

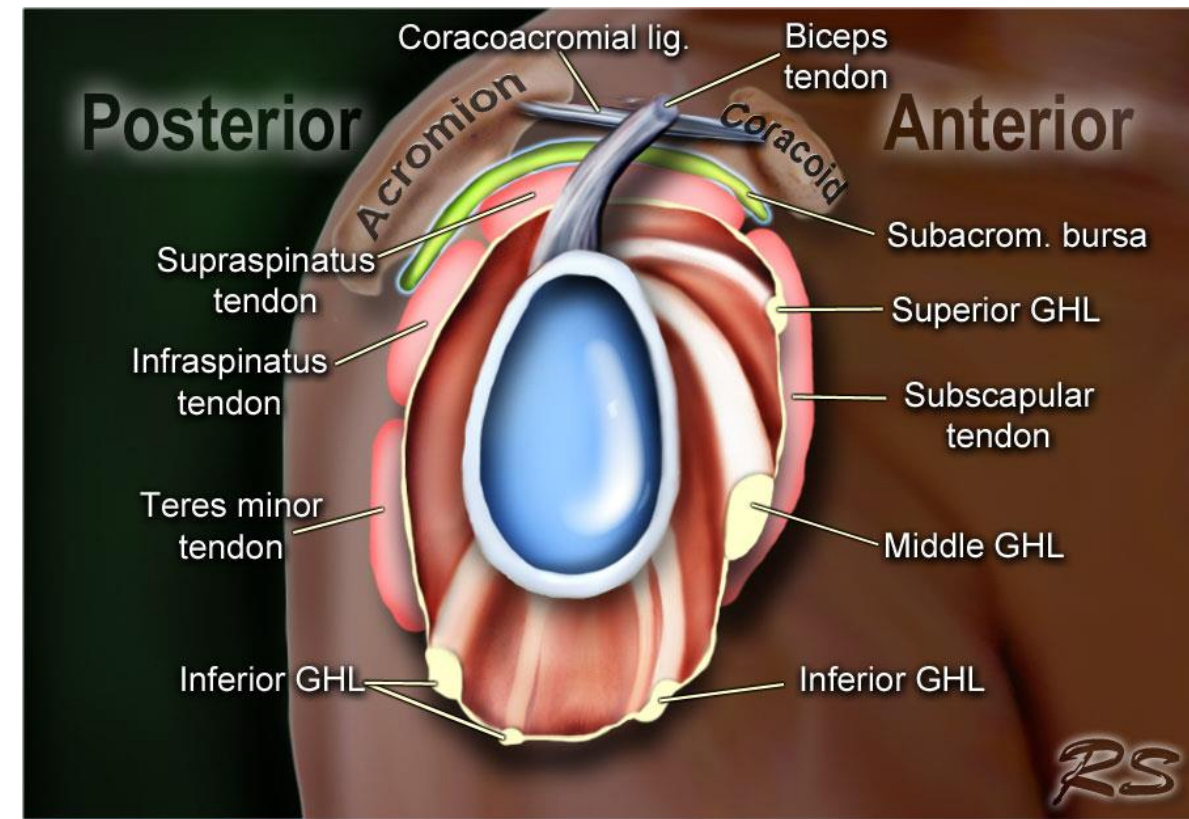
# Anatomy tutorial –Batch -28

Osteology and joints of upper limb

1. Briefly describe the structures involved in shoulder stabilization and anatomical basis of shoulder dislocation ?
2. Define Colles fracture and outline its complications?
3. List complications of proximal humerus fractures?
4. What are the complications of humerus mid shaft fracture?
5. What are the complications of supra condylar fracture?
6. What is the anatomical basis of avascular necrosis of scaphoid bone following untreated scaphoid fracture ?

1. Briefly describe the structures involved in shoulder stabilization and anatomical basis of shoulder dislocation

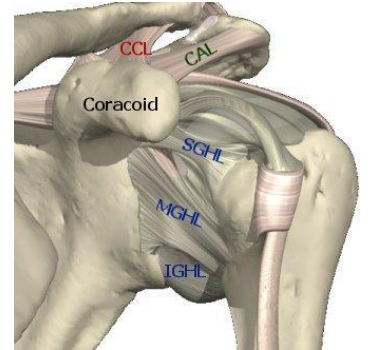
- Shoulder stability is maintained by
  - glenohumeral ligaments
  - joint capsule
  - rotator cuff muscles
  - negative intra-articular pressure
  - bony/cartilaginous anatomy.



- Main stabilizers of the shoulder joint are the ligaments and the capsule complex
- Inferior glenohumeral ligament is the most important and the one most commonly injured during an anterior shoulder dislocation.
- Injury may be a tear of the ligament/capsule off one of its bony attachments

- Tears in the rotator cuff muscles may also lead to shoulder instability

- Supraspinatus
- Infraspinatus
- Subscapularis
- Teres minor



- Large rotator cuff tears may lead to shoulder instability, even with intact glenohumeral ligaments.
- Instability of the shoulder can also occur from injury to the nerves that innervate shoulder muscles, specifically the axillary nerve
- Very mobile joint- Often placed in awkward positions during sports (specifically abduction and external rotation)
- If the force is strong enough, the athlete may tear the ligaments/tendons

- Approximately 95% of shoulder dislocations result from a major traumatic event, and 5% result from atraumatic cause

## Diagnosis

- Ex

### Anterior Dislocation –

- Thin patients - prominent humeral head can be felt anteriorly and the void can be seen posteriorly in the shoulder.

### Posterior Dislocation-

- Prominent head can be seen and palpated posteriorly. Posterior shoulder dislocations can be missed,



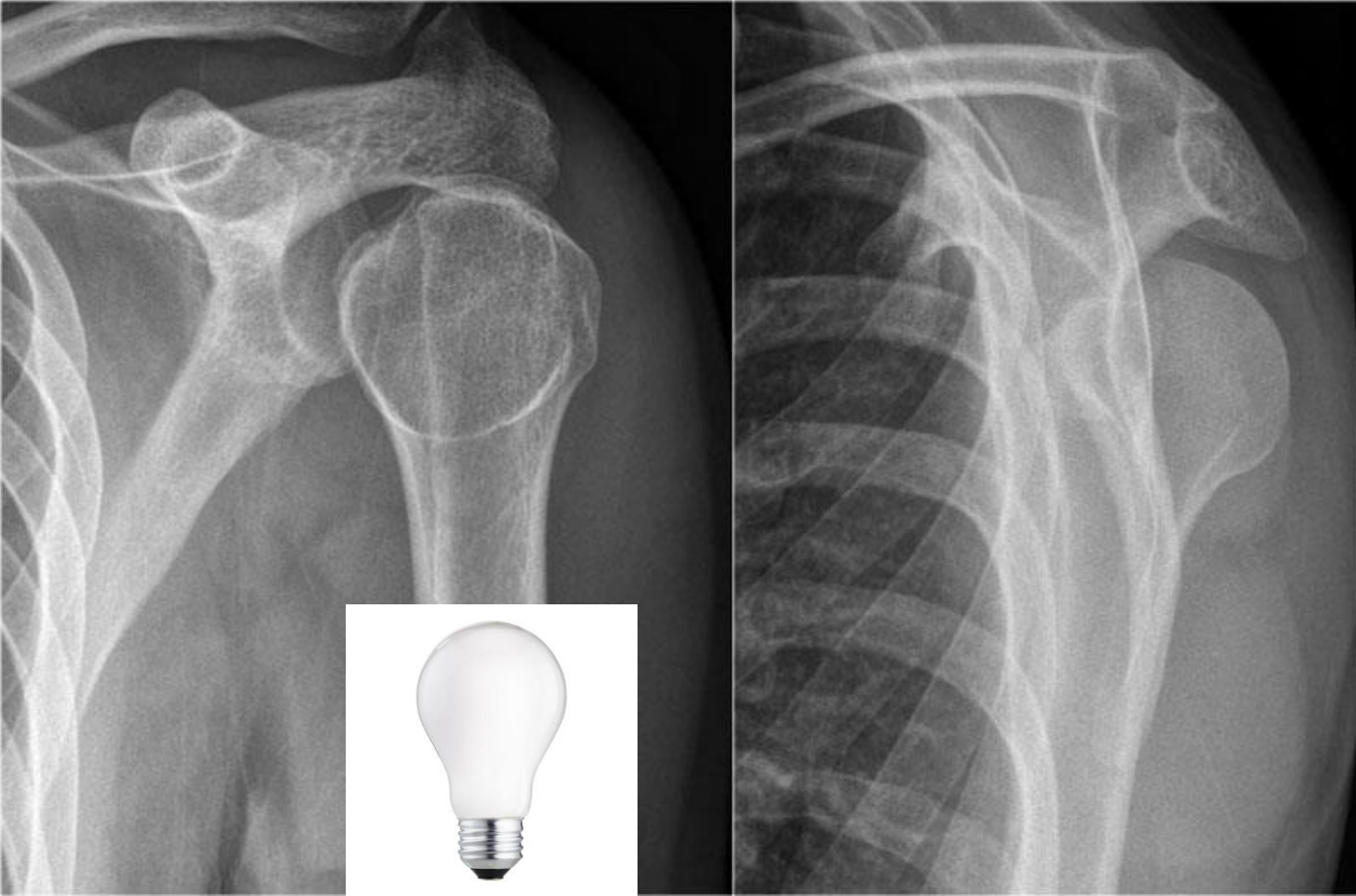
# Radiological diagnosis-Anterior

- Anteroposterior (AP) view of the shoulder and an axillary lateral view.



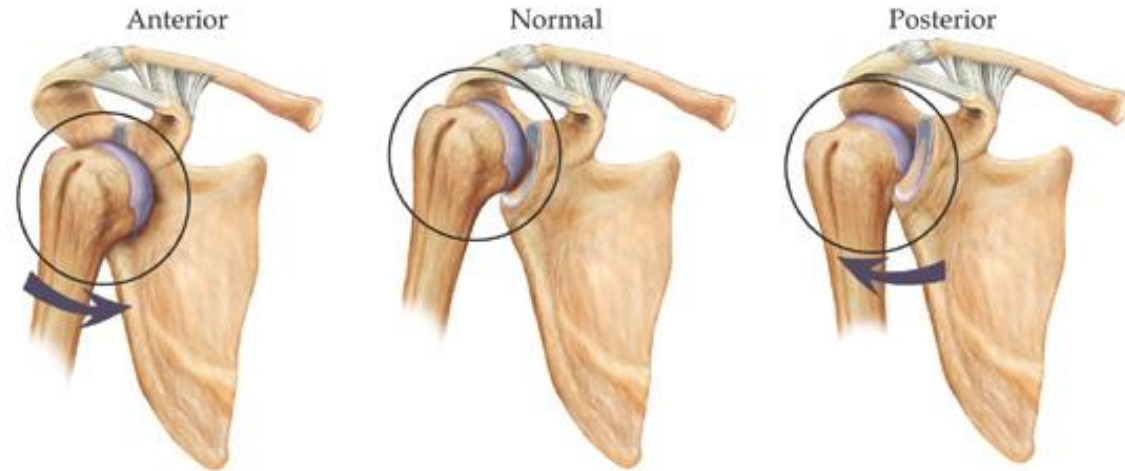


# Radiological diagnosis-Posterior



## Dislocation of the Humerus

The shoulder joint is the most frequently dislocated joint in the body. It can become dislocated when a strong force pulls the shoulder outward (abduction) or when extreme rotation of the joint causes the head of the humerus to pop out of the shoulder socket.



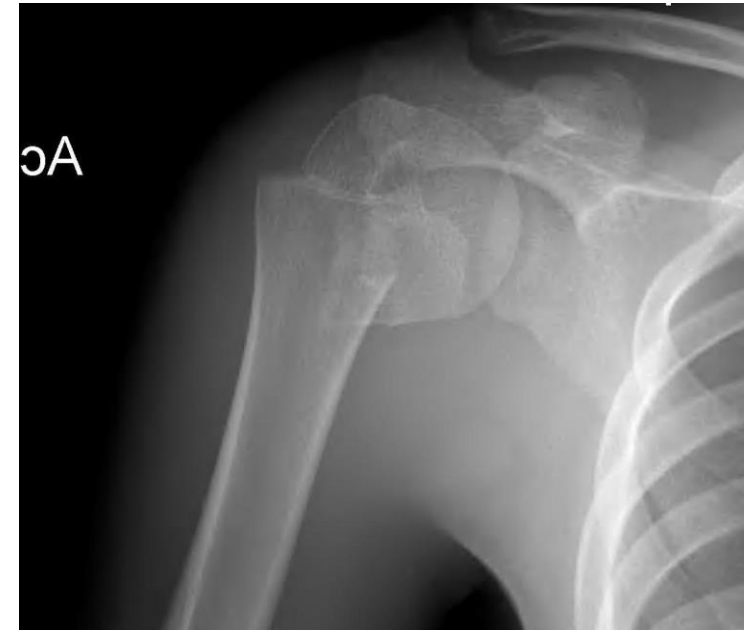
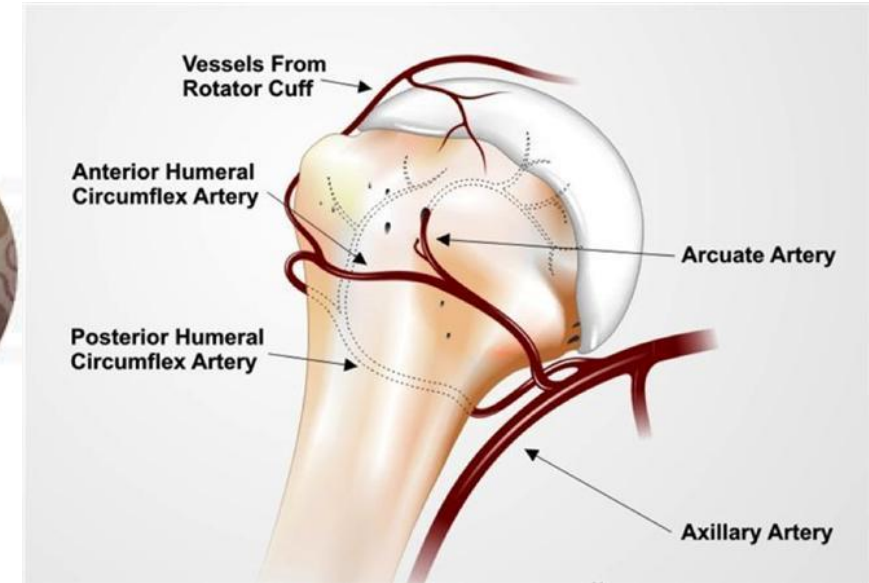
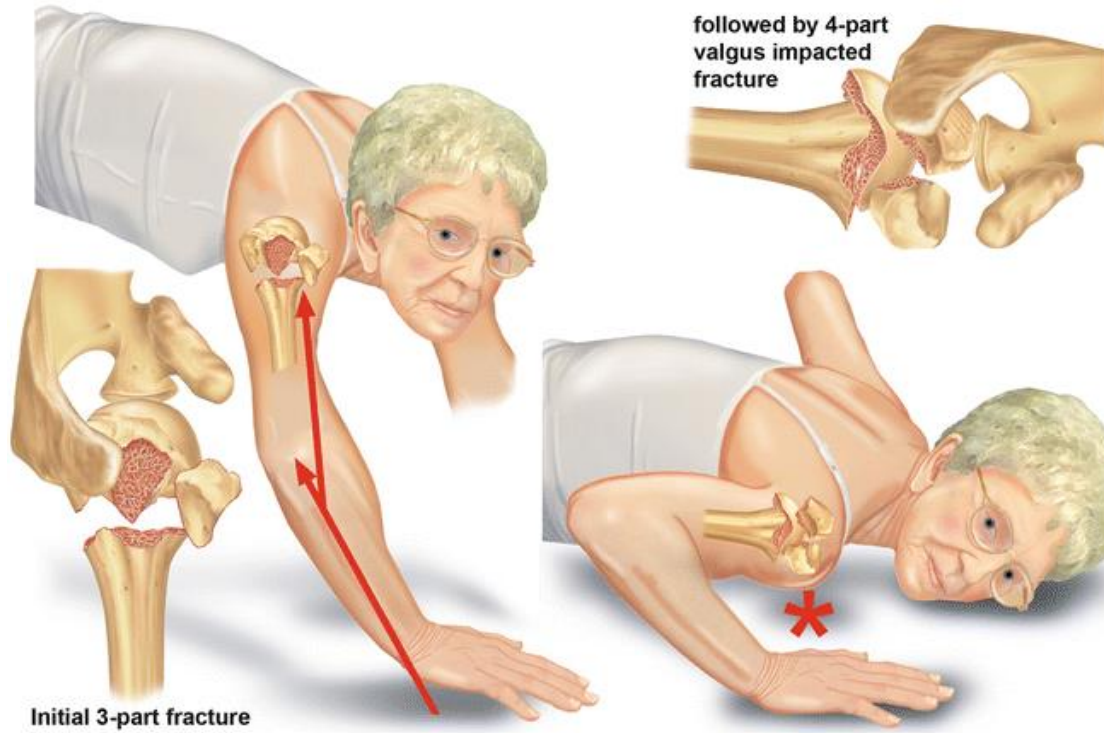
If good radiographs cannot be obtained, order a computed tomography (CT) scan.



# Complications:

- Recurrent shoulder dislocation( Most common Cx) <20Y -90% >40 Y-10-15%
- Anatomical bony lesions:
  - Bankart's lesion:
  - Hill-Sachs lesion:
- Nerve damage- 10- 25%
  - Most often traction related neuropraxias – Resolve spontaneously
  - Axillary or Mus cut nv
  - (Brachial plexus, radial and other nerve damage.)
- Axillary artery damage (more likely if brachial plexus injury is present - look for axillary haematoma, a cool limb and absent or reduced pulses).
- Associated fracture (30% of cases) - eg, humeral head, greater tuberosity, clavicle, acromion.
- Rotator cuff injury.

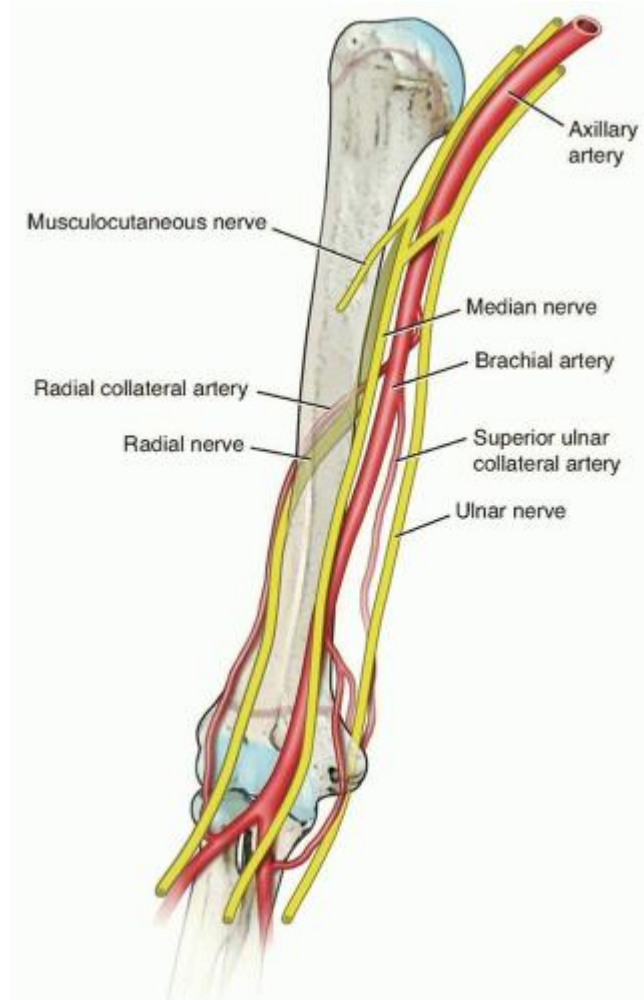
# List complications of proximal humerus fractures



# List complications of proximal humerus fractures

- **Avascular necrosis** -Damage to post and ant circumflex humeral art
- **Nerve injury**
  - Axillary nerve injury (up to 58%)
  - suprascapular nerve (up to 48%)
- Malunion
- Nonunion
  - usually with surgical neck and tuberosity fx
- Rotator cuff injuries and dysfunction
- Missed posterior dislocation
- Adhesive capsulitis
- Posttraumatic arthritis

# What are the complications of humerus mid shaft fracture



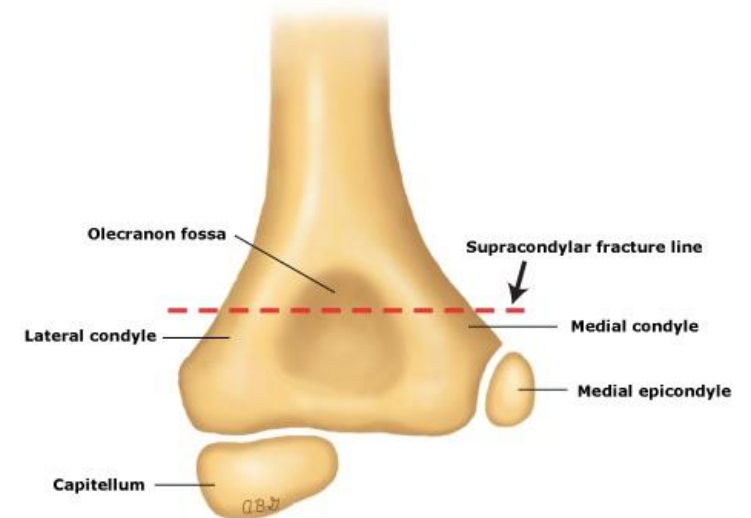
- 3-5% of all fractures
- bimodal age distribution
  - young patients with high-energy trauma
  - elderly, osteopenic patients with low-energy injuries

- Malunion
- Humeral shaft fx nonunion
- Radial nerve palsy
  - seen in 8-15% of closed fractures
  - increased incidence distal one-third fractures
- Neuropraxia most common injury in closed fractures
- 85-90% of improve with observation over 3 months
- Spontaneous recovery found at an average of 7 weeks, with full recovery at an average of 6 months



# What are the complications of supracondylar fractures?

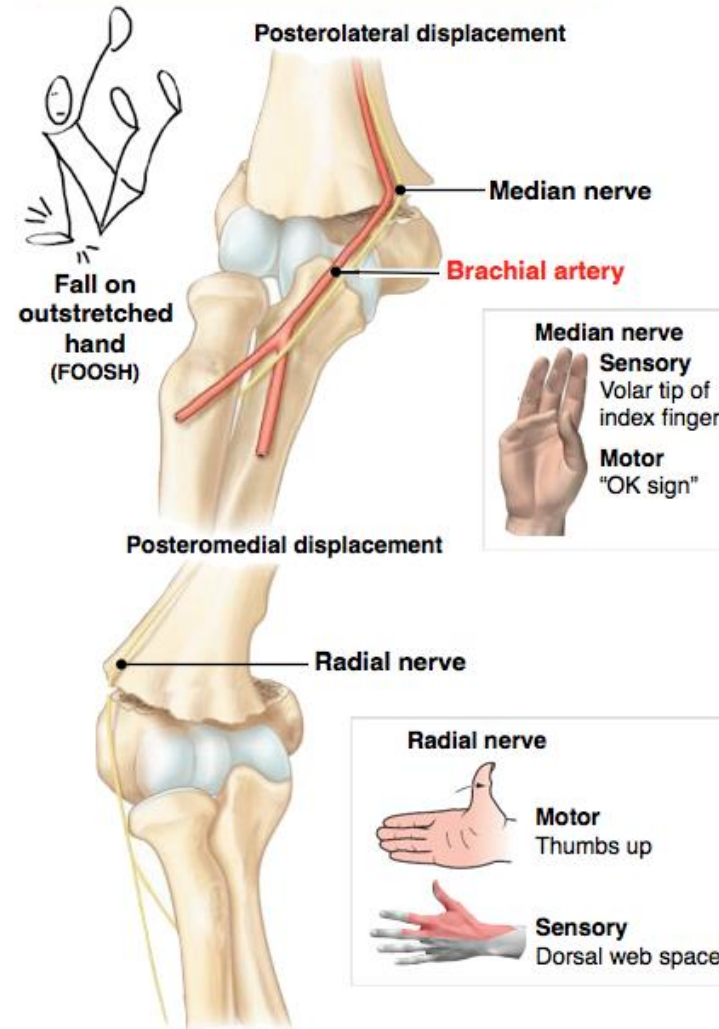
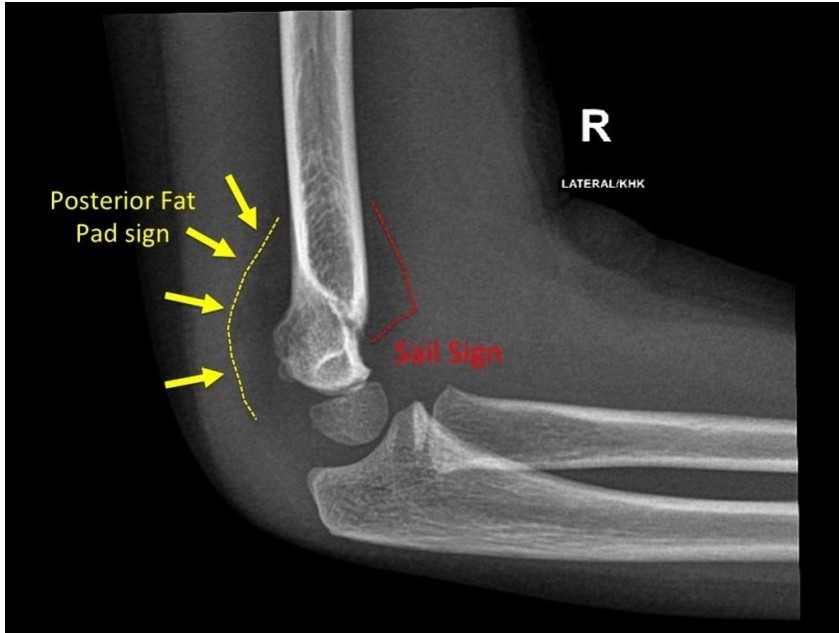
- **Fracture of the distal humerus** just above the elbow joint.
- Usually transverse or oblique and above the medial and lateral condyles and epicondyles
- Simple supracondylar fractures are typically seen in younger children
- uncommon in adults
- 90% are seen in children younger than 10 years of age  
peak age of 5-7 y.
- More commonly seen in boys
- These injuries are almost always due to accidental trauma, such as falling from a moderate height (bed/monkey-bars)





# Supracondylar Fracture

Most common pediatric elbow fractures



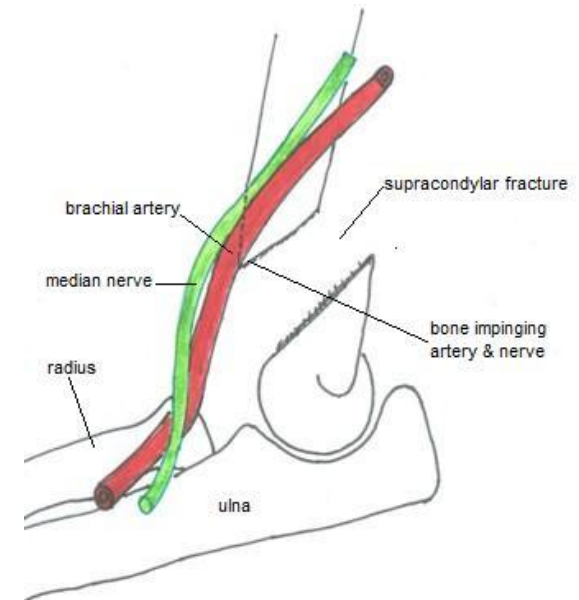
## Complications

- Volkmann ischemic contracture
- Neurologic deficit
- Cubitus varus deformity
- Fishtail deformity



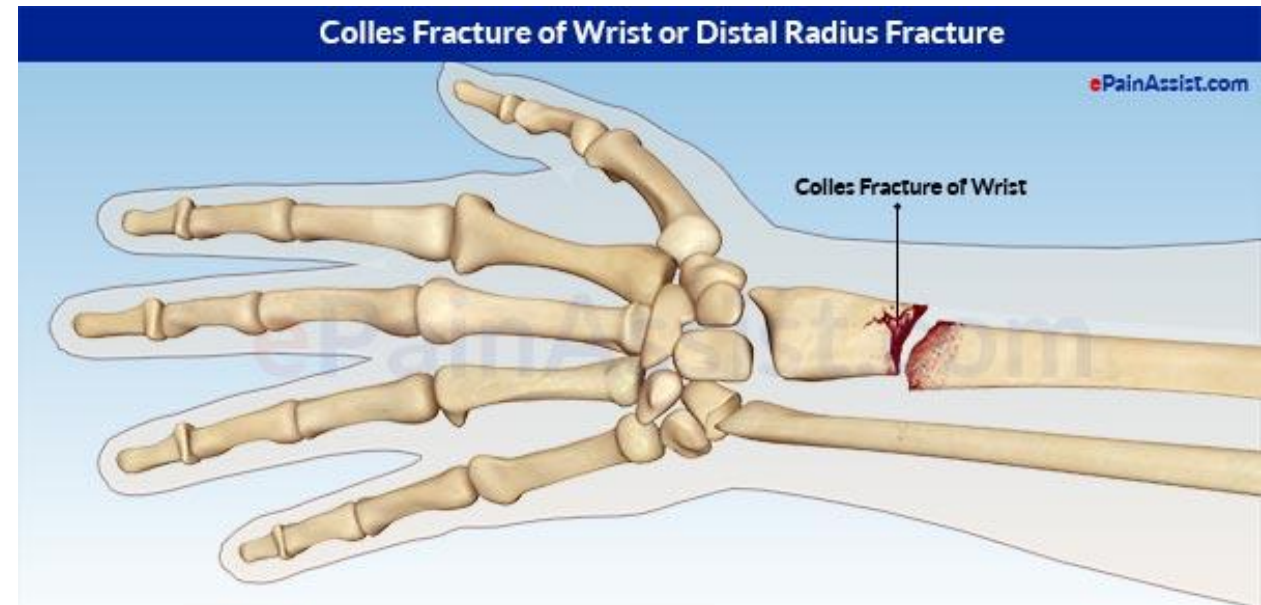
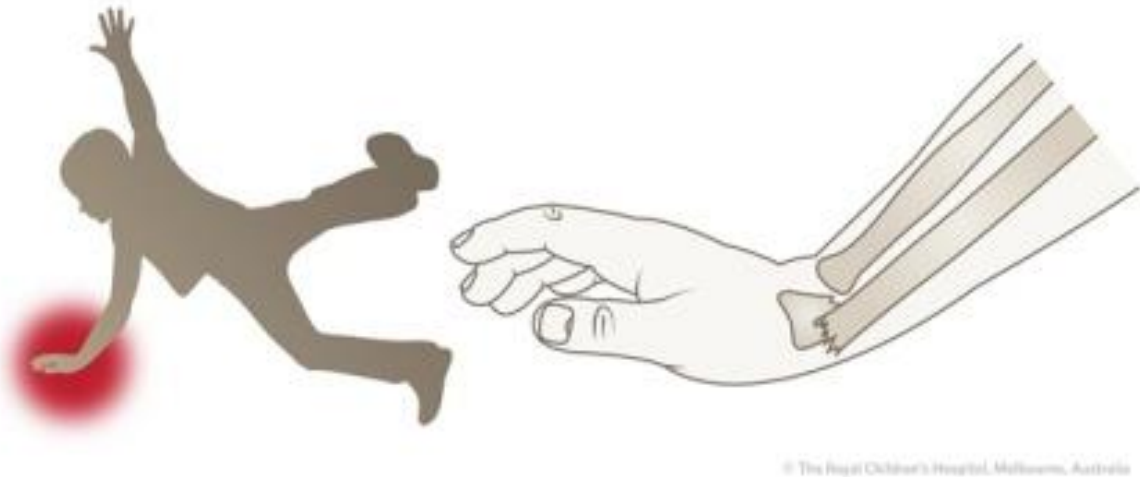
# Complications of supracondylar fracture

- Malunion
- Nerve palsy from injury
  - Usually resolve
  - Damage to the [ulnar nerve](#) (most common), [median nerve](#), or [radial nerve](#)
- Vascular Injury
  - due to damage/occlusion to the [brachial artery](#) and resulting in [volar compartment syndrome](#)
- Radial pulse absent on initial presentation in 7-12%
  - pulseless hand after closed reduction and pinning (3-4%)
  - Volkmann ischemic contracture
    - rare, but dreaded complication
- Ischaemic contracture ([Volkmann contracture](#))



## 2. Define colles fracture and outline its complications

- Fracture of distal radius with dorsal angulation of distal bony fragment and impaction
- Occur as the result of a fall onto an outstretched hand (FOOSH)
- Very common extra-articular fracture
- Bimodal distribution
  - younger patients - high energy
  - older patients - low energy / falls



# Colle's vs Smith's #



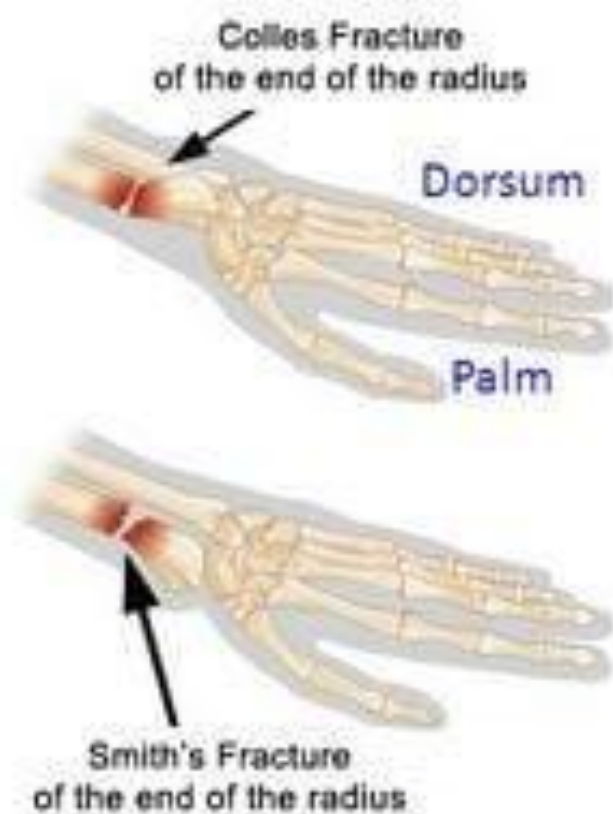
Distal Radius Fractured

Q – Dorsal angulation of the distal bone fragment...

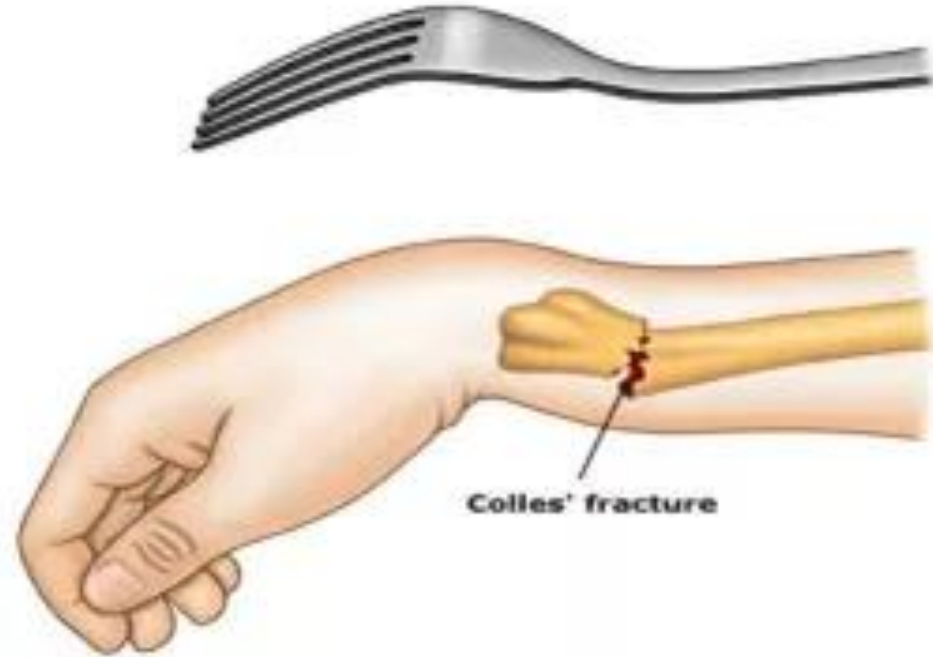
A – Colle's

Q – Palmar angulation of the distal bone fragment...

A – Smith's – More dangerous due to the neurovascular structures in this direction!



# Colles fracture –Dinner for deformity



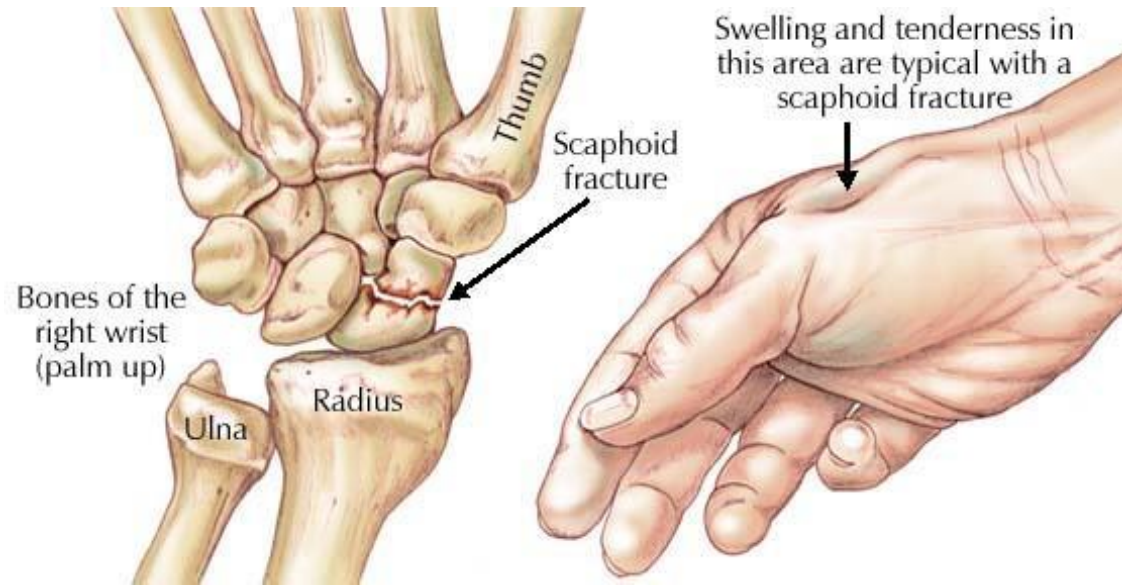
# Complications:

- Malunion resulting in dinner fork deformity
- Median nerve palsy and post-traumatic carpal tunnel syndrome
- Secondary osteoarthritis, more frequently seen in patients with intra-articular involvement
- EPL tendon tear.





# Scaphoid fracture



Need 5 views of x ray –Called “scaphoid view”

- Often missed fracture
- Classically there can be pain in [anatomical snuffbox](#)
- Falling on an outstretched hand
- [Avascular necrosis](#)
  - -most commonly involves the proximal portion as a result of arterial supply to the scaphoid entering distally

