# COMMON ADULT'S FRACTURES

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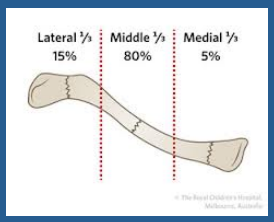
## OBJECTIVES

- CLAVICAL FRACTURE
- HUMERUS (PROXIMAL & SHAFT)
- BOTH BONE FOREARM FRACTURS
- DISTAL RADIUS FRACTURE
- HIP FRACTURE
- FEMUR SHAFT FRACTURE
- TIBIAL SHAFT FRACTURE
- ANKLE FRACTURE

## CLAVICLE FRACTURE

- Clavicle is S shape bone
- It is anchored to scapula via ACJ.
- It is anchored to trunk via SCJ
- Most of fracture occurs as result from fall onto shoulder.


- Fracture is classified into: proximal, middle and lateral third fractures.
- Most of fractures are of middle third.



- Clinical findings:
  - Check the skin
- Injury to brachial plexus and subclavian artery/ vein may be present
- Rarely, Pneumothorax can occur.

- X-rays:
  - AP chest
  - Clavicle special view.

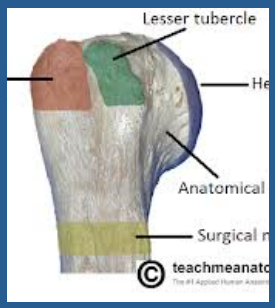
- Treatment:
  - Most of clavicle fractures are treated with a sling.

Few fractures should be treated surgically with open reduction and internal fixation

- Skin is tented
- Severe displacement:
  - 100% displacement
  - > 2 cm overlap

## PROXIMAL HUMERUS ANATOMY

- Proximal humerus has four anatomic parts:
  - Head
  - Greater tubrosity
  - Lesser tubrosity
  - Shaft
- Anatomic neck v.s surgical neck.




## PROXIMAL HUMERUS FRACTURE

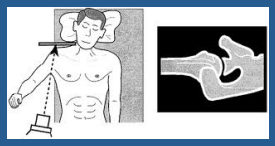
- In younger patients: violent trauma.
- In older patients: minor trauma.
- Most fractures are minimally displaced.

## PHYSICAL EXAM

- Expose the shoulder very well.
- Look for fracture signs
- Check the skin.
- Peripheral N/V exam.
- Axillary nerve: lateral skin patch.
- Examine cervical spine.

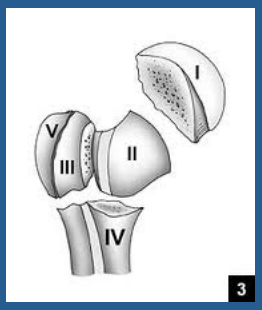
## X-rays

- AP
- Lateral
- Axillary views.
- CT scan for displaced fractures.

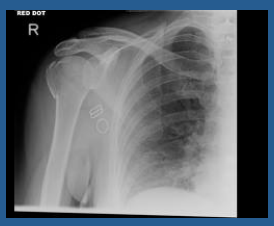


## X-rays

- Fracture is defined by the fragments displaced.
- Displacement: more than 1 cm.




## Normal AP shoulder




- If fracture is not displaced:
  - Treatment with sling and NWB of UE for 6-8 weeks.
  - Early ROM exercises after 2-4 weeks.
  - Normal function can be resumed after 3-4 months.

- If the fracture is displaced:
  - Surgery is indicated.
  - ORIF is indicated (plate and screws).
  - Shoulder hemi-arthroplasty is indicated in some cases.

## HUMERUS SHAFT FRACTURE

- It can be classified based on location of fracture. (proximal, middle and distal)
- Fracture symptoms.
- On exam:
  - Skin
  - N/V
  - Compartment
- Watch for radial nerve palsy.

## X-rays

- Almost all humerus shaft fracture can be treated non-surgically.
  - Close reduction
  - Functional brace x 4-6 weeks + NWB
  - Early ROM of elbow and shoulder.

- Surgery is indicated for specific conditions like:
  - Segmental fracture
  - Open fracture
  - Obese patient
  - Bilateral fracture
  - Floating elbow ( forearm and humerus)
- Surgery: ORIF with plate and screws.

## BOTH BONES FOREARM FRACTURE

- Forearm is complex with two mobile parallel bones.
- Radius and ulna articulate proximally and distally.
- It very unlikely to fracture only one bone without disruption of their articulation:
  - Both bone fracture
  - Monteggia fracture
  - Galeazzi fracture.

- Fractures are often from fall or direct blow.
- Both bones fracture:
  - Means radius and ulna are broken.
- Monteggia fracture:
  - Means proximal or middle third ulna shaft fracture with dislocation of radius proximally (at elbow)
- Galeazzi fracture:
  - Means distal third shaft radius fracture with disruption of DRUJ.

## Monteggia

## Galeazzi

## Galeazzi

## CLINICAL

- Symptoms and signs of fracture
- Check the skin
- Check the compartments of forearm
- Check Ulnar, median and radial nerve (PIN,AIN)
- Check vascularity: color, temperature, capillary refill and pulse.

## Investigations

- 2 orthogonal views
- CT scan if fracture extends into joint.

Frame A: AP forearm (including both joints)
Frame B: Lateral forearm (including both joints)
Image courtesy of Dr. Naveed Ahmad

## Treatment

- Both bone fracture:
  - Reduce and splint at ER/clinic (temporary)
  - Are treated almost always with ORIF: (plate and screws)
- Monteggia fracture:
  - ORIF ulna and close reduction of radial head
- Galeazzi fracture:
  - ORIF radius and close reduction of DRUJ.

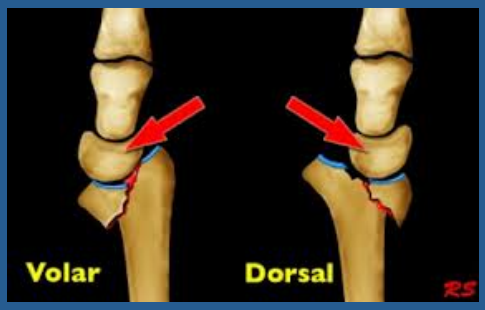
## DISTAL RADIUS FRACTURE

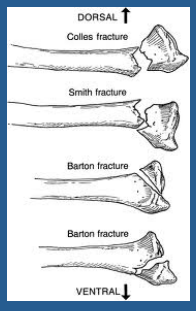
- Most common fracture of upper extremity.
- Most frequently are seen in older women.
- Young adults fractures are most commonly secondary to high energy trauma.


- Extra-articular:
  - Colles' Fracture: dorsal angulation, shortening and radial deviation
  - Smith's fracture: shortening and volar angulation. (reverse Colles')
- Intra-articular:
  - Barton's fracture: volar or dorsal
  - others

## Colles'

## Smith's



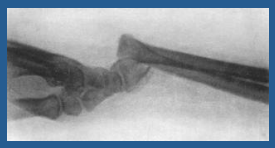




## Clinical

## X-rays

**Colles'**

**Smith's**



CT scan if fracture extends into joint

- Extra-articular fractures:
  - Close reduction and cast application.
  - Immobilization for 6-8 weeks.
  - ROM exercises after cast removal.
  - Surgery: if reduction is not accepted
- Intra-articular fracture:
  - a step more than 2 mm is an indication for surgery.
  - ORIF with plate and screws.

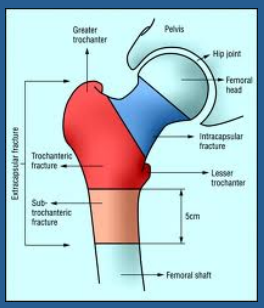
## LOWER EXTREMITY

## HIP FRACTURE

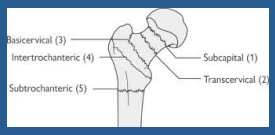
(Old Patients: > 60 yrs)

- It is the most common fracture of LL.
- It is associated with osteoporosis.
- Most common mechanism is a fall from standing height.
- Other causes of fall (stroke, MI) should be rolled out during clinical evaluation.
- It is a life changing event.

- Fractures can be classified
  - Intra-capsular
  - Extra-capsular
  - Displaced vs not displaced




- Intra-capsular:
  - Subcapital
  - Trans-cervical
- Extra-capsular:
  - Basicervical
  - Intertrochanteric
- AVN risk is higher with intra-capsular fracture.




## Clinical

- Full detailed history of mechanism of injury.
- R/O syncope, chest pain, weakness etc.
- A detailed systemic review.
- Deformity: Abduction, External rotation and shortening.
- Assess distal N/V status
- Avoid ROM if fracture is expected.

- Common associated injuries:
  1. Distal radius fracture
  2. Proximal humerus fracture
  3. Subdural hematoma
- R/O:
  - ACS
  - Stroke

- 3 views are needed:
  - AP pelvis
  - AP hip
  - Lateral hip
- MRI is sensitive for occult fracture.

## Treatment

- No close reduction is needed.
- No traction is needed.
- Patient needs surgery ideally within 48 hrs.
- The goal is to ambulate patient as soon as possible.
- Be sure that DVT prophylaxis is started.
- Be sure that patient will be evaluated for osteoporosis after discharge.

## Treatment

- If fracture is intra-capsular:
  - Displaced: hemiarthroplasty
  - Not displaced: percutaneous in situ Screws fixation.

- If fracture is Extra-capsular:
  - Stable: Close reduction and DHS
  - Unstable: Intra-medullary devise

- Fracture instabilities signs:
  1. Large LT fragment
  2. Extension to subtrochantric region
  3. 4 parts fracture.

**DHS**


**IM nail**

## Complications

- Nonunion
  - 2% ( IT fractures)
  - 5% (non displaced neck fracture)
  - 30% (displaced neck fracture)
- AVN (femoral neck fracture) :
  - 10% (non displaced)
  - 30% (displaced)
- Death: early 4 %. At 1 year: 20-40 %
- VTE

## Femoral Neck FRACTURE (Young Patients)

- It is a completely different entity from similar fractures in elders (>60 years).
- High energy mechanism.
- ATLS protocol.
- 2.5%: associated femoral shaft fracture. (long femur X-ray)
- Patient should be taken to operative room for ORIF within 6 hours.
- Nonunion: 30% (most common complication)
- AVN: 25-30%

## Femur Shaft Fracture

- Most common:
  - high energy mechanisms
  - Young patients (male, < 30 years).
  - ATLS protocol.
- Less common:
  - low energy mechanism (torsional forces)
  - Old patients.
  - Spiral type fracture.
- R/O pathological fracture in Young + low energy mechanisms.

- Associated musculoskeletal injuries:
  - Ipsilateral femoral neck fracture (10%. Missed in 30-50%)
  - Knee ligaments injuries: 50%
  - Meniscal tear 30%
  - Floating knee injury: less common
  - Vascular/nerve injuries: rare
  - Contralateral femur shaft fracture (worse prognosis among above)

- Associated non-MS injuries:
  - Fat embolism
  - ARDS
  - Head injuries.
  - Abdominal injuries

## Clinical

- ATLS
- Fracture symptoms and signs
- Skin integrity
- N/V exam.
- Compartment assessment
- Knee swelling or ecchymosis.

## Investigations

- AP and lateral views femur
- 15° Internal rotation AP view ipsilateral hip.
- Lateral view ipsilateral view
- If femoral neck fracture is suspected: CT scan hip.
- Knee AP and lateral views

## Management

- ATLS: ABC resuscitation.
- Skeletal traction (proximal tibial pin)
- Early surgical fixation:
  - Proven to reduce Pulmonary complications.
  - Must be within 24 hrs (ideally < 6 hrs)
  - If patient is unstable: External fixation.
  - If Patient is stable IM nailing

## FEMUR SHAFT FRACTURE

## Complications

- Malunion:
  - ➢most common.
  - ➢More common with proximal fracture (subtrochantric fracture)
  - ➢Rotational, angulation and shortening
- Nonunion: rare
- Infection.
- VTE.

## TIBIA SHAFT FRACTURE

- It is a subcutaneous bone ( high suspicion for skin injury.
- Most common large long bone fracture.
- It can be secondary to low or high energy mechanism.
- It carries the highest risk of compartment syndrome.
- 20 % of tibial fracture can be associated with ankle intra-articular fracture.

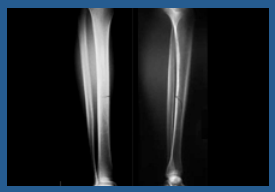
- It can be classified based on location and morphology:
  - – Proximal third
  - – Middle third
  - – Distal third
- Displaced vs. Non-displaced:

- Clinical:
  - Skin integrity.
  - Assess compartments of leg : needs serial exam.
  - Serial N/V exam.

## INVESTIGATIONS

- X-rays:
  - AP and lateral tib/fib .
  - AP/lateral knee
  - AP/ Lateral ankle
- CT SCAN IF FRACTURE EXTENDS INTO JOINTS ABOVE OR BELOW.

NOT DISPLACED



DISPLACED

## MANAGEMENT

- Indications for non-surgical treatment:
  - NO displacement : < 10° angulation on AP/lateral x rays.
  - < 1 cm shortening.
  - Not comminuted.
- C/I:
  - Displacement.
  - Open fracture.
  - Compartment syndrome.
  - Floating knee.

## MANAGEMENT

- Close reduction and cast immobilization:
  - Above knee back slab and U slab if surgical treatment is chosen.
  - Above knee full cast if non-surgical treatment is chosen: it must be bivalved to minimized compartment syndrome.
  - Always provide patient with Compartment Syndrome checklist if patient is discharged home with cast.
  - NWB for 8 weeks with cast immobilization.

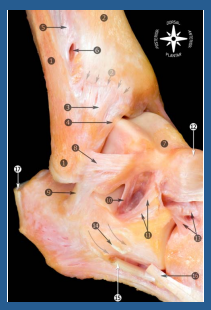
- Surgical treatment:
  - Most common modality of treatment.
  - Most commonly IM nail fixation.

## COMPLICATIONS

- Non-union: most common complication.
- Delayed union
- Infection: open fracture
- DVT/PE

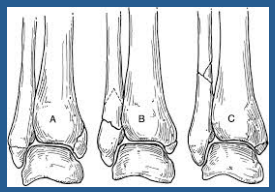
## ANKLE FRACTURE

- Ankle anatomy:
  - Medial and lateral malleoli, distal tibia and talus.
  - Highly congruent joint
  - Fibula is held to distal tibia by syndosmotic ligament.
  - Medial malleolus is held to talus by deltoid ligament.
  - Lateral malleolus is held to talus by LCL.



- Low energy (torsional): malleoli fracture.
- Classification:
  - Stable v.s Unstable fracture:
    - lateral displacement of talus
  - Medial, lateral or bimalleolar fracture
  - Lateral malleolus: Weber A, B, C

## ANKLE FRACTURE

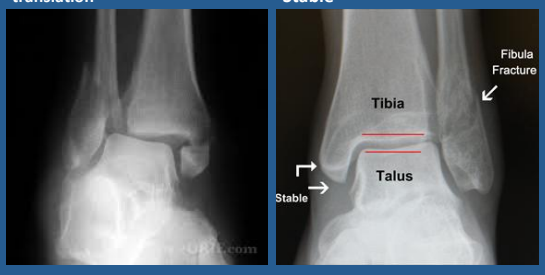




## CLINICAL

- Look for Fracture symptoms and signs.
- Assess medial joint ecchymosis or tenderness to assess medial malleolus and deltoid ligament integrity.
- Assess N/V status (before and after reduction).

- X-rays:
  - AP
  - Lateral
  - Mortise view
  - Long leg x-rays: if only medial malleolus is broken.
- CT SCAN IF FRACTURE EXTENDS TO ARTICULAR DISTAL TIBIA SURFACE.

- Intact medial malleolus:
  - Weber A:
    - splint + NWB X 6 weeks.
    - Early ROM.
  - Weber B/C:
    - If medial joint line widen (unstable): ORIF.
    - If not: Call Orthopedic for stress film x-rays.
  - If both malleoli are broken:
    - ORIF


**THANKS**