Anatomie du coude : ligaments

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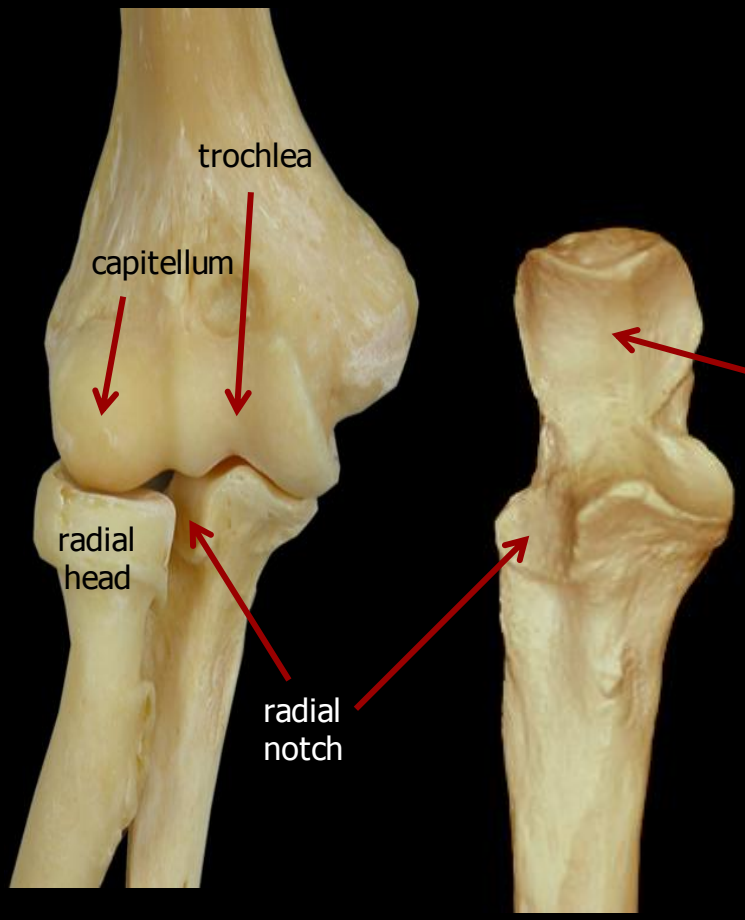
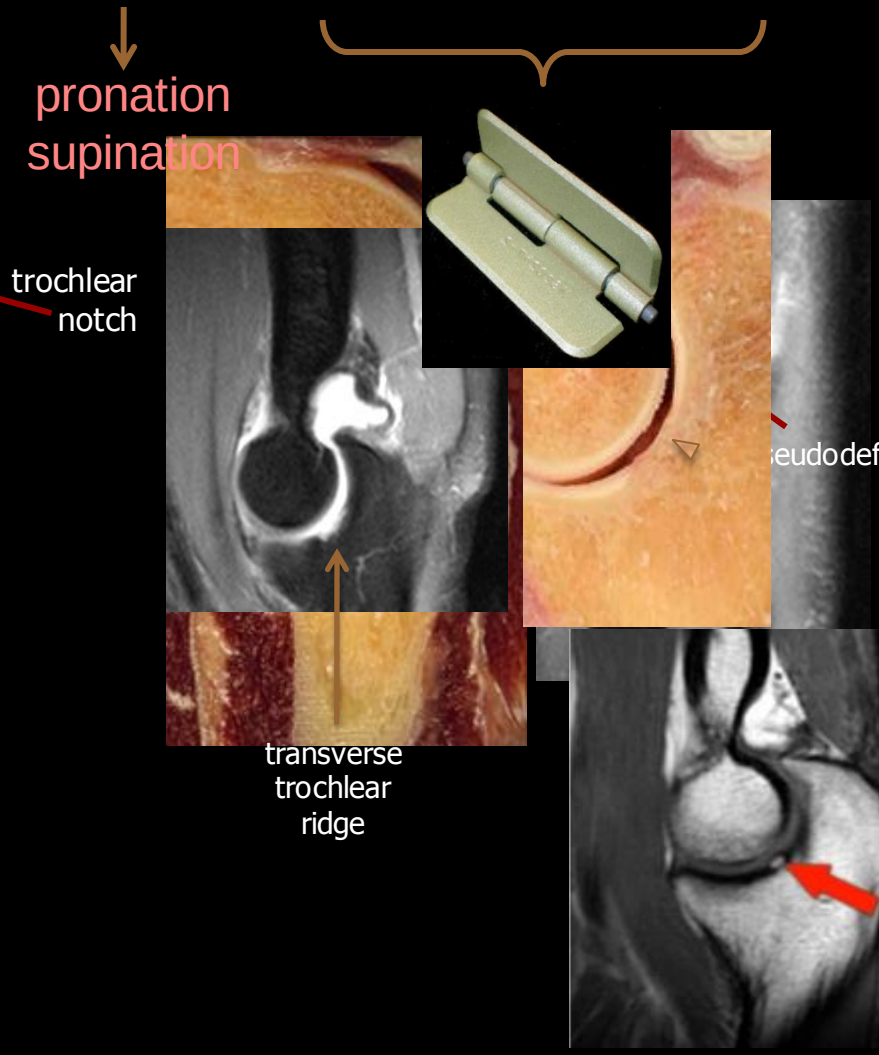
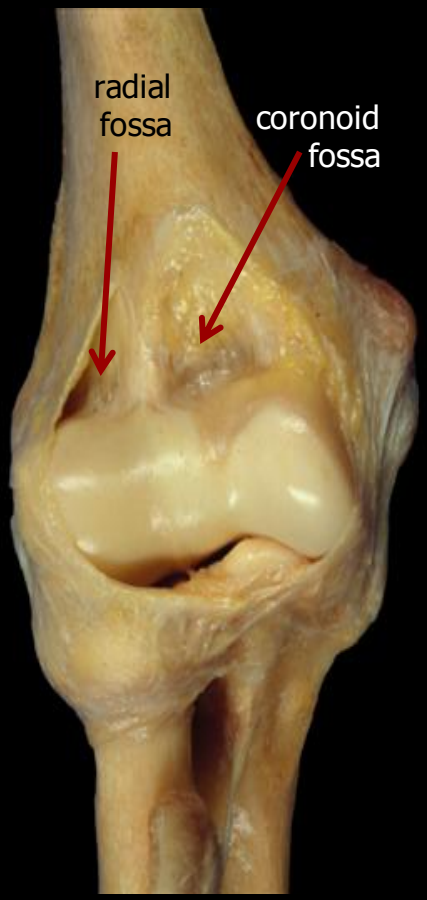
Bones - anatomy

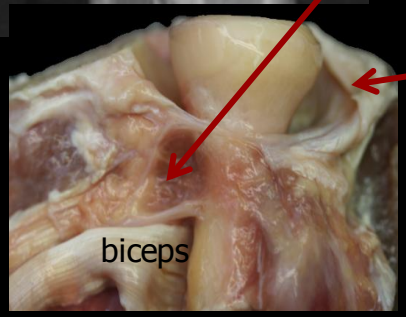
- Tri-arthrodial joint
- proximal radioulnar, radiohumeral, ulnohumeral





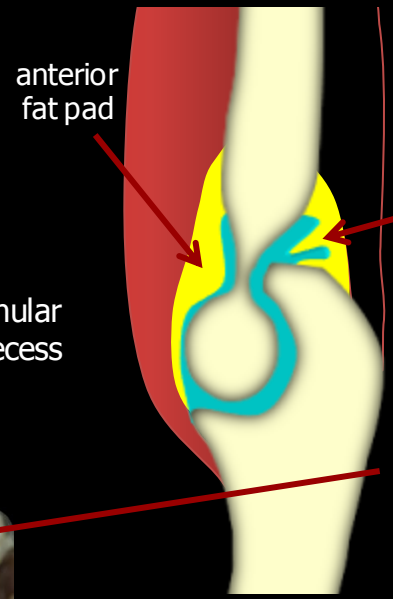
Elbow Joint - anatomy

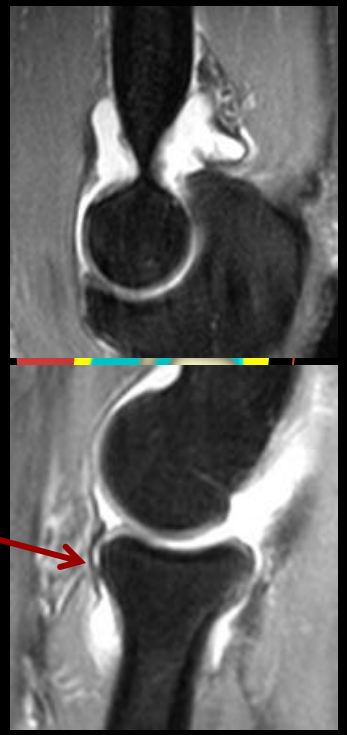




JOINT CAPSULE

- thin anterior and posterior portions
- joint capacity ➔ 25-30ml
- intracapsular extrasynovial fat pads





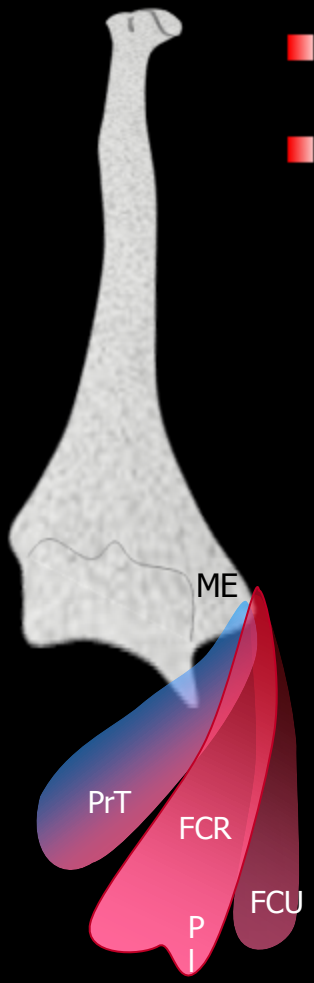
Epiphyseal maturation

OSSIFICATION CENTERS

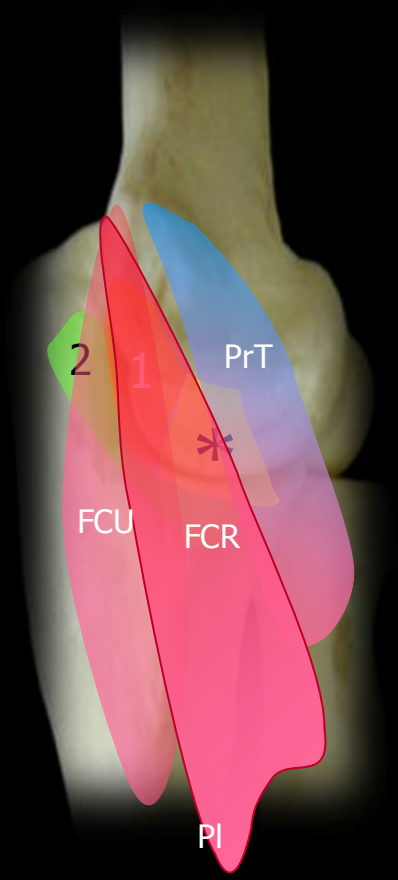
- CAPITELLUM ➔ 1-2 yrs.
- MEDIAL EPICONDYLE ➔ 4 yrs. (15-16)
- RADIAL HEAD ➔ 5 yrs. (sclerotic centers)
- TROCHLEA ➔ 8 yrs. (multicentric)
- OLECRANON ➔ 9 yrs.
- LATERAL EPICONDYLE ➔ 10-11 yrs. (14)

Lack of visualization of a secondary nucleus of ossification may suggest avulsion and displacement

Common Flexor Tendon Origin



- The flexor-pronator group of muscles arises by a common flexor tendon from the medial epicondyle
- Four contributions: PrT, FCR, PL, FCU



Medial Elbow Stabilizers

- olecranon-trochlea congruence
- MCL (three bands), flexor muscles, anterior capsule

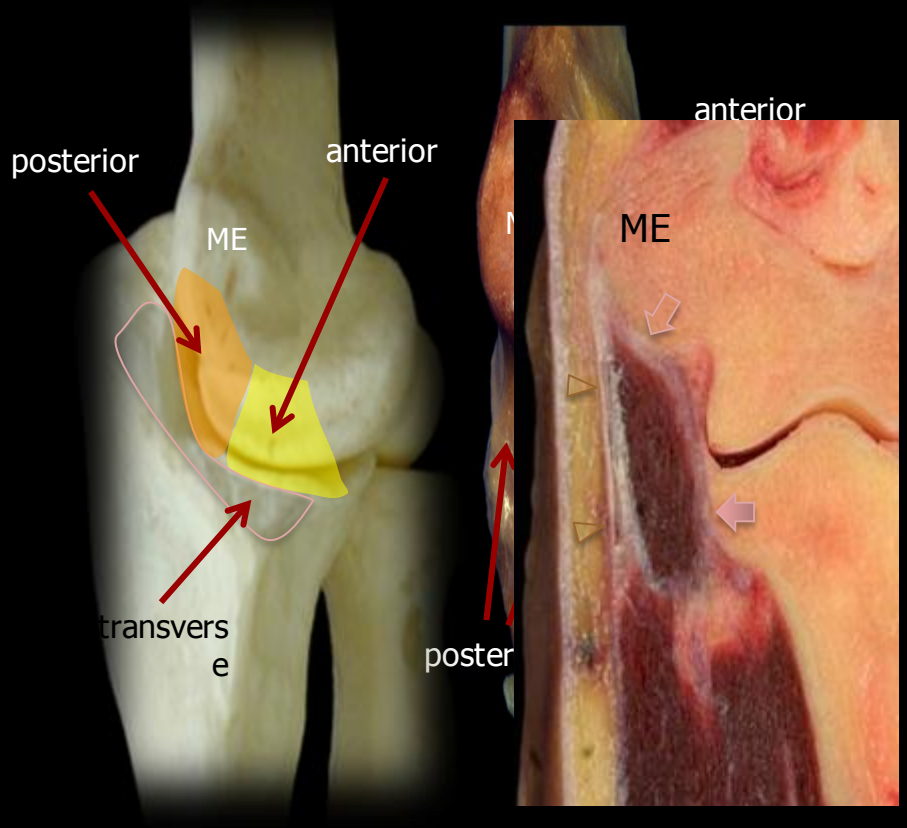
- the anterior band of the MCL stabilizes the elbow during valgus stress
- the common flexor tendon provides dynamic support to the underlying MCL in resisting valgus stress

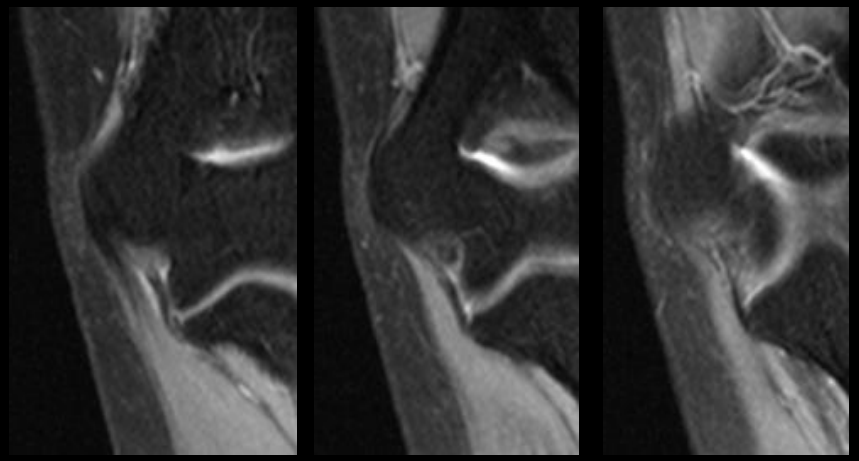
Morrey and An, 1985
Ciccotti et al. 2004

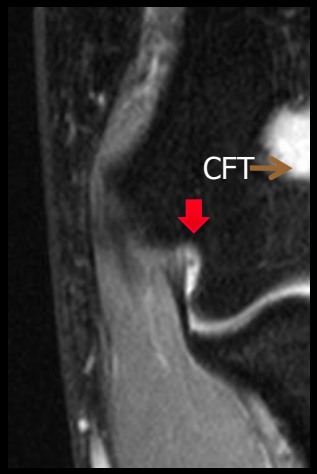
Medial Collateral Ligament Complex

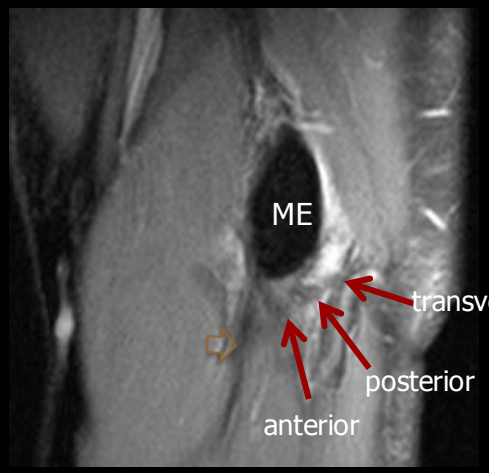
- Posterior & Transverse Bundles ➔ floor of the cubital tunnel
- Anterior Bundle ➔ constraint to valgus stress

Anterior ⟷ Posterior

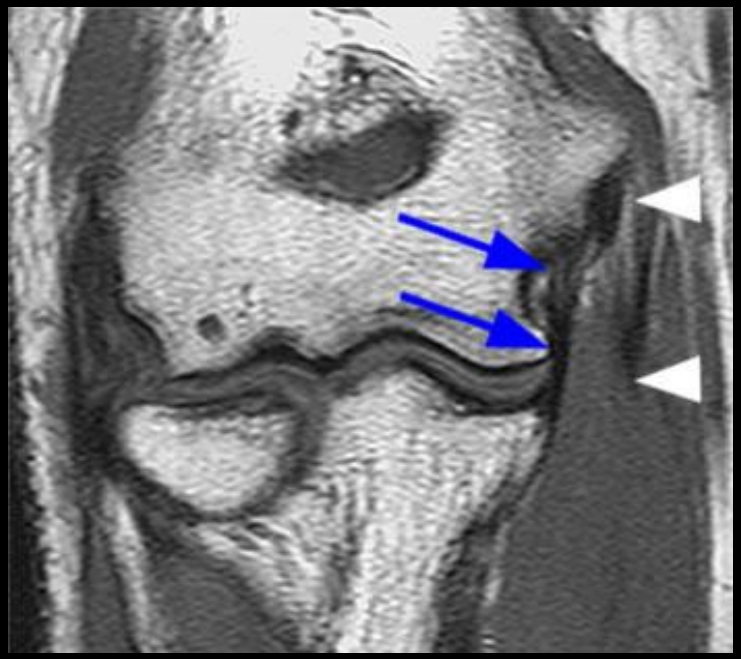


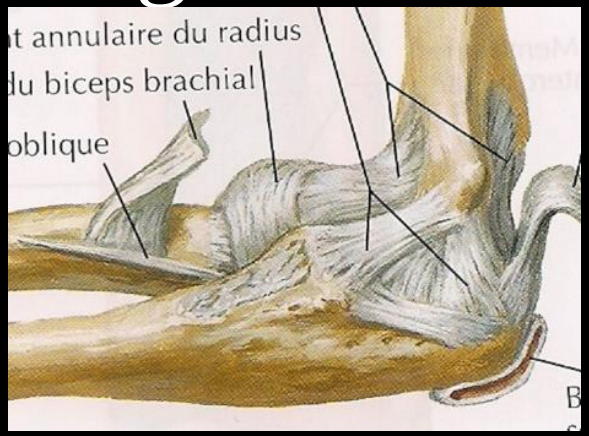


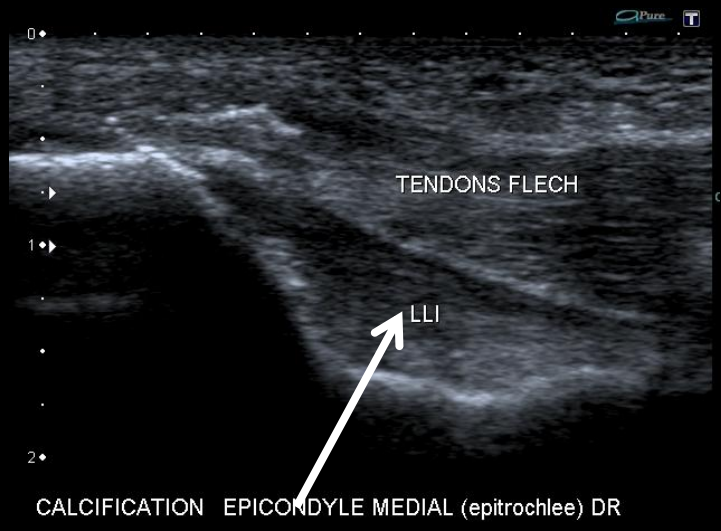




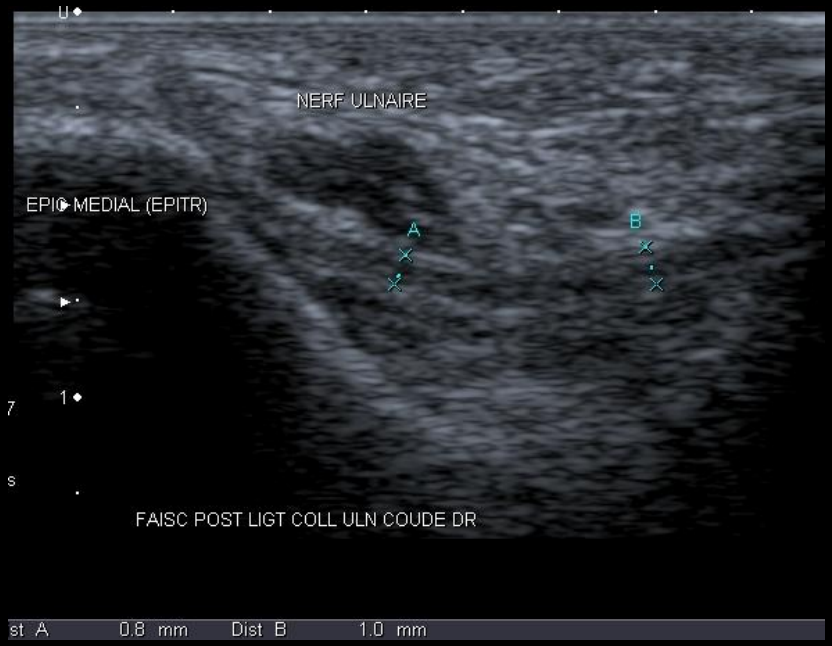
Medial (ulnar) collateral ligament







Anterior part

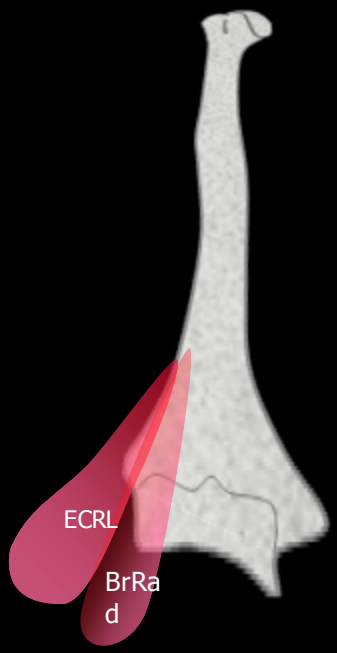


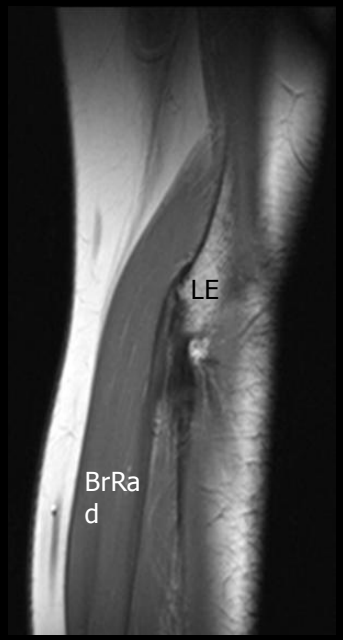
Posterior part

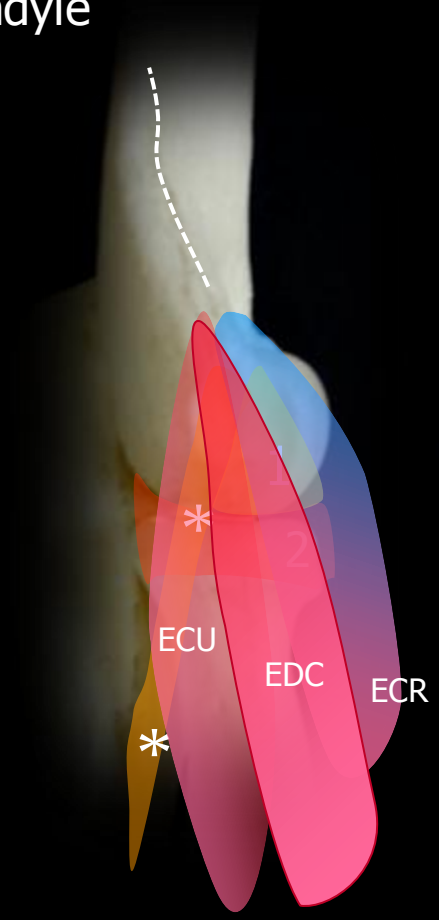
Common Extensor Tendon Origin

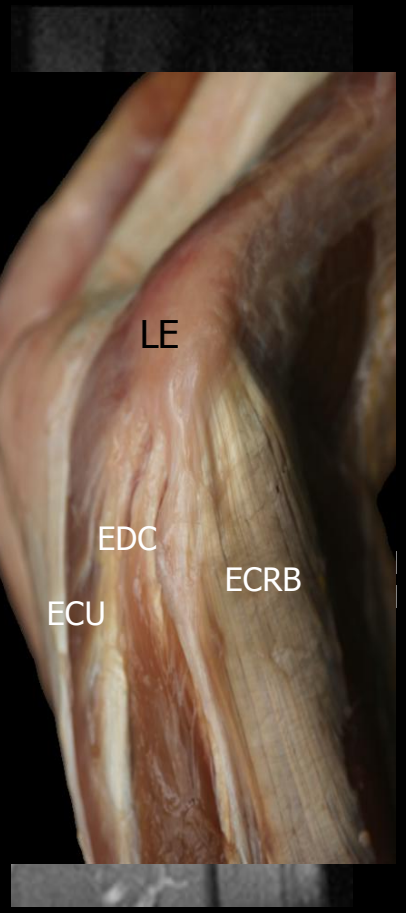
- The common extensor tendon origin is a flattened tendon which arises from the anterolateral surface of the lateral epicondyle
- Four contributions: ECRB, EDC, ECU, EDM

Long Extensors

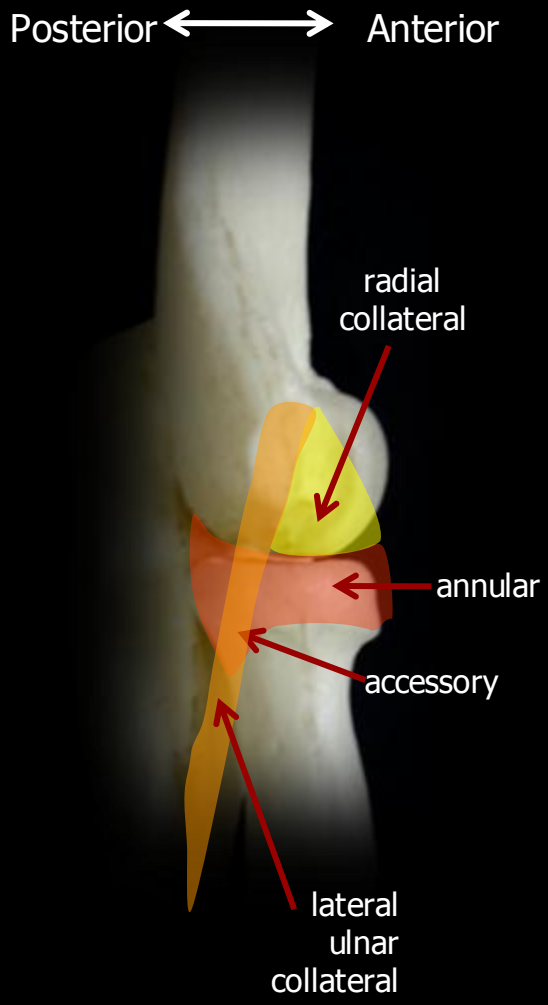


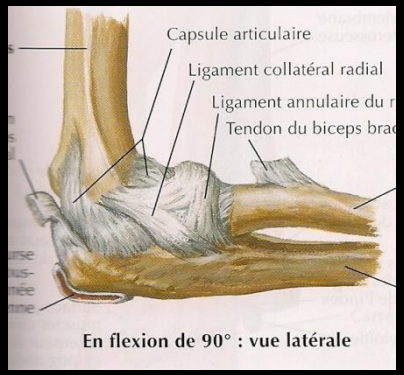


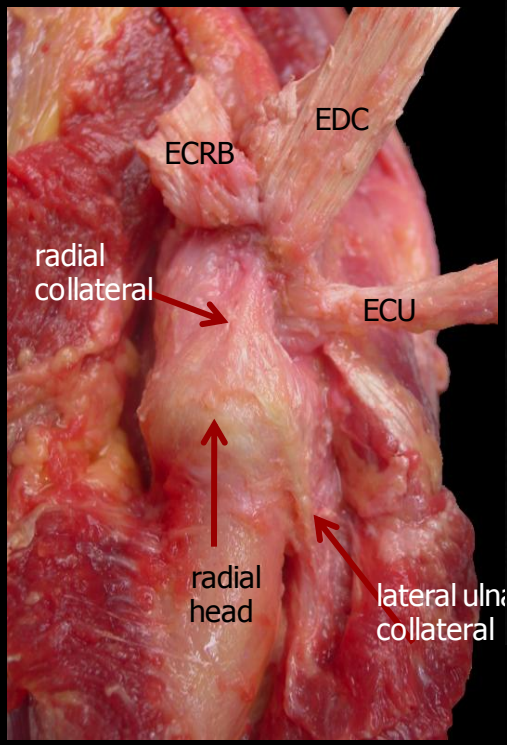


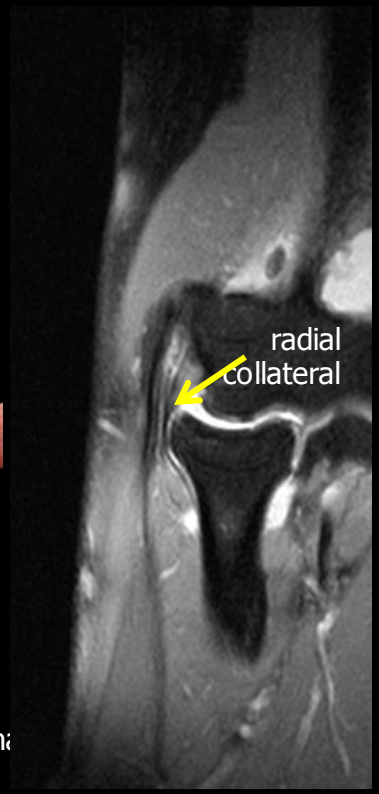


Lateral Collateral Ligament Complex









Elbow instability

- Two major clinical situations with frequence related to the world geography
  - North America : Valgus instability
    - Around 10% of all baseball pitchers will get valgus instability
  - Europe : Posterolateral rotatory subluxation or instability

Elbow instability

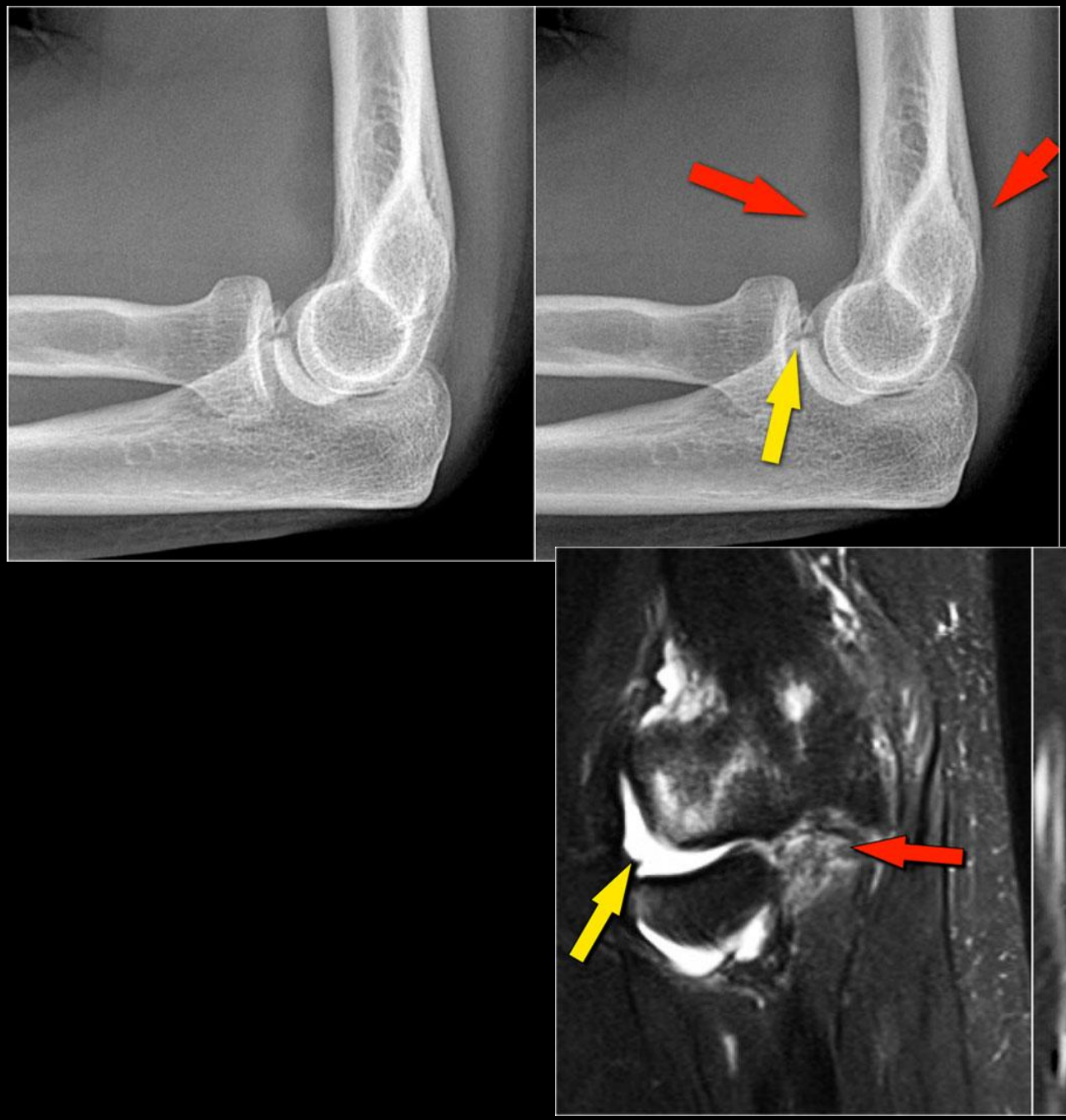
- Primary static stabilizers
  - Ulnohumeral joint
  - LCL – ulnar part (LUCL)
  - MCL (UCL – anterior bundle)
- Secondary static stabilizers
  - Common extensor and flexor tendons
  - Radial head
  - Capsule

- If the 3 primary constraints are intact : no instability
- If coronoid process fracture, radial head becomes the stabilizer
- If radial head fracture >> terrible triad

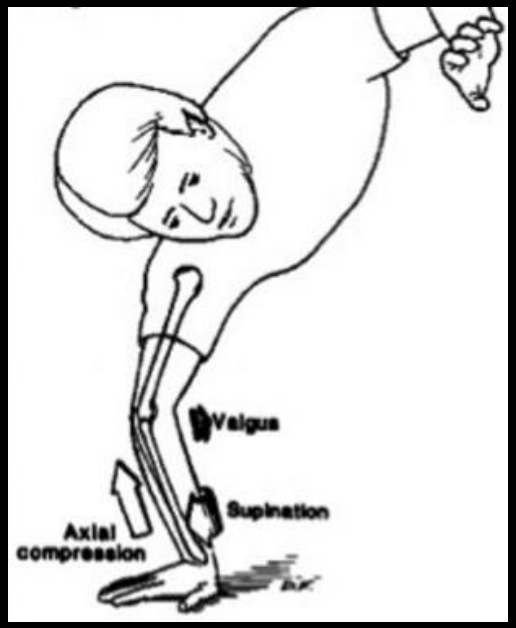
Terrible triad

Role of the radiologist

- Identify if any fracture
- If there is a fracture but no dislocation: report it
- Advise CT scan if doubt on plain X-rays
- MRI usually not indicated in acute elbow pathology but may lead to better understanding (if poor radiological report)
- Ultrasound not indicated if fracture or dislocation



From subluxation to dislocation



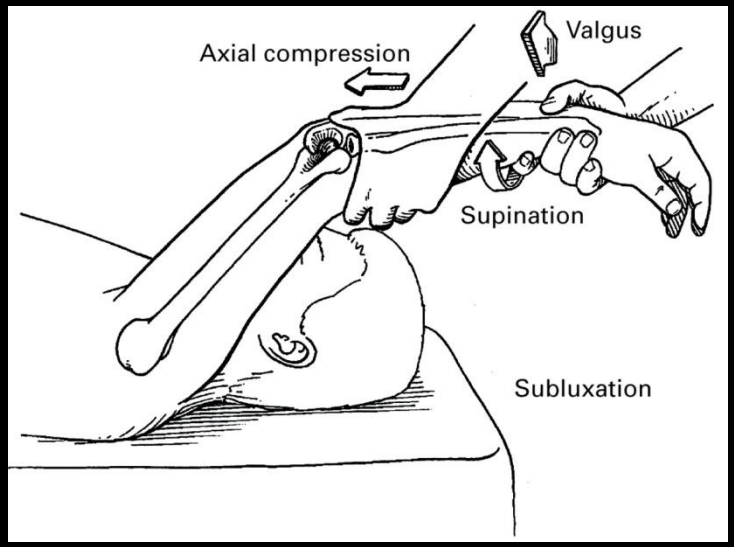
- Fall on outstreched hand
  - Axial compression
  - Valgus extension
  - Supination of the forearm

3 stages

- LUCL will tear first
- Anterior – posterior capsule
- UCL last

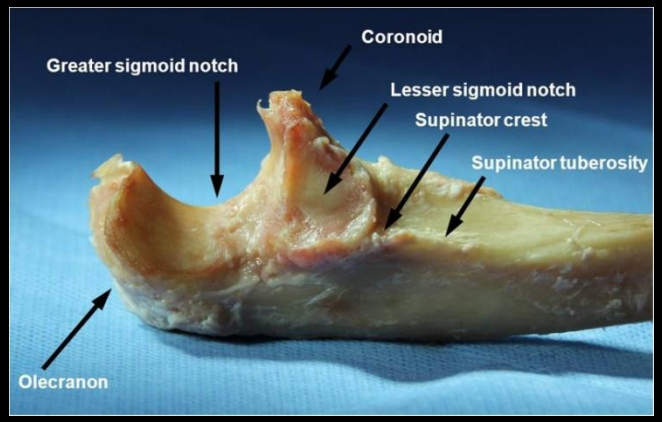
Imaging posterolateral instability

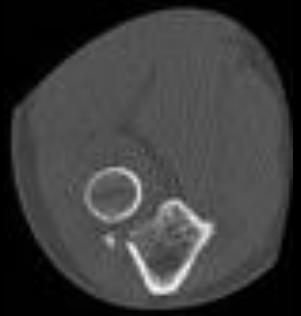
- Lateral problem (LUCL)
- Post-traumatic
- Often with normal UCL
- Clinical diagnosis
  - Pain, catching, locking
  - Pivot shift test (sometimes under general anesthaesia)



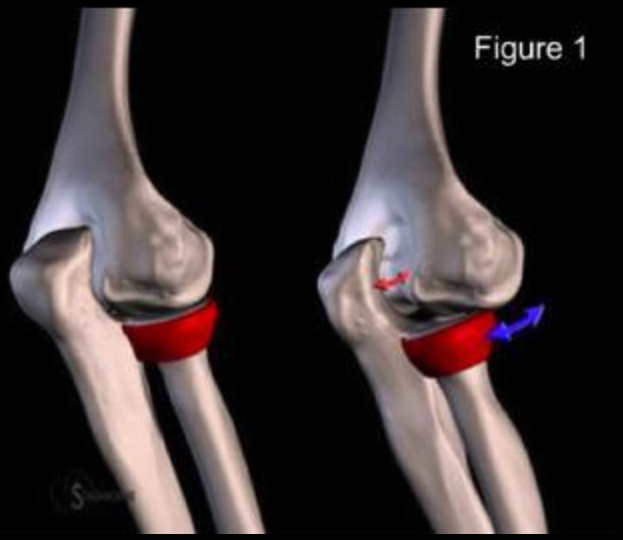
Imaging posterolateral instability

- Subtle signs on X-rays
  - Profile : posterior displacement of the radial head
  - “Posterior sag sign”
  - Supinator crest avulsion (best seen on CT scan)
- MRI :
  - Difficult to image the entire LUCL (50-100%)
  - Proximal part non differentiable separately from radial part
  - Best seen around the annular ligament

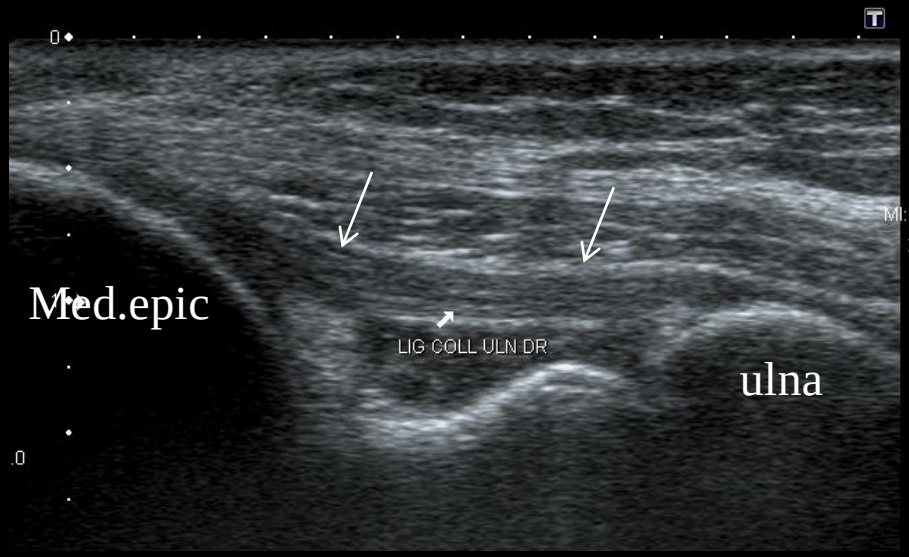




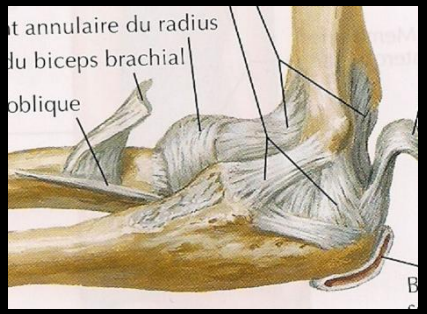
“Posterior sag sign”



Imaging the valgus instability



- Ultrasound fairly shows the anterior bundle of the UCL
  - Sublime tubercle of the ulna > inferior part of the medial epicondyle
  - Thicker proximally than distally
- MRI if any doubt



Medial (ulnar) collateral ligament (anterior bundle)

Diagnosis “easier “ with MRI than US

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Conclusion

- 2 major instabilities
  - Valgus instability
    - Involves the anterior bundle of the UCL
    - Ultrasound --- MRI ---- MRA
  - Posterolateral instability
    - Involves the Lateral Ulnar Collateral Ligament (LUCL)
    - Plain X-rays ---- MRI ---- (CT)