $\bar{x}$ 76.1±SD 8.6 | $\bar{x}$ 79.6±SD 10.3 | 0.428 |
| BMI | $\bar{x}$ 28.27±SD 4.75 | $\bar{x}$ 26.83±SD 4.47 | 0.207 |
| Number fragility fractures | $\bar{x}$ 1.32±SD 0.6 | $\bar{x}$ 1.29±SD 1.1 | 0.135 |
| T-score femoral neck | $\bar{x}$ -3.05±SD 2.1 | $\bar{x}$ -2.17±SD 3.3 | 0.236 |
| T-score lumbar spine | $\bar{x}$ -2.58±SD 0.9 | $\bar{x}$ -2.80±SD 1.65 | 0.428 |

Regarding the intervention group at the time of investigation, the mean replacement dosage of levothyroxine was 0.124±0.088 mcg/d. The mean time of treatment with THR was 9.2±5.7 y.

**Conclusion:** In this cohort no statistically significant differences were found regarding number of fragility fractures of any site and BMD between euthyroid osteoporotic postmenopausal women treated with THR and osteoporotic postmenopausal woman without thyroid pathology. Due to the transversal nature of this study no data from previous hormone thyroid status was recorded. This study indicates that THR maintaining a euthyroid state in hypothyroid patients results in no increased bone loss or risk of fracture in postmenopausal women. For robust conclusions, we need large prospective cohort studies.

## P829
### ASTRAGALUS TINCTURA AS MEDICATION FOR STRUCTURAL CHANGES OF THE BONES IN JUVENILE RATS EXPOSED TO FORMALDEHYDE VAPORS

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**Objective:** To test the effects of *Astragalus tinctura* on the proximal epiphyseal cartilages of the humeri in juvenile rats exposed to formaldehyde vapors.

**Methods:** 72 month-old rats with body weight of 130-150 g were used. Animals were distributed into three groups as follows: group1 comprised intact animals, group 2 consisted of the animals exposed to formaldehyde vapors in concentration 2.766 mg/m$^3$ 60 min everyday. Animals of the group 3 were exposed to formaldehyde vapors and received *A. tinctura* by oral gavage at 100 mg/kg of body weight daily Observation terms were 10, 20, 30, 60, and 90 d. Animals of the group 3 were withdrawn from the experiment only 10$^{th}$ and the 30$^{th}$ day. HE stained sections of the proximal epiphyses of the humeri were photographed under the light microscope and images were used for histomorphometry. The data obtained were analyzed with the use of variation statistics methods.

**Results:** In the first group primary spongiosa share decreased as compared to the control animals in the period from the 10$^{th}$ to the 90$^{th}$

day of observation by 3.93%, 4.34%, 4.74%, 6.83%, and 7.35% respectively. Osteogenic zone narrowed in the period from the 20$^{th}$ to the 90$^{th}$ day by 4.38%, 7.06%, 8.44%, and 9.23%. Number of osteoblasts in this period also decreased by 4.21%, 4.98%, 7,43%, and 7.94%. After administration of *A. tinctura* significant differences between the groups 2 and 3 were registered only by the 30$^{th}$ day. Width of the whole growth plate increased by 4.01%, osteogenic zone widened by 5.13% and number of osteoblasts increased by 4.22% (all in comparison with the group 2).

**Conclusion:** Exposure to formaldehyde vapors results in inhibition of activities of the proximal growth plate. Inhibition in this case grows with time.. Administration of *A. tinctura* to the animals exposed to formaldehyde leads to restoration of growth plate functioning beginning from the 30$^{th}$ day after administration of medication.

## P830
### MAGNETIC RESONANCE IMAGING IN EVALUATING LUMBAR SPINE DISC HERNIATIONS

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**Objective:** MRI is one of the most important modern imaging techniques used for assessing lumbar spine disc herniations [1, 2]. The radiologist can detect and characterize a disc herniation and correlate clinical information with medical imaging data [3]. The main objective of our study is to determine which lumbar intervertebral disc is most frequently affected by using MRI in order to ease the decision regarding the therapeutic approach.

**Methods:** The study included a total of 32 patients (18 men, 14 women) between 40-60 y of age with a mean age of 48.93 y. The patients underwent clinical evaluation and MRI of the lumbar spine. The inclusion criteria consisted of radiating pain and/or numbness in the inferior limbs and herniated lumbar intervertebral discs. The MRI examinations were performed using a 1.5T GE machine.

**Results:** In the current study, disc herniation was most common in the L5-S1 (59.37%), closely followed by L4-L5 (46.87%). Disc herniation was less common at L1-L2 (0.06%), L2-L3 (15.62%) and L3-L4 (15.62%). Disc migration was encountered in 12 patients, with the L4-L5 intervertebral disc being the most commonly affected (7 patients). Disc migration occurred on a mean distance of 8 mm.

**Conclusion:** MRI has proven extremely useful in accurately detecting the etiology of the radiating pain and/or numbness in the inferior limbs. Furthermore, MRI examinations of the lumbar spine play a central role regarding the therapeutic approach of herniated lumbar intervertebral discs.

**References:**
1. Musetescu AE, et al. Rev Chim (Bucharest) 2019;70:1067.
2. Florescu A. Life-Basel 2021;11:218.
3. Musetescu AE, et al. Rev Chim (Bucharest) 2018;69:1122.

## P831
### WEDGE SHAPE CALCULATION IN HIGH TIBIAL OSTEOTOMY BY ASSESSING THE OPENING WEDGE OF HEMICALLOTASIS USING A DYNAMIC AXIAL FIXATOR IN OSTEOARTHRITIS KNEE

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**Objective:** Medial compartment osteoarthritis is generally seen in the initial stages of osteoarthritis. This leads to malalignment of the lower

limb which in turn leads to further degeneration of the medial compartment of the knee joint. The management constitutes high tibial osteotomy which involves the correction of the alignment. Opening wedge osteotomy generally leads to an empty space being formed which may or may not be filled up with bone graft with internal fixation. The base of the wedge depends on the amount of correction required. However, due to the triangular shape of the tibia, the wedge is of different sizes posteriorly as compared to anteriorly. This study predicts the shape of the wedge from medial to lateral and posterior to anterior with the help of hemicallotasis wedge opening while using the dynamic external fixator for HTO in OA knee.

**Methods:** A total of 40 knees in which HTO was performed using the dynamic axial fixator were taken. Exclusion criteria consisted of patients in whom the preoperative and postoperative X-rays were not in the same rotation. Inclusion criteria consisted of patients in whom the posterior slope did not significantly change in the postoperative X-rays as compared to the preoperative X-rays. This led to the inclusion of 32 X-rays in this study. The wedge opening was calculated in the anterior surface and the maximum opening of the osteotomy in the lateral and AP view X-rays. This was then compared to the width of the tibia to find out any correlation between the same.

**Results:** In the 32 X-rays it was seen that the opening of the anterior cortex was not significant as compared to the maximum opening of the wedge. There was no correlation between the width of the tibia and the difference in wedge opening. There was no significant change in the posterior slope of the proximal tibia in the postop as compared to the preop X-rays.

**Conclusion:** This study gives a great insight into the shape of the wedge opening in the HTO tibia. The wedge should be maximum at the medial cortex and should be sloping laterally and anteriorly. However, the sample size is small and large scale studies are required for the validation of this study.

## P832

### DISTRIBUTION OF DUAL-ENERGY X-RAY ABSORPTIOMETRY MACHINES IN IRAN

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**Objective:** According to the osteoporosis guidelines, measuring BMD is the main method of osteoporosis diagnosis. This study aims to investigate the distribution of DXA machines in the provinces of Iran and their inequality based on the socio-economic development status of the provinces.

**Methods:** All public and private clinics with DXA machines were identified across the country and the number of standard DXA machines was counted. Then, the number of standard devices per one million populations over 50 years was calculated by province. To investigate inequality in the distribution of DXA machines between the provinces, the concentration index (CI) was calculated. For this purpose, we plotted the cumulative proportion of the number of DXA machines per 1 million >50 y population of each province against the cumulative proportion of the socioeconomic rank of the provinces (poor to rich) (1).

**Results:** There were 299 standard DXA machines across the country. Of these, 58 (19.4%) of machines were available in public clinics and 243 (81.3%) were in the clinics located in the capital city of the provinces. The distribution of DXA machines in Iran is illustrated in Figure 1. The CI of the distribution of DXA machines between the provinces was estimated as 0.13, 95%CI: (0.005-0.25) (Figure 2).

**Conclusion:** DXA machines are not evenly available in most parts of Iran. More machines are needed to improve access to osteoporosis diagnostic services in remote areas.
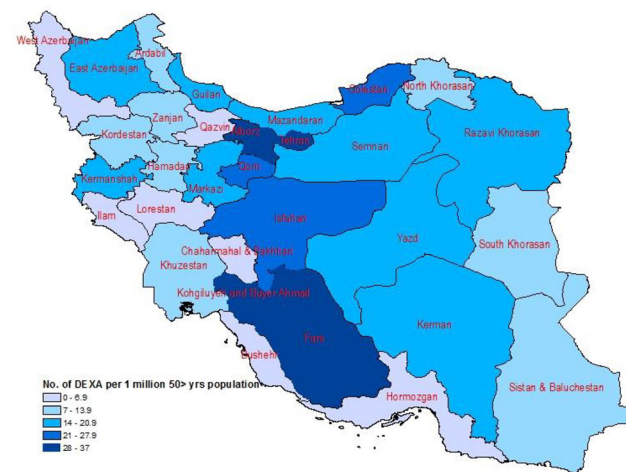


Figure 1. Distribution of DXA machines in Iran.
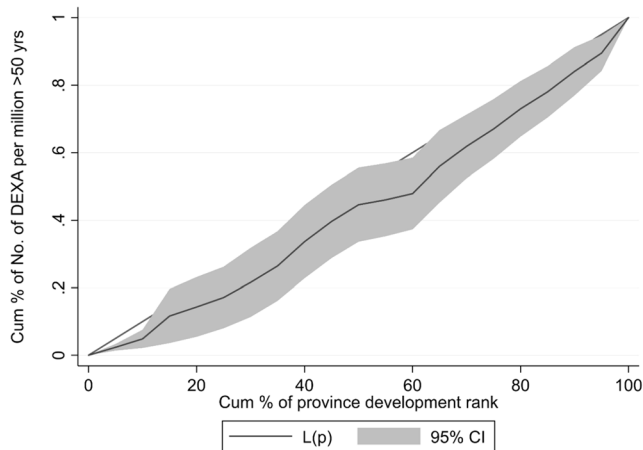


Figure 2. Lorenz curve; the cumulative proportion of number of DXA machines per million 50> years population vs. the cumulative proportion of the socioeconomic rank of the provinces (low to high).

## P833

### OCCURRENCE OF NEW FRACTURES DURING TREATMENT WITH ALENDRONIC ACID IN SEVERE OSTEOPOROSIS

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**Objective:** Alendronate is one of the drugs that has shown statistically significant efficacy in reducing the number of fractures in women after menopause. Its mechanism of action is based on the inhibition of osteoclasts, and on bone turnover. However, apart from generally tolerated gastrointestinal disturbances, the occurrence of fractures during treatment with alendronic acid remains rare. We report a series of 4 patients who had a fracture under alendronic acid.

**Methods:** Retrospective, descriptive study conducted in the rheumatology department of the Ibn Rochd hospital university over a period of 5 y from 2015 to January 2020, on patients in whom an osteoporotic fracture occurred during treatment with alendronic acid. Before retaining the patients, we had excluded all fractures that had occurred with other antiosteoporotics, and those who had not presented any fractures during the treatment sequence.

**Results:** Out of a total of 1200 files used, 4 patients were identified. The mean age was 72.5 (±4.12), a history of personal fracture was noted in ¾ of the patients, the fractures were distributed as follows: a wrist fracture in 3 patients, a fracture of the upper extremity of the femur occurred bilaterally in one patient, with a mean time to onset of 2.5 y. A history of fracture in a 1st-degree relative was not found in any patient, osteoporosis was postmenopausal in 1 case, cortisone in 1 case, iatrogenic in 1 case, and senile in 1 case. The vitamin D level was low in all patients despite the correction. A T-score for the L1-L4 lumbar spine was on average -3.525 (±0.22), and for the femoral neck at -2.675 (±1.004). Treatment with alendronic acid was started in all patients, with a mean duration of 75 months (6.25 y), a vertebral fracture occurred in two patients and a wrist fracture in two patients during follow-up, a change of treatment towards zoledronic acid was carried out in two patients, towards denosumab in a patient after ineffectiveness of zoledronic acid. The cause of the fracture was poor adherence to treatment in one patient, the added risk factor for osteoporosis in two patients.

**Conclusion:** Fractures added during treatment with alendronic acid are rare, but they should be kept in mind, given the difficulty and complexity of their management. It is first necessary to look for the causes of fractures before attributing them to treatment. Adherence to treatment, regular monitoring and prevention of falls remain the most important preventive measures in case of osteoporosis.

## P834

### USE OF ELECTRONIC MEDIA AS AN OPTION FOR CONTINUING MEDICAL CARE IN A FRACTURE LIASON SERVICE DURING COVID-19 CONTINGENCY

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**Objective:** Infection by SARS-Cov-2 (COVID-19) has affected practically all the world. Health care systems were overwhelmed and were issued general recommendations urging people to avoid hospitals and doctor's offices unless strictly necessary. These measures represented a challenge to provide continuity of health care for Fracture Liaison Services (FLS). Some pragmatic adaptations were proposed for continuing delivery of medical attention, including telemedicine. The primary objective of this study was to assess the feasibility of telehealth videoconferencing (TVC) as a media for medical consultations of previously functional and adherent patients in an urban-based FLS during the COVID pandemic. Secondary objectives were to estimate the utility of TVC to achieve continuity of treatment and evaluate the satisfaction with the medical care provided.

**Methods:** Functional and adherent patients with at least 6 months in treatment were monitored using a mobile device-based videoconference platform, the proportion of successful connection evaluated feasibility. Patient perception of usefulness, ease of use, effectiveness, reliability, and satisfaction were evaluated using the Telehealth Usability Questionnaire (TUQ).

**Results: 100** sequential FLS patients taken from the database were monitored through a teleconferencing platform; in 87% of the patients, it was feasible to conduct a successful monitoring consultation. However, 40% of the cases required the support of caregivers to carry out the task. Usefulness, ease of use, effectiveness, reliability, and satisfaction were

highly rated using the Telehealth Usability Questionnaire (TUQ), with most patients agreeing to continue treatment.

**Conclusion:** Based on our observations, the use of electronic media is a feasible option for successful health interactions with previously functional and adherent patients in an urban fracture liaison service setting during a health contingency.

## P835

### APPLICATION OF A DIPOTASSIUM PHOSPHATE PHANTOM FOR ASYNCHRONOUS CALIBRATION QCT

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**Objective:** To develop an asynchronous calibration QCT method that employs a dipotassium phosphate phantom (PHK), and to compare the changes in BMD of the vertebrae with the data from the asynchronous calibration QCT method used in routine clinical practice.

Methods. The study was conducted using a 64-slice CT scanner. BMD was evaluated using two methods: 1) Asynchronous calibration QCT processed by the QCT Mindways software 2) QCT-PHK using the PHK phantom. Both methods measured BMD values for L1-L2 vertebrae.

**Methods:** The first method was applied in accordance with the manufacturer's guidelines. The BMD values were measured in the spongy substance of the human vertebrae in the 3-dimensional region of interest. The CT scanner was calibrated monthly using the Model 4 asynchronous phantom, following the manufacturer's recommendations. The second method was based on the in-house PHK phantom that imitated the lumbar spine. The phantom contained "vertebrae" filled with $K_2HPO_4$ in various concentrations, representing the normal/osteopenia/osteoporosis values, respectively. Paraffin patches were used to simulate the fat. Similar to QCT, we picked a region of interest that corresponded to the spongy layer. The resulting HU values were converted into BMD using the linear calibration obtained from the PHK phantom scans.

**Results:** The statistical comparison of the patient's vertebrae BMD using the QCT and QCT-PHK methods yielded a significant Pearson linear correlation R2=0.977 (p<0.05). The Bland-Altman plot shows the lack of correlation between the difference in measured values and the average BMD. Also, it was observed that the positive systematic BMD bias of +4.50 mg/ml in QCT, may be attributed to the differences in phantom configurations. The Wilcoxon signed-rank test showed that the difference for the breakdown into the normal/osteopenia/osteoporosis groups using the ACR criteria for both methods turned out unreliable after the adjustment for the systematic bias.

**Conclusion:** The results of the BMD measurement using the in-house asynchronous calibration QCT-PHK method correlate well with that of the QCT Mindways. The developed method could be used for opportunistic screening for osteoporosis, and AI-assisted automated detection of BMD.

## P836

### FAVORABLE OUTCOME OF PAGET'S DISEASE OF THE BONE AFTER 4 YEARS OF DISCONTINUATON OF ORAL BISPHOSPHONATE THERAPY

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**Objective:** Paget's disease of the bone (PDB) represents a benign skeletal condition characterized by acceleration of bone turnover in one or more areas. The pathophysiology of this disorder consists in an abnormally

rapid bone resorption followed by osteoblast overactivity resulting in an abnormal, fragile, disorganized bone. We present a case of asymptomatic PDB presented in an endocrinology department for another endocrine disorder. Bone was evaluated using plain radiographs, computed tomography, radionuclide bone scan with 99mTc-HDP and DXA. The informed consent was obtained.

**Case report:** A 50-year-old female first presented in our clinic in 2015 for examining a thyroid nodule. Biochemical examination showed a serum total alkaline phosphatase (ALP) of 266 u/L (normal 38-105 u/l), normal thyroid biochemical profile and an enlarged thyroid gland with a benign nodule of 8/4 mm. Repeated evaluations showed a dynamic increase in ALP values 266 u/l to 375 u/l indicating possible PDB. Imaging showed: multiple osteolytic lesions of the L4 vertebrae, bilateral hip bone, greater trochanter and left femur alternating with areas of bone sclerosis, cortical thickening of the femoral bone, cranial vault thickening. Whole body scan revealed: increased uptake in the skull, spine, sternum, pelvis, left femur and bilateral tibia. Biochemical markers of bone resorption - CrossLaps 1.31 ng/ml (normal 0.162-0.436 ng/ml) and bone formation - osteocalcin 45.95 ng/ml (normal 11-43 ng/ml ) were elevated. DXA of the pelvic bones showed unilaterally elevated left hip BMD and a T-score of 3.5 DS. Active multiostotic PDB was confirmed and oral bisphosphonate therapy with 35 mg risedronate 6 d/week for 2 months was initiated, along with combined oral vitamin D and calcium supplements. We have been following this patient for 4 y during which biochemical and radiological remission was achieved.

**Conclusion:** Many patients with Paget's disease of bone are asymptomatic, and the disease is discovered accidentally during check-ups for other conditions. Asymptomatic patients with active disease should be treated especially if they are at risk of further complications. Treatment with bisphosphonates showed evidence of remission for at least 3 y requiring constant follow-up every 6 months.

**P837**

**THE ASSOCIATION OF OSTEOSARCOPENIA AND WHO CARDIOVASCULAR RISK SCORES IN THE ELDERLY POPULATION: RESULTS FROM BUSHEHR ELDERLY HEALTH (BEH) PROGRAM**

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**Objective:** There are some reports on the association of cardiovascular disease (CVD) with both osteoporosis and sarcopenia. This study aimed to explore the association between a newly developed CVD risk score and osteosarcopenia in the elderly population.

**Methods:** Male participants of the second phase of the BEH program were included in this analysis. Osteosarcopenia was defined as having both osteopenia/osteoporosis and sarcopenia. The CVD risk was defined as the 10-y risk for major cardiovascular events estimated using the lab-based version of the WHO updates Cardiovascular Risk Charts. The participants were considered high risk if the CVD risk was ≥20%. The estimated risks were compared in men with and without osteosarcopenia.

**Results:** In all, 2392 participants (1161 men) with a mean age of 69.3 (±6.3) y were studied. The median (IQR) CVD risks were 0.340 (0.2142)

and 0.230 (0.128) in men with and without osteosarcopenia, respectively (P<0.001). In women, the corresponding values were 0.260 (0.148) and 0.208 (0.138) in individuals with and without osteosarcopenia, respectively (P<0.001). The proportion of individuals with high CVD risk were higher among the participants with osteosarcopenia compared to those without osteosarcopenia in both men and women (Table).

**Conclusion:** This study displayed a significant association between WHO CVD risk score and osteosarcopenia. Further studies are required to investigate common pathways of cardiovascular and musculoskeletal systems.

Table. The prevalence of high-risk population for CVD in the osteosarcopenic and nonosteosarcopenic elderly population.

| | | Osteosarcopenia + | Osteosarcopenia - | P-value |
|---|---|---|---|---|
| CVD High-risk population (%)* | Women | 70.7 | 53.6 | <0.001 |
| | Men | 87.6 | 63.9 | <0.001 |

*High-risk was defined as having the CVD risk score≥ of 0.20

**P838**

**VARIATIONS IN BMD DEPENDING ON AGE AND GENDER, BASED ON DXA DATA FROM AN OUTPATIENT CITY CLINIC OF MEGAPOLIS**

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**Objective:** To evaluate the distribution patterns for male/female patients with osteopenia/osteoporosis, who underwent DXA in one of the outpatient clinics of Moscow. To compare the age distribution for femur BMD with NHANESIII.

**Methods:** We analyzed the studies from the DXA database (Lunar Prodigy Advance) available in the outpatient clinic of Moscow (population coverage: 250,000 patients). 5781 patients were selected after the screening (448 males; 20-92 y.o.; >50: 79.3% and 5333 females 20-93 y.o.; >50: 91.7%). This paper is based solely on original studies. BMD and T-scores were evaluated for the following sites: femoral neck (FN), total hip (TH), and spine L1-4 (SP). Precision and accuracy were estimated on a one-off basis using an in-house PHantom Kalium (for fat/no fat conditions is 0.83/0.85% and 4.94/-1.17%). Age distribution for femur BMD (FN,TH) was compared to NHANESIII following the Hologic-Lunar conversion.

**Results:** According to the WHO diagnostic criteria and based on the measurements of all sites in patients, the occurrence of osteoporosis/osteopenia was 8.8%/48.2% in men and 27.3%/51.2% in women. The acquired data were adjusted for the age distribution in the general population. The dependence between BMD and the patients' age was compared against the NHANES III data (mean relative BMD values were calculated). For the 20-50 y.o. patients the FN/TH in men:-7.4/-6.9%; in women:-8.3/-5.8%. The differences were significant (p<0.05) across all the comparisons. For the >50 y.o. interval, FN/TH in men:-1.3/-0.17%; in women: 1.4/5.9%. The differences were significant (p<0.05) only for TH in female patients. This cohort comprises most of the studied patients, so the BMD age distribution structure seems to closely resemble that of the general population.

**Conclusion:** The analysis of the DXA database of the outpatient city clinic revealed that in patients over 50 y.o. the occurrence of osteoporosis/osteopenia was 18.8%/48.2% in men, and 27.3%/51.2% in women, which seems to correlate with the data for the general population. We demonstrated a positive decrease in BMD compared to NHANESIII

(FN,TH) in patients below 50 y.o. which can be attributed to the high frequency of secondary osteoporosis.

## P839
### EVALUATION OF THE PLATELET RICH PLASMA EFFICACY ON PATIENTS DIAGNOSED WITH UPPER LIMB EXTENSOR TENDINOPATHY

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**Objective:** We wanted to evaluate the platelet rich plasma (PRP) efficacy on patients diagnosed with forearm extensor tendons' tendinopathy based on patient related outcomes (PROs).

**Methods:** After obtaining the approval of our Hospital's Ethics Committee, from January 2018 to December 2020 we recruited a total of 94 patients. In our research we included adult patients (18-76 y.o.) with no known blood pathology who were primarily diagnosed with forearm extensor tendons' tendinopathy. All the recruited patients had not received any other treatment before the application of the PRP preparation and had a full blood count within normal rates. All the participants had given written consent and answered voluntarily and anonymously the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire before and at 6-8 weeks interval since the ambulatory application of the 2 ml autologous PRP preparation on their lateral epicondyle. The DASH questionnaire is a self-administered specific measurement tool which has been previously validated for the Greek population. It uses 30 items to measure physical function and symptoms in persons with musculoskeletal disorders of the upper extremity for the previous seven days. The scoring system is on a 0-100 scale and higher values mean greater disability [1]. None of the participants had physiotherapy or any other additional treatment after the PRP application until the second assessment.

**Results:** From the initial group of the 94 participants, 16 patients did not attend their 1.5-2 month follow-up assessment and were not included in the final data analysis. In our cohort (n=78) there were 47 males and 21 patients (9 females) have been diagnosed with lateral epicondylitis of their non-dominant hand. None of the patients developed any local pathology after the PRP application or any allergic reaction. The average DASH score was 73 before the PRP application and 36 at the 6-8 weeks post PRP application assessment. The gender parameter seemed to play an important role on PROs as females had an initial mean Dash score of 67 and a 44 afterwards. Patients regardless of age and sex considered that their everyday quality of life was severely affected in case their dominant hand was affected as they presented higher average DASH scores of 87 and 46 respectively.

**Conclusion:** According to our data based on PROs, the application of PRP on patients diagnosed with forearm extensor tendons' tendinopathy has a favorable effect on their symptoms and disability. The results are affected by the patients' specific characteristics.

**Reference:**

1. http://www.dash.iwh.on.ca/sites/dash/files/downloads/quickdash_info_2010.pdf

## P840
### THE ROLE OF PHYSICAL THERAPY IN THE RECOVERY OF COMPLEX REGIONAL PAIN SYNDROME IN THE PATIENT WITH STROKE

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**Objectives:** To highlight the role of physical therapy in patients with stroke and complex regional pain syndrome (CRPS) compared to conventional therapy.

**Methods:** 62 patients divided into two groups were studied. The study group included 32 stroke and CRPS patients who received, in addition to conventional therapy with analgesics and non-steroidal drugs, vitamin D3 in therapeutic doses, physical treatment involving massage, physical therapy, and analgesic electrotherapy. The control group received only pharmacological treatment consisting of analgesics (painkiller), nonsteroidal drugs and vitamin D3. Patients were evaluated clinically, functionally, goniometric joint measures, ADL (activity of daily living) scale and VAS scale was used for pain.

**Results:** It was found that the study group obtained much better functional scores compared to the control group, and the pain was reduced by a percentage of 38.6% compared to the control group.

**Conclusion:** Early kinetic physical therapy improved patients' symptoms and functionality was also improved in patients with complex regional pain syndrome.

## P841
### BEREAVEMENT AND THE USE OF ANTIDEPRESSIVE AGENTS AS A CAUSE OF FRACTURES

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Bereavement is a form of severe stress. It may cause depression which may require the use of antidepressive agents for its treatment. The aim was to describe the case of a patient who developed osteoporosis and fractures after bereavement, depression and the use of antidepressive agents.

The case of a female patient aged 52 y who presented with fractures is described. The patient had a negative family history for osteoporosis. Her twin sister had normal BMD and reported no fractures. The patient reported menopause at the age of 50 y. At the age of 50 she had suffered a fragility fracture of the 3rd metatarsal bone of the right lower extremity. At the age of 51 she had a fragility fracture of the cuboid bone of the right foot. The fractures were managed conservatively. A detailed history was taken including all agents administered in the past for different pathologies. It was found that the patient had lost a son after an accident at the age of 42 y. She developed depression and was treated with antidepressive agents, including selective serotonin reuptake inhibitors. BMD was measured in the left hip and a T-score of -2.6 was found. Alendronate was administered along with calcium and cholecalciferol.

Bereavement is a form of severe stress and may cause depression. Depression has a negative effect on bone metabolism and is a risk factor for the development of fractures. Antidepressive agents, in particular selective serotonin reuptake inhibitors may have adverse effects on bone metabolism and may be related to the development of fractures. Thus, bereavement and the subsequent depression may adversely affect bone metabolism and may be a risk factor for fractures. The use of antidepressive agents, such as selective serotonin reuptake inhibitors may also be a risk factor for osteoporosis. In conclusion, the case of a patient is described who developed fractures and osteoporosis after bereavement and depression requiring treatment with antidepressants.

## P842
### SPINAL ORTHOSES PRESCRIPTION FOR VERTEBRAL FRAGILITY FRACTURES: THE SPIN-VER SURVEY

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**Objective:** Aim of this survey was to investigate the common clinical practice in terms of prescription of spinal orthoses for patients with vertebral fragility fractures (VFFs).

**Methods:** In this nationwide cross-sectional survey, entitled "Spinal orthoses Prescription IN VERtebral fractures (SPIN-VER)" Survey, we involved a cohort of Italian Physical and Rehabilitation Medicine physicians commonly involved in the management of patients with VFFs in their outpatient clinics. All study participants were recruited from April 2020 to May 2020, through an email recruitment strategy and were asked to participate to an online 13-item questionnaire investigating information on outpatients assessed by the physicians, spinal orthoses prescription, and anti-osteoporotic therapy.

**Results:** We included data collected from 126 PRM physicians that completed the survey. They came from all over the Italian country: 54 (42.9%) were from northern Italy, 23 (18.2%) from central Italy, whereas 49 (38.9%) were from southern Italy. Almost half of physicians involved in the survey reported to assess >100 patients per month and 14.3% of participants managing over 200 patients per month. 71 participants (56.3%) reported a prevalence of 20-50% of osteoporotic patients and 13 (10.3%) reported a diagnosis of osteoporosis in even >50% of their patients. The 66.7% of participants reported the absence of VFFs in low back pain patients in more than 20% of cases.

**Conclusion:** A correct management of VFFs is mandatory to improve pain and reduce disability in fragile osteoporotic patients. The results of the SPIN-VER survey showed that most of PRM physicians prescribe spinal orthoses in outpatients suffering from VFFs, albeit this therapeutic intervention is not fully supported by evidence, partly due to the large gap in the current literature.

## P843

### BONE HEALTH AND ORAL HYGIENE STATUS IN A COHORT OF BREAST CANCER WOMEN BEFORE STARTING ANTIOSTEOPOROSIS THERAPY: CROSS-SECTIONAL STUDY

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**Objective:** To assess bone health and oral hygiene status in a cohort of breast cancer (BC) women before starting an anti-osteoporosis therapy for their cancer treatment-induced bone loss.

**Methods:** In this observational cross-sectional study, we recruited postmenopausal women with a diagnosis of invasive BC surgery performed at least 12 months earlier, undergoing tamoxifen or aromatase inhibitors adjuvant hormone therapy. The following data regarding bone health were also collected: previous femoral and vertebral fragility fractures, lumbar spine (LS) and femoral neck (FN) BMD, Fracture Risk Assessment tool (FRAX®) major and hip fractures risk, and serum levels of 25-hydroxyvitamin D (25(OH)vit. D), calcium, PTH, and alkaline phosphatase. Furthermore, all participants underwent a specialistic oral health evaluation, including the following outcomes: Decayed, Missing and Filled Permanent Teeth Index; Oral Hygiene Index (OHI), and Plaque Control and Record Index.

**Results:** Out of 128 subjects recruited, 122 postmenopausal BC women (mean aged 55.6±10.4 y) were included in the final analysis. The mean LS BMD was 1.049±0.147 g/cm$^2$, whereas the mean FN BMD was 0.747

±0.109 g/cm$^2$; 23% of BC women had osteoporosis and 52.5% had osteopenia. the mean serum level of 25(OH)vit.D was 23.9±16. ng/ml, and 89 patients (72.9%) reported hypovitaminosis D ([25(OH)vit.D] <30 ng/ml). The OHI showed that only 11.5% (n=14) had good oral hygiene while 35.3% had a sufficient oral health and 53.2% (n=65) had an insufficient status. There were no statically significant correlations (p>0.05) among oral health indexes and BMD or vitamin D status.

**Conclusion:** BC women had high prevalence of osteopenia/osteoporosis, hypovitaminosis D, and a very high prevalence of mild/moderate periodontitis and low oro-dental care. This study might be a starting point for future works investigating the correlation between BC, osteoporosis and oral health to define a patient-oriented multidisciplinary management.

## P844

### USE OF THE SERGI EQUATION TO ESTIMATE THE APPENDICULAR MUSCLE MASS IN THE MEXICAN POPULATION: AN EXPLORATORY STUDY

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**Objective:** Sarcopenia is the age-related loss of skeletal muscle that can result in decreased muscle strength and physical performance. To make the diagnosis, evaluation of muscle mass is recommended through measurement of appendicular muscle mass (AMM) and appendicular muscle mass index (AMMI). In Mexico, access to DXA devices is limited, so it is necessary to develop new ways to identify subjects with low AMM. This study aimed to evaluate the concordance between the Sergi equation and the DXA measurement to estimate the appendicular muscle mass in the Mexican population.

**Methods:** Cross-sectional study design. Participants: 5 men and 5 women residents of León, Mexico. Measurements: height, weight and hand grip strength were evaluated. A body composition analysis was done by bioelectric impedance analysis (BIA) and by DXA.

**Results:** Table presents the characteristics of the study subjects. A good correlation was found between AMM DXA and AMM Sergi (r=0.971, p<0.000), AMMI DXA and AMMI Sergi (r=0.90, p<0.000) and AMMI DXA/Height and AMMI Sergi (r=0.888 p<0.001). Through the Bland Altman analysis, good agreement was found between the variables (Figure). The ICC was obtained to evaluate the concordance between AMM DXA and AMM Sergi (ICC=0.9672, 95%CI 0.8680 to 0.9919), AMMI DXA and AMMI Sergi (ICC=0.9407, IC 0.7614 to 0.9853), AMMI DXA/Height and AMMI Sergi (ICC=0.9335, IC 0.7324 to 0.9835).

**Conclusion:** The findings of this study confirm, in a preliminary way, that the Sergi equation presents a good agreement with the DXA analysis to estimate AMM in older Mexican adults. In Mexico, its use can make the diagnosis and follow-up of patients with sarcopenia more accessible.

Table.

| Descriptive Statistics | All, mean (+/- SD) n=10 | Men mean (+/-SD) n=5 | Women mean (+/- SD) n=5 |
|---|---|---|---|
| Age | 69.8 (+/-6.44) | 72 (+/-6.44) | 67 (+/-1.34) |
| Weight | 66.23 (+/-11.21) | 74.06 (+/-9.11) | 58.40 (+/-6.84) |
| Height | 158.53 (+/-7.47) | 162.98 (+/-7.74) | 154.08 (+/-4.0) |
| BMI | 26.35 (+/-3.69) | 27.98 (+/-3.63) | 24.73 (+/-3.31) |
| Arm. Circ. | 30.09 (+/-2.93) | 31.18 (+/-2.41) | 29.00 (+/-3.25) |
| Triciptal fold | 21.15 (+/-5.73) | 19.6 (+/-5.22) | 22.70 (+/-6.37) |
| Max. Strength | 25.7 (+/-6.41) | 28.2 (+/-7.98) | 23.20 (+/-3.63) |
| AMM DEXA | 17.51 (+/-4.39) | 21.20 (+/-2.85) | 13.81 (+/-1.04) |
| AMM SERGI | 17.26 (+/-3.35) | 20.25 (+/-1.51) | 14.27 (+/-.825) |
| AMMI DXA | 7.00 (+/-1.19) | 8.08 (+/-0.25) | 5.92 (+/-0.47) |
| AMMI SERGI | 6.77 (+/-0.93) | 7.4 (+/-0.93) | 6.15 (+/-0.38) |
| AMMI DXA/Height | 6.89 (+/-1.19) | 7.96 (+/-.44) | 5.82 (+/-.430) |
| Resistance | 546 (+/-77.85) | 492.48 (+/-62.60) | 599.64 (+/-50.40) |
| Reactance | 54.65 (+/-13.62) | 52.06 (+/-18.18) | 57.24 (+/-8.37) |
| Phase Angle | 5.99 (+/-1.25) | 5.92 (+/-1.42) | 6.06 (+/-1.22) |
| Resistance Index | 47.37 (+/-10.81) | 54.95 (+/-10.37) | 39.80 (+/-3.52) |
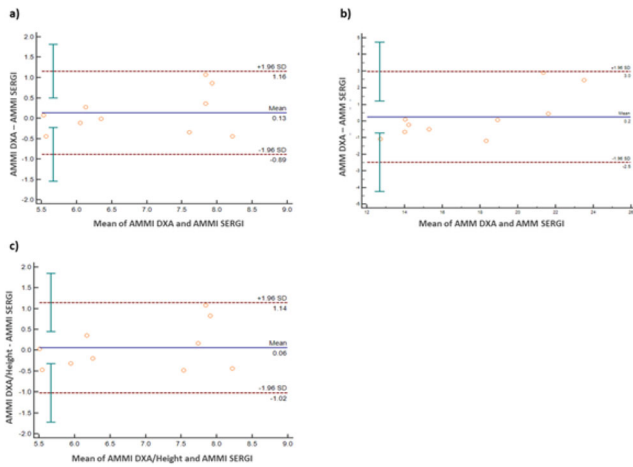
## P845

### HYPERTHYROID MEN HAVE REDUCED GLOBAL STRENGHT OF THE PROXIMAL FEMUR IN 3D-SHAPER ANALYSIS

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**Objective:** Hyperthyroidism is an important cause of secondary osteoporosis and fragility fractures because it induces bone loss, mainly cortical. The 3D-SHAPER software incorporates a model-based algorithm to analyze the bone in 3D from a standard DXA scan, allowing the study of both trabecular and cortical compartments of the proximal femur. This study aimed to analyze both cortical and trabecular compartments of the proximal femur in men with hyperthyroidism.

**Methods:** A group of 21 men aged <50 y with nontreated hyperthyroidism was paired by age and height with a control group (n=21). The BMD (g/cm$^2$) at the lumbar spine and at the proximal femur were evaluated by DXA (QDR DiscoveryW, Hologic, EUA). The 3D analysis of the DXA scans was done with the software 3D-SHAPER v2.10 (Galgo Medical, Spain) and evaluated several parameters namely vBMD integral total (mg/cm$^3$), vBMD integral neck (mg/cm$^3$), and neck Z (cm$^3$). Adequate statistical tests were used according to parameter normality distribution, significance P<0.05.

**Results:** The mean age and height were identical. The means (±SD) of the BMD, integral and neck vBMD and neck Z are described in Table.

| Groups Variables | CONTROL (n=21) | HYPERTHYROIDISM (n=21) | P |
|---|---|---|---|
| Lumbar spine BMD g/cm$^2$ | 1.093 (±0.1) | 0.981 (±0.1) | 0.007 |
| Proximal femur BMD g/cm$^2$ | 1.094 (±0.1) | 0.973 (±0.1) | 0.005 |
| vBMD Integral Total mg/cm$^3$ | 359.7 (±55.5) | 318.4 (±46.2) | 0.012 |
| vBMD Integral Neck mg/cm$^3$ | 431.2 (±78.7) | 381.9 (±55.4) | 0.024 |
| Neck Z cm$^3$ | 1.24 (±0.32) | 1.04 (±0.25) | 0.037 |

**Conclusion :** This study of men with nontreated hyperthyroidism aged <50 y showed a significant decrease of the BMD at the lumbar spine and at hip. The 3D analysis of the proximal femur highlighted the negative effect of the disease in both cortical and trabecular compartments and so a reduction of the global strength at the proximal femur, which can be risk factors for osteoporotic femur fractures.

## P846

### Relationship Between Frailty And FRAX in predicting future fractures in Elderly Patients With Acute Hip Fractures

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**Objective:** Frailty is common in older patients and has been associated with increased of falls and fractures. FRAX is a WHO fracture risk prediction tool that has been extensively validated in different population groups. It incorporates clinical risk factors for osteoporosis with and without BMD to predict a 10-y probability of sustaining a major osteoporotic fracture and hip fracture. Acute hip fracture patients are frequently frail with an increased risk of falls and fractures but frailty scores are not routinely incorporated into fracture risk assessment tools. Aims: 1. To determine if there is a correlation between frailty and FRAX in predicting 10-y probability of sustaining a major osteoporotic or hip fracture; 2. To assess the impact of gender on this relationship.

**Methods:** A retrospective, cross-sectional analysis of patients admitted with acute hip fracture to a district general hospital was carried out. Anonymized data was manually extracted from electronic records. Rockwood clinical frailty score (CFS) was used to calculate frailty score and FRAX UK (without BMD) was used to calculate fracture risk. Patients younger than 60 y and patients with incomplete data were excluded from analysis. SPSS 27 software was used for statistical analysis. Descriptive statistics was used to assess baseline characteristics; spearman correlation co-efficient and linear regression were used to determine correlation.

**Results:** 195 patients were included in analysis – 49 males and 146 females. Overall mean age was 82.3 y ±8.13; mean age in the males was 80.6 y ±7.1 and in the female patients 82.8 y ±8.4. There was statistically significant positive correlation between CSF and FRAX overall and in the female patients but not in the men (r=0.221; p<0.001; r=0.481; p<0.001; r=0.163; p=0.163; p=0.26 for major osteoporotic fractures and r=0.314; p<0.001; r=0.440; p<0.001; r=0.165; p=0.26 for future hip fractures respectively).

**Conclusion:** Frailty is associated with increased 10-y probability of major osteoporotic and hip fractures in elderly female patients with acute hip fractures but not in males.

## P847

### INCREASING THE QUALITY OF LIFE IN PATIENTS WITH OSTEOPOROSIS AND STROKE BY COMBATTING SPASTICITY USING INCOBOTULINUMTOXIN A INJECTION

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**Objective:** Prolonged immobilization of the stroke patient will increase the degree of osteoporosis and the risk of fragility fractures. We aim to increase the quality of life in patients with osteoporosis and stroke by combating spasticity using treatment with incobotulinumtoxin A administered focally intramuscularly with ultrasound guidance.

**Methods:** We studied 34 stroke patients who had a bone density test - DXA score of <-2.5 SD. The study group, 17 patients, received treatment with bisphosphonates, vitamin D3 and incobotulinumtoxin A every 3 months. Patients were monitored for 9 months. The control group, also 17 patients, received only conventional treatment with bisphosphonates and vitamin D3. The evaluation consisted of health-related quality of life assessed using the Romanian version with 15 items. Fall events were counted in each patient during the study.

**Results:** We noticed that the study group received more good scores at the evaluation every 3 months. Functionality has been improved; patient compliance with this treatment has increased. The fall events were reduced to the study group.

**Conclusion:** Using modern methods of spasticity therapy in patients with osteoporosis and stroke has reduced the number of falls and thus the risk of fragility fracture, which demonstrates the effectiveness of this approach in the neurological patient associated with osteoporosis to increase the quality of life.

## P848

### BONE AND THYROID GLAND PATHOLOGY IN RHEUMATOID ARTHRITIS

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**Objective:** To study the presence of osteoporosis and thyroid gland pathology in patients with rheumatoid arthritis (RA) and to determine their correlation with disease activity.

**Methods:** A total of 59 RA patients and 48 non-RA patients were included in the study, with the mean age of 54.2±9.6 and 55.1±10.2 y respectively. To appreciate osteoporosis BMD was measured by DXA, using WHO criteria. The presence of thyroid gland pathology was estimated by TSH, free thyroxine (fT4), antithyroglobulin antibody (TgAb), and antithyroid peroxidase antibody (TPOAb). Disease activity was measured by DAS-28-ESR.

**Results:** Mean disease duration of RA was 9.6±5.6 y. Mean duration of menopause was 5±2.6 y in RA group and 4.9±1.8 y in non-RA group. RA patients were in 89% positive for rheumatoid factor and in 72% positive for antiCCP antibodies. Osteoporosis at the level of hip was confirmed in 41% of cases in patients with RA and only in 17% of cases in control group, while osteoporosis at the level of lumbar spine was more common for non-RA patients in 48 vs. 13% in RA. Clinical hypothyroidism was reported in 20.33% patients with RA and 2.08% without RA. Clinical hyperthyroidism was found in 3.38% patients with RA patients. Subclinical hyperthyroidism was reported in 11.86% patients with RA and in 4.16% patients without RA. Subclinical hypothyroidism was reported in 3.38% patients with RA and in 2.08% patient without RA. Total of 30.5% patients with RA and 4.16% patients without RA had TgAb, while TPOAb were found in 37.28% patients with RA and in 6.25% patients without RA. ESR (35.5±24.2 vs. 18.4±5.0 mm/h) was significantly higher in patients RA. Low disease activity was found in 3.39% patients, moderate disease activity was in 20.34% patients, high disease activity was in 76.27% patients. High disease activity positively correlated with the presence of osteoporosis and thyroid gland pathology (r=0.58 and r=0.34, respectively), at the same time the presence of thyroid gland pathology was associated with lower BMD.

**Conclusion:** The relationship between RA and osteoporosis was confirmed, while concomitant thyroid pathology contributed to more evident loss of BMD. Bone loss at hip level was more characteristic for RA. Presence of both osteoporosis and thyroid gland pathology correlated with high disease activity by DAS28-ESR.

## P849

### VITAMIN D STATUS IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISM

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**Objective:** To study the vitamin D status in postmenopausal women with primary hyperparathyroidism (PHPT).

**Methods:** We studied 52 postmenopausal women with PHPT (the main group), average age 64.4±7.592 y. The control group was 52 postmenopausal women without PHPT, average age 62.3±6.287 y in physiological menopause. Examination: total calcium, phosphorus, albumin, creatinine, PTH, 25(OH)D, BMD measurements by DXA, LVA.

**Results:** There were no differences in the age, height, weight, BMI, age of menopause starting, duration of menopause in both groups. The level of vitamin D in postmenopausal women with PHPT was significantly lower (15.9 (10.8-21.1) ng/ml) in comparison with the control group (20.9 (16.5-24.6) ng/ml, U=944.0, p=0.014). The vitamin D level >30 ng/ml in the main group was detected in 9.6% cases, in the control group – 15.4% ($\chi^2$=0.79, p=0.374). The vitamin D level 20-29 ng/ml in the main group was detected in 19.2% cases, in the control group – 48.1% ($\chi^2$=9.69, p=0.0019). The vitamin D level <20 ng/ml in the main group was detected in 71.2% cases vs. the control group 38.5% ($\chi^2$=11.22, p=0.0008).

Significant increase of the vitamin D deficiency (<20 ng/ml) was found in postmenopausal women with PHPT in comparison with the control group.

**Conclusion:** The results of the study detected the significant increase of the vitamin D deficiency (<20 ng/ml) in postmenopausal women with PHPT in comparison with the control group.

## P850

### VERTEBRAL FRACTURES IN PATIENTS WITH HIP FRACTURE

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**Objective:** Vertebral fractures (VF) are the most common fragility fractures and despite its value as a powerful predictor of future fracture risk and mortality are often undiagnosed. This study aimed to assess the prevalence of undiagnosed VF in a cohort of hip fracture patients.

**Methods:** We retrospectively identified all hip fractures admitted to our fracture liaison service (FLS) between January 2017 and August 2020. Spine images and clinical reports of this patients were reviewed. The data was analysed using SPSS version 27.

**Results:** From a total of 162 patients who were admitted to our FLS, we included 90 referred because of hip fracture. 84% were female with a mean age of 80.4 y (SD: 7.7). Of the 49 (54.4%) patients who had spine images available for analysis, 26 (53.1%) had a VF on imaging review. Among these 26 patients, only 2 (7.7%) had previously diagnosed VF and 6 (23.1%) had symptoms suggestive of fracture. The majority (92.3%) of patients who had radiological evidence of VF were previously undiagnosed.

**Conclusion:** Patients with hip fracture admitted to our FLS had a high prevalence of undiagnosed spine fractures. This highlights the need for a screening strategy for the presence of VF in hip fracture patients in order to identify those at greatest risk and offer an appropriate treatment at earlier stages.

## P851

### FRAGILITY FRACTURES IN MEXICO: BEST PRACTICE PROPOSAL THROUGH FRACTURE LIAISON SERVICES (FLS)

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In Mexico, the fragility fractures (FF) represent a public health problem; recent reports state rates of almost 2,000 cases for every 100,000 inhabitants with an expected sevenfold increase by 2050 (Clark.P-2005). Hip fracture cases will go up from 155,875 to 226,886 in 2050 (5.2 to 7.2 times more than those registered in 2005) (Johansson.H-2011). According to ICUROS-Mx study mortality after FF was 20.2%. Quality of life after FF is affected significantly (Borgstrom.F-2013). The costs related with the handling of nonpharmacological low bone mass (osteopenia), osteoporosis and FF are high in our country; they reach over 5,191 million (MXP) in 2010 and $ 7,575 million pesos in 2020 (Carlos.F-2013).

The Mexican health care system comprises two sectors: public and private, offers coverage to 82.2% of the 119.5 million inhabitants registered in that year. An example is Instituto Mexicano del Seguro Social (IMSS) Victorio-de-la-Fuente-Narváez where the traumatology unit alone will require a budget greater than 315,000,000 million (MXP) per year as per 2050 forecasts. We show the direct costs derived from the most frequent FF according to the Group Related Diagnosis (GRP) published in 2017 by the IMSS with costs updated to 2020 (Gilma.A-2014).

Fracture Liaison Services (FLS) with a worldwide successful experience for the care of FF patients offer diverse and feasible models enable to adapt to different Health Systems settings. The aim of this review is to put forward the possible implementation of the International Osteoporosis Foundation (IOF) Capture the Fracture® program) in Mexico.

The initial experience in the implementation of the Capture the Fracture program in diverse Mexican institutions shows us that this program is feasible of being adapted for being implemented in countries with fragmented health system such as Mexico.

The fishbone diagram below (Figure 1) lists the barriers impacting the development of FLSs in Mexico. These barriers include a series of factors required for an effective and efficient FLS. All these factors were exacerbated by the COVID-Sars2.
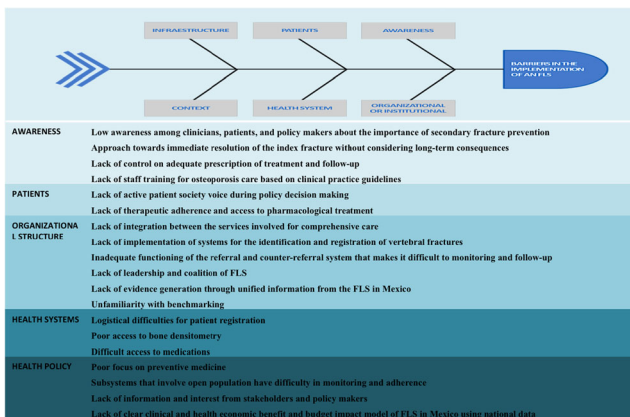


Figure 1. Barrier for FLS implementations in Mexico.

**Conclusion:** Fragility fractures represent a health problem in Mexico and in the world. This study reviews and puts forward the implementation of FLS as a feasible and cost-effective alternative in health institutions in our country.

**Disclosure:** MKJ has received honoraria and grant support from Amgen, UCB and Kyowa Kirin Hakin.

## P852
## TREATMENT OF OSTEOPOROSIS WITH TERIPARATIDE
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**Objective:** Teriparatide is recombinant human PTH analog (1-34) [rhPTH(1-34)] indicated for treatment of patient with osteoporosis associated with high risk for fracture due to sustained systemic glucocorticoid therapy, postmenopausal women and increase of bone mass in men with primary or hypogonadal osteoporosis. This work is to study the clinical profile of patients with osteoporosis treated with teriparatide.

**Methods:** 4-y prospective study including patients with osteoporosis treated with teriparatide. Indications for treatment are postmenopausal osteoporosis (PMO), corticoid-induced osteoporosis (CIO), severe osteoporosis. Osteoporosis is defined by a femoral neck T-score and/or lumbar spine $\leq$-2.5 by DXA. the treatment by teriparatide injection 20 ug/d during 24 months.

**Results:** we collected 18 patients 17 women and 01 men treated with teriparatide, the average age is 56 y among them there 11 cases of CIO, were 4 cases of PMO, 1 case of hyperparathyroidism, and 1 of celiac disease, the underlying pathologies were rheumatoid arthritis (RA) in 5 patients, one case of Gougerot-Sjögren syndrome, 1 case Churg-Strauss syndrome, 1cas of Horton, 2 cases of scleroderma, and 1 case systemic lupus erthyromatoes; 8 patients had at least of fracture, 4 of them presented fracture spine. As example from our study, patient with OP CIO with underlying pathologies rheumatoid arthritis the DXA before treatment at femoral neck T-score <-2.8 and, lumbar spine <-3.4 by DXA at 24 months of treatment with teriparatide a which gain femoral neck T-score <-0.3 and, lumbar spine <-03.

**Conclusion:** The majority of our patients treated by teriparatide have a severe osteoporosis complicated with fractures; however the teriparatide can lessen the number of fractures of the spine and other bones fracture related to osteoporosis, or who have several risk factors for fracture.

## P853
## EXTRASKELETAL CALCIFICATION AND BONE DISTURBANCES IN HEMODIALYSIS PATIENTS
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**Objective:** To study the prevalence of disorders of mineral metabolism and parathyroid glands function and to rule out factors which lead to extraskeletal calcification (EC) in chronic kidney disease (CKD) patients receiving hemodialysis.

**Methods:** We examined 157 adults (58 men, 79 women) with CKD 5 stages on hemodialysis, mean age 51.2±14.5 y from a single dialysis center. The laboratory investigations included evaluation of PTH, serum total and ionized calcium, serum phosphate, serum level of alkaline phosphatase concentrations. PTH level in serum was evaluated by solid phase chemiluminescent immunoassay. All patients had undergone Echocardiography examination and lateral abdominal X-ray examination.

**Results:** Overall, 67 (42.67%) of patients had bicuspidal, aortic valve or both valves calcification either peripheral artery calcification. Patients with EC had significantly more prominent disturbances in mineral metabolism compared to group of patients without calcification. Phosphorous concentration in group with EC showed 2.37±0.09 vs. 1,97±0.05, p<0.01 in group without EC. Calcium level was significantly higher in group with EC (2.32±0.05 vs. 2.19±0.02, p<0.05). On the other hand it was not significant difference in PTH level (574.16±119.2 vs. 520.78±50.40, p>0.05). Patients were divided into groups according to KDIGO recommendations for PTH levels in order to establish the association between PTH levels and EC. In patients with low levels of PTH incidence of EC was significantly higher compared to those with target PTH levels (31.34 vs. 12.2%, p<0.05). On the other hand in

patients with higher levels of PTH in which it was observed more than 6 times increase of this hormone over the upper limit level, incidence of EC was significantly higher compared to those with PTH within target levels (43.28 vs. 25.6%, p<0.05). In patients with target PTH levels (2 to 6 times increase over the upper limit) incidence of EC was significantly lower compared to those with elevated either decreased PTH levels (25.37 vs. 62.2%, p<0.01).

**Conclusions:** EC is present in 67% of hemodialysis patients and is associated with hypercalcemia and hyperphosphatemia. Both low and increased levels of PTH contribute significantly in development of EC in dialysis patients compared to those with target PTH levels.

## P854
### CONSUMPTION OF SEVERAL MACRO-, MICROELEMENTS AND VITAMIN D BY PERIMENOPAUSAL AGE FEMALES WITH ARTERIAL HYPERTENSION

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**Objective:** To evaluate the dietary body supply with macro-, microelements and vitamin D and their interrelation with endothelial function in perimenopausal period women with arterial hypertension (AH).

**Methods:** We investigated 102 women of the perimenopausal period with AH stage II aged 50 (46; 52): group I – 41 women without endothelial dysfunction (ED), group II – 61 women with ED. ED was diagnosed in endothelium dependent vasodilatation (EDVD) assessed by computed impedancemetry during reactive hyperemy test when $\Delta dz/dt$ <12% was related to ED. The levels of nitrate/nitrites (NO) in blood plasma were determined by spectrophotometry using Griess reagent. The evaluation of calcium (Ca), phosphorus (P), magnesium (Mg), sodium (Na), molybdenum (Mo) and vitamin D consumption was performed by the analysis of actual 3 d food intake.

**Results:** EDVD in group I was 39.2(30.3; 53.3)%, in group II – 12.7 (-22.8; 0.3)%, (p<0.01). The level of NO in blood plasma was higher (p=0.01) in group I – 23.4 (14.4; 32.8) as compared to group II – 12.5 (9.4; 21.5) mcmol/l. Women in groups I and II showed verifiable difference in P consumption 975.8 (811.8; 1228.5) vs. 875.4 (710.2; 1044.4) mg/d (p=0.04); Mg – 242.6 (217.4; 299.8) vs. 221.9 (181.1; 253.7) mg/d, (p=0.02); Na – 1088.6 (626; 1684.5) vs. 816.6 (506.9; 1081.5) mg/d, (p=0.03); Mo – 39.6 (32.5;57.6) vs. 30.7 (20.1; 42.8) mg/d, (p=0.01), respectively. The Ca consumption (group I – 496.3 (398.3; 668.2) mg/d, group II – 547.5 (331.6; 612.2) mg/d and vitamin D consumption (group I – 0.32 (0.16; 1.51) mcg/d, group II – 0.23 (0.08; 1.08) mcg/d) in both groups showed no difference (p>0.05). Group II showed correlation between NO level and P (R=-0.28), Ca (R=-0.32), Mo (R=-0.31) consumption, in group I – between EDVD and Na (R=-0.39) consumption, the level of NO and Mg (R=-0.37) consumption. Both groups showed established positive correlation between vitamin D consumption and Ca, P intake.

**Conclusion:** In women of the perimenopausal period with AH having ED showed verifiable lower P, Mg and Mo dietary consumption. The intake of P, Ca, Na and Mg is associated with endothelial function. Deficiency of vitamin D intake with food was revealed in all investigated women with AH.

## P855
### A SCIATICA REVEALING A BONE LYMPHOMA: CASE REPORT

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**Objective:** Non-Hodgkin's malignant lymphoma (NHML) is rare and difficult to diagnose. The primary bone location represents <5% of NHML. Diffuse large B cell lymphomas are the most common variety, accounting for one-third of all lymphomas. These lymphomas are predominant in men with a peak frequency between the sixth and seventh decades. We report the case of a young women with bone lymphoma revealed by sciatica.

**Case report:** Miss K.M 19 years old, with no particular history, was hospitalized for exploration of bilateral pygalgia which progressed for 1 year accompanied by left S1 sciatica with inflammatory appearance. The general condition was moderate and the clinical examination found rachidian syndrome, pressure pain of the sacroiliacs, hypoaesthesia in the posterior side of the left thigh and a palpable mass at the level of the upper internal quadrant of the right breast. Biology showed inflammatory syndrome, regenerative anemia, moderate acute inflammatory response to serum protein electrophoresis, and severe renal failure. the phosphocalcic balance was normal and the LDH level was high (426 iu/l), Radiographs of the pelvis and spine were normal, MRI of the pelvis revealed bony lesions of the pelvic bones extending to soft muscle tissue and the left S1 root. Bone biopsy with anatomopathological and immunohistochimical study concluded in a diffuse large cell B lymphoma reaching the psoas muscle and infiltrating the bone marrow. As part of the extension workup, a PET scan was performed, showing support for multiple lymphomatous locations: mammary, renal, bone and mediastinal lymphadenopathy. Chemotherapy according to the R-CHOP protocol was recently started in hematology.

**Conclusion:** Primary bone lymphoma is rare, the particularity of our observation lies in the occurrence of this hemopathy in a young woman. Lymphoma is often difficult and late to diagnose. The patient's clinical symptoms and multifocal PET scan were already evidence of an advanced stage of the disease.

## P856
### BONE MINERAL DENSITY AND BODY WEIGHT IN POSTMENOPAUSAL WOMEN

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**Objective:** The variance in BMD is known to be largely regulated by genetic factors. However, other modifiable factors such as BMI might have an impact on bone density.
The aim of this study was to investigate the relation between BMD and body weight in postmenopausal women.

**Methods:** This was a cross-sectional study that included postmenopausal women. Weight (in kg) and height (m) were measured for each patient and BMI (in kg/m$^2$) was calculated according to WHO criteria. BMD of lumbar spine (L1-L4) and femoral neck were measured using DXA. Mann-Whitney U-test and Pearson's correlation test were used to investigate the association between the study variables. A 0.05 significance level was considered.

**Results:** 67 postmenopausal women with a mean age of 64.3 (46-91) y were included in this study. 33 women had healthy weight and 34 were overweight or obese. In the healthy weight group, 66.7% of patients had osteoporosis. However, in the overweight or obese group, only 35.5% had osteoporosis. This difference was statistically significant (p=0.001). Mean BMD of lumbar spine was significantly higher in the overweight or obese group compared to the healthy weight group (0.848±0.025 vs. 0.944±0.041; p=0.05). When BMD of femoral neck was measured, no statistically significant difference was found between the two groups (0.742±0.023 vs. 0.823±0.045; p=0.2). BMI was correlated with BMD of lumbar spine (p=0,03; r=0,301) but not with BMD of femoral neck (p=0,343; r=0,138).

**Conclusion:** Postmenopausal women who were overweight or obese had a significantly higher BMD of lumbar spine. Significant positive correlation was also observed between BMI and lumbar spine BMD.

## P857
### RELATIONSHIP BETWEEN BONE MINERAL DENSITY OF THE AXIAL SKELETON AND KNEE OSTEOARTHRITIS (PRELIMINARY DATA)

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**Objective:** To evaluate the effect of BMD of the axial skeleton on the clinical manifestations and radiological picture of knee osteoarthritis (OA).

**Methods:** The prospective study included 100 women (mean age 59.3 ±8.6 y.o.) with a reliable diagnosis of I-III Kellgren-Lawrence stage of knee OA (ACR). OA duration was 8(4-12) y. An individual map was filled out for each patient, including anthropometric indicators, anamnesis and clinical, instrumental examination data.

**Results:** Osteoporosis (OP) and/or osteopenia of the axial skeleton were detected in 29% of pts (group 1), normal BMD in 71% (group 2). Pts with reduced BMD were older (64.8±6.6 vs. 56.7±9.9 y, p=0.002), had a greater Me of pain intensity, as well as significantly higher values of stiffness and functional failure (FF) by WOMAC and lower values of the KOOS index (Table). Associations between the stage of OA and total hip BMD (g/cm$^2$) were revealed (r=0.5, p=0.01). The Spearman correlation analysis confirmed positive correlations (p<0.05) between decreased BMD (OP and osteopenia) and OA duration (r=0.24), age (r=0.4), stiffness by WOMAC (r=0.32), FF by WOMAC (r=0.3), knee pain (r=0.3), and negative correlations - weight (r=-0.32), KOOS score (r=-0.4) and uric acid (r=-0.3).

Table. Comparative characteristics of patients with OA and reduced BMD compared to patients with OA and normal BMD

| Parameters | Group 1 | Group 2 | p |
|---|---|---|---|
| Pain VAS, mm | 50(40-71) | 44(25-51) | 0.03 |
| Stiffness WOMAC, mm | 105(59- 127) | 61(40-90) | 0.02 |
| FF  WOMAC, mm | 820(460 -1027) | 520(289-780) | 0.02 |
| KOOS | 47 (34-55) | 66(47-82) | <0.01 |

**Conclusion:** The high BMD values in the lumbar spine and proximal femur are more often observed in pronounced stages of OA, and associations between the OA stage and the total hip BMD are confirmed. However, in pts with OP/osteopenia in the axial skeleton, compared women with normal BMD, a more severe course of OA was noted: greater pain intensity, high values of the WOMAC index and low values of the KOOS index.

## P858
### CAN THE TREATMENT OF PHEOCHROMOCYTOMAS/ PARAGANGLIOMAS REVERSE THEIR NEGATIVE EFFECTS ON BONE METABOLISM?

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**Objective:** Pheochromocytomas and paragangliomas (combined PPGL) are catecholamine-producing tumors, which are associated with deteriorated bone metabolism (BM), reduced bone mass density (BMD) and secondary osteoporosis. Surgical treatment of PPGLS could reverse these effects and restore the normal bone function. Aim of this study was to evaluate whether BM and BMD significantly improve 12 months after successful treatment of PPGL.

**Methods:** Parameters of BM and BMD in the femoral neck (FN) and the lumbar spine (LS) were evaluated in 67 patients before and 1 y after the surgical treatment of PPGL. 50,7% of the patients were female with a mean age and BMI of 49.7 y and 26.7 kg/m$^2$ respectively. The main presenting symptom was a pheochromocytoma crisis while PPGL had a mean diameter of 4.8 cm. Regarding comorbidities, 23/67 patients suffered from diabetes mellitus type 2, 38/67 patients had arterial hypertension and 35/67 patients had reduced BMD (27 presented with osteopenia and 8 with osteoporosis).

**Results:** At baseline, mean T-Score in the FN and LS were -1.05 and -0.95 respectively. Mean BMD in FN was 0,78 and in LS 0,84. Regarding BM markers, mean P1NP and BGP values were 45.67 μg/L and 22.7 ng/ml respectively while mean β-CrossLaps value was 0.55 ng/ml. 1 y after surgical treatment of the PPGL, mean T-Score in both the FN and LS was higher, more specifically -0.88 and -0.83 respectively (16% and 12% increase). Equally, mean BMD in both sites was increased. Moreover, both bone formation (mean values of P1NP 37.76 μg/L and of BGP 22.39 ng/ml) and resorption markers (mean value of β-CrossLaps 0.39 ng/ml) were decreased. The rise of the number of patients with normal BMD values (43/67 patients, +12%) mirrored the positive effect of PPGL treatment on bone turnover.

**Conclusion:** The results of this study show that PPGL has an often underdiagnosed, though detrimental effect on BM and BMD. Furthermore, this study underlines the rapid improvement of BM and BMD parameters after effective surgical treatment of PPGL. Conclusively, the effects of PPGL on bone tissue health should be taken into consideration and monitored in our routine clinical practice.

## P859
### SPONTANEOUS HIP FRACTURE IN PATIENTS TAKING GLUCOCORTICOIDS: TWO CASE REPORTS

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**Objective:** Treatment with glucocorticoids causes osteoporosis with loss of bone mass and a higher risk of fractures than is expected on the basis of the measured BMD targeting mainly vertebrae as well as proximal femur. The risk of fractures depends on the daily and accumulated dose of glucocorticoids.

**Case report:** The first case report concerns a 44-year-old female patient with complicated course of Behcet disease treated with immunosuppressive drugs (azathioprine, methotrexate, cyclosporine) and prednisolone at an average dose of 30 mg per day, with preventive application of calcium and vitamin D. After 16 months of treatment the patient started to complain of spontaneously occurring pain in her right groin area disabling her from placing weight on her right lower limb. An x-ray of her right hip did not show any pathological signs. It was recommended that the patient use crutches to reduce weight bearing on her right lower limb. After 3 weeks a healing basicervical fracture of the femoral neck was confirmed by magnetic resonance and computer tomography. BMD measurements showed a normal value.

The second case history presents a 59-year-old woman treated for giant cell arteritis with prednisolone, without calcium due to established primary hyperparathyroidism. After 7 months of corticoid therapy, she complained of a suddenly occurring pain in her hip and the inability to put weight on it. An x-ray of her hip showed no pathology. All weight bearing was eliminated from the left lower limb. A subcapital fracture of the femoral neck and avascular necrosis of the femoral head were established by magnetic resonance after 2 weeks.

**Conclusion:** Suddenly occurring pain in the hip with no trauma may be a symptom of a spontaneous fracture of the femoral neck or avascular

necrosis of the femoral head in patients taking glucocorticoids, despite the fact that x-rays and BMD are normal. Eliminating weight bearing on the affected limb by using crutches is crucial, until the reason for the pain is clarified by magnetic resonance, possibly computer tomography or bone scan. The second case history also proves the possibility of avascular necrosis as a complication of a subcapital fracture of the femoral neck.

## P860
### BONE DENSITY PATTERN IN MULTIPLE MYELOMA

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**Objective:** Several studies show a decrease in BMD in multiple myeloma (MM), particularly at the vertebral site. These densitometric data explain the high incidence of fractures not related to tumor lysis during this pathology. This study aimed to evaluate the bone density pattern in patients with MM.

**Methods:** Retrospective study of a series of patients with diagnosed MM (SWOG criteria) and in which a study of BMD over lumbar spine and hip sites was performed (DXA test) before any treatment interfering with bone metabolism. The presence of osteopenia or osteoporosis was based on a lower T-score according to the WHO classification.

**Results:** The diagnosis of MM was defined in 44 patients. A study of BMD was performed in 14 of these patients when diagnosed. The BMD study revealed abnormalities in 11 cases out of 14 (78.5%): these were osteoporosis (n=8) including 5 in the lumbar spine and hip sites, 2 in the lumbar spine and 1 in the femoral site, or vertebral osteopenia (n=3). There were 4 men and 7 women, aged on average 70.5 y [54-81]. All women were menopausal. The MM development pattern corresponded to bone pain (n=5), back pain or inflammatory lumbo-radicular pain (n=4), or vertebral fractures (n=4). In one case the diagnosis was made at a systematic assessment of diffuse osteoporosis. Standard radiographs showed bone abnormalities for all patients with multilevel compression of vertebrae (n=7) and punched out lytic images (n=7). According to the Durie & Salmon stage, one patient was at stage I, one at stage II and nine at stage III. Six patients had IgG isotype, three patients IgA and two patients had light chain MM.

**Conclusion:** Consistent with the literature data, our study shows that diffuse osteoporosis is common and early in the MM. In parallel with the tumor osteolysis, osteoporosis increases the axial fracture risk. The practice of a systematic study of bone densitometry at the diagnosis of MM will identify patients at risk of vertebral fracture, candidates for chemotherapy and more intensive antiresorptive treatment.

## P861
### BONE MINERAL DENSITY PROFILE IN PSORIATIC ARTHRITIS

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**Objective:** Juxta-articular osteoporosis is frequent in psoriatic arthritis (PsA). Recent studies have suggested that PsA is associated with general bone density loss. The aim of this study was to evaluate BMD and to determine risk factors of bone rarefication in psoriatic arthritis patients.

**Methods:** This was a retrospective cohort study of 23 PsA patient. Patients were distributed into three groups: patients with osteoporosis, osteopenia, or normal bone density according to WHO criteria. Results were correlated with demographic data, disease characteristics and laboratory blood tests.

**Results:** 23 PsA patients with a mean age of 55.3 y were included in this study; 6 males and 13 females. Results are summed up in the Table.

| | Osteoporosis (n=6; 26%) | Osteopenia (n=7; 30.5%) | Normal bone density (n=10; 43.5%) | P |
|---|---|---|---|---|
| Mean age | 51,16 | 58.2 | 48.2 | |
| Sex ratio | 1 | 0.16 | 0.42 | 0.448 |
| Mean disease duration (y) | 16.6 | 15.8 | 6.5 | 0.1 |
| Mean ESR (mm) | 51 | 33 | 35 | 0.608 |
| Mean CRP (mg/l) | 8 | 20 | 14 | 0.187 |
| Mean BMI (kg/m$^2$) | 22.2 | 31 | 25.6 | 0.041 |
| Menopause | N=3 | N=6 | N=4 | 0.068 |
| Form: | | | | 0,356 |
| Axial | N=0 | N=1 | N=2 | |
| Peripheral | N=3 | N=3 | N=1 | |
| Combined | N=3 | N=3 | N=7 | |
| Corticosteroids | N=2 | N=6 | N=4 | 0.132 |
| Methotrexate | N=3 | N=6 | N=9 | 0.415 |

**Conclusion:** PsA was associated with osteopenia and osteoporosis. Bone density loss was more important when BMI was low.

## P862
### BMD AND PROXIMAL FEMUR 3D-DXA ANALYSIS IN SYSTEMIC LUPUS ERYTHEMATOSUS AND SPONDYLOARTHRITIS

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**Objective:** Chronic inflammation in rheumatoid arthritis (RA), systemic lupus erythematosus (SLE) and spondyloarthritis (SPA) has a negative impact on bone mass even in premenopausal women. Recently we evaluate BMD, sarcopenia and 3D-DXA parameters in RA patients. Aim: to evaluate BMD and cortical and trabecular compartment by proximal femur 3D-DXA analysis in SLE and SPA patients.

**Methods:** Adults SLE (n=13) and SPA (n=15) were included and compared to healthy subjects (n=28) as control group (CG) matched by age, sex and BMI. BMD (g/cm$^2$) was measured by DXA (Hologic Discovery Wi) on right femoral neck (FN) and total hip (TH). The 3D-DXA analysis was performed with 3D-Shaper software (v2.9, Galgo Medical, Spain). The cortical BMD (sDens - mg/cm$^2$) and trabecular volumetric BMD (trab vBMD - mg/cm$^3$) were considered. Data were expressed as mean±SD and p<0.05 was considered significant.

**Results:** 13 SLE patients (age: 47.4±10.1), 15 SPA (11 women, 4 men, age: 53.9±13.1) and 28 CG (age: 50.7±12.1) were included. Biochemical parameter at the moment of BMD: calcium: 9.2±0.5 mg/dl (95%CI 9.0-9.5); phosphate: 3.6±0.6 mg/dl (95%CI 3.5-4.2); 25OHD: 29.8±5.9 ng/dl (95%CI 26.8-34.7); PTH: 26.9±4.5 pg/ml (95%CI 26.3-33.5). No statistical differences were found among groups (ANOVA, Bonferroni's multiple comparison test): Right FN BMD=CG: 0.795±0.132; LES: 0.718±0.104; SPA: 0.764±0.122; p=ns; Right TH BMD=CG: 0.921 ±0.127; LES: 0.832±0.126; SPA: 0.909±0.129; p=ns; cortical BMD sDens=CG: 165.4±23.3; LES: 147.8±27.4; SPA: 160.8±27.8; p=ns; trab vBMD=CG: 194.3±43.9; LES: 183.7±47.2; SPA: 179.2±48.0; p=ns. However, patients with LES has consistently lower bone parameters compared with CG (~10%).

**Conclusion:** SLE and SPA patients has no differences in BMD and cortical and trabecular compartment by 3D-DXA compared to controls.

A tendency to lower bone mass would seem to be observed in the LES group but a larger number of patients is required to confirm it.

## P863

### CHARACTERIZATION OF PATIENTS WITH CLASSIC FRAGILITY FRACTURES IN A HIGH COMPLEXITY CENTER IN COLOMBIA, 2019

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**Objective:** Osteoporosis is the most common metabolic bone disease, fragility fractures are its most common complication and for many years it has been a disease that has been given little importance in Colombia. Aim: clinically characterize patients older than 50 y, with fragility fractures, treated in a hospital in Colombia.
**Methods:** Observational, descriptive and cross-sectional study. 139 patients with fragility fractures were included.
**Results:** The most frequent types of fractures, in order of prevalence, are: lower radius epiphysis representing 20.7% (n=30), femoral neck 18.6% (n=27) and upper humerus epiphysis with 13, 8% (n=20); 64.8% (n=94) of the population was female, with an average age at the time of the fracture of 73.1($\pm$12.4) y; 56.6% (n=82) of the studied population had some type of comorbidity, the most frequent being type 2 diabetes mellitus, rheumatoid arthritis, kidney failure and cardiovascular disease. It is important to note that only 4.1% (n=6) of the patients had a diagnosis of osteoporosis and only 0.7% (n=1) received treatment, the prescribed treatment was alendronate. The hospital stay was approximately 4.9 ($\pm$5.5) d; only 2.8% (n=4) had some type of complication, infectious complications being the most frequent; 2.8% (n=4) required ICU management. 6.9% (n=10) died during hospitalization, while 8.3% (n=11) died 30 d after discharge and 12.4% (n=17) died one year. 11.2% (n=12) had densitometry one year after the fracture; currently 92.5% (n=99) are without medical follow-up for osteoporosis.
**Conclusion:** In Colombia, osteoporosis continues to be a silent disease, so it is important to make medical personnel aware of the need for early intervention, knowing the behavior of this disease in our population justifies the implementation of programs that have shown a decrease in impact on health and cost. inexpensive like Capture The Fracture.

## P864

### DENSITOMETRIC PROFILE OF THE ELDERLY MAN

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**Objective:** To estimate the frequency of osteoporosis (OP) in a cohort of elderly men, then to investigate the particularities of its treatment at this age.
**Methods:** We conducted a retrospective, monocentric study of 59 men older than 65 y. We analyzed their BMD and medical records for risk factors for OP, signs of secondary OP, complications, and drugs received. In the absence of a consensus to define male OP and its border threshold we used the WHO definition as stated for postmenopausal Caucasian women.
**Results:** The mean age of the male was 71.3 y [65-92 y]. 46% of patients were osteoporotic, 32% osteopenic, and 22% had normal BMD. In search of risk factors: low calcium intake was noted in all patients, 3 patients were skinny (all osteoporotic), no patient reported alcohol consumption,

32 were smokers (of whom 87.5% had OP or osteopenia), only 3 patients maintained regular physical activity and they had normal BMD. No patient reported a family history of OP, and 23.7% had a personal history of fracture, including 6 involving the upper end of the femur (UEFF). 36 patients and 21 others had either a disease or a drug predisposing to OP. Therapeutically, 74.5% of the patients were putted on calcium and vitamin D supplementation and 46% were putted on bisphosphonates (2/3 osteoporotic and 1/3 osteopenic). During the follow-up, 7 patients developed new vertebral fractures and 2 patients developed UEFF. One patient died one year after the occurrence of UEFF.
**Conclusion:** Male OP is more common than one would think. Even in the elderly, the search for an etiology or a contributing factor is necessary. Education of elderly men to reduce modifiable risk factors is warranted to avoid OP and its sometimes fatal complications.

## P865

### DATA SUGGESTIVE OF INFLAMMATORY MYOPATHY IN SUBACUTE POST-COVID-19 PATIENTS

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**Objective:** Identify muscle inflammatory pattern in subacute post-COVID-19 patients with musculoskeletal ultrasound. To analyze the association between echogenicity of the rectus femoris and grip strength in post-COVID19 patients.
**Methods:** An observational cross-sectional study was conducted in patients in a subacute post-COVID-19 state. BMI was evaluated, dominant/nondominant grip strength was evaluated using Jamar dynamometer; cross-sectional area and angle of penetration of the bilateral rectus femoris were measured by MSK ultrasound; by image analysis with ImageJ software, the mean echogenicity of the cross-sectional area of the rectus femoris was calculated. For echogenicity, a cutoff point of 130 was established for suggestive cases if it was bilateral, and suspicious if it was unilateral. Central tendency and dispersion were calculated for quantitative variables, frequencies and percentages for qualitative variables. Correlations were made with Pearson's p, and the chi-square test for qualitative variables. The protocol was submitted to the research and ethics committee.
**Results:** 44 patients (25 women, 19 men) were analyzed, with a mean age of 41.1 y (SD 12.7; range 18-68). The BMI had a mean of 27.29 (SD 5.03; range 68-41.1). The grip strength of the dominant hand was 30.5 mmHg ($\pm$9.9), the nondominant hand was 29.2 mmHg ($\pm$9.9). For the cross-sectional areas and the angle of peneation right and left of the rectus femoris 5.6 cm$^2$ ($\pm$2.3) and 5.6 cm$^2$ ($\pm$2.1), and 8.4º ($\pm$2.6) and 8.6º ($\pm$3.3) respectively. The echogenicity of the rectus femoris right and left was 100 ($\pm$29.7) and 127 ($\pm$32.2) respectively. Dominant and nondominant grip strength positively correlated with bilateral cross-sectional areas (r=0.478 and r=0.514; p=0.001 and p=0.001). The dominant grip strength showed a negative correlation with the right rectus femoris echogenicity (r=-0.459; p=0.002). By echogenicity, 5 cases were identified as suggestive and 7 suspicious, no statistical significance was found when correlated with the Borg scale (p=0.38 and p=0.441).
**Conclusion:** Data suggestive of inflammatory myopathy were identified through musculoskeletal ultrasound, which may represent a useful and low-cost tool for the study of post-COVID-19 sequelae. Grip strength decreased in relation to the intensity of muscle echogenicity in postCOVID-19 patients. It was observed that the greater the grip force, the greater the cross-sectional areas of the rectus femoris muscle. The greater the grip strength, the greater the cross-sectional area of the rectus femoris was observed.

## P866

### ANXIETY LEVEL IN PATIENTS WITH OSTEOARTHRITIS OF TEMPOROMANDIBULAR JOINT VALIDATED BY CONE BEAM CT

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**Objective:** To determine the association of clinical signs of TMJ osteoarthritis with patients' anxiety and with the duration of pain before the first examination.

**Methods:** From 2001- 2011, a total of 112 patients were treated for osteoarthritis, which has been diagnosed by means of MRI. This study included patients (n=53, mean age 47.7±17.2 y; 96.2% female) with further confirmed osteoarthritis using cone beam CT (CBCT). All patients had painful symptoms of TMJ, with or without sounds and with limited mouth opening. The clinical diagnostics included RDC/TMD Axis I and manual functional analysis of the stomatognathic system. The psychological assessment was carried out by Spielberger's State-Trait Anxiety Inventory (STAI). The radiological analysis by CBCT included an assessment of bone changes of cortical and subchondral bone of TMJ joint surfaces. The control group included the students of the School of Dental Medicine (n=50, mean age 23.8±2.0 y; 76% female) without asymptomatic disc displacement and OA changes (confirmed by MRI) for anxiety variables and mouth opening measurements.

**Results:** The control group was younger than the group of patients (p=0.003), had a higher rate of mouth opening and a lower rate of anxiety compared to patients, which was statistically significant. The mean pain on the VAS scale was 6.2±1.3. Radiological signs of osteoarthritis of painful joints independent of the body side (n$_{joints}$=62) included deformities caused by: generalized sclerosis and hypertrophy of bone surfaces, erosion of cortical bone, formation of subchondral cysts, osteophyte formation and bone particle findings within the joint. The analysis of sounds (average pain on VAS) showed crepitation in 45.2% (VAS=5.9±1.4), clicking in 25.8% (VAS=6.2±1.3) of joints, and without any pathological sounds there were 29% (VAS=6.7±1.1) of diseased joints (n$_{joints}$=62, p=0.126). The difference in the occurrence of bruxism (p=0.238) between patients (45%) and students (32%) was not found. However, a significantly higher anxiety on STAI 2 (p=0.029 was found in patients with bruxism. These patients suffered pain before the first examination, on average/median 26±67.1/10 (range: 0.2-456) months, thus showing a significant association with higher levels of anxiety on STAI 1 (p=0.045) and STAI 2 (p=0.034).

**Conclusion:** CT diagnosis is considered the gold standard for detection of bone deformities because the interpretation of the variable finding implies the identification of osteoarthritic changes in the TMJ with an unclear clinical finding.

## P867

### EFFECT OF GYNAECOLOGICAL HISTORY IN BONE MINERAL DENSITY IN WOMEN WITH RECENT FRACTURE

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**Objective:** To verify if gynaecological history is related to BMD in patients with osteoporotic fracture.

**Methods:** We perform a retrospective study of patients followed in our fracture liaison service, from January of 2017 until February 2020. Descriptive statistics of continuous variables were reported as mean±SD if normally distributed or as median and quartiles if non-normally distributed. Descriptive analysis of categorical variables were displayed as frequency or proportions. It was done a multivariate logistic regression with controlling of age and BMI.

**Results:** 72 female patients were included, with a mean age of 76.01 (±10.42) y, BMI mean of 25.77 kg/m$^2$ (±4.76). Menarche age of 13.14 (±1.73) y, menopause mean age of 48.23 (±5.48) y and parity mean of 2.28 (±1.56). In lumbar spine, 47.5% presented osteoporosis by BMD and 31.1% osteopenia; in femoral neck, 47.4% presented osteoporosis and 35.1% osteopenia. After multivariate logistic regression (Table 1), it was found that menarche age over 14 y and fertility years over 35 y were protectors against loss of BMD. Menopause age ≤45 y showed to be a predictor of osteoporosis. When we evaluated BMD of the femoral neck (Table 2), high parity showed to be a protector and menarche age ≥14 y is a predictor of osteoporosis.

**Conclusion:** Menarche age has shown controversial data concerning BMD; this study has shown similar results to those published by Ho, S.C. Prolonged duration of fertility period and late menopause has been pointed as protector factors of BMD in diverse studies. Other studies have shown controversial data about the relation of parity and BMD.

Table 1. Multivariate logistic regression with age and BMI control, in BMD of the lumbar spine.

| Variables | B | Osteopenia (T-score lumbar) | B | Osteoporosis (T-score lumbar) |
|---|---|---|---|---|
| **Parity** | | | | |
| ≤2 | Reference | Reference | Reference | Reference |
| ≥3 | -0.270 | p=0.780 | -1.101 | p=0.170 |
| **Menarche age** | | | | |
| <14 y | Reference | Reference | Reference | Reference |
| ≥14 y | 0.631 | p=0.980 | -18.943 | p<0.001 |
| **Menopause age** | | | | |
| ≤ 45 y | -1.013 | p=0.480 | 17.347 | p<0.001 |
| >45 y | Reference | Reference | Reference | Reference |
| **Last delivery age** | | | | |
| ≤ 35 y | Reference | Reference | Reference | Reference |
| >35 y | 0.924 | p=0.357 | 2.159 | p=0.053 |
| **Fertility duration** | | | | |
| ≤ 34 y | Reference | Reference | Reference | Reference |
| 35-40 y | 0.983 | p=0.341 | -16.123 | p<0.001 |
| >40 y | 1.266 | p=0.391 | -16.778 | p<0.001 |

Table 2. Multivariate logistic regression with age and BMI control, in BMD of femoral neck.

| Variables | B | Osteopenia (T-score femoral neck) | B | Osteoporosis (T-score femoral neck) |
|---|---|---|---|---|
| **Parity** | | | | |
| ≤2 | Reference | Reference | Reference | Reference |
| ≥3 | 0.27 | p=0.986 | -5.358 | p=0.015 |
| **Menarche age** | | | | |
| <14 y | Reference | Reference | Reference | Reference |
| ≥14 y | -1.253 | p=0.336 | 3.709 | p=0.049 |
| **Menopause age** | | | | |
| ≤ 45 y | Reference | Reference | Reference | Reference |

| | | | | |
|---|---|---|---|---|
| >45 y | 20.829 | p<0.001 | -3.260 | p=1.000 |

Last delivery age

| | | | | |
|---|---|---|---|---|
| ≤ 35 y | Reference | Reference | Reference | Reference |
| >35 y | 19.112 | p<0.001 | 19.887 | p=0.058 |

Fertility duration

| | | | | |
|---|---|---|---|---|
| ≤ 34 y | Reference | Reference | Reference | Reference |
| 35-40 y | -22.660 | p<0.001 | 4.468 | p=1.000 |
| >40 y | -21.194 | p<0.001 | 1.108 | p=1.000 |

## P868
### PREVENTION OF THE RISK OF SARCOPENIA IN POST COVID-19 ELDERLY PATIENTS

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**Objective:** To evaluate the effects of combined drug treatment and occupational therapy in the basic instrumental activities of daily life, in physical ability and in the risk for sarcopenia in post COVID-19 elderly subjects.

**Methods:** 7 post COVID-19 elderly people (M 3, F 4, mean age 82 + 6) hosted in an extended care unit were included in the study. The design of the study included tests performed before and after follow-up such as: 1) Mental State Examination (MMSE); 2) Geriatric Depression Scale (GDS); 3) Activities of Daily Living (ADL);4) Instrumental Activities of Daily Living (IADL); 4) Short Physical Performance Battery (SPPB). SPPB is a combination of a balance test based on 3 increasingly difficult positions, a 4-m walking route and a repeated stand up test aimed at elderly reduced physical ability patients (score >5 and <9) who are therefore classified as fragile and at risk of disability. The subjects of the study showed: 1) Mean MMSE score was 23.7+8.3; 2) Mean GDS score was 13+1.8. In the group 3 subjects showed an ADL score <3, 6 had IADL <4. All subjects were specifically treated pharmacologically for comorbidities. Through SPPB evaluation we detected a mean score of 6 in physical ability. The dedicated nursing focused on personal care (hygiene and clothing): mild help needed, assistance in every phase of the activity; self-assurance (physical and/or psychological) and risk of fall due to low vision and walking difficulty; movement (deambulation and transfer), selfsufficient transfers and supervised walking outside one's room. To improve ADL and IADL a 6-d/week occupational therapy programme was introduced. This focused on teaching patients how to compensate and adapt either physically and socially. Presence or absence of cooperation in ADL is strongly linked to the depression level. This depression is also strongly linked to the evaluation of life quality.

**Results:** Before and after a 2-month follow-up we detected: 1) GDS score 13+1.8 vs. score 8+1.7 (p<0.01); 2) ADL 3/6 score vs. 5/6 score (p<0.01); 3) IADL 4/8 score vs. 6/8 score (p<0.01); 4) SPPB score 6 vs. 8 (p<0.01).

**Conclusion:** The combination of drug treatment and occupational therapy in post COVID-19 patients showed an improvement both in ADL and IADL. We have also linked the increased physical ability to the risk reduction of sarcopenia. The occupational therapist approach was customized in order to make the patients more selfassured and independent.

## P869
### COMPARATIVE EVALUATION OF BONE TURNOVER MARKERS IN OVARIECTOMIZED DIABETIC RATS TREATED WITH CANAGLIFLOZIN AND LIRAGLUTIDE

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**Objective:** In menopause (M) there is a high level of BR (bone remodeling), and BMD is decreased. In DM BR is usually low and BMD is normal or high. In women with M and DM BR may develop individually. We investigated bone turnover markers (BTM) in ovariectomized rats with experimental type 2 DM and to compared liraglutide (LIRA) and canagliflozin (CANA) effect on bone metabolism.

**Methods:** Female Wistar rats were subjected to bilateral ovariectomy. Type 2 DM was modelled in some of the rats by high-fat diet and streptozotocin + nicotinamide. The groups were made: "CRL" (control, n=7,), "M" (rats after ovariectomy, n=5), "DM" (rats with DM without Tx (treatment) for 12 weeks, n=3), "DM+M" (rats with DM after ovariectomy, n=5), "DM+M+LIRA" (rats with DM after ovariectomy, Tx with LIRA 0.06 mg/kg for 8 weeks, n=5), "DM+M+CANA" (rats with DM after ovariectomy, Tx with CANA 25 mg/kg for 8 weeks, n=5). Blood samples for BTM evaluation were obtained prior to euthanasia.

**Results:** OCL (osteocalcin) was higher in the "CRL" group (16.97 (14.36; 18.19) ng/mL) compared to the "DM", "M", "DM+M" groups. OCL was higher in "DM+M" compared to "DM", but lower than in "CRL" group. OPG (osteoprotegerin) was higher in the "CRL" (12.27 (8.42; 14.65) pmol/L) compared to the "DM", "M", "DM+M". OPG was higher in "DM+M" than "DM", though lower than in "CRL" group. OPG was lower in "DM+M+LIRA" than in "DM+M" (1.7 (1.15; 1.87) vs. 9.1 (6.52; 10.99), p <0.000) and lower in "DM+M+CANA" than "DM+M" (1.88 (1.73; 3.8) vs. 9.1 (6.52; 10.99), p=0.001). The negative effect on OPG level was more pronounced in "DM+M+LIRA" than in "DM+M+CANA" (1.7 (1.15; 1.87) vs. 1.88 (1.73; 3.8), p=0.023). RANKL level was higher in the "M" group compared to "CRL" and "DM+M" There was no difference between "CANA" and "LIRA" groups. The highest Ca (calcium) level was in "DM+M" (2.73 (2.69; 2.89) mmol/L), the significant difference was in comparison to "CRL". Ca was higher in "DM+M+CANA" compared to "DM+M+LIRA" (2.82 (2.69; 2.97) and 2.64 (2.6; 2.73), p=0.09).

**Conclusion:** BR increasing in M manifests in high OCL, OPG, RANKL levels. LIRA treatment is associated with lower OPG and Ca levels than CANA Tx, which might reflect more prominent negative influence of LIRA on bone resorption in M and DM conditions.

## P870
### PERCUTANEOUS TREATMENT OF HYPEREXTENSION INJURIES OF THE ANKYLOTIC UPPER THORACIC SPINE: A REPORT OF 2 CASES

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**Objective:** Ankylotic spines may result from ankylosing spondylitis or diffuse idiopathic skeletal hyperostosis. Due to increased vertebral rigidity, ankylotic patients have higher risk of unstable spine fractures after lower energy trauma. Thus, hyperextension type fractures of the spine (AOSpine type B3) become common in these patients. Our objective is to report 2 cases of hyperextension type fractures in elder patients with ankylotic spines, successfully treated with isolated percutaneous pedicular screw fixation (PPSF).

**Methods:** The first was a 85-year-old male who suffered a minor fall with thoracolumbar trauma, with no neurological deficits. CT scan and MRI of the spine revealed an ankylotic spine with a transosseous hyperextension fracture at T6 level. Surgical fixation was performed, with PPSF of T4-5-7-8, with no complications observed. The second case was a 72-year-old female, who presented after a fall from a tree (3 m) with posterior thoracic

pain and no neurological deficits. Study with CT scan and MRI showed a transosseous hyperextension fracture at T5-T6 levels, in an ankylotic spine, with associated rib fractures. She was treated with PPSF of T3-4-5-6-7-8, having no surgical complications.

**Results:** Both patients presented a quick recovery, regaining autonomous ambulation by the third postoperative day. At last follow-up (3 and 1 y, respectively), both patients reported no pain or late complications. Radiographic evaluation shows complete fracture healing, with no segmental deformities at the fractured level.

**Conclusion:** The safety of PPSF in the upper thoracic spine has been questioned and its usage remains highly controversial in flexion-distraction injuries with ligamentous involvement, for not allowing fusion. However, the soft-tissue ossification in ankylotic patients turns these into purely transosseous hyperextension fractures, which allow complete fracture healing with this minimally invasive fixation, requiring no additional fusion procedures. That, allied to frequently happening in frail elderly patients, makes PPSF an ideal option to safely treat these injuries in neurologically intact cases.

## P871
### INFLUENCE OF BARIATRIC SURGERY ON 25-OH-VITAMIN D AND PTH IN OBESE PATIENTS

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**Objective:** Obesity is associated with vitamin D deficiency and potential calcium malabsorption. Bariatric surgery is performed for the treatment of obesity with increasing frequency, but may aggravate malabsorption and increase the risk of osteoporosis and fractures. Therefore, supplementation of vitamin D (alongside with minerals and other vitamins) is part of the follow-up program after bariatric surgery. We present data on the vitamin D status and PTH before and after bariatric surgery.

**Methods:** We studied 23 obese patients before bariatric surgery and 25 patients after bariatric surgery. 25-OH-Vitamin D was used as an estimate for vitamin status. 25-OH-vitamin D and PTH were measured by the automated methods of Roche Diagnostics (Mannheim) using a COBAS 411 platform. Clinical Chemistry (calcium, phosphate, alk. phosphatase, creatinine) were measured by routine standard methods. Group differences were evaluated with t-test and Pearson correlation analyses were done.

**Results:** The BMI in the group before surgery was $49.9 \pm 8.4$ kg/m$^2$, and after surgery $34.6 \pm 7.8$ kg/m$^2$ (mean±SD), $p < 0.001$. The age of the patients was $40.9 \pm 10.7$ y. 25-OH-vitamin D serum concentrations were $49.9 \pm 21.8$ nmol/l and $72.7 \pm 37.3$ nmol/l after surgery ($p < 0.05$). The physiological range for 25-OH-vitamin D is 50-125 nmol/l. PTH was $23.2 \pm 17$ ng/l before surgery and $36.7 \pm 19.2$ ng/l after surgery ($p < 0.05$), the normal range for PTH being 10-65 ng/l. There was a significant negative correlation between BMI and 25-OH-vitamin D in patients before surgery (r=-0.46, p=0.03). After surgery, this relationship was not significant anymore (r=-0.17, p=0.41). There was no significant correlation between BMI and PTH. 25-OH-vitamin D and PTH were negatively correlated. This correlation was not significant before surgery (r=-0.36, p=0.09), but after surgery (r=-0.39, p=0.05).

**Conclusion:** Obese patients displayed vitamin D insufficiency, as has been described in former studies. The vitamin D status was significantly improved after bariatric surgery, which resulted also in a substantial weight loss. Since 25-OH-vitamin D is negatively correlated with BMI, the reduction in BMI may explain the increase in 25-OH-vitamin D. However, the widely used vitamin supplementation after surgery may also contribute to the better vitamin D status.

## P872
### THE LOCAL USE OF A THERAPEUTIC COMPOSITION TO INCREASE OSSEOINTEGRATION

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**Objective:** Our study was related to a therapeutic composition of sclerostin and dickoppf -1 antibody support early bone formation around dental implants and graft materials in extraction sockets. The dual inhibition of two proteins secreted within the bone microenvironment and targeting Wnt/β-catenin pathway modulation which may enhance the potential bone formation increasing osseointegration and accelerating healing in dental implantation and bone volume augmentation in filling of insufficient bone sites, and methods of local administration.

**Methods:** Male rabbits (3-month-old, weight ≈ 2.5-3 kg) of five, tooth extraction and treatment groups were fully randomized among all rabbits to ensure any bias. Before tooth extraction, the allowed amount of whole blood was drawn. Comparison of the experimental animals was done according to the groups (control, graft control, scl-ab, dkk-1 ab, and scl+dkk-1 ab group of different ratios and time intervals as 2 and 4 weeks. Related measurements were carried out by using microcomputed tomography, hematoxylin-eosin and immunohistochemical staining.

**Results:** Osteoconductive growth was observed. Around the graft material throughout the extraction area, mature bone tissue formations in the form of lamellas and partly osteoid tissue areas were observed at dual usage. PCT/TR2020/050731).

**Conclusion:** The combination of scl-ab and dkk-1 ab, which are targeted, used with graft materials in local applications, has the potential to increase bone healing rate and bone quality.

## P873
### THE SIGNIFICANCE OF THE OA SCHOOL AT THE TIME OF THE COVID-19 PANDEMIA

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**Objective:** To determine the advantages of conducting OA school in parallel with classical physical therapy in persons with chronic OA of the knee.

**Methods:** We conducted a randomized study of patients attending osteoarthritis school (OA school) and those who underwent classical physical therapy in a Clinical Hospital Dubrava. Patients with OA of the knee were randomized in a 1:1 ratio to the application of OA school or to undergo classical physical therapy. One year after the onset of the pandemic COVID-19, patients in both groups were interviewed by telephone to compare the morbidity and function of were treated with physical therapy as part of the OA school and classical physical therapy. The main test comparing the above results was WOMAC. The Short Physical Performance Battery (SPPB) and The International Classification of Functioning, Disability and Health (ICF) used to evaluate function and mobility.

**Results:** We enrolled 100 patients with a mean age of 71 y; 50 patients were assigned to each group. Baseline characteristics, including severity

of pain and level of disability, were similar in the two groups. The mean (±SD) baseline WOMAC scores were 33 in the OA school group and 27 in the classical physical therapy group. At 1 y, the mean scores were 58 and 60, this is how we established better long-term results of the osteoarthritis school. After a year without physical therapy (because of COVID-19) the results of other tests were also beneficial to the OA school.

**Conclusion:** OA school is more effective than regular physical therapy at long-term effectiveness for relieving pain and improving physical function in patients with chronic OA of the knee.

## P874
### CANAGLIFLOZIN, EMPAGLIFLOZIN AND SITAGLIPTIN INFLUENCE ON BONE TURNOVER MARKERS AND BONE MORPHOLOGY IN DIABETIC RATS

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**Objective:** To compare bone turnover markers (BTM) and bone structure in diabetic rats treated with canagliflozin (CANA), and empagliflozin (EMPA) and sitagliptin (SITA).

**Methods:** 4 weeks after type 2 diabetes mellitus induction male Wistar rats were divided into groups: "DM" (n=4), "SITA" (n=4) (50 mg/kg), "CANA" (n=4) (25 mg/kg), "EMPA" (n=4) (2 mg/kg) for 8 weeks. Control "CRL" animals (n=4) received vehicle. Blood glucose level (BGL) was studied every $3^{rd}$ day. Blood samples for osteocalcin (OCL), osteoprotegerin (OPG), RANKL were obtained prior to euthanasia. Femur samples were collected for histological examination.

**Results:** OCL in "DM" (10.69 [9.97; 11.03] ng/mL) was lower than in "CRL" (49.1 [47.98; 54.57]). OCL in "SITA" (19.57 [17.85; 24.44]) and "EMPA" (16.0 [15.72; 17.0]) was higher than in "DM". All drugs decreased OPG (6.28 [3.06; 9.99], 1.26 [1.04; 1.88] and 1.85[1.19; 1.9] pmol/L for SITA, EMPA, CANA). Both SGLT-2i caused more prominent decrease in OPG than SITA. RANKL in "SITA" (248.38 [220.81; 300.96] pg/mL) and "EMPA" (254.1 [231.62; 284.0]) did not differ from "CRL" (247.81 [205.36; 289.67]). CANA increased RANKL (342.86 [280.0; 355.29]) in comparison with other drugs. OPG/RANKL ratio did not differ between the "CRL" (0.53 [0.38; 0.66]) and "DM" (0.53 [0.19; 0.58]) and was higher comparing with treatment groups (0.24 [0.01; 0.45], 0.005 [0.003; 0.007], 0.005 [0.003; 0.007] for "SITA", "EMPA", "CANA"). The lowest OPG/RANKL ratio was in "EMPA" and "CANA", with no differences between them. Area of epiphyseal bone trabeculae was decreased in "EMPA" and "CANA" (56.3 [50.0; 61.1]% and 52.7 [47.3; 60.7]%), compared with "CRL" (62.5 [55.1; 71.3]%). BGL was normal in all treatment groups.

**Conclusion:** Both EMPA and CANA cause increase in bone resorption, SITA has neutral effect on bone remodeling, independently on BGL.

## P875
### TBS SCORES OF LUMBAR VERTEBRAE: COMPARISON WITH FOREARM BONE MINERAL DENSITY

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**Objective:** Osteoporosis is commonly diagnosed using BMD measurements from spine and hip sites. Patients with degenerative changes in the spine and hip bones can have falsely elevated BMD measurements in DXA scans, potentially misdiagnosing osteoporosis. Low forearm BMD for these patients may indicate generalized osteoporosis.

**Methods:** We reviewed a total of 1081 stored consecutive cases from a bone densitometer for patients referred between November 2020 and May 2021 for the DXA measurement. Demographics, TBS-score of lumbar vertebrae, and T-scores from three sites (spine, hip and 1/3 radius of forearm) were recorded. For each case, the BMD measurement for each site was coded as meeting criteria for osteoporosis, osteopenia, or normal bone density.

**Results:** A total of 107 patients (median age 73 y) exhibited osteoporotic forearm BMD (T-score below -2.5 SD) only, while other sites showing normal to osteopenic range from 1081 patients. TBS spine measurement evaluated using the same bone densitometer with equipment specific calibrated TBS software. 53 patients median age 71 y) had osteoporotic forearm BMD, 27 patients having osteoporosis both by spine TBS and concomitant forearm osteoporosis. Conventional lumbar BMD measured normal/osteopenia. TBS scores were highly correlated with forearm DXA (p<0.009). Another 54 patients met the same criteria for osteoporosis in forearm BMD without demonstrable osteoporosis BMD data either in the spine, hip or both sites. TBS software was not available for these patients for measurements.

**Conclusion:** BMD for the forearm is not generally considered in the diagnosis of osteoporosis. However, 107 of 1081 cases, or approximately 10%, had forearm BMD alone in the osteoporotic range, corroborating with TBS score in the osteoporotic range. This suggests that forearm BMD alone ±TBS measurements of lumbar DXA, may be sufficient to diagnose generalized osteoporosis. This may lead to increased treatment of osteoporosis.

## P876
### TREATMENT PROCESSES OF PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS DURING COVID-19 PANDEMIC

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**Objective:** We aimed to determine the effects of COVID-19 pandemic on treatment continuity and habits of patients diagnosed with postmenopausal osteoporosis.

**Methods:** Patients followed up from the Physical Medicine and Rehabilitation Clinic with the diagnosis of postmenopausal osteoporosis were included in the study. Continuation of the treatment and exercise and eating habits of the patients who received oral and parenteral therapy were questioned during the pandemic period. Perceived Stress Scale 14 (PSS) values were also recorded. Data was statistically analyzed between the groups. Significance was evaluated at the p<0.05 level.

**Results:** 179 patients with a mean age of 68.1 y were questioned. 76 patients were using oral alendronate 70 mg/week. 84 patients were using sc denosumab 60 mg/6 months. 14 patients were using iv zoledronic acid 5 mg/y. 5 patients were using oral ibandronic acid 150 mg/month. 21 of 84 patients using denosumab were stopped treatment for 4-12 weeks and 8 were discontinued treatment for more than 12 weeks. 12 of 76 patients using alendronate were stopped treatment for 4-12 weeks and 6 were discontinued treatment for more than 12 weeks. 4 of 14 patients using zoledronic acid were stopped treatment for 4-12 weeks and 2 were discontinued treatment for more than 12 weeks. 1 of 5 patients using ibandronic acid were stopped treatment for 4-12 weeks, 2 were discontinued treatment for more than 12 weeks. 51 of the patients stated that they exercised regularly before the pandemic, and 18 could continue exercising during the pandemic period. 25 patients stated that they could not exercise or walk due to pandemic precautions and anxiety, 6 patients due to health problems, and 2 patients for other reasons. Considering the continuity of treatment and the tendency to quit; there was no statistically significant difference between oral and parenteral treatment groups. In

terms of stress level, no statistically significant difference was found between the groups in PSS-14 values (p>0.05).

**Conclusion:** The continuation of the treatment and physical activity levels of the patients who received medical treatment with the diagnosis of postmenopausal osteoporosis were affected by the pandemic process. It is important to develop new strategies that will facilitate the treatment and health services for situations that may cause disruptions in health care such as pandemics and natural disasters.

## P877
### SPECIFIC COLLAGEN PEPTIDES IMPROVE BONE ELASTIC STRUCTURE IN POSTMENOPAUSAL WOMEN

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**Objective:** Investigations in rodents as well as in vitro experiments have suggested an anabolic influence of specific collagen peptides (SCP) on bone quality both bone formation and BMD. The goal of the study was to investigate the effect of 120 d daily oral administration of 15 g SPC group on BMD in postmenopausal women with primary, osteoporosis reduction of BMD undergoing drug holiday and food diary control.

**Methods:** 10 women were enrolled in this study denominated "area test 120". The primary endpoint was the change in BMD after 120 d on either the left femoral neck or the lumbar spine.

**Results:** A total of 9 woman completed the study, but all subjects were included in the intention-to-treat (ITT) analysis (age 61.2 7.2 y; BMI 23.6 3.6 kg/m$^2$; average T-score -2.61). In the SCP group the BMD increased significantly (average T-score -2.13 p=0.184). **Conclusion:** These data demonstrate that the intake of SCP increased BMD in postmenopausal women with primary, osteoporosis reduction of BMD undergoing drug holiday and diary food control. In addition, SCP supplementation was associated with a favourable shift in bone markers, indicating increased bone formation and reduced bone degradation.

## P878
### ULTRASOUND-GUIDED INTRA-ARTICULAR INJECTION: EFFICACY OF HYALURONIC ACID COMPARED TO PEPTIDES IN THE TREATMENT OF KNEE OSTEOARTHRITIS

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**Objective:** Osteoarthritis (OA) is a degenerative joint disease which causes pain and functional impairment. there is no definitive cure for OA. Intra-articular injections may be useful in terms of pain and functional status, in knee OA. Hyaluronic acid (HA) and peptide molecules recently begin to be used. The aim of this study was to compare the efficacy of intra-articular peptide injection with that of the HA in the persons with OA. to make the procedure more accurate and assessment more objective, we use ultrasonography (US) with power Doppler.

**Methods:** We performed a retrospective evaluation of a cohort of patients with knee OA, from our injection outpatient clinic, treated by US-guided joint injection of HA and Peptide. The patients were divided according to the type of treatment they underwent: group I (N=54), patients treated with HA (three US-guided knee injections one week apart); group II (N=35), patients treated with Peptide (once US-guided knee injection). All patients were monitored for 3 months, evaluating: subjective pain using a 10-cm Visual Analogue Scale; pain, stiffness, functionality using the Western Ontario and McMaster Universities Arthritis Index (WOMAC), Lequesne Index and Health Assessment Questionnaire (HAQ).

**Results:** A total of 89 patients with knee OA were evaluated (women 86.5%) with a mean age of 57.5±7.8 y. There was no difference for age, BMI and knee OA degree between groups. All the subjects analyzed showed a significant pain reduction at the end of therapy and 3 months after treatment. WOMAC was statistically significantly improved from baseline in both groups examined. WOMAC pain score of peptide group was lower than HA group at the 3 months follow up (p<0.05). Other WOMAC subgroups and total were same at the 3 months follow up. Both groups had statistically significant HAQ improvement (p<0.01), there was not any difference at the end of therapy and three months follow up between groups.

**Conclusion:** This study demonstrated the efficacy of OA treatment with peptide is similar to HA. Unique dose peptide injection was cheaper from three injection of HA and because of three times application, HA was more painful.

## P879
### RELATIONSHIP BETWEEN SARCOPENIA AND ATHEROSCLEROSIS OF THE CAROTID ARTERIES IN MEN WITH CORONARY HEART DISEASE

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**Objective:** To study the relationship between sarcopenia and atherosclerosis of the carotid arteries in men with coronary heart disease (CHD).

**Methods:** 79 men aged over 50 y with verified CHD were examined (mean age 63 (57; 66) y). To assess muscle mass, the total area (cm$^2$) of the lumbar muscles of the axial section at the level of the 3rd lumbar vertebra (L3) was determined using multispiral computed tomography on a 64-slice computer tomograph "Somatom Sensation 64" (Siemens AG Medical Solution, Germany). The ratio of the obtained index of the area of skeletal muscle to the square of the patient's growth index determined the "musculoskeletal index L3". The media considered the threshold value to be 52.4 cm$^2$/m$^2$. Evaluation of muscle strength was performed using a mechanical wrist dynamometer DC-25. Muscle function was examined using a short physical performance battery (SPPB). The severity of atherosclerotic lesions of the carotid arteries was assessed by color duplex scanning with the study of the intima-media thickness (IMT), the presence of atherosclerotic plaques (ASB) and the degree of artery stenosis. In accordance with the recommendations of the EWGSOP (2010, 2018), the patients were divided into 3 groups: 1$^{st}$ - 31 patients without sarcopenia, 2$^{nd}$ - 21 patients with presarcopenia, and 3$^{rd}$ - 27 patients with sarcopenia.

**Results:** IMT in the group of patients with sarcopenia is significantly higher than that in men without sarcopenia (p=0.005). The most severe lesion of the carotid arteries with multiple ASB and stenosis 50% or more was significantly more frequent in men with sarcopenia compared with the group of patients with presarcopenia (48.15 vs. 9.5%, p=0.015) and without sarcopenia (48.15 vs. 12.9%, p=0.013). According to the results of the correlation analysis, a significant negative relationship was established between the severity of carotid atherosclerosis and the musculoskeletal index (r=-0.227, p=0.047).

**Conclusion:** An increase in IMT is associated with a decrease in muscle mass, which indicates a more severe atherosclerotic lesion of the carotid arteries in men aged over 50 y with verified CHD and sarcopenia.

## P880
### PREDICTORS OF MUSCLE MASS LOSS IN IN MEN WITH CORONARY HEART DISEASE

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**Objective:** To identify predictors of muscle loss in men with coronary heart disease (CHD).

**Methods:** 79 men aged over 50 y with verified CHD were examined (mean age 63 (57; 66) y). To assess muscle mass, the total area ($cm^2$) of the lumbar muscles of the axial section at the level of the 3rd lumbar vertebra (L3) was determined using multispiral computed tomography on a 64-slice computer tomograph "Somatom Sensation 64" (Siemens AG Medical Solution, Germany). The ratio of the obtained index of the area of skeletal muscle to the square of the patient's growth index determined the "musculoskeletal index L3" (SMI). The media considered the threshold value to be 52.4 $cm^2/m^2$. Evaluation of muscle strength was performed using a mechanical wrist dynamometer DC-25. Muscle function was examined using a short physical performance battery (SPPB). The construction of a predictive model of a decrease of SMI below the threshold value was performed using the binary logistic regression method. Threshold values for parameters associated with a decrease in media were determined using ROC analysis.

**Results:** According to the results of binary logistic regression, it was found that significant predictors of a decrease in the musculoskeletal index in this work were the indicators of BMI, a short physical performance battery (SPPB) and total cholesterol level (TC) ($R^2$=57.9%). It was shown that an increase in BMI by 1 $kg/m^2$ reduces the likelihood of a decrease of SMI below the threshold value by 1.5 times (OR 0.657, 95%CI: 0.531-0.813), an increase in the result of a SPPB by 1 point reduces the likelihood of a decrease of SMI by 3,2 times (OR 0.313, 95%CI: 0.145-0.677), and an increase in the TC level by 1 mmol/L, on the contrary, is associated with an increased risk of a decrease in the SMI by 1.9 times (OR 1.914, 95%CI: 1.166 -3.141). According to the results of the ROC analysis, it was revealed that the BMI indicator has a reliable predictive ability to detect a decrease in mass media. The threshold value of BMI, providing sensitivity of 81.3% and specificity of 64.5%, was ≤30.1 kg/m2. The threshold value of SPPB providing a sensitivity of 52.1% and a specificity of 74.2% was a result of ≤10 points. The threshold value of total cholesterol was> 4.7 mmol / L with a sensitivity of 56.3% and a specificity of 87.1%.

**Conclusion:** The results of study indicate the presence of common pathogenetic mechanisms of sarcopenia and cardiovascular diseases, which determines the relevance of further research in this area.

## P881
### BLOOD LIPID PROFILE IN MEN WITH CORONARY HEART DISEASE AND SARCOPENIA

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**Objective:** To study the characteristics of lipid metabolism in men with coronary artery disease (CHD) and sarcopenia.

**Methods:** 79 men aged over 50 y with verified CHD were examined (mean age 63 (57; 66) y). The diagnosis of sarcopenia was based on the recommendations of EWGSOP (2010, 2018) with the determination of three parameters - muscle strength (mechanical wrist dynamometer DC-25), muscle mass (multispiral computed tomography) and muscle function (short physical performance battery). Total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol (LDL-C) were determined in fasting blood serum by spectrophotometric method. In accordance with the recommendations EWGSOP, the patients were divided into 3 groups (EWGSOP, 2010): 1st - 31 patients without sarcopenia, 2nd - 21 patients with presarcopenia, and 3rd - 27 patients with sarcopenia.

**Results:** The TC level in patients negatively correlated with the musculoskeletal index (r=-0.315, p=0.005) and the total area of skeletal muscles at the 3rd lumbar vertebra level (r=-0.277, p=0.013). In a comparative analysis it was found that TC level in men with CHD and sarcopenia was significantly higher compared to that in patients with CHD and without sarcopenia (5.20 (3.75; 6.00) mmol/L vs. 3.90 (3.40; 4.60) mmol/L, p=0.03). Based on the regression analysis, a direct relationship between the TC level and the risk of a decrease in the musculoskeletal index was established (OR 1.914, 95%CI: 1.166-3.141). According to ROC-analysis, the threshold value of total cholesterol was >4.7 mmol/L with a sensitivity of 56.3% and a specificity of 87.1%.

**Conclusion:** The presence of sarcopenia in men with CHD is associated with more severe proatherogenic abnormalities in the blood lipid profile. Hypercholesterolemia is an additional predictor of muscle loss.

## P882
### RELATIONSHIP OF SARCOPENIC SYNDROME AND CORONARY ARTERY ATHEROSCLEROSIS IN MALE PATIENTS WITH ISCHEMIC HEART DISEASE

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**Objective:** To study the relationship between severity of coronary atherosclerosis and sarcopenia in in men with coronary heart disease (CHD).

**Methods:** 79 men aged over 50 y with verified CHD were examined (mean age 63 (57; 66) y). To assess muscle mass, the total area ($cm^2$) of the lumbar muscles of the axial section at the level of the 3rd lumbar vertebra (L3) was determined using multispiral computed tomography on a 64-slice computer tomograph "Somatom Sensation 64" (Siemens AG Medical Solution, Germany). The ratio of the obtained index of the area of skeletal muscle to the square of the patient's growth index determined the "musculoskeletal index L3" (SMI). The media considered the threshold value to be 52.4 $cm^2/m^2$. Evaluation of muscle strength was performed using a mechanical wrist dynamometer. Muscle function was examined using a short physical performance battery (SPPB). The variant of coronary atherosclerosis was assessed according to coronary angiography: variant A - one- and two-vessel lesion; variant B - three-vessel lession; variant C - lesion of the left trunk of the coronary artery in combination (or without) with hemodynamically significant narrowing of any other coronary arteries.

In accordance with the recommendations EWGSOP, the patients were divided into 3 groups (EWGSOP, 2010): 1st - 31 patients without sarcopenia, 2nd - 21 patients with presarcopenia, and 3rd - 27 patients with sarcopenia.

**Results:** The severity of coronary atherosclerosis in patients negatively correlated with the musculoskeletal index (r=- 0.227, p=0.047). In a comparative analysis, a higher incidence of lesion of the left trunk of the coronary artery±any other arteries was found in the group of patients with CHD and sarcopenia compared to that in patients with CHD and presarcopenia and without sarcopenia (29.6% vs. 20.0% and 13.3%, respectively). According to the results of the ROC analysis, it was found that impaired blood flow in three vessels or he left trunk of the coronary artery±any other arteries was associated with a decrease in SMI with a sensitivity of 68.1% and a specificity of 56.7% (AUC was 0.634; 95%CI: 0.515-0.741; p=0.028; Youden's index 0.248).

**Conclusion:** A higher incidence of the prognostically unfavorable variant of coronary lesions in patients with CHD and sarcopenia was found, which makes further research in this area relevant.

## P883

### DENUSOMAB PERSISTENCE DURING THE COVID PANDEMIC

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**Objective:** To investigate the effect of the COVID-19 pandemic on denosumab persistence.

**Methods:** All patients who initiated denosumab treatment at our outpatient care (osteoporosis/endocrinology unit) between 2016-2019 were included and date of injections were recorded from case records. Persistence was analyzed regarding 2-y persistence and 1-y persistence. Persistence was defined as a maximum interval of either 1) 8 months (m) [6+2m], or 2) 9m [6+3m].

**Results:** In total 171 patients were included. Mean age was 74.3±10.2 y (range 35-93 y) and 87% were women. Age and gender distribution did not differ significantly between the year of denosumab initiation. The 2-y persistence rate (8-m interval permitted) was lower in patients starting denosumab 2019 than those starting 2016-1018, i.e., 69% vs. 83%, p=0.044. No significant difference was seen analyzing 1-y persistence in the same groups (87 vs. 91%, p=0.410). When using a more liberal persistence definition, i.e., 9+m interval permitted, no difference was seen between 2 y persistence, 77 vs. 83%, p=0.341.

**Conclusion:** The present study indicates that a higher number of patients got their injection later than recommended during the pandemic, but despite high pressure on our healthcare system and health concerns in the general population, no significant influence on denosumab persistence using a more liberal interval allowance was seen in this outpatient osteoporosis group.

**Disclosure:** AS received lecture fees from Amgen Inc. and Mylan.

## P884

### PHYSICIANS PREFERENCES FOR VITAMIN D PRESCRIPTION

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**Introduction:** Disorders of mineral homeostasis leading to decreased bone density and fractures are strongly associated with severe vitamin D deficiency in most people. Currently, the most effective mean of preventing osteoporosis is long-term intake of vitamin D in various dosage forms, which are aqueous solutions, oil drops, tablets/capsules and granules.

**Aim:** The aim of our study was to assess the priority of prescribing of different forms of vitamin D based on a comparative analysis in a national study.

**Materials and methods:** We conducted a national online-based survey which included 704 physicians specialized in various fields (endocrinologists accounted for 80% of them).

**Results:** The largest number of doctors (35,2%) do not have any preference in prescribing the form of vitamin D. The second place in priority of appointment (28,3%) is occupied by an aqueous solution. Oil drops are prescribed in 21 percent of cases. Administration of capsules, tablets and granules is far behind (10,8%, 3,9% and 0,8% respectively).

**Conclusion:** Aqueous solution of vitamin D has the greatest bioavailability among the other dosage forms, that determines predominance of it's appointment. Moreover, a lot of people have severe limitations regarding medication's intake, such as unwillingness to take medications in a gelatinous frill - capsules (people adhering to vegetarianism) or inability to consume fats, which lower the frequency of an administration of vitamin D in capsules containing gelatin and vitamin D in the form of oil drops. Domination of "all the same" position reflects the absence of doctor's affiliation with pharmaceutical companies. Thereby the best bioavailability and absence of potential patient's negativism determine the leading position of the administration of aqueous solution among the other forms of vitamin D.

## P886

### FREQUENCY AND RISK FACTORS FOR LOW BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH SYSTEMIC SCLERODERMA

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**Objective:** To determine the frequency and risk factors for low bone mineral density (BMD) in postmenopausal women with systemic scleroderma (SSc)

**Patients and methods:** 113 postmenopausal women with SSc were enrolled in the study: 77 (68.1%) with limited and 36 (31.9%) with diffuse cutaneous subtype. Patients with overlap rheumatic syndromes were not included. The median age was 59.5 [54.0; 63.0] years, the median duration of the disease was 10.0 [6.0; 15.0] years. 94 (83.2%) patients were treated with glucocorticoids (GC), the median duration of GC use - 10.0 [6.0;15.0] years. Dual energy X–ray absorptiometry (DXA) of the lumbar spine (LS), the femoral neck (FN) and the total hip (TH) was performed. Osteoporosis (OP) was diagnosed with a T-score < -2.5 SD and osteopenia – with a T-score from -1SD to -2.5 SD in any region of interest. Traditional risk factors of OP were analyzed, and the search for specific risk factors for low BMD in patients with SSc was carried out using multivariate linear regression analysis.

**Results.** The median LS BMD was 0.95 [0.87; 1.04] g/cm2, the FN BMD -0.78 [0.69; 0.86] g/cm2 and the TH BMD - 0.81 [0.74; 0.91] g/cm2. Low BMD at least in one region of interest was detected in 106 (93.8%) patients: OP - in 51 (45.1%) and osteopenia - in 55 (48.7%) women. OP was significantly more common in patients with the diffuse form (63.9%) compared to the limited form SSc (36.4%) (p=0.0062). 41 (36.2%) women had a history of low-trauma fracture, among them 25 (61.0%) patients had OP, 14 (34,1%) - osteopenia and only 2 (4.9%) persons - normal BMD. OP was significantly more common in patients with interstitial lung disease (ILD) (p=0.0014), with finger contractures (p=0.0065), positive for anti-Scl 70 (p=0.022) and anti-nuclear antibodies (ANA) measured by indirect immunofuorescence (IFI) using Hep-2 (p=0.0038). Median level of 25(OH)D was 19.68 [14.31;23.72] ng/ml. Low vitamin D level was detected in 91.2% of patients: 44.2% women had hypovitaminosis D, 41.6% – vitamin D deficiency and 5.3% - severe deficiency (25(OH)D less than 10 ng/ml) with no significant difference between patients with diffuse and limited form.

In multivariate linear regression analyses the duration of GC use was negatively associated with LS BMD (b=-0.007, $R^2$= 0.196, p <0.00093). The following factors associated with FN BMD: BMI(b=0.007, $R^2$=0.208, p<0.00093), creatinine clearance (CrCl) (b=0.313, $R^2$=0.213, p<0.00037), duration of postmenopause (b=-0.223, $R^2$=0.134 p<0.00000), duration of proton- pump inhibitors (PPI) use (b=-0.277, $R^2$=0.291, p<0.00000), cumulative dose of GC (b=-0.269, $R^2$=0.134 p<0.00000), and with TH BMD - BMI (b=0.493, $R^2$=0.244, p<0.00000), CrCl (b=0.313, $R^2$=0.150, p<0.00016) and cumulative dose of GC (b=-0.219, $R^2$=0.289, p<0.00029).

**Conclusions:** Low BMD was found in 93.8 % of postmenopausal women with SSc, among them 45.1% had OP. OP was significantly more common in patients with a diffuse cutaneous subtype. 91.2% of the patients had low level of vitamin D. BMI and CrCl were positively, and the cumulative dose of GC was negatively associated with FN and TH

BMD. The duration of postmenopause and PPI use negatively affected FN BMD, and the duration of GC use had a negative effect on LS BMD.

## P887
### THE FREQUENCY OF SARCOPENIA AND FACTORS ASSOCIATED WITH MUSCLE MASS IN WOMEN WITH SYSTEMIC SCLERODERMA (PILOT STUDY)

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**Objective:** to identify the frequency of sarcopenia (SP) and risk factors for low muscle mass in women with systemic scleroderma (SSc).
**Patients and methods:** 47 women aged > 40 years who met the 2013 ACR/EULAR classification criteria for SSc were recruited. Among them 29 (61.7%) patients with limited and 18 (38.3%) - with diffuse form of the disease. Pregnant or breast-feeding women and patients with overlapping rheumatic syndromes were not included. 17 (36.2%) women were of fertile age and 30 (63.8%) - postmenopausal. The median age was 53.9 [48.0;62.0] years, and the median duration of the disease was 6.0 [1.0;12.0] years. Muscle strength was measured using hand dynamometry and "Chair rising" test. All patients underwent whole-body dual energy X-ray absorptiometry (DXA). The appendicular muscle mass index (AMI) was calculated as the ratio of appendicular muscle mass (AMM) to height squared (kg/m2). Physical performance was assessed using a gait speed test and the Short Battery of physical performance (SPPB). Sarcopenia (SP) was diagnosed according to the updated EWGSOP2 criteria [1]. Associations between AMM, AMI and SSc disease characteristics were analyzed in univariate linear regression analysis.
**Results.** 10 (21.3%) women with SSc were classified as having SP (6,4% - severe sarcopenia). Among them 6 (33.3%) patients with diffuse and 4 (13.8%) with limited form of the disease (p > 0.05). Patients with SP did not differ from patients without SP in age, BMD, and the frequency of OP, number of fractures, skin score, positivity of Scl 70 and ACA, the nutritional status assessed by MNA-SF. At the same time, they were significantly more likely to fall (p=0.039), they had a lower BMI (p=0.044), a longer disease duration (p=0.039) and a higher cumulative dose of glucocorticoids (GC) (p=0.045).Univariate linear regression analysis revealed that AMM and AMI were positively associated with BMI (b=0.44, p<0.05 and b=0.15, p<0.01, respectively) and MNA-SF (b=0.37, p<0.01 and b=0.11, p=0.02, respectively), and negatively - with the Rodman skin score (b=-0.17, p=0.04 and b= -0.06, p=0.01, respectively) and falls during the past year (b=- 2.54; P=0.02 and b= -0.96, P<0.01, respectively). Additionally, a negative association with the cumulative dose of glucocorticoids (GC) was found for A M (b <-0.01, p=0.04).
**Conclusions:** SP was diagnosed in 23.1% of women with SSc with no significant difference between the limited and diffuse forms of the disease. BMI and the nutritional status positivity associated with AMM and AMI, while Rodman skin score and a history of falling in the past year negatively. A high cumulative dose of GC negatively affected the AMM value. Although age is the main risk factor for sarcopenia in the general population, it did not differ between SSc patients with low and normal AMM and AMI in our study.

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### DEVELOPMENT OF A CLINICAL PREDICTION TOOL FOR PREOPERATIVE PREDICTION OF 1-YEAR POSTOPERATIVE FUNCTIONAL OUTCOME OF INTERTROCHANTERIC FRACTURE

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**Objective:** Ambulatory status restoration is an important therapeutic goal for patients with intertrochanteric fractures. Several studies had identified prognostic factors associated with functional endpoints after the operation. We aimed to develop a practical tool for preoperative prediction of good postoperative ambulatory status at 1-year for each patient with intertrochanteric fracture.
**Methods:** We performed a secondary analysis of a retrospective cohort of patients with intertrochanteric fractures who were operated on at Chiang Mai University hospital between January 2017 and February 2020 to derive clinical prediction models. Several factors were preselected as candidates for model derivation, such as the patients' sex, body mass index, Charlson's comorbidity index, and preinjury New Mobility Score (NMS). Multivariable fractional polynomial (MFP) procedure with logistic regression was used for statistical modeling.
**Results:** A total of 221 patients with intertrochanteric fractures were included in the secondary analysis. Of these, 160 (72.4%) had good postoperative ambulatory status (NMS ≥5) at 1-year. Male sex, body mass index, Charlson's comorbidity index, and preinjury NMS were incorporated in the final logistic model. Only preinjury NMS was transformed into second-degree fractional polynomial, while the rest were fitted with linear terms. The final logistic model showed an acceptable discriminative ability [AuROC of 0.77 (95%CI 0.70 to 0.85)] and model calibration. For applicability, the model was presented as a user-friendly mobile web application.
**Conclusion:** Our newly-derived clinical prediction tool showed acceptable discrimination and calibration in predicting postoperative ambulatory status at 1-year in patients with intertrochanteric fractures using only four simple predictors. This tool would allow physicians to provide patients and their families with individualized preoperative predictions of postoperative ambulatory status. However, the model should be further evaluated in an external dataset before being implemented in practice.
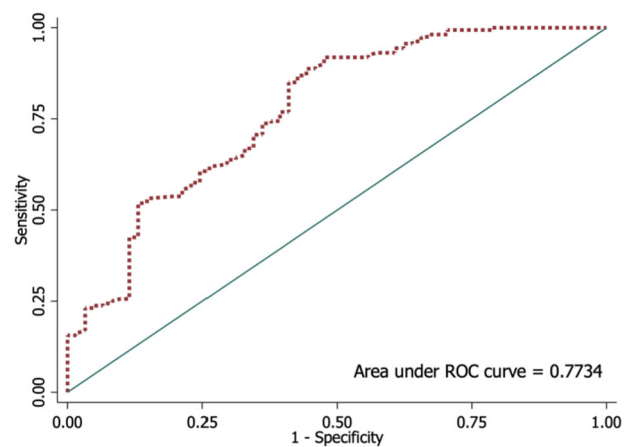


Fig 1. Area under ROC of the developed model

Fig. 2 The web application interface of the predicting model