

on reducing femur bone loss of hindlimb unloaded rats. In this study, clinostat was employed as a ground based model of stimulated microgravity to investigate the possible mechanisms of this prescription.

Methods: Serum from rat treated with herbs (SRH) was prepared by methods of serum pharmacology. Osteoblast was isolated cultured from bone tissue and then randomly grouped into three groups, placebo serum control group (PSC), placebo serum rotating group (PST), and SRH group (SRH). Each group were prepared to three concentration, 5%, 10%, and 20%. Then osteoblast of PST and SCM were rotated for 48 h in clinostat. Temperature inside was 37 °C and the rotating speed was 30 rpm. At the end of the 48th hr, proliferation of osteoblast, content of C-terminal propeptide of type I procollagen (PINP) and Osteocalcin (BGP), activity of Alkaline Phosphatase (ALP), and mRNA expression of insulin-like growth factor 1 (IGF-1) in osteoblast were tested separately.

Results: 48 h after rotating, compared with the corresponding concentration of serum of PSC, in PST, proliferation and ALP activity of osteoblast in 5% serum were significantly decreased; proliferation, BGP content, and mRNA expression of IGF-1 of osteoblast in 10% serum were significantly decreased; BGP content of osteoblast in 20% serum significantly decreased. Compared with the corresponding concentration of serum of PST, in SRH, 5% serum notably increased ALP activity and PINP content, and had the tendency to up-regulate mRNA expression of IGF-1 in osteoblast. 10% serum notably promoted proliferation of osteoblast, raised the PINP content, and had the tendency to up-regulate mRNA expression of IGF-1 in osteoblast. 20% serum notably increased ALP activity in osteoblast. No serum of SRH with different concentration had marked effects on BGP content.

Conclusion: The decreased proliferation of osteoblast induced by stimulated weightlessness might be related with the reduction of mRNA expression of IGF-1, BGP and PINP content, and the decreased ALP activity. The Chinese herbal prescription in this trial, to some extent, up-regulates mRNA expression of IGF-1, promotes proliferation, differentiation and maturation of osteoblast. One step further, it increases synthesis of collagen protein so as to reduce bone loss due to weightlessness.

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T35

The study of two Chinese herbal prescriptions on reducing bone and muscle loss of hindlimb unloaded rats

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Background and Objective: With the development of spaceflight in China, traditional Chinese medicine is playing a more and more important role in this field. However, different herbal combinations have different medical effect. Therefore, in this trial, we compared the effects of two Chinese herbal prescriptions, which were designed according to the basic theory of TCM, on reducing bone and muscle loss of hindlimb unloaded rats.

Methods: 40 8-week-old male Wistar rats were randomly divided into 4 groups: control group (CON), hindlimb unloading group (HU), HU+Chinese herbal prescription NO.1 (HUM1), and HU+Chinese herbal prescription NO.2 (HUM2). During the whole experiment (3 weeks), CON and HU were free to animal food and water, while HUM1 and HUM2, at the same time, were given different Chinese prescriptions. HU, HUM1 and HUM2 simulated weightlessness by

–30° tail suspension during the last two weeks. The biochemical indices such as Ca, P, ALP in serum were examined, biomechanical strength and bone mineral density (BMD) of humerus and femur, weight index of gastrocnemius, triceps brachii and their water content were determined.

Results: Compared with CON, serum calcium of HU, HUM1 and HUM2 increased significantly ($p < 0.05$). Compared with CON, weight index of gastrocnemius of HU, HUM1 and HUM2 were remarkably decreased.

Conclusions: The results indicated that both two Chinese herbal prescriptions, to some degree, had the function to inhibit bone and muscle loss in hindlimb unloaded rats. Virtually, our Chinese prescriptions had little effect on upper limbs, but the hindlimb of rats became the pharmacological target. One of the prescriptions was adept at reducing bone loss, and the other one was good at increasing content of muscle tissue of hindlimb. Further study on mechanism should be taken.

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T36

Intravenous ibandronate—Patient satisfaction, acceptability and side effects

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Objective: To assess the patient satisfaction and incidence of side effects with intravenous (IV) Ibandronate.

Methods: Questionnaire based interview of 100 consecutive patients attending our bone clinic for IV Ibandronate. It included questions about reasons for the treatment, length of treatment, incidence of side effects, improvement in symptoms, over all satisfaction and preference, if they had been switched from IV Pamidronate. Over all satisfaction was recorded on a scale of 1 to 5. 5 being the point of highest satisfaction and 1 as dissatisfaction, with three as no preference.

Results: The age range was 37–86 years with a mean of 70 years. 67 patients were on this treatment for over 12 months.

62 patients were switched over from IV Pamidronate treatment due to change in our guidelines, 30 patients were started treatment with IV Ibandronate, because of intolerability of oral medications and 8 because of history of definite upper GI problems.

76 patients did not experience any side effects. 10 patients reported aches and pains, 7 flu like symptoms (lasting up to 48 h), 2 had nausea, 1 fainted after the injections, 1 developed rash (resolved spontaneously) and 1 complained of palpitations. One patient reported that her mobility had deteriorated and one reported that her nails had become brittle.

10 patients reported a sense of well being, 2 said that their mobility had improved, and 3 felt their pains and aches had improved. This may just be placebo effect though bisphosphonates have been reported to have some analgesic property.

81 patients were highly satisfied with 5 on the scale, 12 satisfied with 4 on the scale, 5 showed no preference and 2 were clearly dissatisfied.

Of the 62 patients switched over from IV Pamidronate, 58 felt that it was definitely better mainly because of ease of injection and quickness of the procedure. However 4 showed preference for IV Pamidronate.

Conclusion: IV Ibandronate is well tolerated by the patients, with few side effects and good over all satisfaction, and preference over IV Pamidronate. Therefore, we feel IV Ibandronate is a way forward in the treatment of osteoporosis and the safety could establish it as a

preferred treatment, may be in the community, improving the compliance of anti-resorptive treatment.

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T37

Percutaneous vertebroplasty for pain relief and spinal stabilization for multiple spinal metastases

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Objective: To evaluate the effects of percutaneous vertebroplasty (PV) performed with polymethylmethacrylate cement to treat pain in patients with multiple metastases to the spine.

Materials and methods: In 2 years, 28 patients (16 men [58%] and 12 women [42%]; the age was 44–78, mean age, 68.7 years) underwent C-arm X-ray guided PVP procedures to treat 154 vertebrae, from T₅–L₅, metastases 2–15 vertebrae, once the most vertebrae for vertebroplasty was 9. Primary spinal metastases included 6 patients with lung cancer, 3 from liver cancer, 3 with renal carcinoma, 4 of breast cancer and 12 with unknown primary carcinoma. Evaluated data included immediate imaging findings (on radiographs and computed tomographic scans) and clinical findings at 1h to two years follow-up.² or Fisher exact testing was performed for univariate analysis of variables.

Results: Among the 28 patients treated for multiple spinal metastases, 24 (86%) had marked to complete pain relief, 2 (14%) moderate relief. Only 4 of the 8 patients with malignancies had significant pain relief. In 7 of these patients, no further vertebral compression occurred, and spinal canal compromise was prevented. The patient with the hemangioma had no significant pain reduction. Minor complications occurred in 3 (6%) patients.

Conclusion: Percutaneous vertebroplasty provided significant pain relief in a high percentage of patients with multiple metastases to the spine. The procedure provided spinal stabilization in patients with malignancies but did not produce consistent pain relief.

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T38

Preliminary results of dynamic analysis of bone density and bone structural parameters after 3DpQCT measurements of the Berliner bed rest study 2

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Objective: To avoid loss of bone mass after immobility in humans, simulated through a bed rests study (60 days), two controlled mechanical conditions (vibration and maximal force) were developed. This knowledge could be used for treatment of osteoporotic patients and maintenance of bone healthy for humans in space.

Methods: Following Wolff and Roux laws, vibration and maximal force were used as mechanical stimuli to maintain normal state of osteoblastic and osteoclastic activity. The training conditions include vibration at 2.6 GHz (5 min/3 times a week) plus a maximal compression force of 3 BW applied simultaneously on the foots (VRES-G). The second one is identical but without vibration (RES-G). An special device was developed to apply this forces in a underlying position with 6° head inclination as maintained during the bed rest

period (BRP). A control group (CTRL-G) was included. To follow the dynamics of bone adaptation 3DpQCT (Xtreme, Scanco Medical) measurements were performed at the left radius and tibia (110 slices, 82 mm) in 24 volunteers, divided in 4 groups (6 individuals at a time, 2/Group).

Results: Preliminary results during the BRP and 90 days after, shows maximal variations of up to $\pm 4\%$ for the bone density and up to $\pm 10\%$ for the structural bone parameters for all individuals (Tb.Th, Th.Sp, etc). The initial mean apparent cortical density was approximately 890 g/m³. In general, high variations in the structural parameters between individuals were detected. Density values in the tibia (D100) could decrease up to 1.5% in only 3 days after the BRP for the CTRL-G and the RES-G but only up to 0.8% for the VRES-G. Dinn variation shows a high dispersion of values for all groups. The cortical tibial thickness was reduced up to 5% during the BRP in the CTRL-G and was maintained in the VRES and the RES-G. With an exception in the CTRL-G the density and structural parameters converge asymptotically to the initial values after the BRP for both tibia and radius. Specific porosity regions at the cortical were observed during the BRP. In general high dispersion without a clear tendency was observed in the radius for all groups.

Conclusion: Vibration at high frequencies applied on the muscles could maintain bone biomechanical properties. Their effectiveness was quantified by maintenance of the cortical thickness in the VRES (Ct.th) and high degradation of the structures at the center of the tibia (Dinn) in the control group. Dynamical stiffness will be estimated by FEM analysis.

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T39

Preliminary study of the change and affecting factors of bone mass in 639 Guangdong healthy women

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Objective: To investigate the change rule of bone mass in climacteric and postmenopausal women, and analyze relevant factors affecting bone mass. Furthermore, to provide scientific basis for preventing and treating osteoporosis of women.

Methods: In this study, 639 women experienced BMD examinations of lumbar spine (L₁–L₄) and left proximal femur, who were participating in health examination, and had lived in Guangdong for 10 years or more. The mean age was 48.91 \pm 7.32 (from 30 to 67). There were 305 women in pre-menopause, with a mean age of 42.85 \pm 4.38 (from 30 to 54); 334 women in post-menopause, with a mean age of 54.34 \pm 4.79 (from 44 to 67), and a mean menopausal age of 49.92 \pm 3.62, all of which had experienced natural menopause. Investigated relevant factors included: age, height, weight, body mass index (BMI), age of menarche, menopause age, childbearing history, information of nutrition and exercise by questionnaire. Statistical analysis: Processed the data with statistical package of SPSS 12.0. All data were expressed as X \pm S.

Results: (1) BMD and age. The BMD of lumbar spine and proximal femur gradually decreased with the growth of age. The lost speed of bone mass accelerated from 50–59 years old, and was about 1.5% every year. BMD of ward's triangle lost more remarkably, and earlier than other locations. (2) BMD and menopause. BMD of pre-menopausal women had decreased a little with the growth of age, especially in Ward's triangle. BMD in lumbar spine and proximal femur lost quickly during the first 4-year after menopause and then gradually lost. The osteoporotic incidence of postmenopausal women was distinctively