



Musculoskeletal History and Examinations

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Learning Objectives

- Musculoskeletal History – specific related questions
- Consider differential diagnoses – orthopaedic, rheumatological or systemic conditions
- Specific shoulder and knee examinations
- Review through clinical case studies

Case Scenario 1 – A painful knee

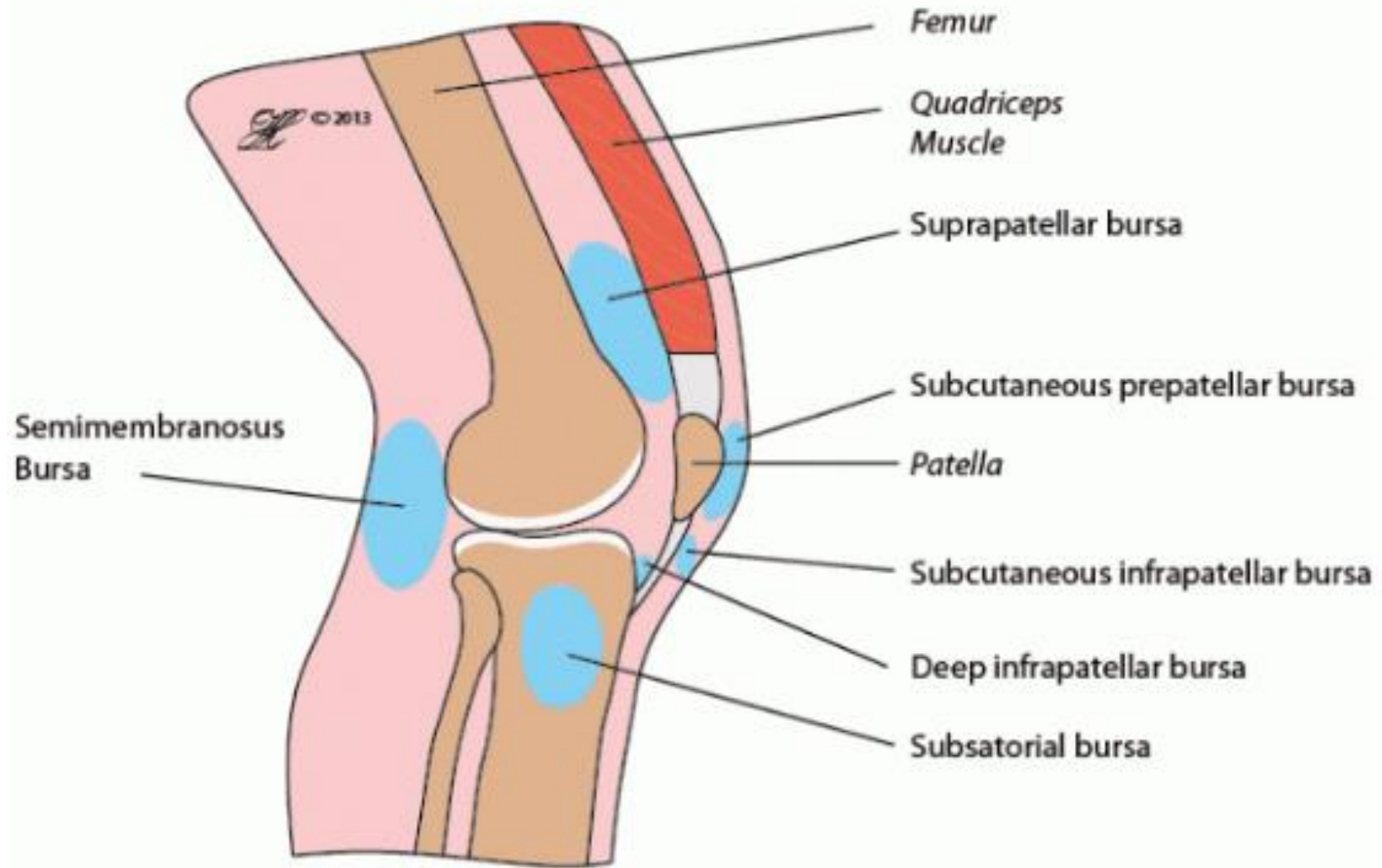
54 year old electrician has been experiencing pain whilst at work when kneeling down. What questions would you ask him?

- Has there been any trauma or injury? No
- Where exactly is the pain? Anterior
- Is there any pain in the groin or ankle? No
- Is there any swelling? Yes at the front of the knee
- Does the knee give way when you're walking or standing? No
- Does the knee ever 'lock' – get stuck when bending it? No
- Is there any stiffness? No
- How does this affect his life? Painful to kneel down for his job and to pray

Specific questions related to the knee?

- Has there been any trauma?
- Where exactly is the pain? i.e. anterior, lateral, medial or posterior
- Is there any pain in the groin (hip)? (ask about nearby joints - is there any referred pain?)
- Is there any swelling? Gradual or sudden onset? Is there whole joint swelling or is there localised swelling around the knee?
- Is there any stiffness? could be muscular origin or a sign of arthritis
- Does the knee give way when you're walking or standing? Instability?
- Does the knee ever 'lock' (get stuck when bending it)? (menisceal tear whether through trauma or wear and tear)

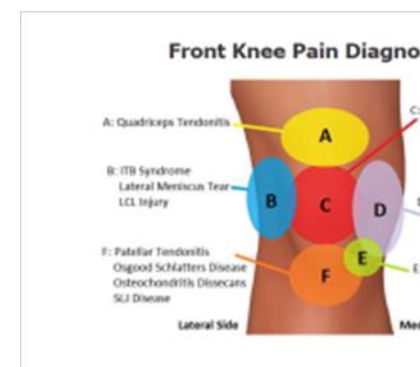
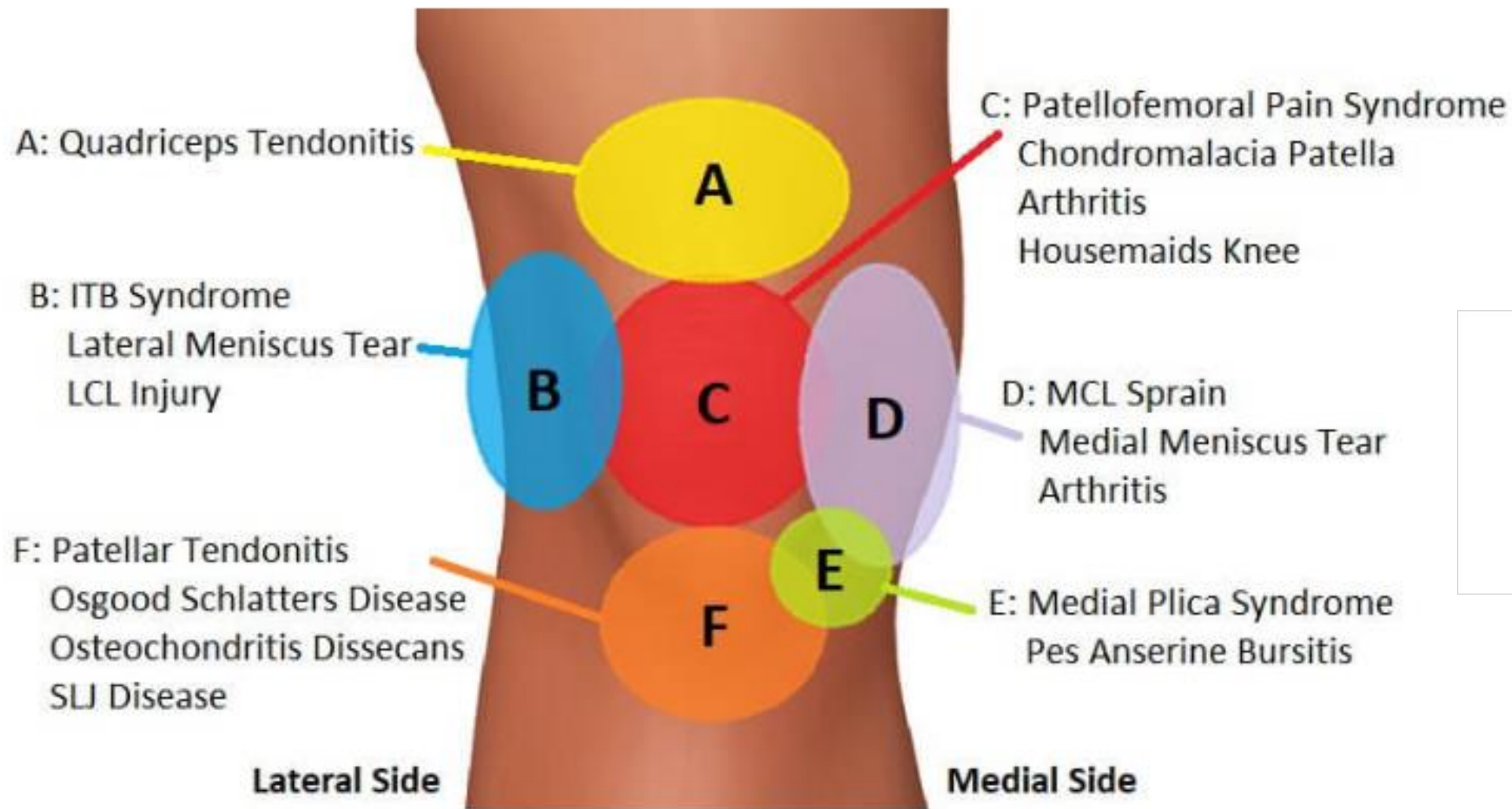
Considering Anterior Knee Pain



Differentials of Anterior Knee Pain

- Osgood-Schlatter Disease
- Patellar misalignment / tendinopathy
- Prepatellar bursitis
- Patellofemoral arthritis
- Patellofemoral Pain Syndrome (PFPS – diagnosis of exclusion)
- Referred pain from hip e.g. OA hip, Perthe's disease ...
- Gout / Rheumatoid Arthritis / Septic Arthritis
- ACL sprain / tear

Front Knee Pain Diagnosis Chart





Knee Examination – Inspection and Palpation

Case Scenario 2 – Knee pain secondary to trauma

2 hours ago an 18 year old gymnast developed severe knee pain after landing awkwardly from jumping from the high bar on to a mat. What questions would you ask?

- Where is the pain exactly? All around the knee
- What is it like? Severe 9/10 initially sharp now throbbing
- Any symptoms with the pain? `pop` sound heard before the pain
- Any swelling? When did the swelling start? Yes started in within first hour
- Can you weight bear? No
- Any locking of knee? No
- Does the knee give way? Hard to tell at the moment as can't weight bear

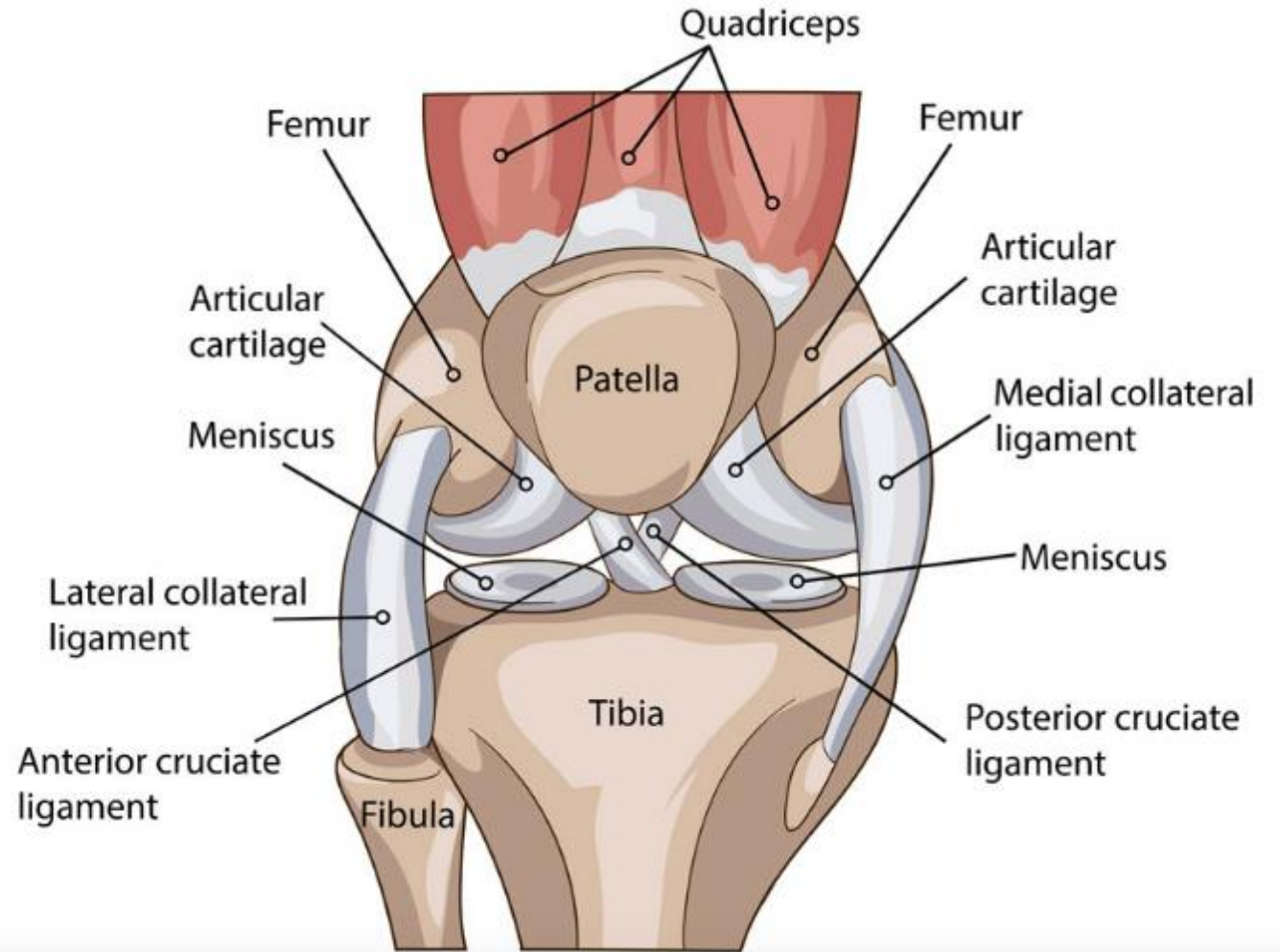
Specific questions related to trauma to the knee?

- Has there been any trauma? What was the *mechanism of injury*?

i.e. side impact – MCL/ LCL sprain, twisting injury – shearing forces can tear meniscus, direct fall on to the knee – trauma to patella or bursa

- Can you *weight bear*? i.e. could there be a fracture?
- Where exactly is the pain? i.e. anterior, lateral, medial or posterior
- Is there any *swelling*? If trauma how quickly did this occur? i.e. first hour or several hours later. Where is the swelling? Localised or joint swelling
- Does the knee *give way* when you're walking or standing? i.e. loss of stability of the knee 2ry to tear of cruciate ligaments
- Does the knee ever '*lock*' – get stuck when bending it? i.e. meniscal tear or foreign body causing locking of the knee

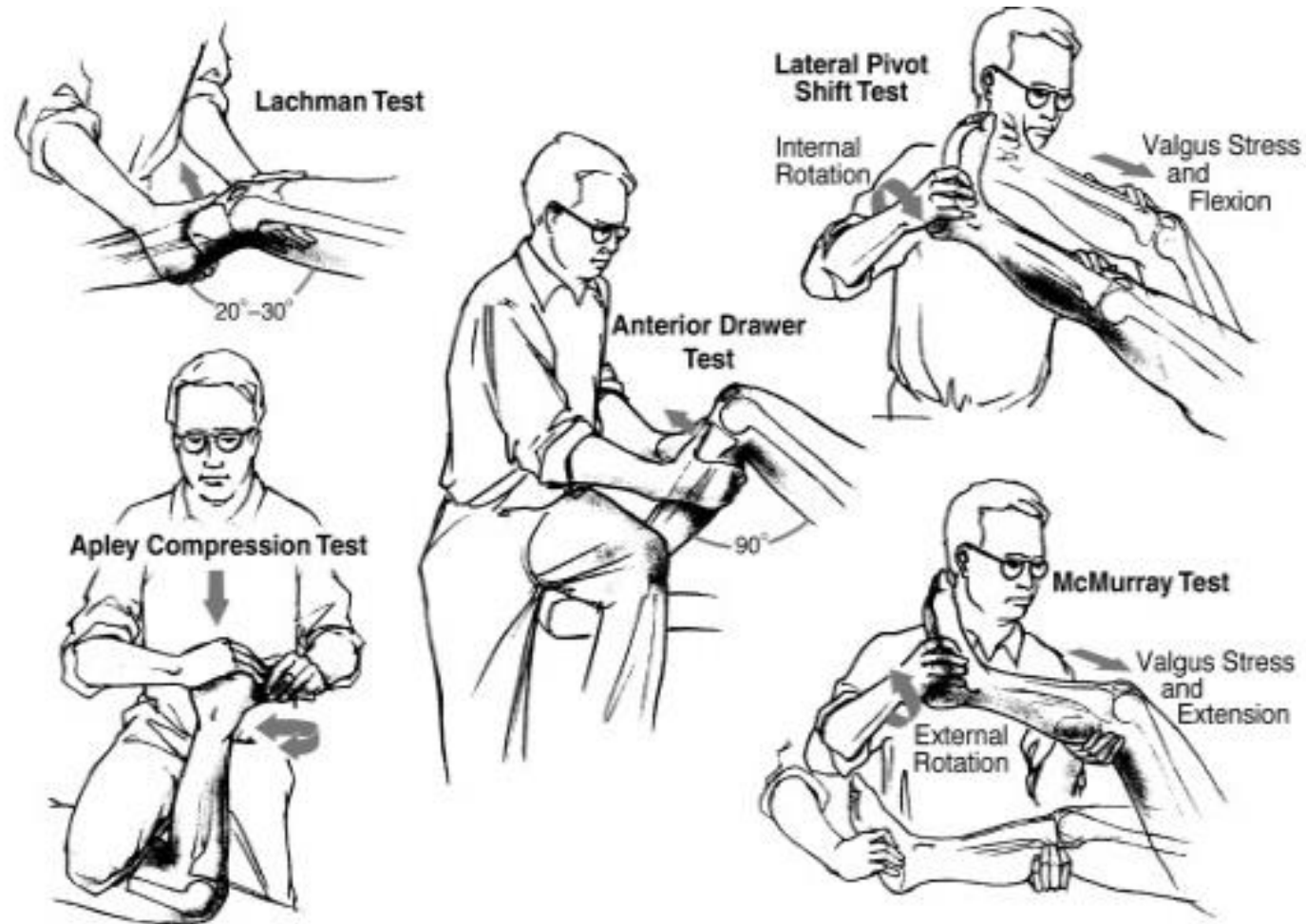
Anatomy of structures around the knee



Anterior Cruciate Ligament (ACL) Tear

- Initial loud 'pop' noise or 'popping' sensation
- Severe pain unable to carry on activities
- Usually pain sharp initially then becomes more of an ache / throbbing
- Rapid swelling in first hour after injury (haemarthrosis) versus slow onset (several hours later) of swelling in meniscal tear
- After pain and swelling eases knee often 'gives way' – stability of knee lost

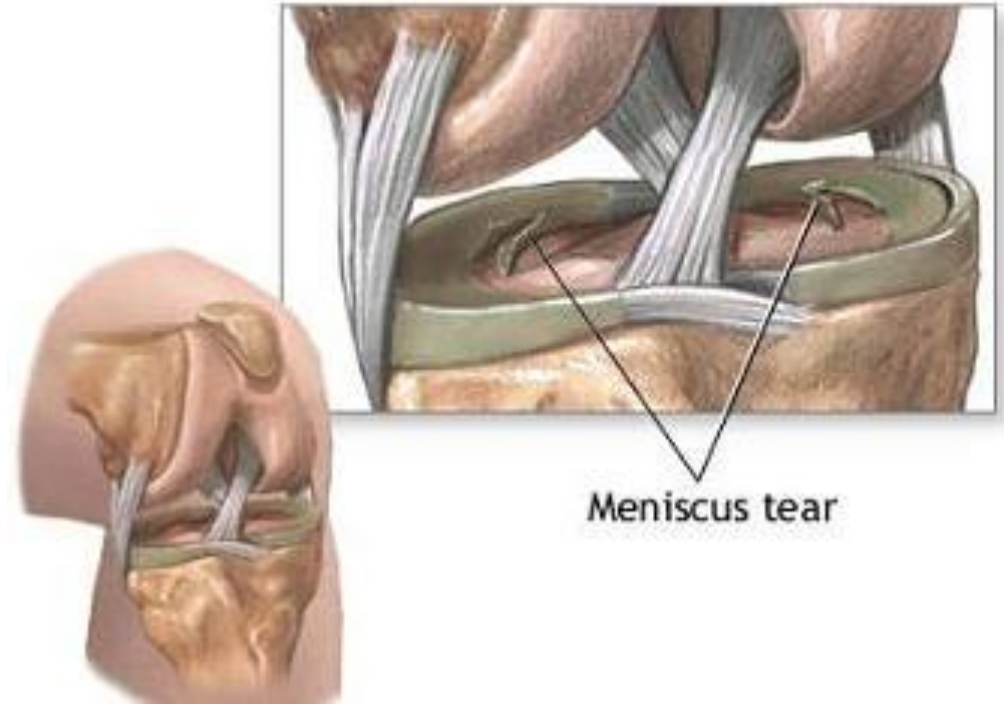
Knee Examination for Collateral, Cruciates and Menisci Testing



MR Scan of Meniscal Tear



Bucket handle tear



Case Scenario 3 – Painful shoulder in a 55 yr old woman

55 year old woman developed right shoulder pain and stiffness

What questions would you ask her?

- When did it start? 3 months ago
- Gradual or sudden onset? Gradual, no trauma
- Continuous or intermittent? Constant, affecting sleep
- Any stiffness? Yes
- Has it affected activities of daily living? Yes – all tasks from washing, dressing, combing hair – difficult to move my arm in all directions
- Any weakness? Have you dropped anything? No
- Is the other shoulder OK? Yes. Any joint pains elsewhere? No

Other causes of *referred* shoulder pain

- *Myocardial Infarction* – any associated chest pain? Timing i.e. on exertion?
- *Cervical disc / root nerve* – any neck pain?

Should include examination of the cervical spine in shoulder examination

- *Gallbladder disease or subphrenic abscess* – referred shoulder tip pain 2ry to phrenic nerve irritation – any abdominal pain? fever?
- *Apical lung cancer* – any smoking history and any other associated symptoms e.g. haemoptysis?

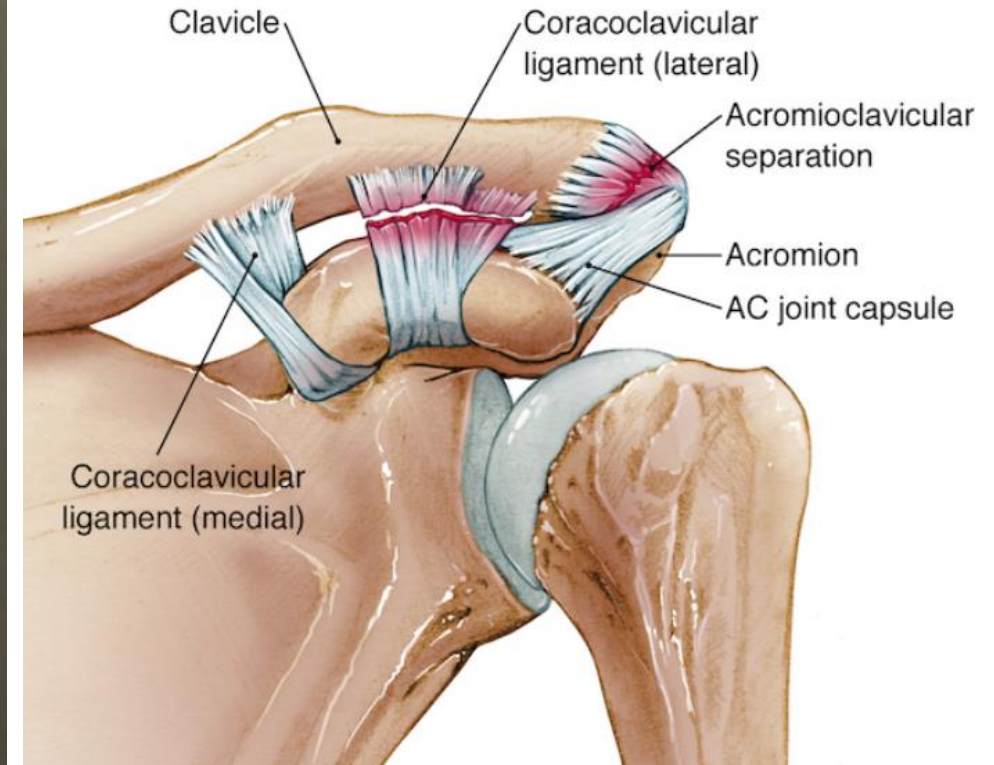
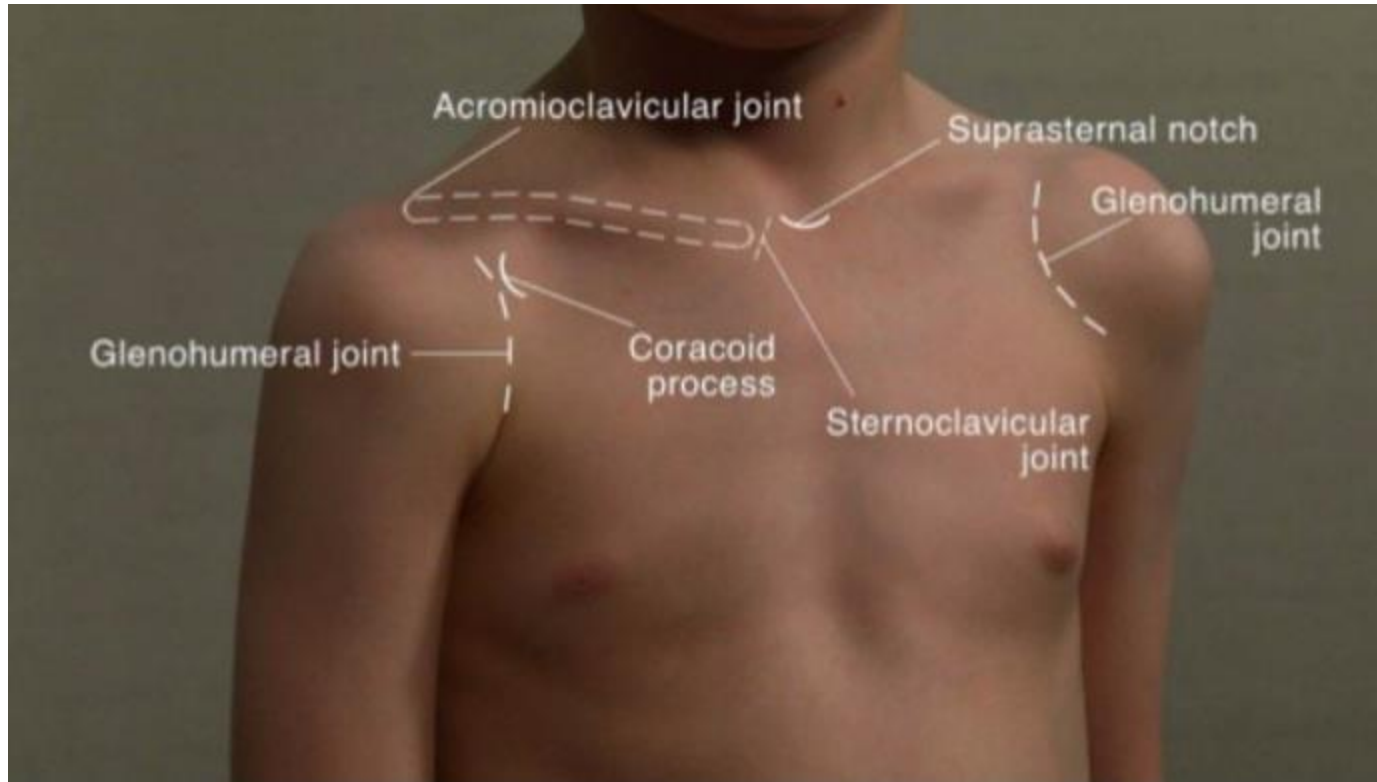
Shoulder Disease Process	Age Group
<i>Rotator Cuff Disease</i>	35-70 years
<i>Rotator Cuff Tears</i>	Over 40 years
<i>Calcific Tendonitis</i>	30-40 years
<i>Adhesive Capsulitis `Frozen shoulder`</i>	40-60 years
<i>Shoulder dislocation</i>	16-40 years (less common after 40years)
<i>Glenohumeral Arthritis – OA or RA</i>	Over 60 years
<i>Polymyalgia Rheumatica</i>	50-80 years (more females than males average age 75 years)

Shoulder Inspection and Palpation



Inspection

Surface Anatomy Landmarks



Inspection

- Need to expose both shoulders
- Look at front, side and back of shoulders
- Any deformities? Look at body contours for asymmetry e.g. dislocation of ACJ (elevated clavicle and disruption of ACJ) and glenohumeral dislocation (easier to detect anterior than posterior dislocation from side view)
- Any swelling? Bony swellings in ACJ dislocation, proximal humeral fractures, inflammation
- Any muscle wasting? n.b. check deltoid bulk laterally, supraspinatus and infraspinatus posteriorly (could be due to tendon tear)
- Any scapula winging? Look first then ask patient to put hands against wall to augment any possible winging related to paralysis of the serratus anterior nerve

Palpation – the journey and landmarks

1. **Start at the sternoclavicular joint** medially and palpate along the clavicle laterally until you come to the acromioclavicular joint (ACJ). Is there any tenderness? ?fracture.
2. **Palpate the acromion and coracoid** (2cm below and medial to tip of clavicle – *see next slide for surface landmarks*)
3. **Move to bicipital groove** to palpate the biceps tendon (if not sure where to locate this in a big shoulder ask the patient to clench their biceps).
4. **Ask patient to extend shoulder to bring the supraspinatus anterior** to acromion and palpate for any tenderness ?impingement ?ligament tear ?calcific tendonitis
5. Check all **borders of the scapula** for any tenderness

Palpating the supraspinatus tendon



Frozen Shoulder

- Progression of symptoms
 - I. Pain (Freezing Stage – 2-9 months)
 - II. Loss of mobility (Frozen Stage – 4-12 months)
 - III. Condition resolves (Thawing Stage – 12-42 months)
- Decreased range of all movements of the shoulder but particularly with external rotation
- Associated with diabetes and hypothyroidism

Case Scenario 4 – 50 year old man with shoulder pain

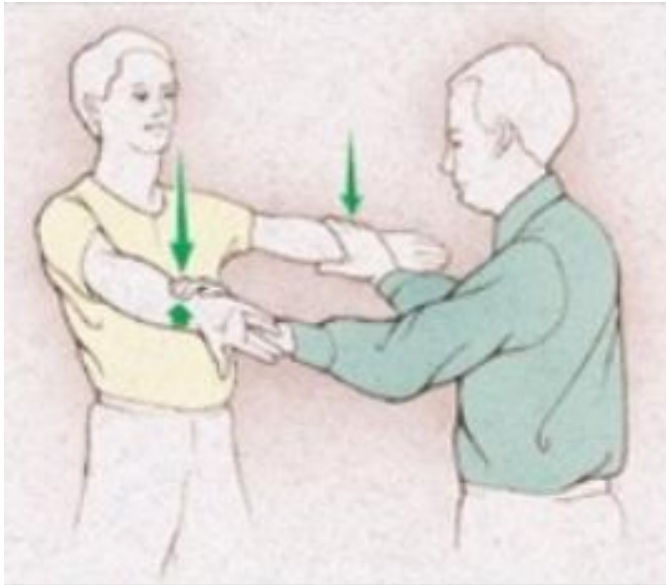
50 year old man with shoulder pain after painting a ceiling 2 weeks ago. What questions would you ask?

- When did it start? 1 week ago after painting ceiling
- Where is it? Outside of shoulder (deltoid)
- Any affect on sleep?
- What activities is it affecting? Unable to comb hair, lift things out of cupboards
- Any stiffness? No
- Any weakness? Unable to hold comb and do hair
- Any past history? Repeated episodes of shoulder pain, painter
- Any medical problems? No
- Smoker? Yes – a packet a day

Rotator Cuff Disease

- Typical triggers – repeated overhead activities e.g. painting ceiling,
- Pain typically over deltoid area – hard to sleep on affected shoulder
- Depending on rotator cuff component unable to carry out:
 - **Subscapularis tendonosis:** Tucking shirt into back of trousers, putting a belt through back of trousers or doing a brassiere at back
 - **Supraspinatus tendonosis:** Pain on reaching up for things, combing hair
 - **Infraspinatus tendonosis:** Externally rotating arm outwards (less important for Activities Daily Living)
- Weakness – unable to lift arm up or off back (Gerber's lift off test)
- Muscle wasting sign of full thickness tear

Testing rotator cuff components



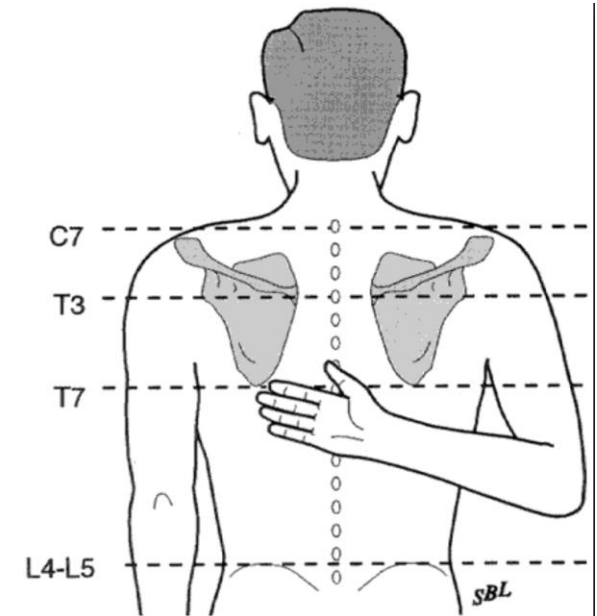
Abduction – Supraspinatus

`Empty can' test OR
abduct with hands by side up to 45°



(e) Infraspinatus test. To test the function of infraspinatus, the patient is required to hold the arm against the body with the elbow flexed, and then externally rotate the shoulder against resistance. Inability to externally rotate indicates weakness or rupture of infraspinatus.

External Rotation – Infraspinatus



Internal Rotation - Subscapularis

The problem is, which test?

Neer Test

Hawkin's Kennedy Test

Empty can (Jobe's test)

Full can test

Copeland impingement test

Horizontal impingement test

Dawbarn's test

Coracoid impingement test

Internal and external rotation resistance strength tests

Bursitis sign

Hornblower's sign

Impingement relief test

Scapular assistance test

Codman's sign (drop arm sign)

Rent test

Zero degree abduction test

Ludington sign (LHB tendinitis)

Scapular retraction test

Patte's test

Burkhead's thumbs down and up

External rotation lag sign

Infraspinatus scapular retraction test

Internal rotation lag sign test

Gerber's lift off

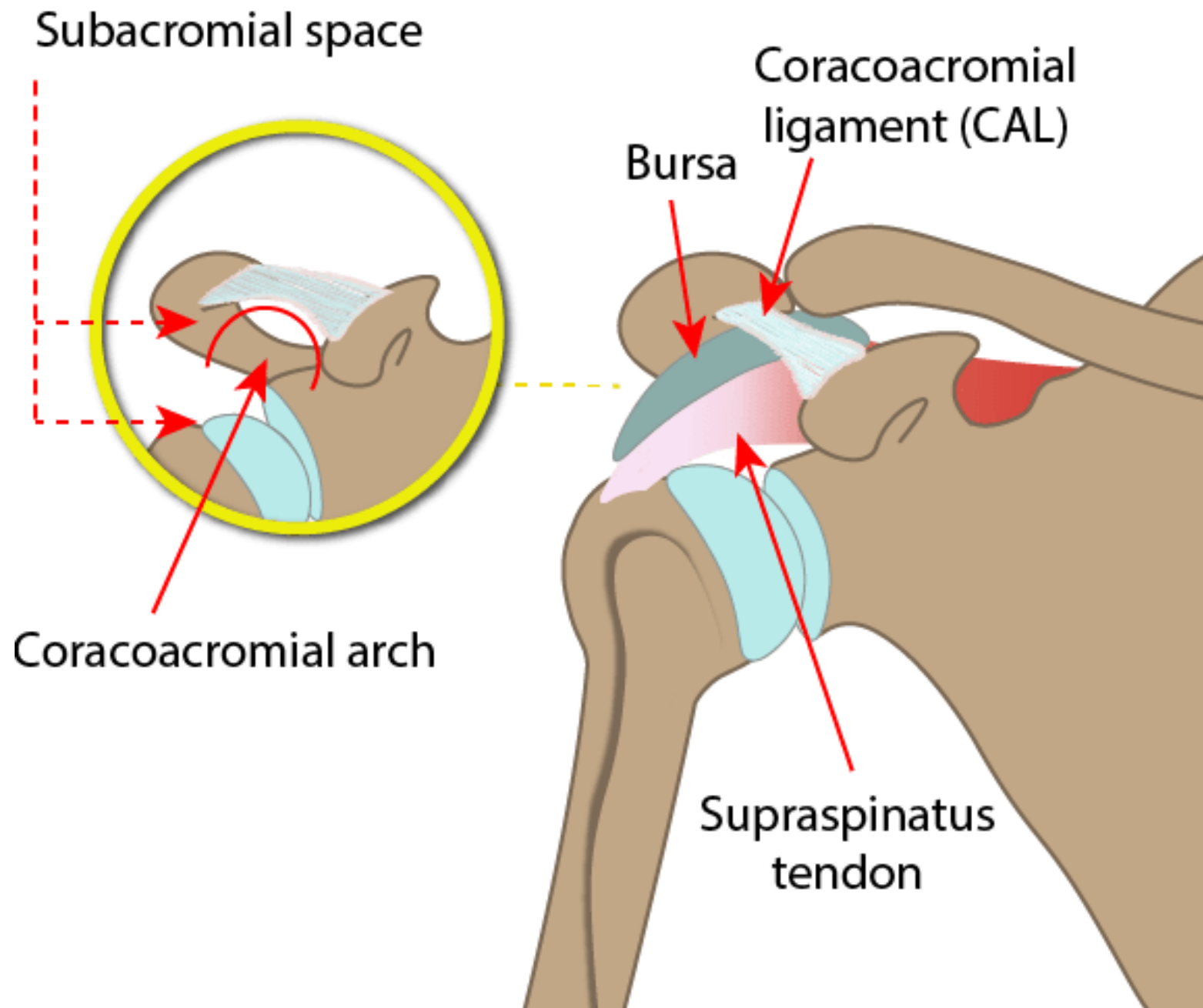
Belly off sign / Belly Press

Bear hug test

Special tests?...

- Over 150!
- Most papers conclude that **one** test in itself is unable to rule in or rule out a specific shoulder conditions
- Need to have the full clinical picture i.e. history and examination together
- For example clinically you can say a patient has '*subacromial impingement*' but many causes for that

e.g. supraspinatus calcified tendonitis, rotator cuff tear (frayed tendon), subacromial bursitis, acromion anatomical variation



Disease Process	Symptom + / - Sign
Rotator Cuff Disease	Pain +/- impingement (painful arc) +/- weakness (if tendon tear)
Subacromial Bursitis	Pain +/- impingement (painful arc)
Adhesive Capsulitis 'Frozen shoulder'	Pain (2-9 months – Freezing Stage) then loss of mobility (4-12 months – Frozen Stage) and then condition resolves (12-42 months – Thawing Stage)
Osteoarthritis of glenohumeral joint or AC joint	Pain on movement + stiffness

Case Scenario 5 – 65 yr old man with painful joints and stiffness

What questions would you ask?

- Tell me more about the stiffness... when does it come on and how long does it last? 30 minutes in morning and then goes eventually
- Which joints in the hands are affected? The MCP joints
- Have you noticed any swelling or warmth in your joints? Yes
- Do you have any rashes? No
- Any eye pain? No
- Any weight loss? Mild
- Fever? Slight

Rheumatoid arthritis
(late stage)

Boutonniere
deformity
of thumb

Ulnar deviation of
metacarpophalangeal
joints

Swan-neck deformity
of fingers



ADAM.



Swan Neck Deformity



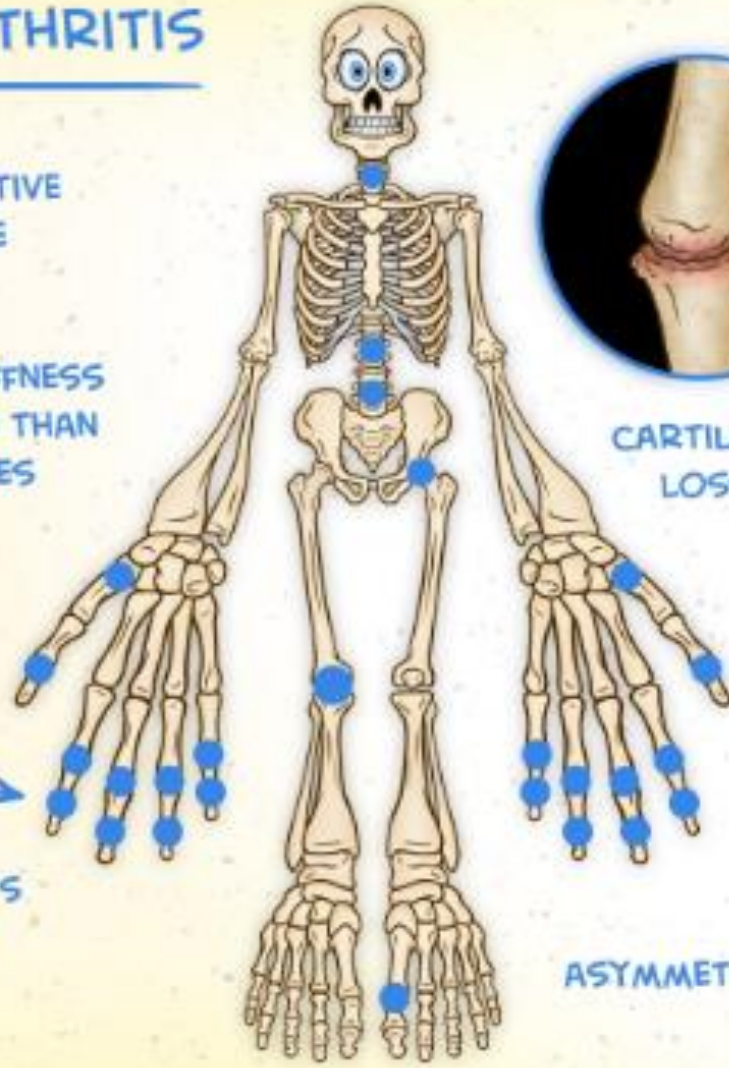
Boutonniere Deformity

OSTEOARTHRITIS

DEGENERATIVE
DISEASE

MORNING STIFFNESS
LASTING LESS THAN
30 MINUTES

HEBERDEN'S
NODES



CARTILAGE
LOSS

ASYMMETRICAL



INFLAMED
SYNOVIUM

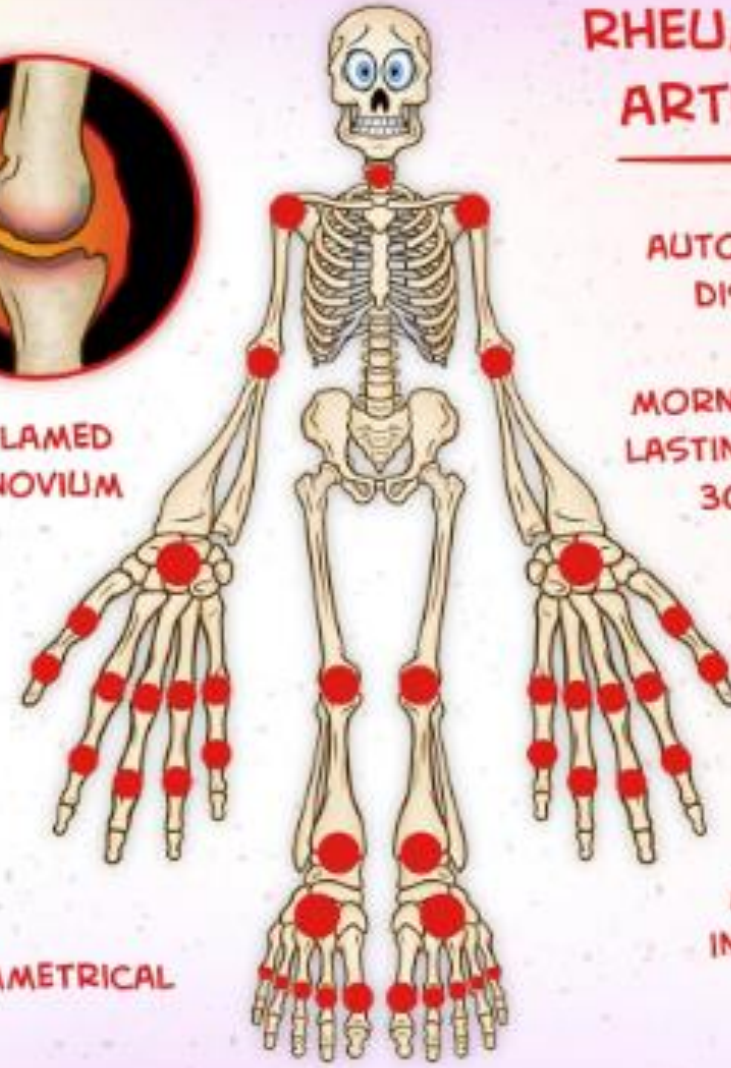
SYMMETRICAL

RHEUMATOID ARTHRITIS

AUTOIMMUNE
DISEASE

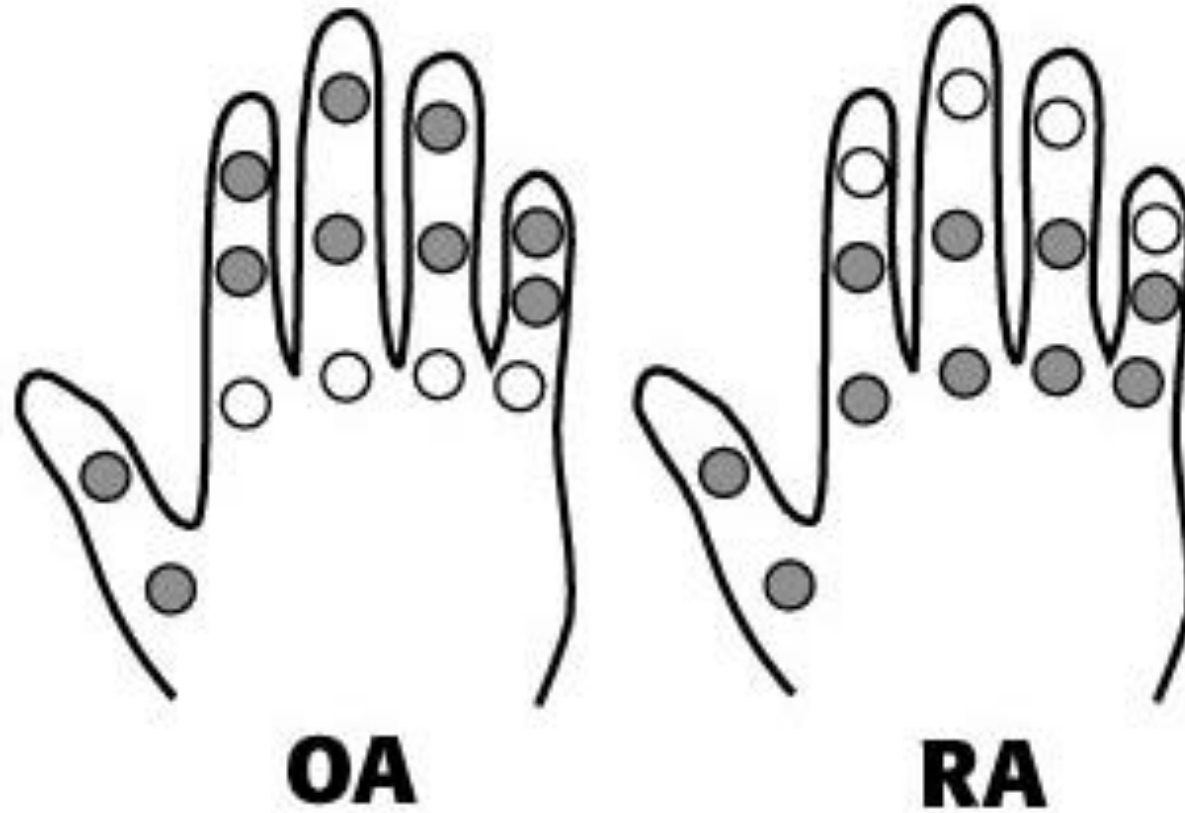
MORNING STIFFNESS
LASTING MORE THAN
30 MINUTES

EXTRA-
ARTICULAR
INVOLVEMENT



EXTRA-
ARTICULAR
INVOLVEMENT

Osteoarthritis the MCP joints are not affected
Rheumatoid Arthritis the DIP joints are not affected



Rheumatoid Arthritis

- Morning stiffness lasts 30 minutes and eases off typically
- Usually starts in hands and feet first (often MCP joints), spares DIP joints but can occur in any joint, symmetrical
- Warm, swollen joints – autoimmune disease
- Fatigue (including anaemia)
- Low grade fever with weight loss
- 40% of patients experience non-joint symptoms – skin, eye, lungs, heart, kidneys, nerve, blood vessels and bone marrow

Case Scenario 6 – 76 year old man with pelvic pain

What questions would you ask?

- When did it start? 6 months ago then sudden severe pain 4 days ago
- What type of pain is it? Gnawing, achy pain and then became suddenly severe and sharp
- Is it continuous or does it come and go? Continuous, keeping me awake at night
- Any pain elsewhere? No
- Any weight loss? Yes – 7kg
- Any fatigue? Yes
- Any difficulty passing urine? No
- Going more often to pass urine? Yes

Multiple Myeloma

- Bone pain (often in the back or ribs)
- Unexplained bone fractures e.g. lumbar wedge fracture
- Fatigue, feeling of weakness (low Hb - anaemia)
- Recurrent infections, fevers (low WCCs)
- Unexplained bruising or bleeding (low platelets)
- Weight loss
- Constipation / increased thirst and urination (hypercalcaemia)



Bone marrow failure

Resources

- Macleod's Clinical Examination
- www.patient.co.uk – rotator cuff disease, gout, rheumatoid arthritis, anterior knee pain....
- www.shoulderdoc.co.uk
- www.arthritis.org
- www.mayoclinic.org