MSK ASSESSMENT:
Part 1: General Principles & Upper limb

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Session Aims and Objectives

- Review core anatomy of major components of the MSK system
- Apply basic principles of MSK assessment
- Discuss relevant history taking

Session Agenda

- Bone structure & MSK changes in the older person
- Overview of joint symptoms
- History taking in relation to trauma
- Silver trauma
- LOOK-EEL-MOVE Principles
- Examination of and injuries to/complaints to:
  - Ribs
  - Neck
  - Red flags in backs
  - Upper limb

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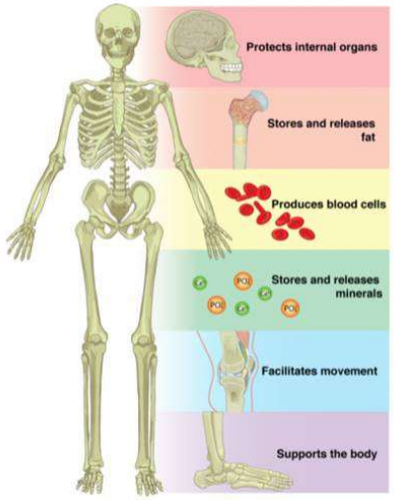
Function of MSK system

- Protection
- Movement
- Support



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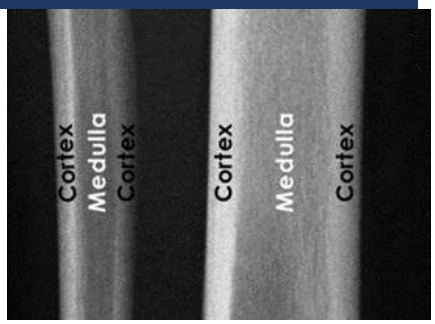
Component of MSK System

- BONES
  - *HOW MANY ?*
- JOINTS
- MUSCLES
- LIGAMENTS
- *What's a tendon ?*

Bones structure

- Bone is made of an outer cortex and an inner medulla.
  - Medulla = cavity
- The walls are composed of spongy bone (cancellous bone)
- Centrally contains the bone marrow



The difference in density allows for differentiation on X-rays –

- cortex is denser and, thus whiter than the medulla.

Bone Development :
occurs in 4 principle situations

- Initial formation of bone in an embryo and foetus
- Growth of bones during infancy, childhood & adolescene
- Remodelling- replacement of old bone by new bone tissue throughout life
- The repair of fractures

20% of all bone tissue is replaced annually- whole skeleton on average ~10 years

Bones: changes with age

- With age, there is an increase in bone resorption which in turn leads to a gradual and progessive loss of bone from the age of 35 onwards !
- Bone loss per year is 0.2% of the total from the age of 35
  - But increased to 1% after menopause in women
  - On average by the age of 80, a woman will have lost 30% of her bone mass compared to 10% of a man of the same age

(Ref: Nicholl & Wilson, 2007)

Other MSK changes with ageing

- Reduction is muscle mass & strength (‘*sarcopenia’):*
  - Reach max strength in 2nd and 3rd decade: then gradual decline
  - By the age of 75: muscle mass is halved and adipose tissue doubled
  - Around age of 0, muscle loss accelerates
- Multi factorial causes of Sarcopenia:
  - Loss of neurons due to CNS decline
    - Loss of contractile function
    - Hormone reduction
  - Reduced rate of muscle protein synthesis
  - Reduced levels of physical activity
  - Increase rates of immobilisation

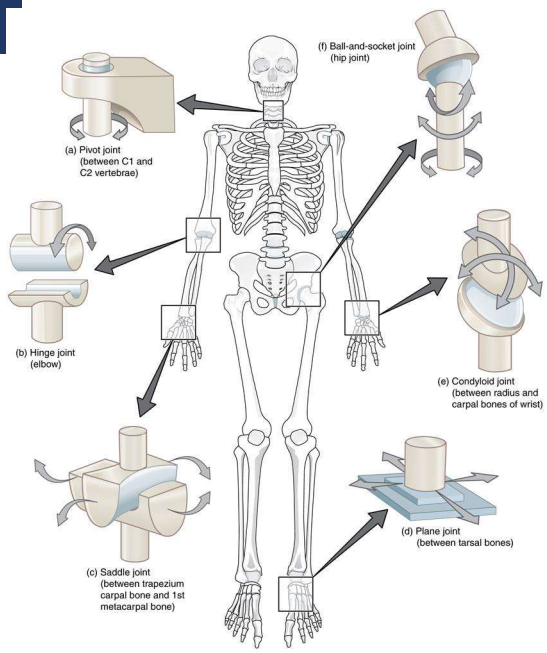
Ref: Nagaratham et al (2016)

Joints

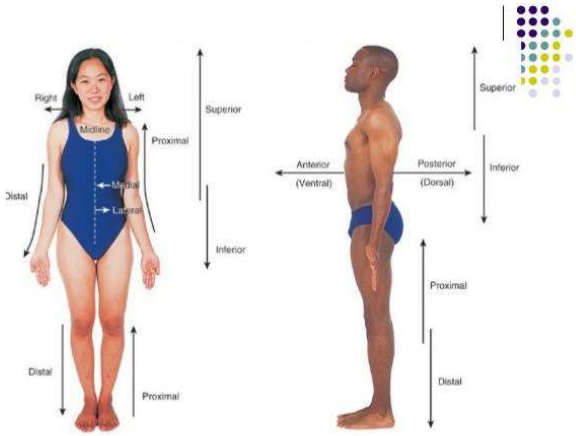
- **Fibrous Joints -immoveable** : held together by only a ligament. Eg radioulnar and tibiofibular
- **Cartilaginous-semimoveable** : connection between the articulating bones is made up of cartilage eg vertebrae in the spine

Synovial: by far the most common classification of a joint within the human body.

- Highly moveable
- Synovial capsule & hyaline cartilage



ANATOMICAL POSITION



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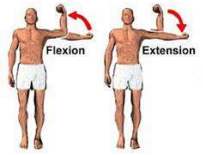
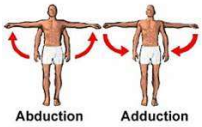
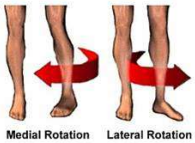
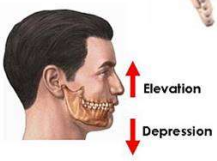
Movement









- Circumduction
- Pronation
- Supination
- Lateral
- Medial
- Adduction
- Abduction
- Flexion
- Extension

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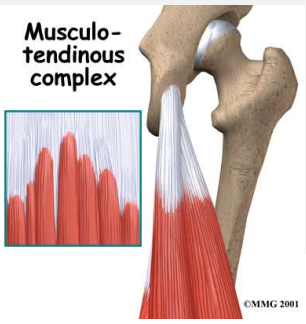
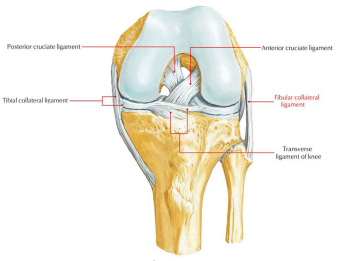
TENDON
Connects muscles to bone- joins muscle at the Muscolo-tendonious junction .

Muscle injuries= STRAINS

LIGAMENT
Fastens/connects bones together at joints-

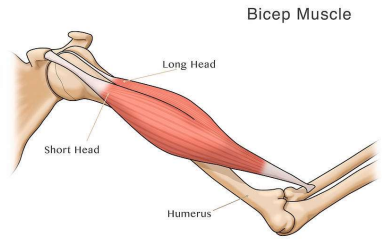
Injury to ligament= SPRAIN





Muscles

- **Pain**
- Stiffness
  - Occurs with inflammatory (worse in the morning & often at end of day) & degenerative conditions
- Weakness
  - Joint disease
- Wasting
- Cramps
  - Rarely pathological. Usually calves & often followed by forced contraction of the muscle



- Fasciculation
  - Several muscles or localised to one area ?
  - Has been called 'verminosis' (they look like *worms* moving below the dermis)
  - Causes include: benign, stress; high coffee intake; sclerosis (ALS) , some medication

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PAIN

- Can be difficult to localise due to referred pain

Sites of referred joint pain	
FROM	TO
C-spine	Head or over shoulder
Lumbar spine	Buttocks/post thigh
Shoulder	Lateral aspect upper arm
Elbow	Forearm
Hip	Anterior thigh or knee of both

Assess

- Severity
- Type of onset (acute or insidious)
- Diurnal variation
- Relation to physical activity
- Any night pain / sleep disturbance
- Mood disturbance

BONE PAIN

- Diffuse in generalised disorder (eg osteoporosis)
- Fracture pain: Sharp and piercing and worsened by movement but relieved by rest

Joint symptoms /Pain

Symptoms include pain, swelling , crepitus and locking

- PAIN
  - Inflammatory cause eg RA, ankylosing spondylitis
  - Mechanical (Osteoarthritis)
  - Infective (Eg TB)
  - Trauma
- Muscle pain
- Often deep, constant and poorly localised
- Pain usually exacerbated by contraction of the muscle

- CREPITUS
  - Crepitus without pain is rarely pathological
- LOCKING
  - A joint can lock if material (eg cartilage) becomes interposed between articular surfaces

Joint swelling

- How long has it been present ?
- Onset- rapid or slower
- Does the swelling fluctuates
- EFFUSIONS
  - If no trauma: usually inflammatory
  - Infection (pus)
  - Trauma
    - Blood (haemoarthrois)
    - Blood/fat (lipohaemoarthrosi)

Differentials : Hot swollen joint

- Infections
- Septic arthritis
- Reactive arthritis
- Gout
- Bursitis

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History taking : TRAUMA

- Hx
- Examination
- Investigation

"I have six honest serving men who taught me all they knew- their names are what and where and why and how and when and who" (Kipling)

- TRAUMA

- **WHAT**: Happened– Do they think is the matter- is their job
- **Where**: Did it happen? Are their relatives
- **WHEN**: was the accident- did the symptoms start and in what order- Did they have any previous tx? Had they had anything like this before
- **HOW**: Did it happen and think practicalities: how are they going to manage/get home
- **WHY**: Think health education- are they here at all? Are they here now? Did this happen (health & safety, drink and are they worried about this?)
- **WHO**: Hit them (think police)- looks after them- has treated them in the past?

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SPECIAL CONSIDERATION ELDERLY

- **WHY DID THE PATIENT FALL ?**
  - Collapse?
  - Facial injuries with failure to out hand out ?
  - Have a low threshold for undertaking BM, BP
- Always obtain full PMH- medication hx and SH
- Are they safe to discharge
  - Stairs ? Anyone at home with them (HI)- any cognitive impairment to selfcare
- Have a low threshold for X-raying elderly due to weaker bones
- Remember : increased sensitivity to certain medication: e.g. Codeine
- Safeguarding concerns ?

Purcell, 2017

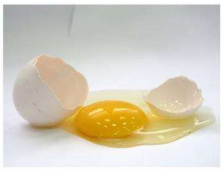
- **comorbid disease, medications and frailty may all affect the expected physiological presentation of major trauma in elderly people.**
- **Elderly patients with head, chest wall and trunk injuries often have significant trauma and even isolated chest injuries have high associated mortality and morbidity.**
- **"Elderly" is defined as aged 70 years and over but this could be younger if frailty is deemed an issue.**

Ref: London Major Trauma System

SILVER TRAUMA -TARN DATA

- Typical major trauma patient has changed from being young and male to being old with lower degree of male predominance
- Fall of <2M is the commonest mechanism of injury

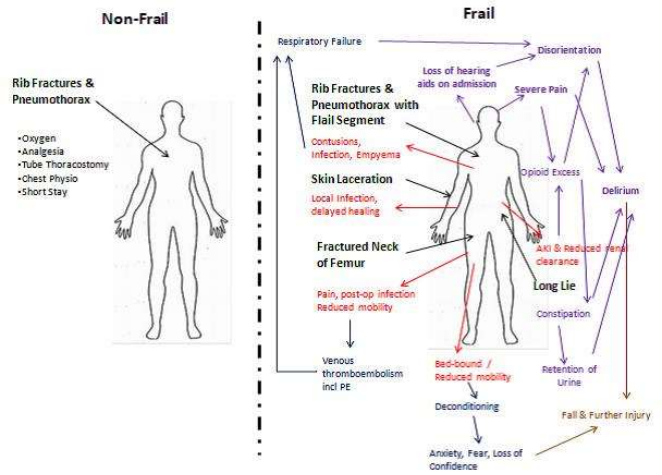
Non-Frail



Frail

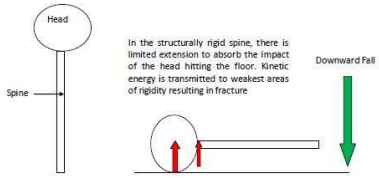
From Dr Raven: ED Consultant Worcester Acute Hospital; & HECTOR project lead

Silver trauma -2



From Dr Raven: ED Consultant Worcester Acute Hospital; & HECTOR project lead

SILVER TRAUMA -3



Any injury above clavicles - assess C-spine

•Any new restricted neck movement

•Any C-Spine pain following fall

•GCS < 15 following head injury

- **REFER TO ED**
  - Suspected pelvic injury
  - Suspected spinal injury
  - Suspected chest injury
  - Injury to 2 or more body region
  - Episode of LOC or GCS<15
  - Abnormal observations
  - Patient on anticoagulant medication or has a bleeding disorder
  - Severe pain
  - Acutely short of breath
  - Uncontrollable major haemorrhage
- Following a low-level fall (e.g. from standing or sitting)
- When taking prescribed anticoagulant medication
- When there is no clear medical cause of fall or unclear reason for ED attendance

From Dr Raven: ED Consultant Worcester Acute Hospital; & HECTOR project lead

SILVER TRAUMA -4

REFER TO ED

- Low level fall- eg from standing to sitting
- Suspected pelvic injury
- Suspected spinal injury
- Suspected chest injury
- Injury to 2 or more body region
- Episode of LOC or GCS<15
- Abnormal observations
- Patient with head injuries /rib injuries on anticoagulant medication or has a bleeding disorder
- Severe pain
- Acutely short of breath
- Uncontrollable major haemorrhage

History taking: non trauma

- History
  - General Health
  - History of presenting condition (HxPC)
- General,
  - Number of joints involved
  - Normal range of movement
  - Onset- duration (Acute/ chronic) episodic
- Main symptoms are:
  - Pain
  - Stiffness
  - Swelling
  - Associated functional problems
- Any recent illness (think reactive arthritis)

- Past Medical History
- Medications
- Allergies
- Family history ; eg
  - Diseases linked to HLA-B27 tissue type
    - Ankylosing spondylitis; iritis; reactive arthritis; inflammatory disease
  - Psoriasis
  - Hypermobile joints
    - Eg Marfan syndrome; Ehlers-Danlos syndrome
  - Gout

History continued

- Weight Bearing Status
- Previous injury
- Dominant hand
- Occupation
- Examination - Look, Feel, Move – begin with joint above and below, and compare with opposite side

OSTEOPOROSIS

- Often the 1st Presentation is a Colles # in women aged 50-65
- Vertebral fractures may present as mid thoracic or low back pain often with no hx of trauma
- Loss of height and dorsal kyphosis secondary to multiple vertebral fractures. A loss of >4cm suggests at least 1 vertebral fracture
- Contact between ribs and iloac crests
- Hip fracture
- Others including hu**m**erus, pelvis ad distal tibia/fibula #

Ref: Nicholl & Wilson (2007)

SYMPTOMS: extra-articular features

Disease	Features
RA	Subcutaneous nodules- Raynard's phenomenon; pleurisy; episcleritis ' sicca syndrome (Sjogrens syndrome)
SLE	Raynard's phenomenon; serositis (inflammation of serous membranes) , alopecia, photosensitivity, rash, fever, episcelritis
Asymmetrical oligoarthritis (a few joints) (psoriatic, reactive) Ankylosing spondylitis	Psoriasis, nail dystrophy Urethritis, conjunctivitis fever, penile ulcers, psoriasisform rash, iritis, mouth ulcers, diarrhoes, tendonitis (eg achilles, planter fasciitis) Iritis, enteritis
Monoarthritis : gout, septic arthritis	Tophi, obesity, renal impairment, - Fever, malaise, source

Macleod & Campbell (2000) Page 261

Principles

- Inspection
- Movement
  - Active
  - Passive
  - Resisted
- Examination

"Look"
"Feel"
"Move"

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ASSESSMENT

LOOK – FEEL- MOVE

Principles of physical assessment

Anatomy	Bony, articular, ligamentous, tendinous, muscular or neurological
Inflammation	Tenderness, erythema, warmth, synovitis, effusion
Function	Range of movements and specific function: eg walking; power grip
Complications	Deformity, instability muscles wasting, calluses, extra articular features

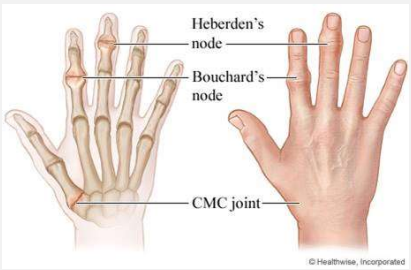
Macleod' & Campbell (2000) page 263

LOOK: Nodules

Rheumatoid nodules ,

Herbeden's nodules

- Seen over DIP joints in osteoarthritis



LOOK

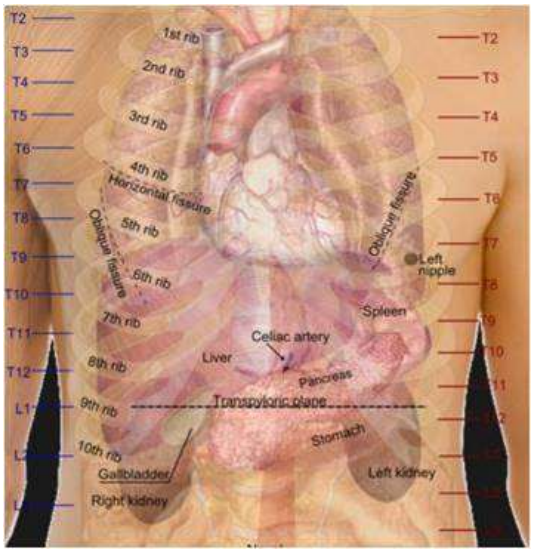
- Position
- Obvious deformity or not
- Wounds
- Bruising
- Swelling
- Effusion
- Scars
- Muscles wasting

FEEL

- Feel for point of maximum tenderness
- Soft tissue or bony tenderness
- Haematoma
- Fluid/pus
- Crepitus
- Heat
- Neuro-vascular status (sensation- normal or altered – pulses/cap refill)

MOVE & GAIT

- ***When does active movements tests***
  - Patient moves limb, muscles and ligaments
- ***What does resisted movement test***
  - Muscles & tendons active. Joint is not moving-ligaments are not stretched
- ***What does passive movements test***
  - Examiner moves the joint, ligaments are stretched, the joint is moving. Muscles are not acting but will be stretched at the limits of range
  - **Stress testing**: Examiner looks for any abnormal mobility of ligaments



NOTE:
Position of spleen and liver !!

Also consider urine dipstick if possible injury over kidneys

Ribs

- Forms an open cage at the top and bottom allowing the lungs to expand and deflate
- The intercostal space contains muscles, nerves and blood vessels
- Usual mechanism of injury are sports in the younger population (eg. blow by an elbow or knee- fall over handlebar) and falls, especially in the intoxicated and the elderly. Fall with the patients elbow trapped against the ribs or a fall in the bath against the edge of the bath are common presentations
- Assault with blunt objects is another source of injury

History

- History, history, history
- Where is the pain- patients can usually localise
- Bruising may not be present
- Crepitus can indicate mobile fracture
- Surgical emphysemia -? pneumothorax
- Pain is the main feature of rib injury
- Pain free at rest but triggered by deep breathing & coughing and certain movements
- Sleep may be disturbed
- Pain tends to worsen on successive days for a week or so- patients may present or return after a week

History-continued

- Any red flags ?
- Any productive cough
- PMH
- Meds
- Allergies
- Smoking
- Alcohol

Look

- Temp , pulse , resps , Sao2
- Ability to talk in full sentences
- Shallow, gasping or laboured breathing
- Paradoxical respiration (chest and abdomen not working together)
- Unequal chest expansion
- Increased resp rate
- Cyanosis
- Bruising of concern
- Penetrating wound
- Distended neck veins
- Cyanosis

Feel

- Bony or soft tissue tenderness
- Crepitus or surgical emphysemia
- If sternum is tender: Refer ED for ECG and +/- sternum x-ray
- Palpate abdomen: especially over liver and spleen

AUSCULTATE !!!

Refer to ED if:

- None or abnormal chest sounds one side or both
- Bowel sounds in chest
- Patient may have multiple rib fractures
- Tenderness mainly in the first 3 ribs: more severe injury with likelihood if injury to major vessels
- Rib Retraction
- Unequal chest movement
- Liver/spleen tenderness
- Any suggestion of spine injury
- Possible fracture of the sternum
- Suggestion of haemo or pneumothorax or severe contusion to the lungs
- History of respiratory illness or the appearance &/or significant respiratory complications
- Caution with elderly patients

SILVER TRAUMA: RIBS

For each additional rib that's broken:

- Odds Ratio PNEUMONIA 1.16
- Odds Ratio DEATH 1.19

Predictors of Mortality:

- Age > 65 OR 1.98
- >/= 3 rib fractures OR 2.02
- Cardio/Resp. Disease OR 2.43
- Pneumonia OR 5.24

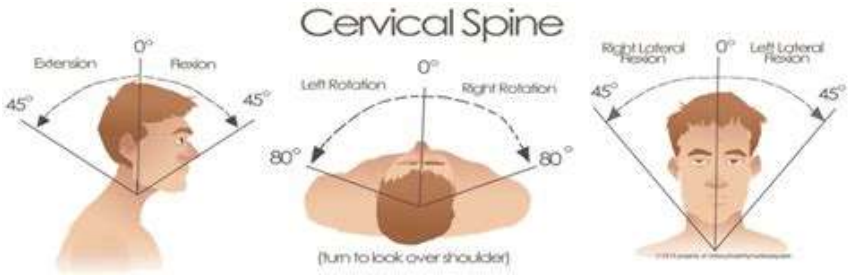
Bulger EM et al. Rib fractures in the elderly. *J Trauma* 2000; 48 (6): 1040-6

Head to Toe MSK : Examination & some complaints

- Neck
- Spine
- Shoulder
- Elbow
- Wrist
- Hand & finger
- Hip
- Knee
- Ankle
- Foot & Toes

NECK

- LOOK
  - Any swelling , neck position
- FEEL
  - Palpate from C-spine to T1; paravertebral & sterno-mastoid; trapezius muscles
- MOVE



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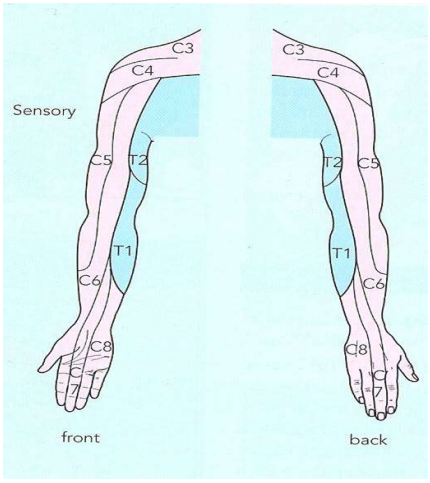
Sensory supply

Dermatone pattern

- Assess sensation by asking patient to close eyes
- Use light touch
- Compare with other side
- Also test sensation to angle to jaw & lower ear (C3/4)

ALSO CHECK

- Upper Limb Strength
- ? Upper limb reflexes



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Cervical Spine

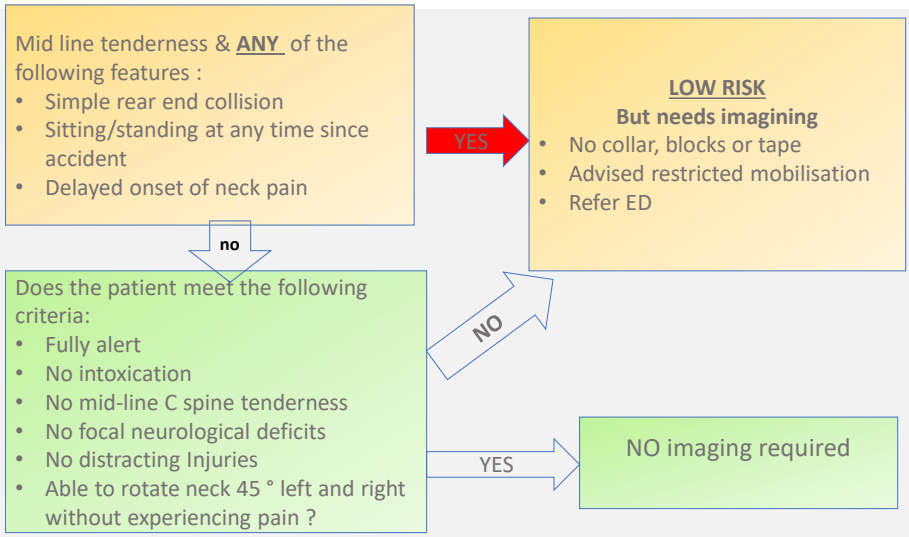
- Overall incidence of cervical spine Injury is 3.7%.
- In alert patients the incidence is only 2.8%,
- In patient who were clinically unevaluable (reduced GCS ,, intoxication etc) , the incident is higher : 7.7%.
  - Bottom line: Patients presenting with potential neck injuries, the vast majority of them will not have a cervical spine injury.

Cervical spine immobilisation carries risks in itself:

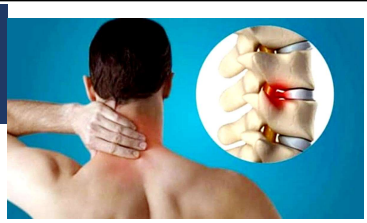
- Collars significantly raise intracranial pressure: an effect that is potentially significant in the presence of head injury
- Long boards and collars cause pain and tissue ischaemia which can lead to pressure sores
- Supine immobilisation causes considerable deterioration in respiratory function

Blackham et al, 2017

TRAUMA



Cervical Spondylosis



- Degenerative changes in intervertebral disc and bony osteophytes
  - Narrowing of canal with nerve root compression
- COMMON & incidence increasing
- 90-95% of men over 50 and 70-90% of woman over 60-65 years of age have radiological evidence of this
- Approx. 25% have symptoms
  - Pain (can radiate to shoulder) & stiffness
  - Headache at the back of head

Treatment:

- Exercise - ? Physio
- Simple analgesia

Refer if:

- Worsening pain
- Pins & Needles to upper limb
- Problems with co-ordination
- Any 'red flags ' spine

Ref: Nagaratnam et al (2016)

TORTICOLLIS /WRY NECK

- Torticollis or wry neck is common and is thought to be due to minor local musculoskeletal irritation causing pain & spasm in neck muscles.
- Cause is often unknown but it may be due to bad posture, e.g. positioning at a computer screen, sleeping without adequate neck support

TORTICOLLIS

History :

- Sudden onset (often on wakening) of severe unilateral pain with deviation of the neck to that side. Occasionally the pain may be at the back of the neck. The pain often refers to the head or shoulder region.
- The neck feels stuck in one position and attempts to move causes sharp spasms of pain.
- There will be NO history of trauma. There may be a history of exposure to cold, prolonged or unusual positioning of the neck or unusual posture
- If there is history of trauma refer to Canadian C spine rules and if required discuss with GP or ED

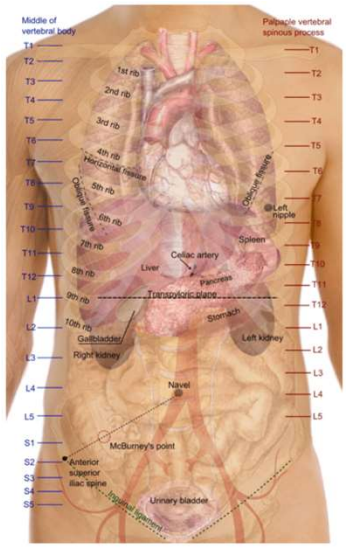
EXAMINATION

- Tenderness is usually diffuse on the involved side with palpable muscle spasm, there may be trigger points (tender points of muscle spasm).
- Look for restricted or painful movements.
- Check for any red flag signs that would suggest a more serious cause-
- Ensure there are NO neurological signs,
    - check for power and sensation in the arms.
- Check the throat for infection and check for regional lymph nodes which would again suggest a different cause.
- There should be no bony tenderness in the neck

TREATMENT

- Explain that acute torticollis usually resolves within 24-48 hours, although occasionally may take up to a week.
- Recurrence is common.
- Analgesia (paracetamol or ibuprofen first line)
- It is important to advise gentle mobilisation within the comfort zone, soft collars are NOT recommended.
- Intermittent heat or cold packs may help reduce pain and spasm. Sleep on low firm pillow, maintain good posture
- Consider a muscle relaxant in severe cases

SPINE



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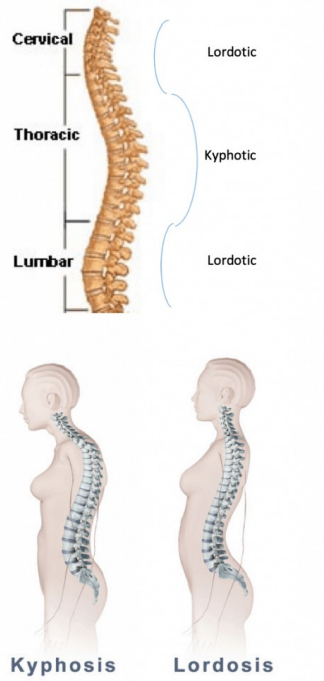
Look

- Always undress your patient
- Gait
- Look at posterior and lateral back
- Looking for Kyphosis and lordosis
- Bruising erythema rash
- Swelling lesions
- Muscle atrophy



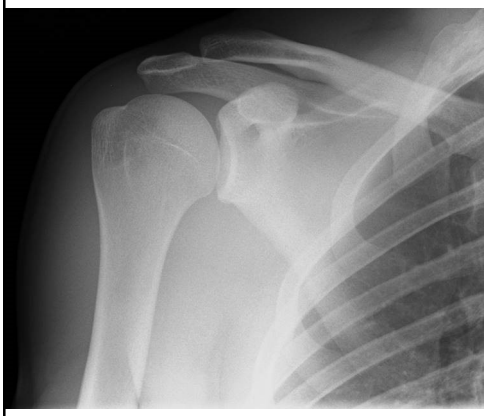
Cauda equina Syndrome: Red Flags

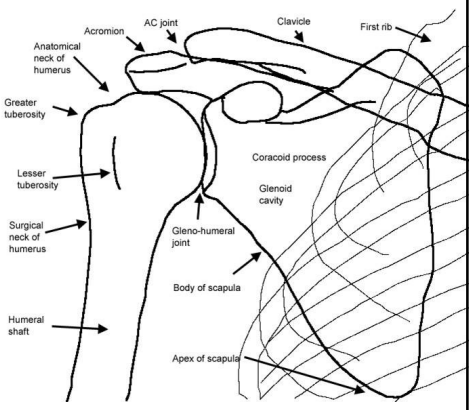
- Saddle anesthesia or paraesthesia
- Bilateral sciatica
- Severe or progressive neurological deficit of legs eg major motor weakness with knee extension, ankle eversion or foot dorsiflexion
- Difficulty initiating micturition or impaired sensation of urinary flow
- Loss of sensation of rectal fullness → irreversible faecal incontinence
- Saddle anesthesia or paraesthesia
- Laxity of anal sphincter

UPPER LIMB

FUNCTIONAL DEMANDS

The shoulder





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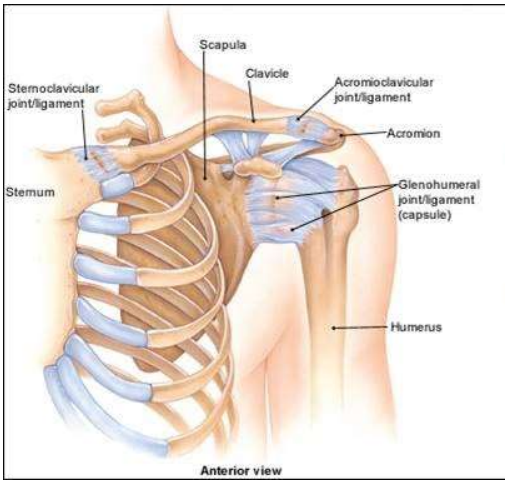

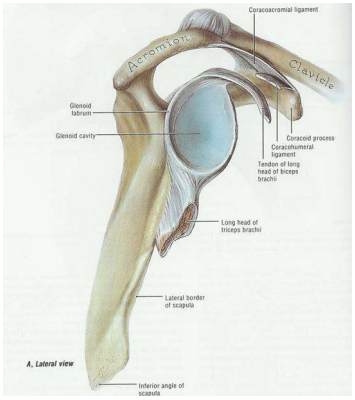

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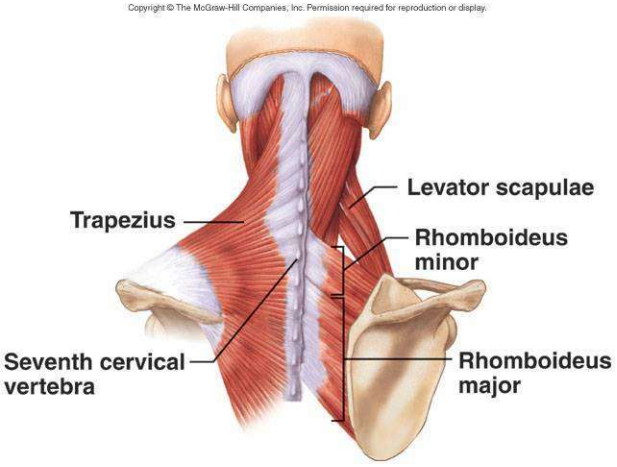
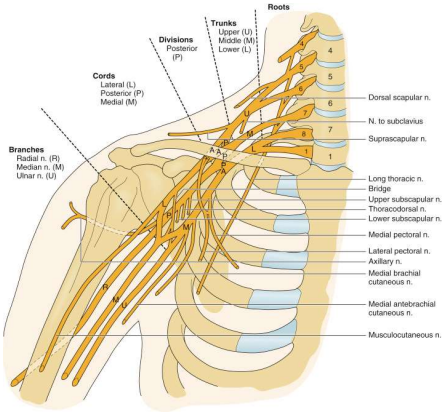
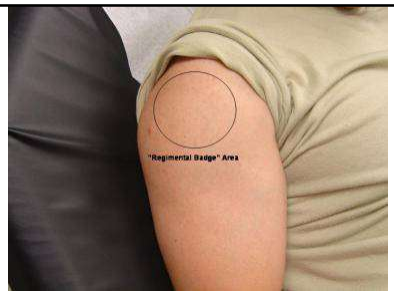
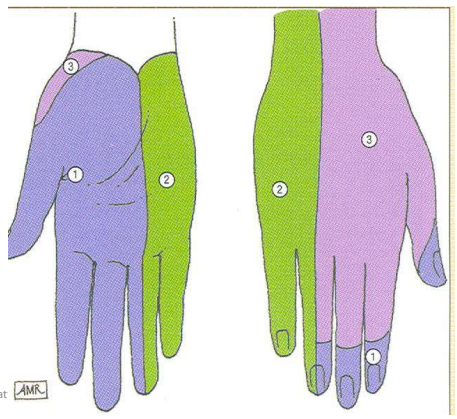
Scapular muscles



Sensory supply

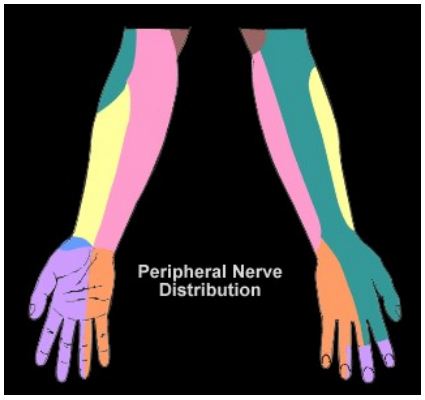






Nerves

- **Median** – *Motor* = thenar muscle
- *Sensory* = thumb, index, middle finger, half ring finger
- **Ulnar**- *Motor* = all interossei, 2-3 lumbricals, hypothenar muscle, adductor pollicis
- *Sensory* = little finger, ulna aspect Ring finger
- **Radial** - *Motor* = wrist extension, finger extension
- *Sensory* = dorsum of hand, thumb, index, middle finger & radial half of Ring finger



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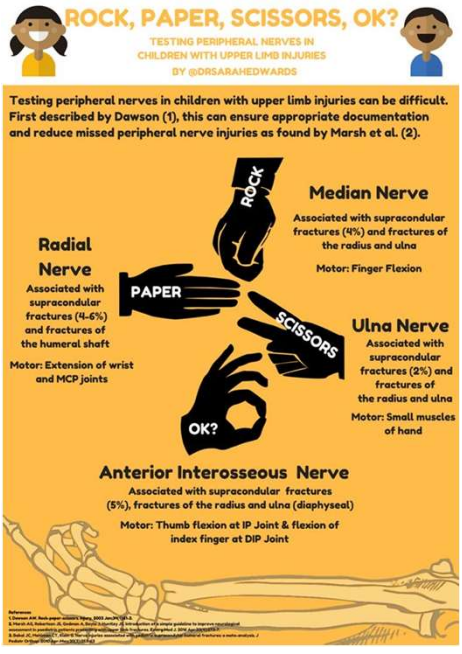

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LOOK

- At the neck
- Look and compare the shoulders, front, back and sides
- Is there any redness, swelling, bruising or deformity
- Observe patients general appearance –eg. Distresses-SOB

FEEL

- The main landmarks
- Feel C-spin
- Feel the anterior structures, the sterno-clavicular joint, clavicle, acromio-clavicular joint and the coracoid process
- Feel the upper humerus, greater & lesser tuberosities, the biceptal groove and the insertion of the supraspinatus
- Feel the scapula: boders, and supericial ridge of its spine

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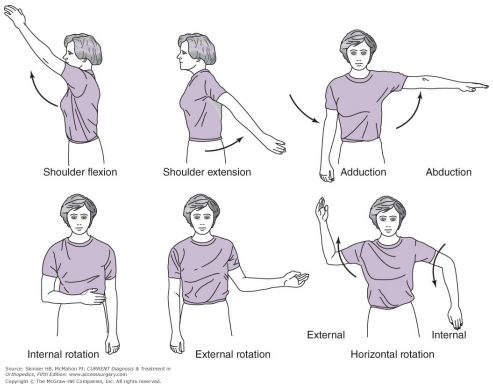
ROM SHOULDER

- Flexion
- Extension
- Abduction
  Adduction
- Internal rotation
- External rotation



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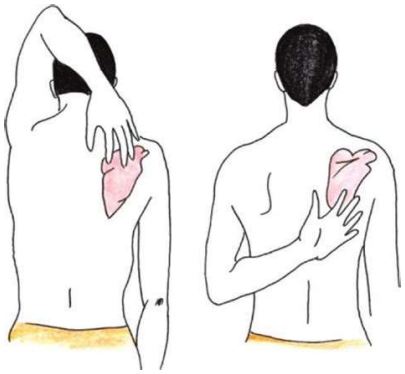
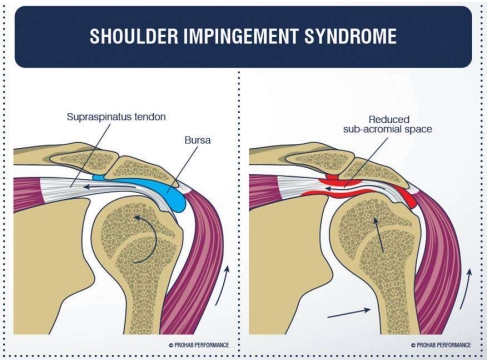
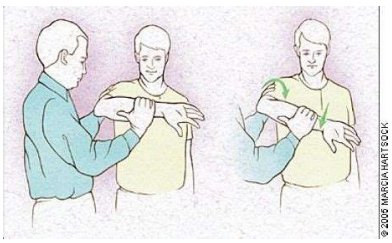
Special tests

- APLEY's scratch test



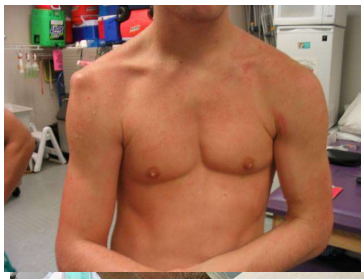
Special tests: Impingement





Hawkins impingement test

Shoulder injuries



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Humeral Head

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Shoulder – Non Trauma

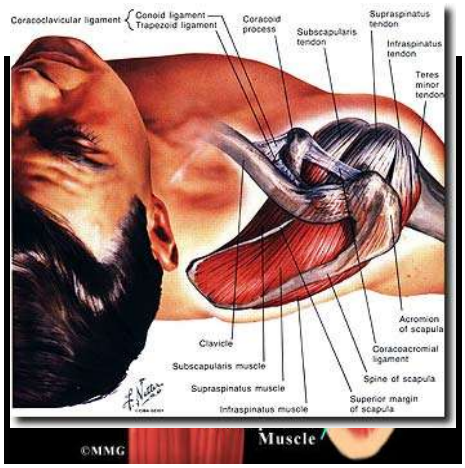
<u>Referred Pain</u>

Hx – No clear hx of injury

1. Disease -
2. Illness at another site – may include life threatening events
   - MI
   - Pneumothorax
   - Pneumonia
   - Tumour
   - Aneurism
   - Gallbladder infection
   - Ruptured spleen
   - Ectopic Pregnancy
3. Cervical Spine – injury or degeneration

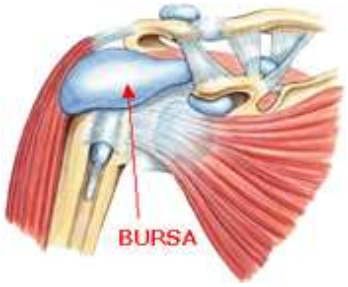
Rotator Cuff Disorders

- Comprises Rotator Cuff tears, Subacromial Bursitis, Calcific Tendinitis/Impingement syndrome
- Relate to damage to the Supraspinatus tendon (+/- Long Biceps) under Coracoacromial arch



Subacromial bursitis

- Inflammation of bursa caused by overuse or impingement & trauma, where bleeding occurs into bursa
- May accompany other shoulder problems
- Fairly quick onset of pain that may disturb sleep and activites
- Sensation of 'heavy' arm

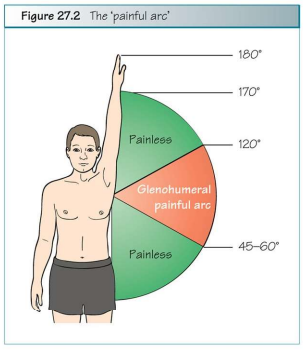


•Impingement test: painful +++

Supraspinatus tendonitis: 'painful arc'

Overuse injury causing tendon to become inflamed- can become chronic

Patient c/o pain and localised tenderness at tendon insertion



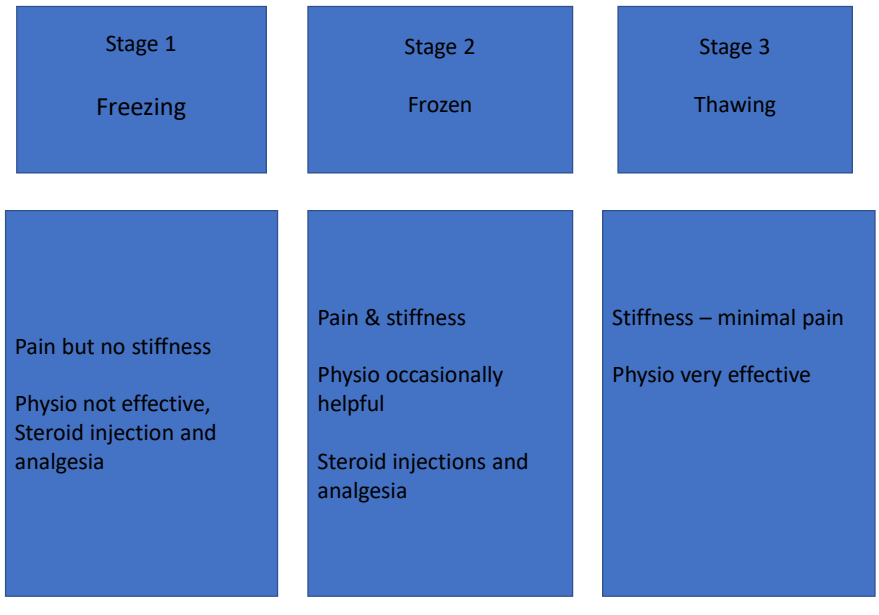
Painful arc: Abduction begins and ends without pain, but during movement (80-120°)= impingement test

Pain on resisted abduction but not passive

Tx:rest, physio, analgesia

Adhesive capsulitis

- Unknown cause but probably a type of inflammatory arthritis/autoimmune or a response to joint degeneration.
- Over diagnosed – only 2-3% of population !
- Patient is usually 60 or over
- Diffuse tenderness with limitation on the capsular pattern
- Can occur post minor trauma (eg walking into a door 1 week prior) , fractures or dislocation or immobilisation of shoulder
- Post surgery
- 3 phases to disorder : but mauy jump through stages



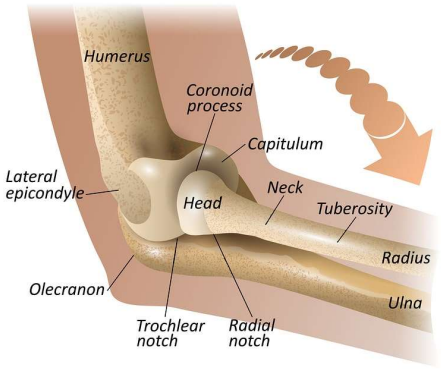
Calcific tendonitis

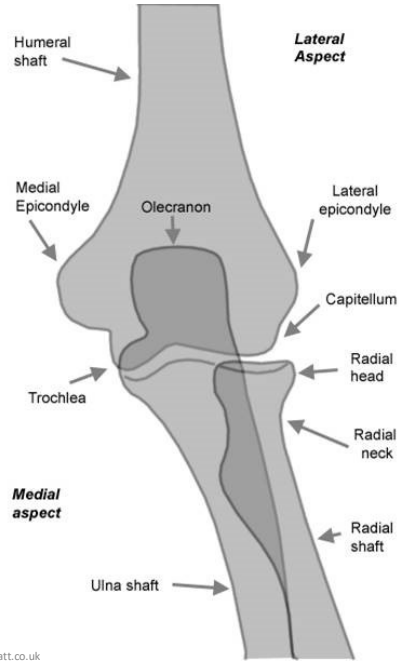
- Acute onset of intense, severe shoulder pain that is neither position nor activity dependent
- Usually no hx of trauma or overuse
- Degeneration of the tendon leading to inflammation followed by calcium deposits in the tendon
- May require opioids for relief
- Localised tenderness over the greater tuberosity of the humeral head
- Active & passive movements severely limited and painful
- Tx: Pain relief
- ? steroid injection
- Rest but avoid stiffness by flexibility exercises
- Rarely removal of calcium deposits-may re-absorption may occur
- 'Needling'

Calcific supraspinatus tendonitis differentiates from adhesive capsulitis ('frozen shoulder'), which has a gradual onset of pain. X-ray will show calcification within the supraspinatus tendon.

THE ELBOW

ELBOW ANATOMY





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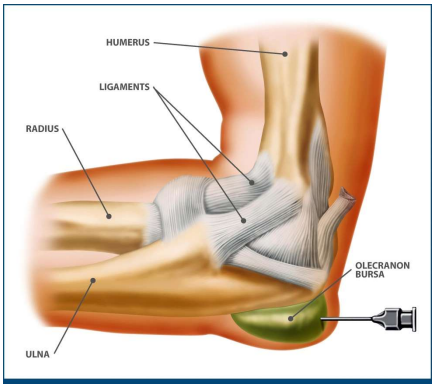
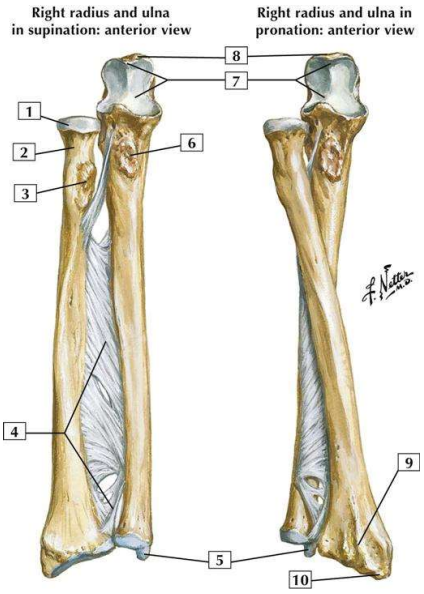


ANATOMY OF THE ELBOW



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The Elbow - Examination

Joint Above – clavicle & shoulder – good range of movement and no tenderness

Look – 'Comfort position'

- Swelling
- Bruising – may not be evident for 2-3 days
- Deformity

Feel – Palpate all bony landmarks

- lateral epicondyle, medial epicondyle
- olecranon
- radial head

Move – Extension, Flexion, Rotation (pronation/supination)

(Active, Passive, Resisted)

NEUROVASCULAR

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Supination and Pronation

Supination

- Supinator muscle
- Palm facing anteriorly

Pronation

- Pronator teres and Pronator quadratus mm.
- Palm faces posteriorly

10-53

Fall onto outstretched hand

• Most common mechanism of injury for both wrist elbow and shoulder injuries

• Examine the whole joint

• The radius & ulna are bound together both proximally and distally through several ligaments. The net effect is that of a bundle of stick tied together in a parallelogram acting as one

• Consequently, there is high likely hood of injuries occurring to both bones

• The onus is on the clinician to positively exclude injury to the other bone

“rough guide”:

15-50 years: Carpal fractures

<12-15: Elbow fractures

>50: Humurus fractures

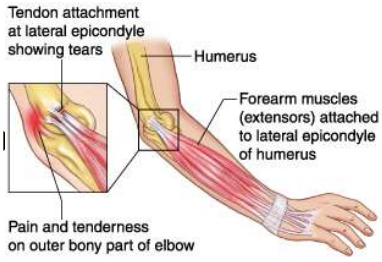
Mechanism of injury

- Fall onto outstretched hand (FOOSH)
- Direct trauma
- Traction injury

- INDICATIONS FOR XRAY:
  - Trauma
  - Specific bony tenderness
  - Inability to fully extend

Elbow – non trauma

Lateral epicondylitis



Tennis Elbow

- Medial Epicondylitis
  - (flexor)

Golfers Elbow

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Olecranon Bursitis

Condition may be caused by repeated minor trauma or leaning on the elbow (‘students elbow).

It is usually inflammatory but occasionally a direct blow can cause bleeding into the joint.

Gout and RA may cause a similar clinical presentation.

Some cases are due to infection and it can be very difficult to distinguish between the causes

LOOK: Large, red swelling . Note any scars/wounds

FEEL: The area is warm/hot and very tender. The swelling if fluctuant

MOVE: There is normal elbow extension indicating that the joint is not involved

TREATMENT:

NSAIDs and rest. Antibiotic is infected

Rarely should aspiration be undertaken-

THE WRIST/HAND/FINGERS

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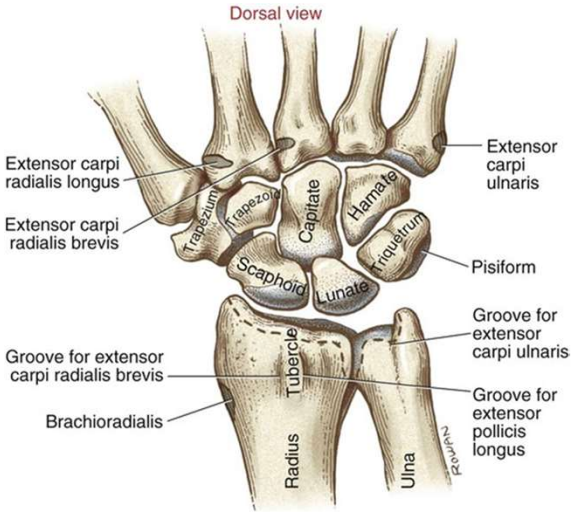
THE WRIST: ANATOMY



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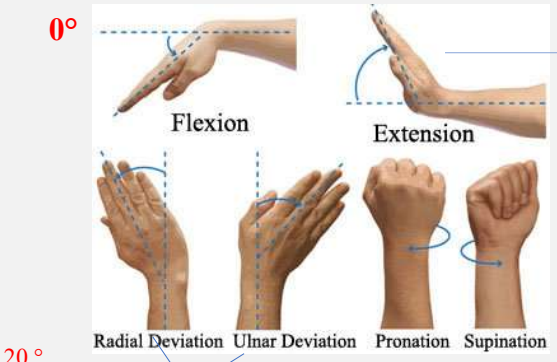
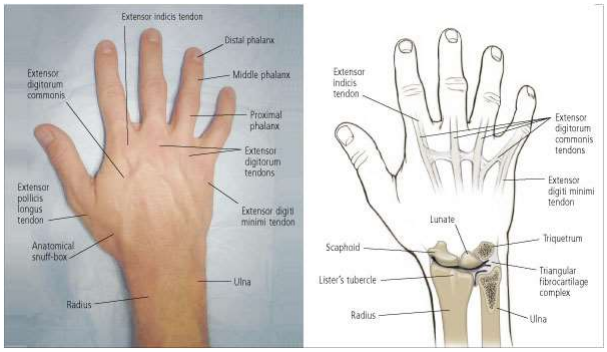
Movements of the wrist



Wrist/Hand - Dorsum



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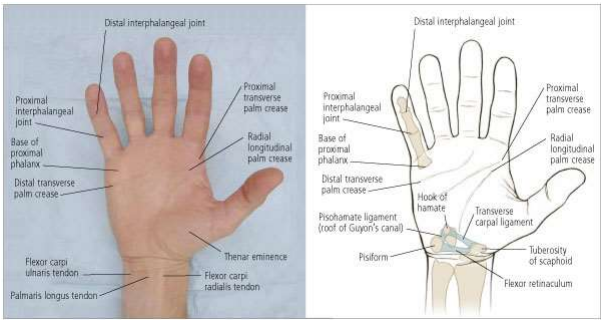
Hand - Volar



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Wrist/Hand - Muscles

- Extrinsic - originate from outside the wrist and hand
  - Extensors – lateral elbow, dorsal forearm to the hand
  - Flexors – medial elbow along palmar forearm
- Intrinsic –
  - Thenar
  - Hypothenar
  - Interosseus
  - Lumbricals

The Wrist - Examination

>15yrs - <50 yrs

- **Joint Above**
- **Look** - Compare both limbs
  - Swelling
  - deformity

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FEEL

- Bony landmarks:
  - distal radius and ulna,
  - ASB,
  - carpo-metacarpal joints
- Crepitus
- Sensation: radial, median and ulna
- Pulses: radial, ulnar, capillary refill
- Assess joints above (elbow)and below (hand)

The Wrist - Examination

- **Move** Elbow – extension/flexion
  Wrist - Pronation
  Supination
  Flexion
  Dorsiflexion
  Abduction
  Adduction

Active, Passive, Resisted

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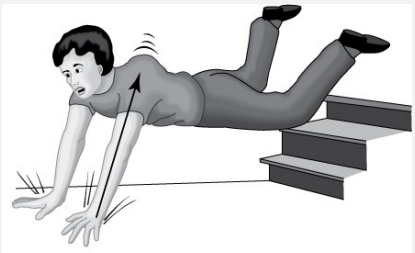
Common presentations

- Fall onto outstretched hand (FOOSH)
  - Most common moi for wrist, elbow & shoulder injuries
  - MUST examine the joint above & below
- Fall onto palmar flexed wrist
- Rotational injury (e.g drill bit catching)
- Overuse complaints
- Inflammatory/infection



Source: Schwartz DT: *Emergency Radiology: Case Studies:* http://www.accessemergencymedicine.com

"**rough guide**":
- 15-50 years: Carpal fractures
- <12-15: Elbow fractures
- >50: Humerus fractures

Parallelogram effect of radius & ulna

The radius & ulna are bound together both proximally and distally through several ligaments.

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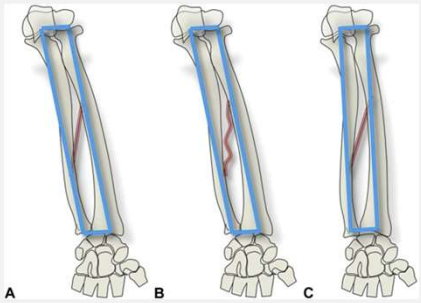
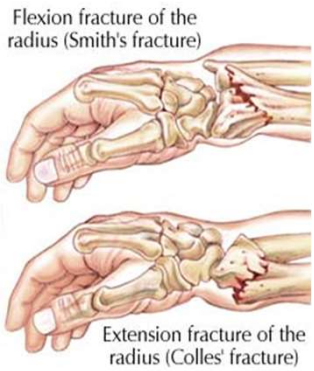


Distal Radius



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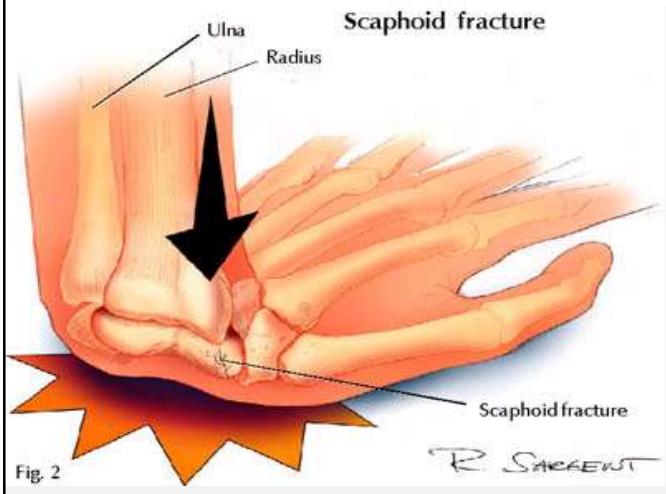


70% of carpal #'s are to the scaphoid (Nishihara,000)

Accounts for 1:10,000 annual ED attendance in the UK (Tai,2005)

During 'FOOSH' the scaphoid is forced back against the dorsal lip of the radius (Purcell, 2010)

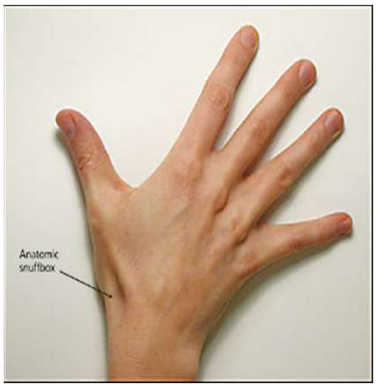
Scaphoid injury

Blood Supply

- Artery enters bone near the tubercle and waist in a Distal to Proximal direction = proximal end highest risk of avascular necrosis

up to 2-9% of patients with scaphoid fractures develop avascular necrosis (Allen, 1983)

Scaphoid Fracture



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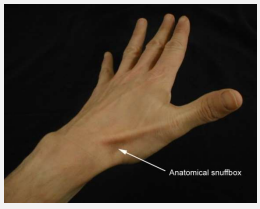
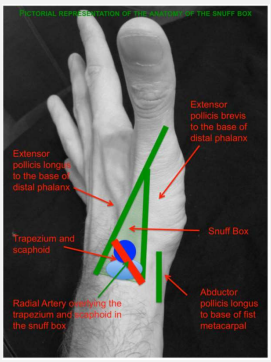
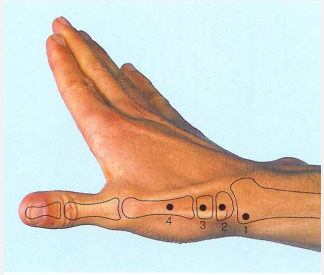
Clinical signs of scaphoid fractures

There are up to 10 tests (Unay et al, 2009) (but mainly 3- ? 4 in common use) that can help identify a fracture scaphoid- however, many of these tests will also be positive in other fractures.







7.45
Anatomical snuff box: bones
1 Radial styloid
2 Scaphoid
3 Trapezium
4 First metacarpal

Snuff box tenderness

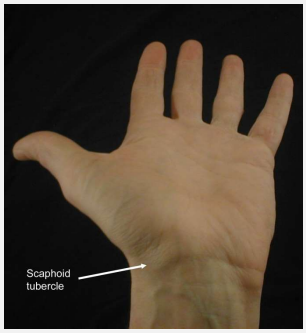
High sensitivity but low specificity

Ref: Edwards, 2018

Clinical signs of scaphoid fractures

Axial compression (telescoping) test- positive if pain is elicited

High sensitivity but low specificity



Pain on direct pressure over scaphoid tubercle

Scaphoid test evidence

- Pain during pronation or when thumb & index finger are being pinched = more likely to indicate scaphoid # (Schubert 2000)
- Painful opposition of thumb and little finger significant (Purcell. 2010)
- Absence of scaphoid tubercle pain in association with lack of anatomical snuff box = scaphoid # unlikely (Laker & Anderson, 2019)

SOFT TISSUE DISORDERS

- **Cumulative Trauma Disorders** – also know as repetitive strain injuries, overuse syndrome and repetitive motion injuries.
- They represent a group of diagnosis: Strain, tendonitis and tenosynovitis.
- In the USA, it is the number one occupational illness and compensation claims are high.
- **Avoid diagnosing RSI for medico-legal reasons.** Refer back to GP.
- It's not a new illness: Gray's anatomy (1893): Washerwoman's thumb; glass arm and telegraphists cramp.
- **TENOSYNOVITIS:** Inflammation and swelling of the synovium of a specific tendon sheath – commonly the wrist and thumb extensors.
- Often caused by repetitive use, or an increase in a specific movement e.g. hammering, heavy digging or brick laying. Can be caused by minor trauma.
- **TENDONITIS:** Inflammation of the tendon. Commonly seen in the shoulder, secondary to small tears, which heal and then calcify.

De Quervain's tenosynovitis

Affects the tendon sheaths of the radial aspect of the wrists, especially the APL & EPB

History & examination

- Obtain occupational & social history
- Other joint symptoms (think arthritis)
- Ask about which movements are painful
- Rule out tendon sheath infection
- Any previous episodes

- There may be swelling over the area
- Specific tenderness which increases with passive movements
- Classically crepitus can be felt over the area but this is not always present
- FINKELSTEIN test to confirm diagnosis

Finkelstein Test

Ask the patient to flex the thumb into the palm and clasp it with the fingers

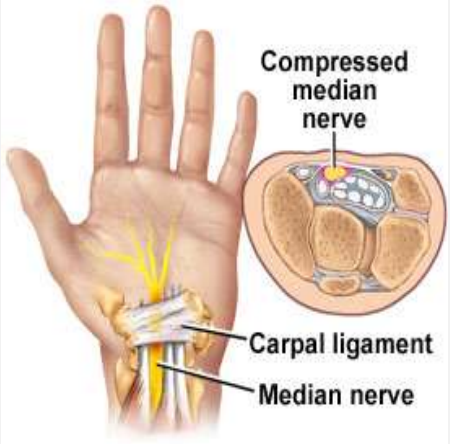
Examiner then ulna deviate the wrist.

If positive: Pain is produced

TREATMENT

- Identify cause
- Rest affected tendon for 2 weeks in splint –including thumb if de Quervains
- GP review
- NSAID's
- ? Steroid injection for repeat episodes

Carpal tunnel syndrome



Carpal tunnel syndrome

- Median nerve compression / numbness
- Pregnancy, menopause, OCP
- Trauma, post Colles #
- RA tendon sheath involvement
- Ganglions, lipomas
- Muscle wasting
- Phalen or Tinel test

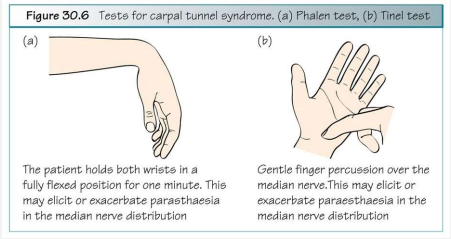


Figure 30.6 Tests for carpal tunnel syndrome. (a) Phalen test, (b) Tinel test

Ganglion

- Cyst (fluid filled) that usually develops near a joint or tend
- Sudden appearance, often no clear cause but can occur post injury
- ?? Herniation of synovium
- May resolve spontaneously
- CCQ's rarely fund surgery except if significant problematic
- High recurrence rate

The Hand - Examination

- **Joint Above –** wrist
- **Look** – back & front – colour, deformity, wounds, swelling, normal cascade of fingers
- **Feel** – bony tenderness, crepitus, instability
- **Move** – General – make a fist, fully extend, abduction, adduction

LOOK

Relaxed position of hand

- Fingers slightly flexed
  - Relative shortness of finger flexors

Skin and Nail health

- Discoloration, texture, hair patterns

Finger alignment

- Tips of fingers should align with finger flexion

Hand abnormalities

- Finger and metacarpal positioning
- Muscle atrophy

Range of motion

The Hand - Examination

- **Circulation**
  - Colour of 'normal' side
  - Pulses
  - Warmth of digits
  - Normal sensation?
  - Normal capillary return?
  - Turgor of fingertip

- **Joints**

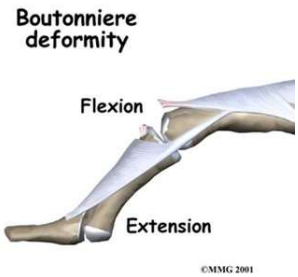
If normal – record 'full extension and curl up'

Reduced movement – record range of movement

Greater range of passive movt compared with active – record

Stability – lateral and AP planes
(compare with other side for 'normality')

Boutonniere deformity



Etiology

Rupture of **extensor tendon dorsal to the middle phalanx – bone passes through central slip**

Forces DIP joint into extension and PIP into flexion

Signs and Symptoms

Severe pain, obvious deformity and inability to extend DIP joint

Swelling, point tenderness

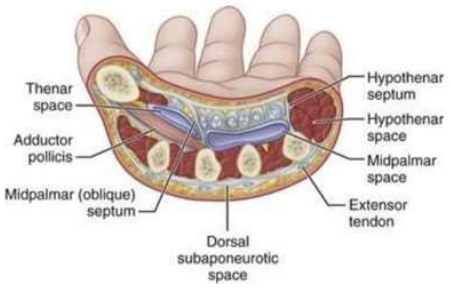
Management

Cold application, followed by **splinting in PIP extension and DIP flexion**

Splinting must be continued for 5-8 weeks

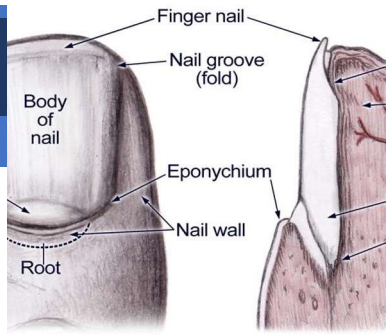
Hand Infection: anatomical compartments

- Nail fold (paronychia)
- Pulp space
- Tendon sheath
- Web space
- Deep palmar space
- Septic arthritis



Paronychia

- Infection localized to the proximal and lateral skin folds of fingers and toes
  - *Staph aureus*
  - Group A or D *Strep*
  - *Pseudomonas*
  - Gram-negative bacteria
  - anerobes

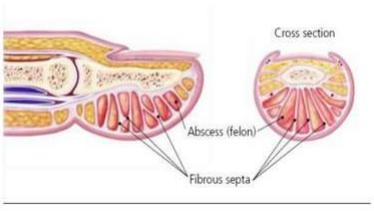


Felon/pulp space infection

- Abscess of distal pulp
- Results from penetrating trauma
- Bacteria trough eccine sweat glands
- Pulp is tense and tender
- Significant edema
- Pad can become necrotic

Needs referral to surgeons and X-ray for osteomyelitis

PULP SPACE INFECTION(FELON)



Tendon sheath infection

Four cardinal signs as described by Kanavel:

(1) uniform, symmetric digit swelling;
(2) at rest, digit is held in partial flexion;
(3) excessive tenderness along the entire course of the flexor tendon sheath; and
(4) pain along the tendon sheath with passive digit extension.

Pain with passive extension has been reported as the most clinically reproducible of these four signs

Worsening hand infection

Conditions That Mimic Infection

- Gout
- Pyogenic granuloma
- Acute calcification
- Foreign body reaction
- Herpetic whitlow
- Metastatic lesions
- Pseudogout
- Rheumatoid arthritis
- Granuloma annulare
- Local reactions

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Female c/o infected right little finger
Hx of self neglect since husbands death a few months ago- has been picking skin around fingers. Nephew visited today- concerned about finger

Nil PMH-Nil Med =NKDA

What is your management plan ?

Any questions?

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