University of Babylon

Hammurabi Medical college

The Elbow And Joints Of The Forearm

Topographical & Applied Anatomy

What to consider about joints ?

- ❖ Articulations
- ❖ Capsule
- ❖ Ligaments
- ❖ Movements
  - muscles
- ❖ Neurovascular supply
- ❖ Bursae

Articulations

- **Osteology**

➢Of humerus:

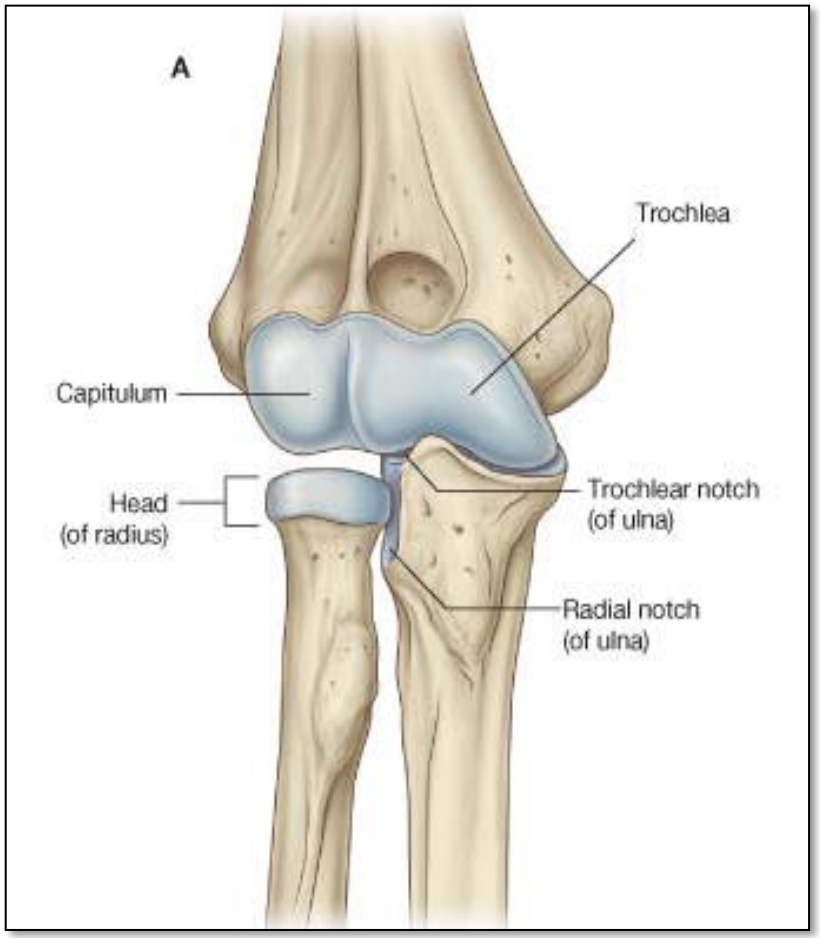
- Trochlea
- Capitulum
- Olecranon fossa
- Coronoid fossa
- Radial fossa

➢Of ulna:

- Coronoid process
- Trochlear notch
- Olecranon process

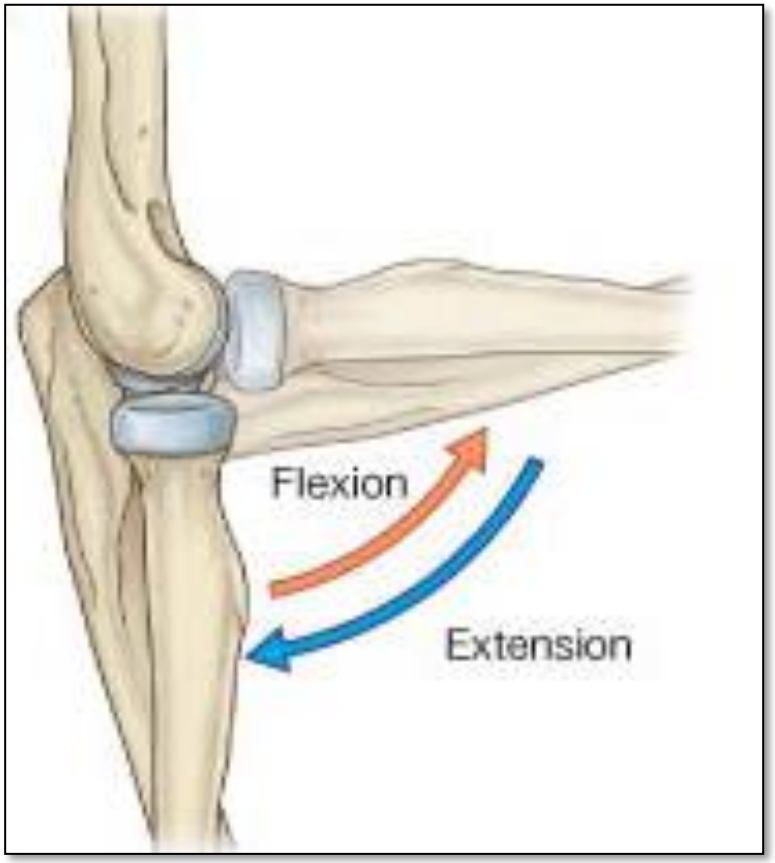
➢Of radius:

- head



Movement - I

- Elbow is a hinge type synovial joint
- At full extension the ulna makes an angle of 170º with the humerus (long axis)
- Note carrying angle
  - forearm angled further away from the trunk in females

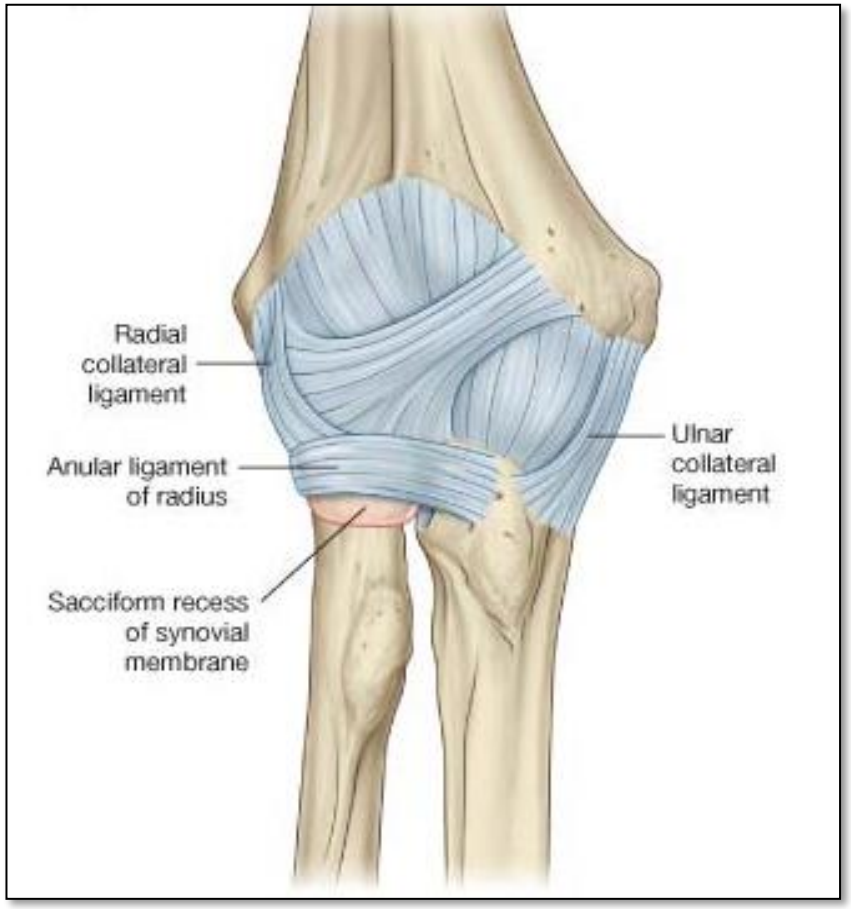


Muscles producing hinge movement

- Biceps brachii
- Triceps brachii
- Branchioradialis

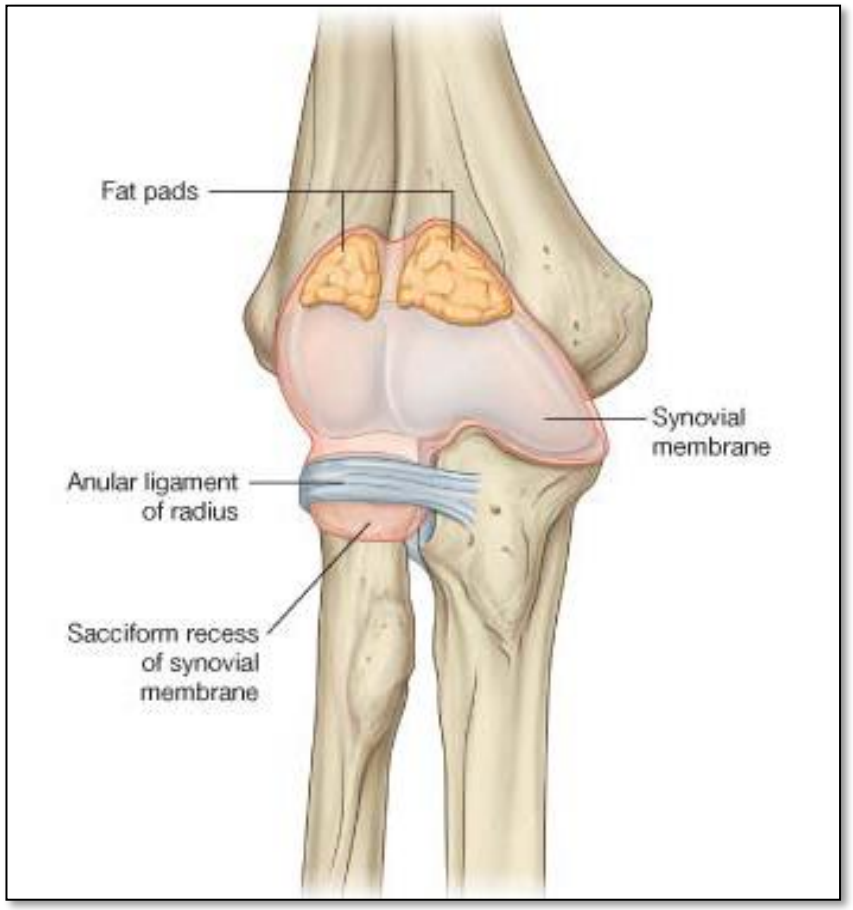
Capsule – I

- Weak anteriorly and posteriorly
- Strengthened by **collateral ligaments** medially and laterally
- Elbow and proximal radioulnar joint share a capsule



Capsule - II

- Synovial membrane lines the fibrous capsule and humerus enclosed by the capsule



Ulnar collateral ligament

Three bands

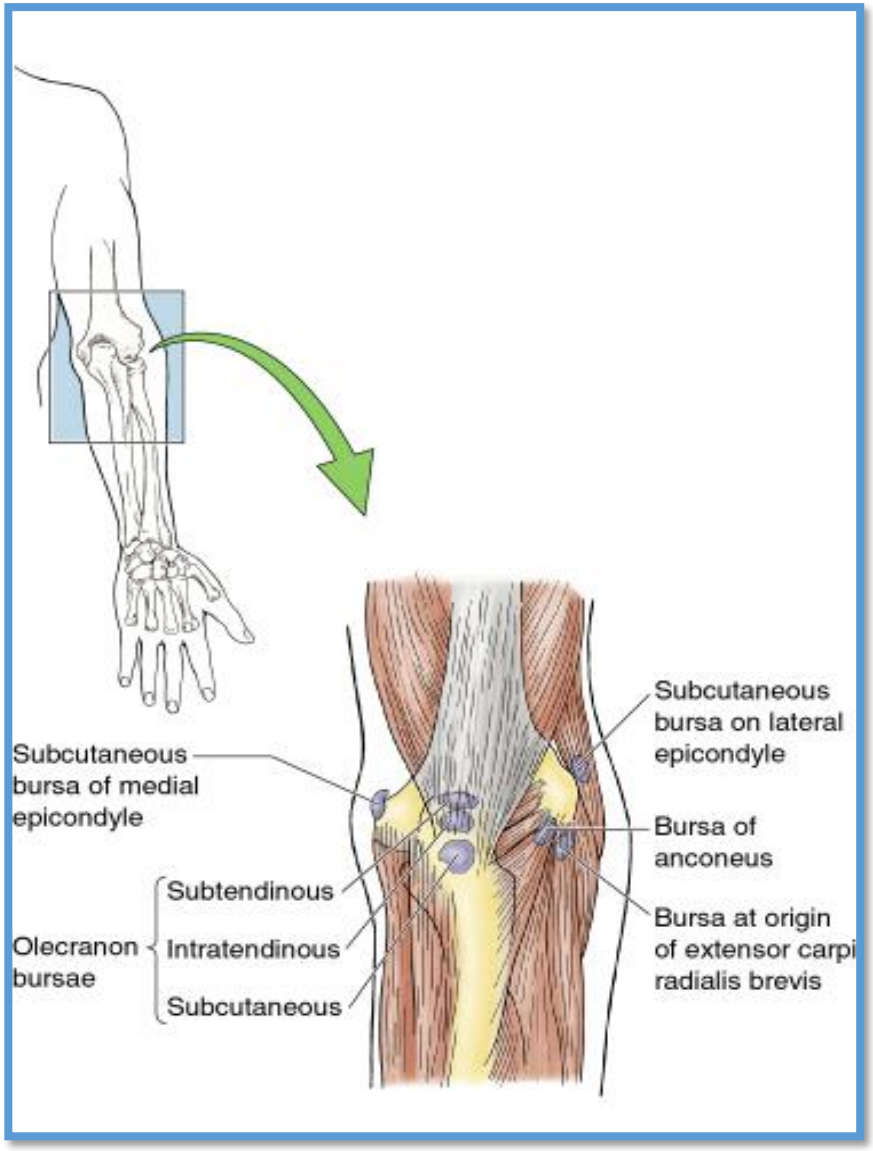
* Anterior – strongest
* Posterior
* Oblique - deepens the socket for trochlea

Radial collateral ligament

* Fanlike
* Blends with annular ligament

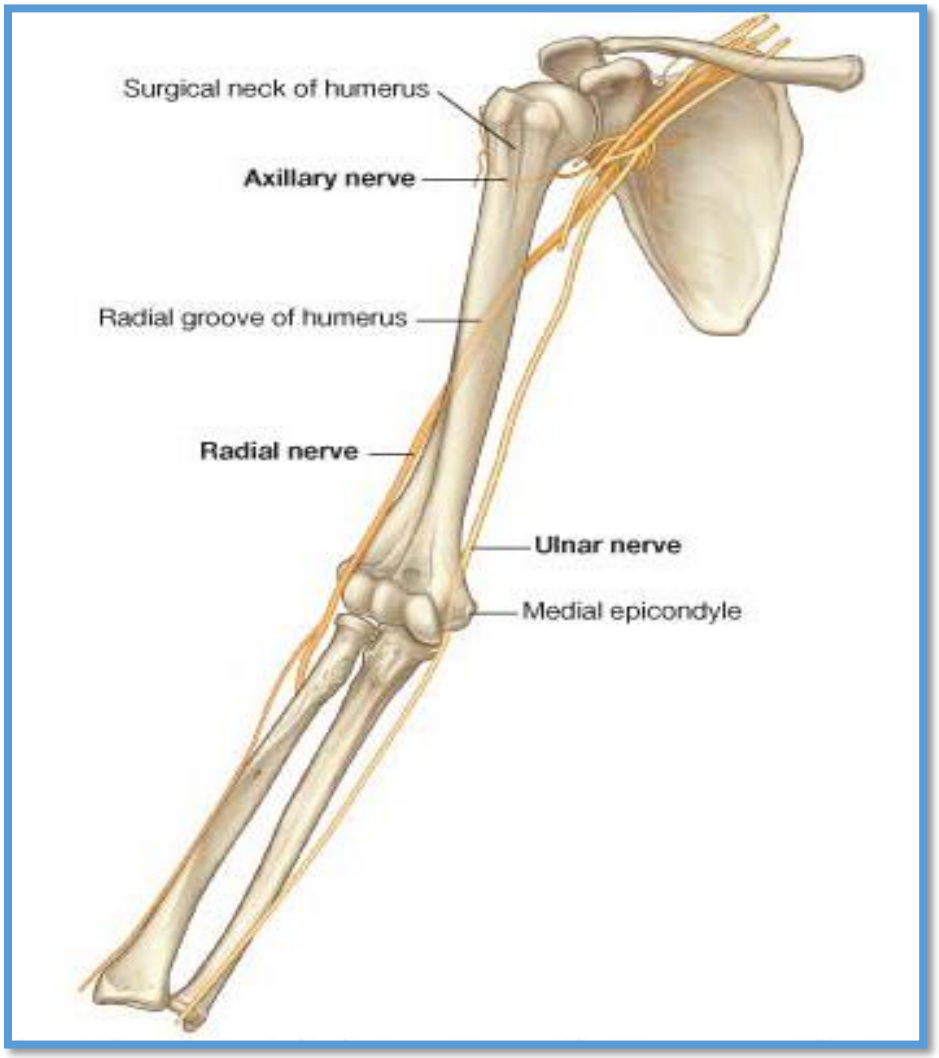
Bursae

- There are lots of them!
- Most give rise to no problems, except…
- Subcutaneous olecranon bursa
- Subtendinous olecranon bursa



Nerves at the elbow

- Radial nerve passes anterior to lateral epicondyle
- Ulnar nerve passes posterior to medial epicondyle



Neurovasular supply of elbow

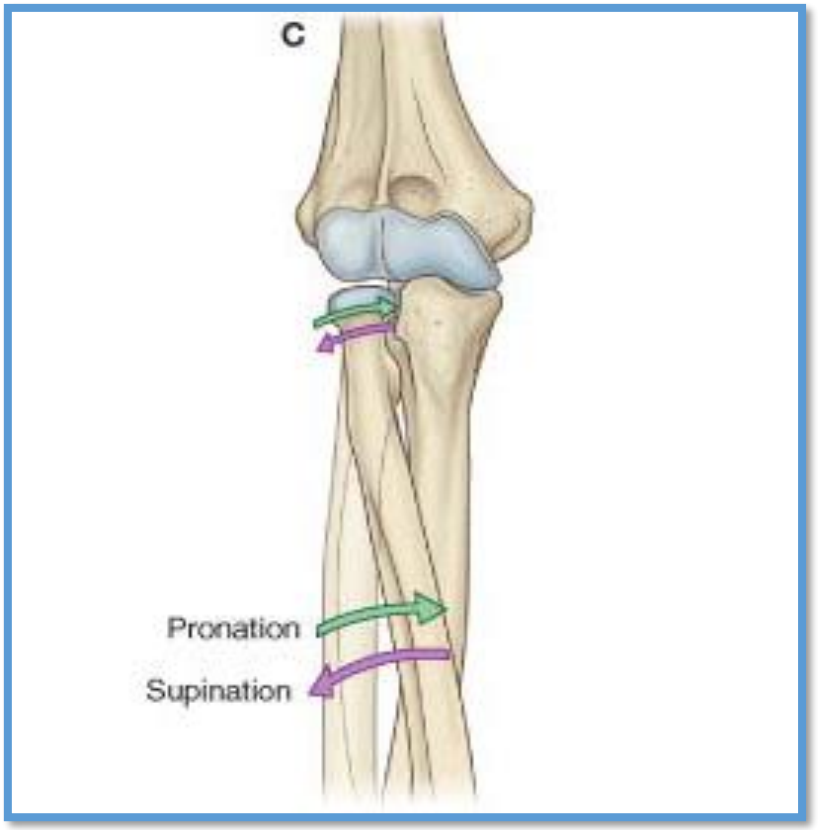
- Hilton's law
- Arterial anastomoses formed by collateral arteries and recurrent branches of ulnar, radial and interosseous arteries

Radioulnar joints

- Proximal radioulnar
- Interosseous membrane
- Distal radioulnar

Movement – II

- Pronation / supination involves movement at the elbow and forearm joints
- Head of radius pivots on capitulum of humerus



Proximal radioulnar joint

- Pivot joint
- Osteology

Of radius:

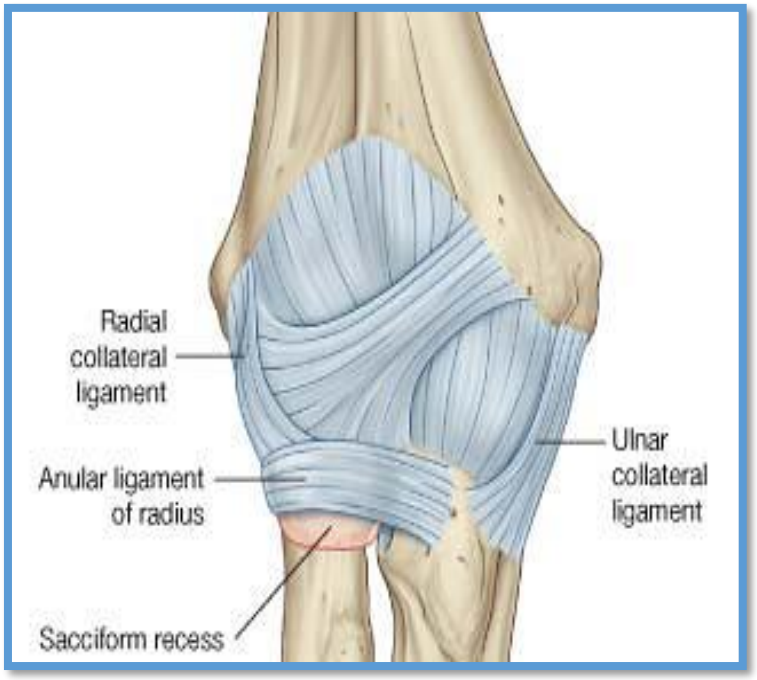
✓ Head

Of ulna:

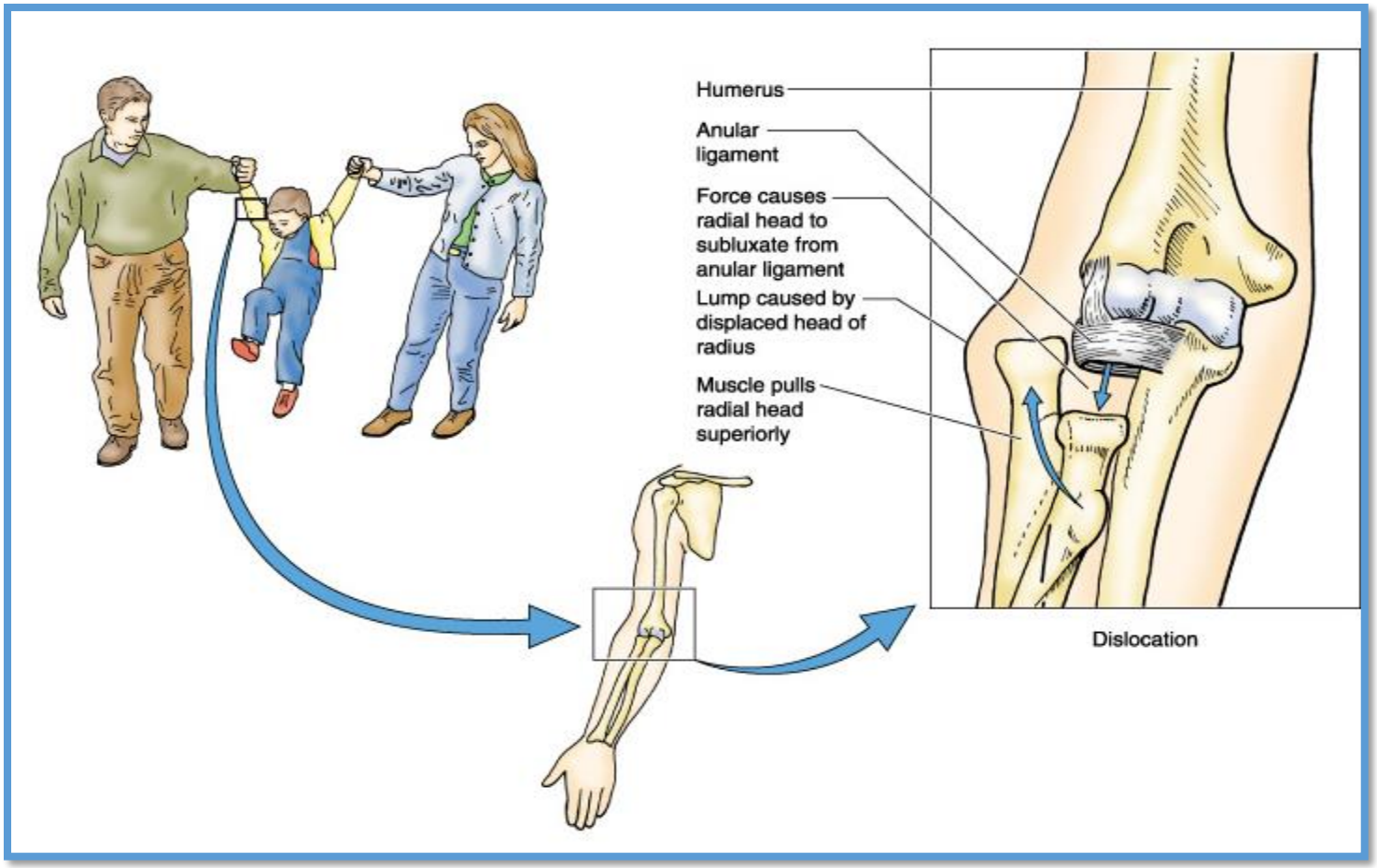
✓ Radial notch

Annular ligament

- Ligamentous collar
- Attached to ulna anterior and posterior to its radial notch

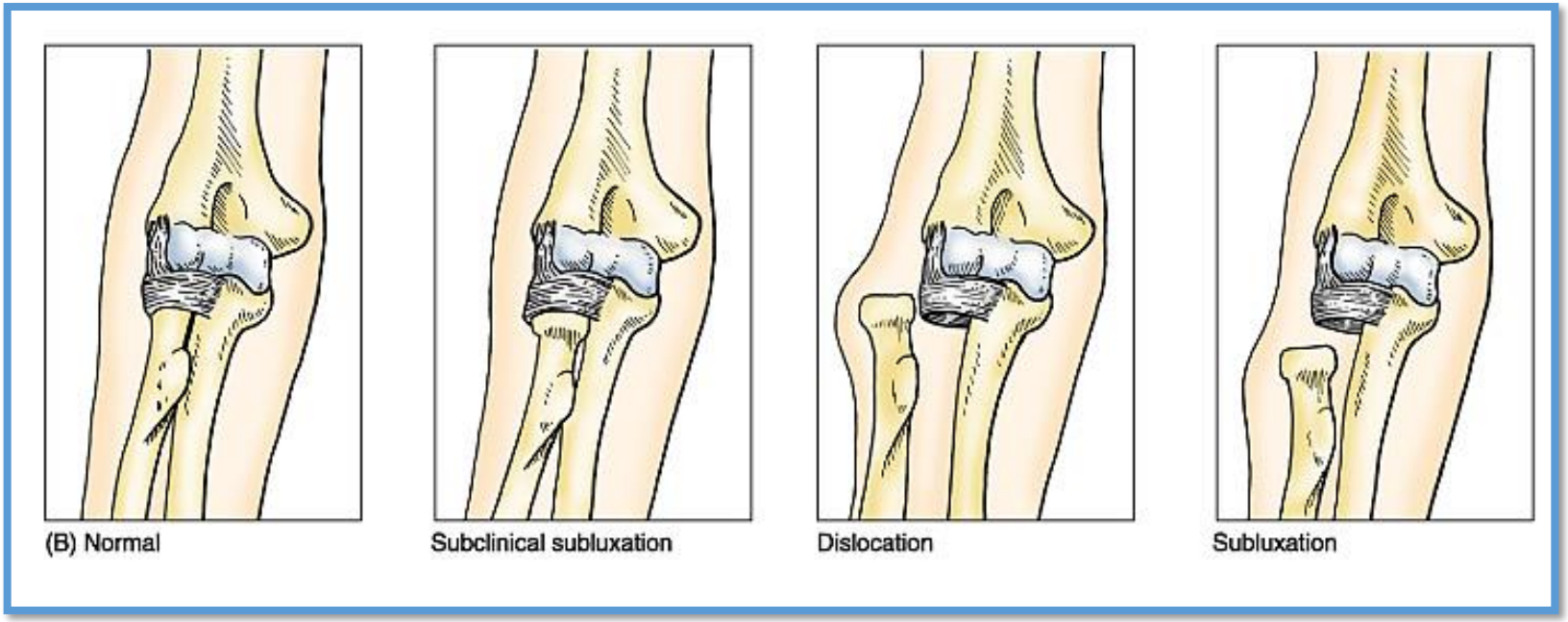


Pulled elbow



- Common in children
- Head of radius subluxates from annular ligament

Important definitions / distinctions



Dislocation

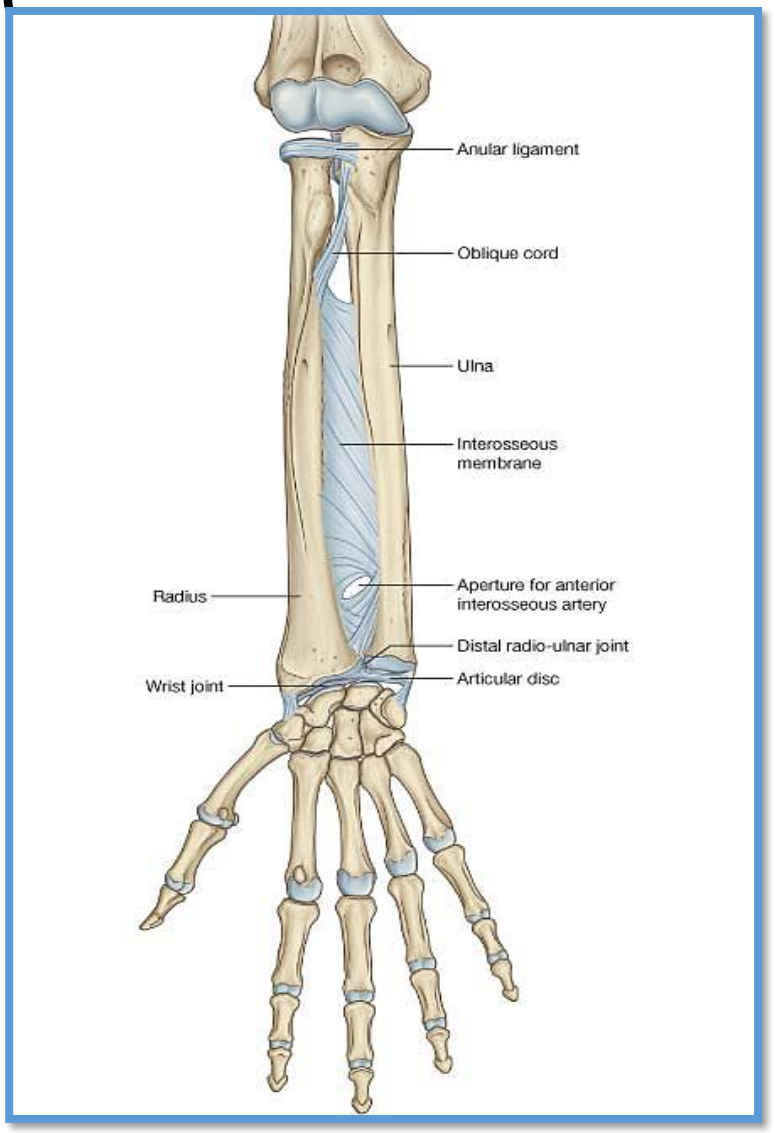
- complete loss of contact of the joint surfaces

Subluxation

- partial dislocation of a joint, so that the bone ends are misaligned but still in contact

Interosseous membrane

- Fibrous joint
- Fibers run inferomedially
- allows distribution of force from radius to ulna



Distal radioulnar joint

- Osteology

❖ Of ulna

  - Rounded head

❖ Of radius

  - Ulnar notch on medial border

❖ Articular disk

  - Main structure affording joint integrity
  - Separates cavity of distal radioular joint from wrist cavity

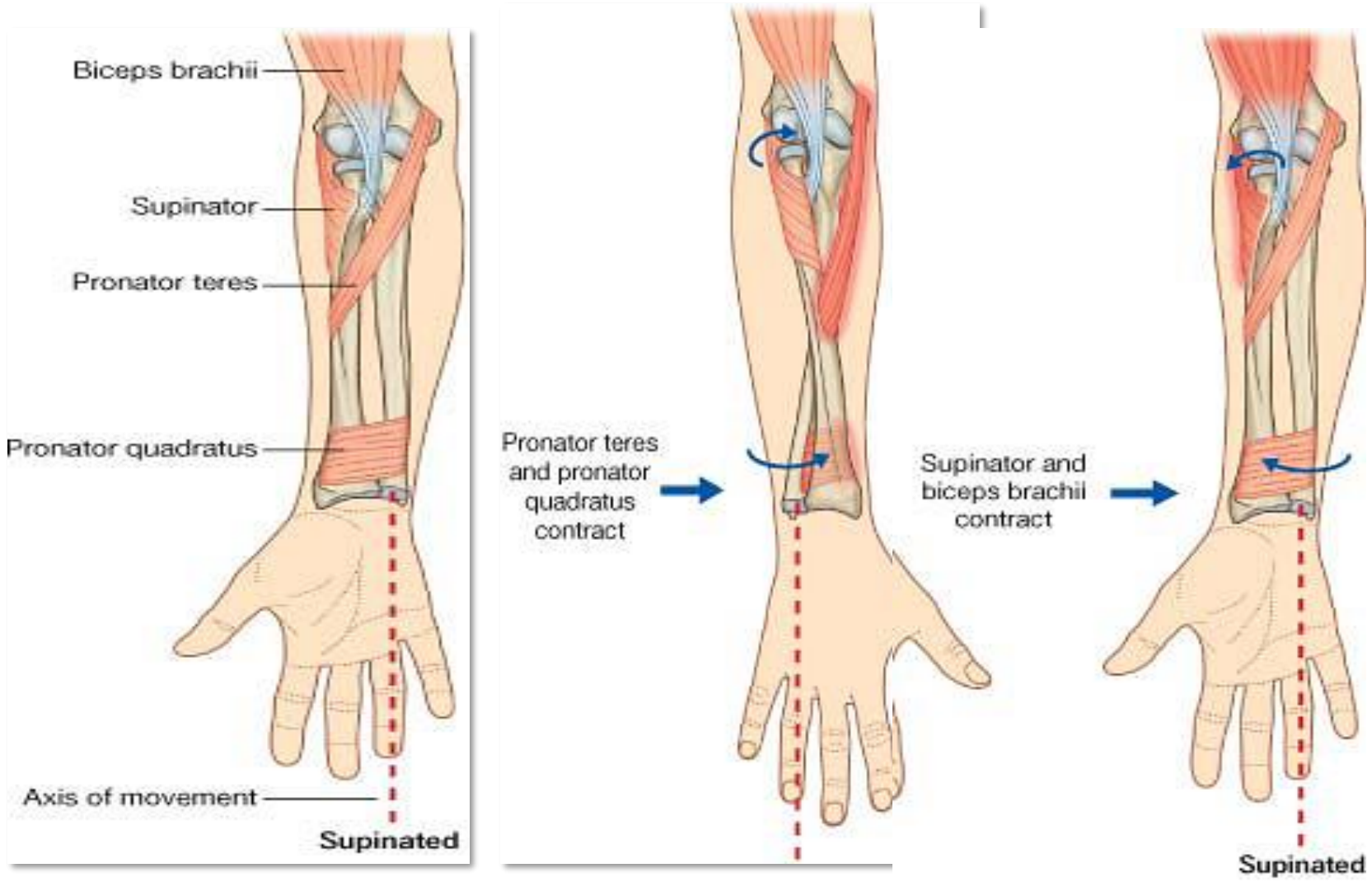
Distal R/U joint in pronation / supination

- Articular disk ensures joint integrity is maintained
- Sacciform recess superior extension of synovial capsule
    - allows twisting of the capsule

Movement of radioulnar joints

- Supinator
- Biceps brachii
- Pronator quadratus
- + pronator teres

Review


Biceps brachii
Supinator
Pronator teres
Pronator quadratus
Axis of movement
Supinated
Pronator teres and pronator quadratus contract
Supinator and biceps brachii contract
Supinated

Facilitation of supination /pronation function

- Head of radius and capitulum
- Annular ligament
- Sacciform recesses
  - Extensions of the synovial membrane
  - On neck of radius
    - At distal radius and ulna (superiorly from articular disk)

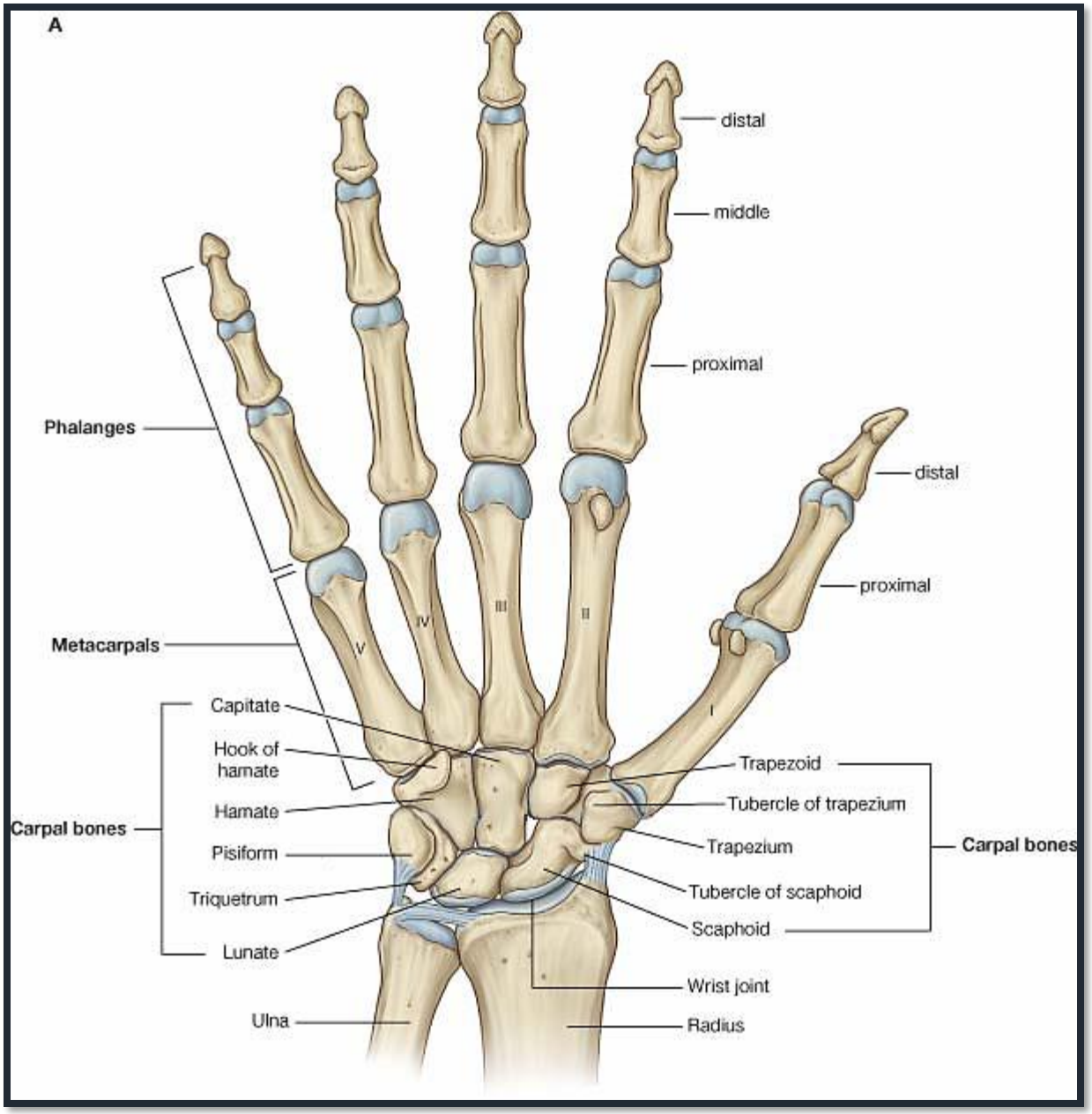
The wrist

❖Radiocarpal joint

- Articulation of distal radius and articular disk with proximal carpal bones

❖Osteology

- Of radius
  - Distal radius
- Of carpus
  - Proximal row of carpal bones (other than
  - pisiform), i.e. scaphoid, lunate and triquetrum


A
distal
middle
proximal
Phalanges
distal
proximal
Metacarpals
V
IV
III
II
I
Capitate
Hook of hamate
Hamate
Pisiform
Triquetrum
Lunate
Carpal bones
Trapezoid
Tubercle of trapezium
Trapezium
Tubercle of scaphoid
Scaphoid
Carpal bones
Wrist joint
Ulna
Radius

Ligaments

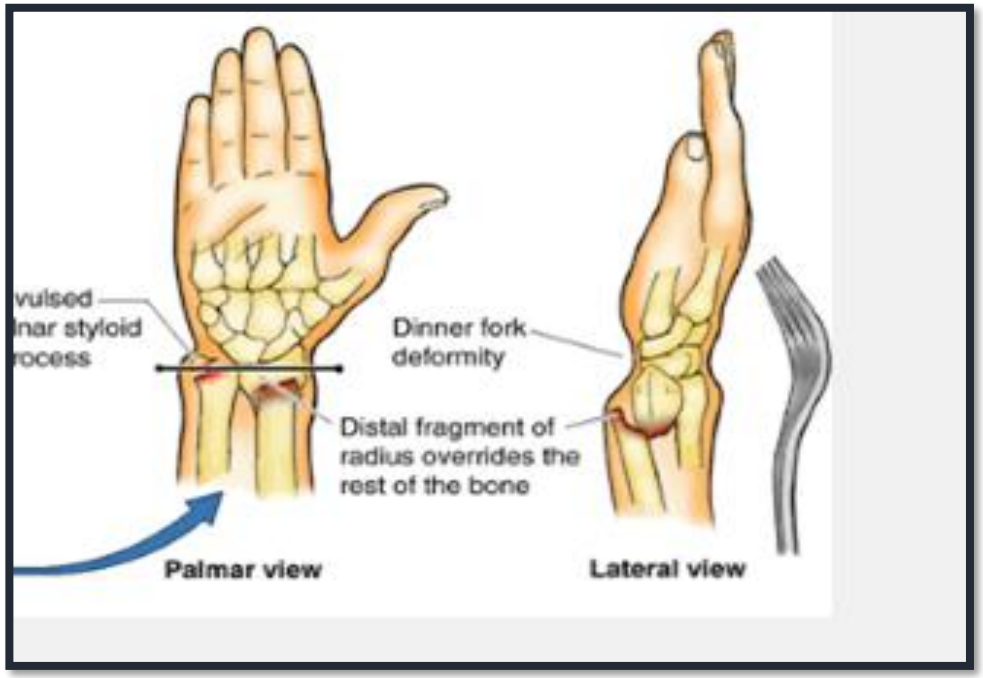
- Collateral ligaments
  - radial & ulnar
- Palmar radiocarpal
  - ensure hand follow radius during supination
- Dorsal radiocarpal
  - ensure hand follow radius during pronation

Movement at the wrist

- Flexion / extension
- Abduction / adduction
  - a.k.a radial deviation / ulnar deviation
  - abduction limited by radial styloid process

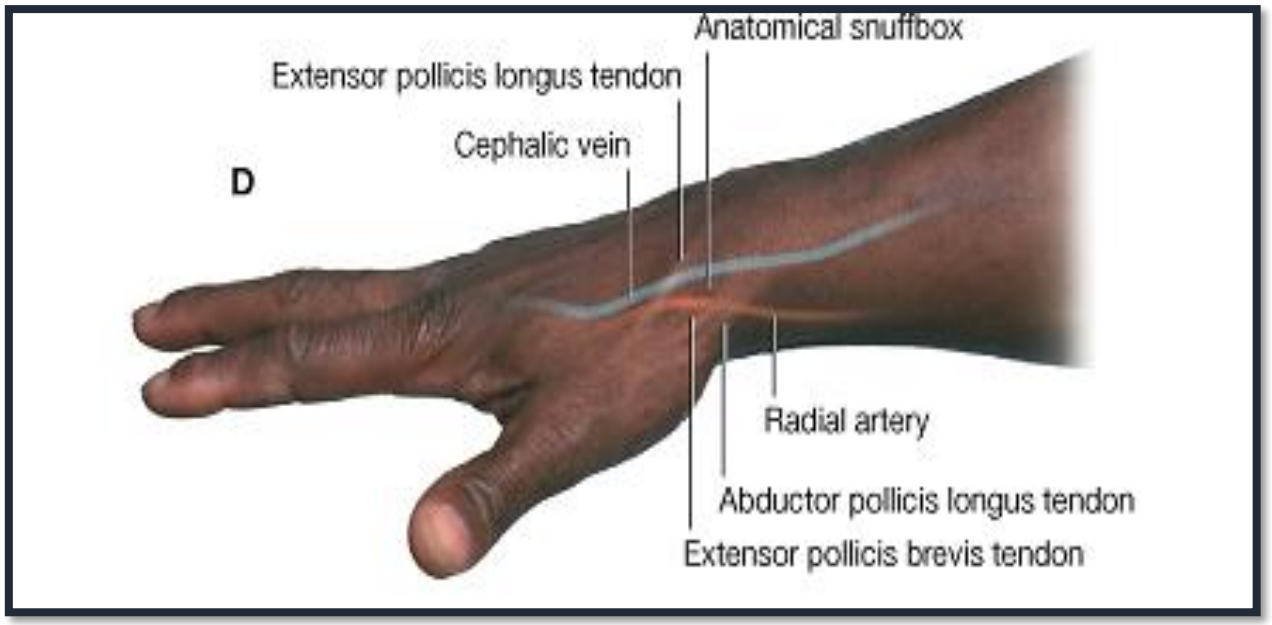
Fracture of distal radius

- Colles fracture
- Posterior displacement of distal fragment of radius



Fracture of scaphoid

- Fall onto outstretched hand
- Tenderness over anatomical snuffbox
- Avascular necrosis possible sequela



Self-study

- Review the osteology of the upper limb
- Review joint classification
  - Synovial joints
  - Fibrous joints
- Reading from relevant sections from “Clinically Oriented Anatomy” or equivalent