Fractures of the upper limb

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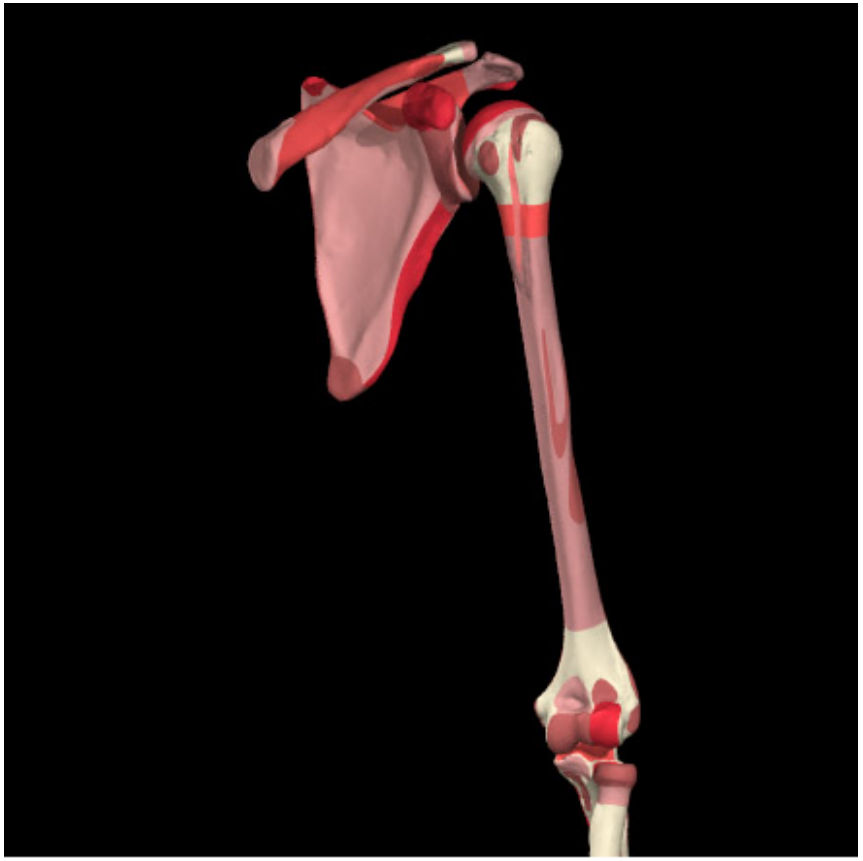
The upper limb

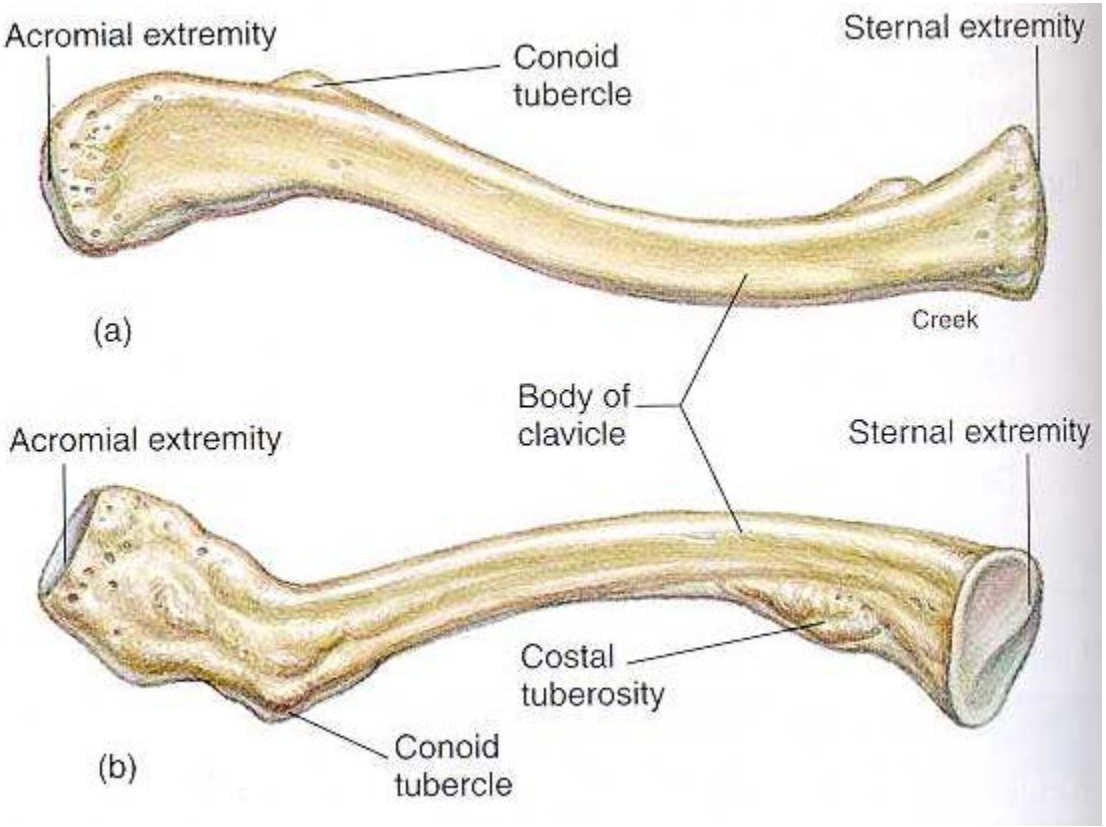


Interactive Shoulder © 2000 Primal Pictures Ltd.

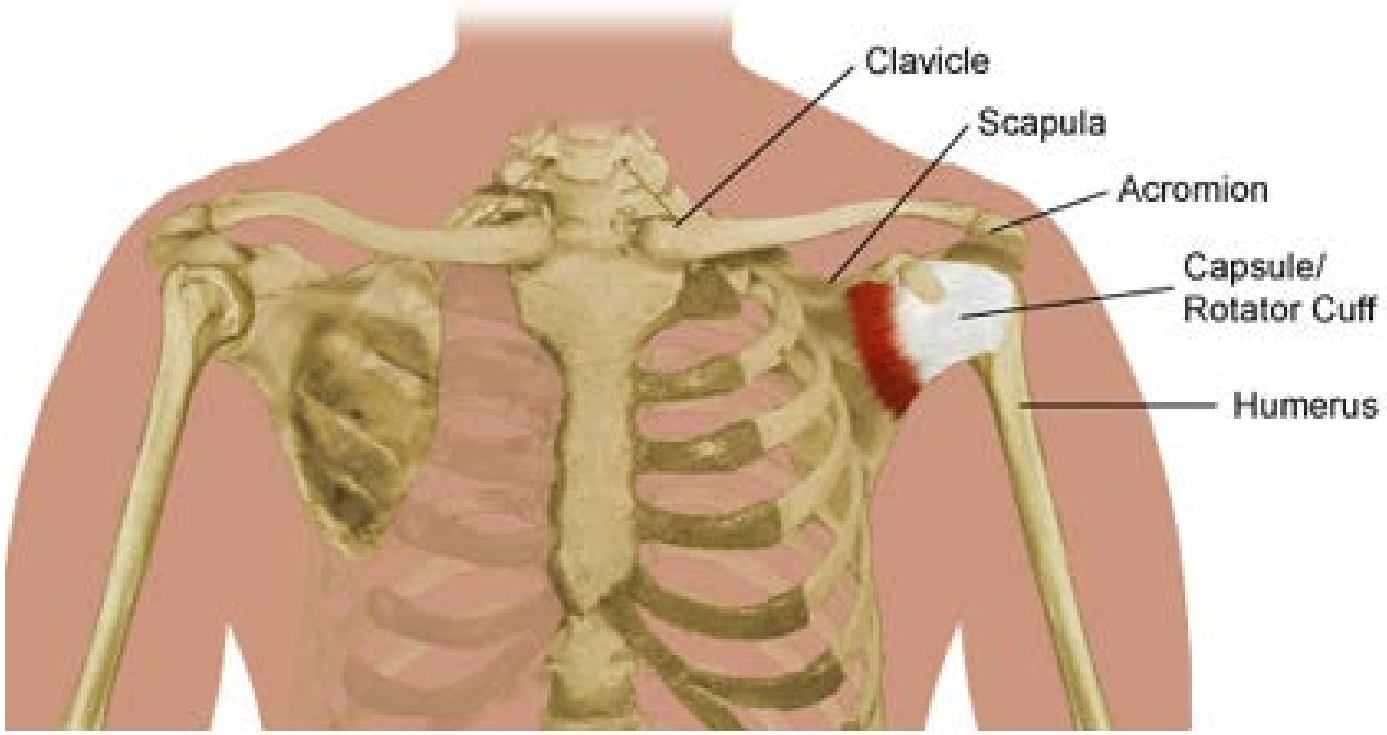
The Clavicle

- Subcutaneous throughout its length
- Close to important neurovascular structures
- Commonly fractured
- Middle third most commonly involved (70-75%)
- Followed by lateral third (20-23%)
- Medial third fracture is rare about (3-5%)

The Clavicle



The Clavicle



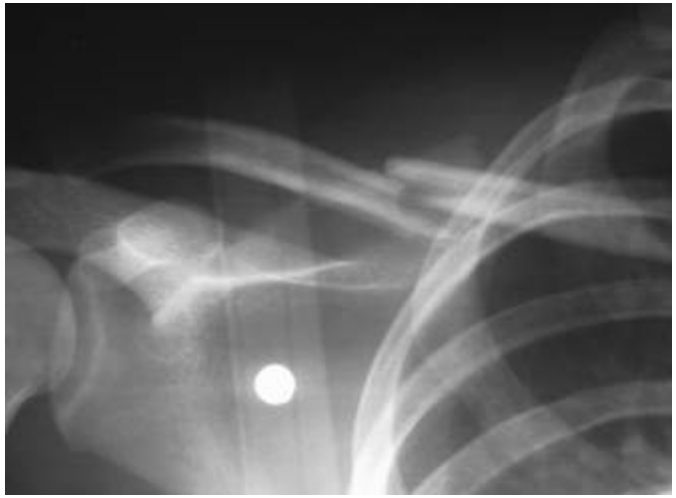
Clavicular Fractures Mechanisms

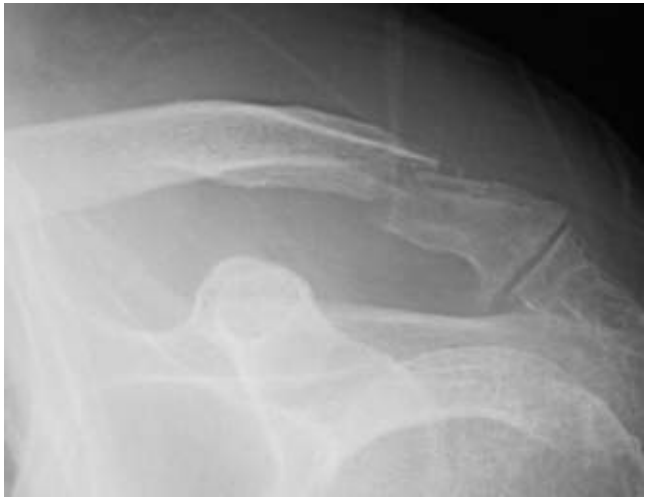
- Fall on outstretched arm
- Direct Trauma

Clavicular Fractures
Clinical features

- Sudden pain
- Tenderness(direct /indirect)
- Loss of shoulder function
- Deformity(rapid swelling/bony deviation)
- Head tilt towards side of fracture
- Crepitus

Clavicular Fractures
Radiological appearance

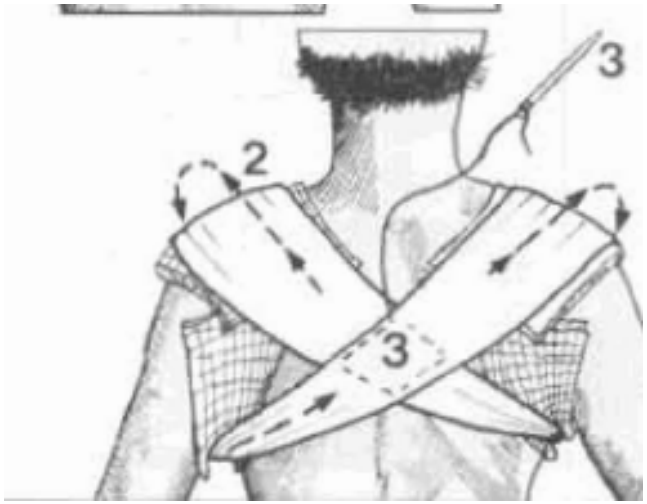




Clavicular Fractures Treatment

- Figure of eight bandage
- Broad arm sling
- ORIF with plates and screws (Occasionally indicated)

- Figure of eight bandage

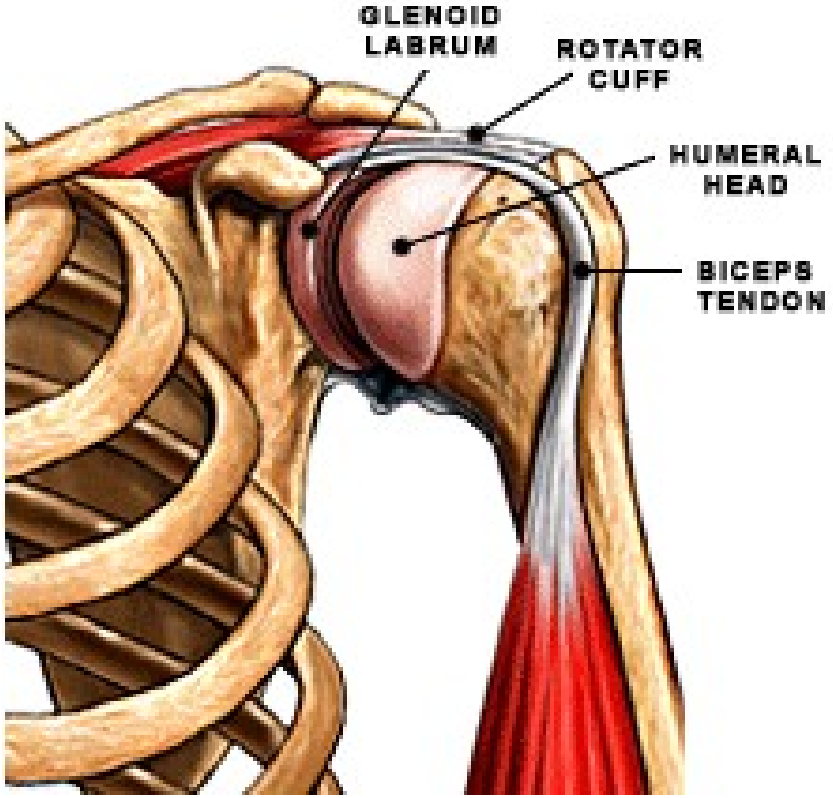


Broad Arm Sling

Clavicular Fractures: Complications

- Malunion is very common
- Nonunion
- Vascular complications e.g., aneurysm of the subclavian artery
- Nerve injuries
- Refractures

The shoulder



Shoulder Dislocation

- The shoulder is the most mobile joint in the body
- Stability is mainly dependent on the joint ligaments, tendons and capsule
- It is one of the most commonly dislocated joint in the body

Shoulder Dislocation

Classified based on the position of the head of the humerus in relation to the glenoid

Anterior ….. 98%

Posterior …..2%

Inferior (Luxatio erectio)…. Rare

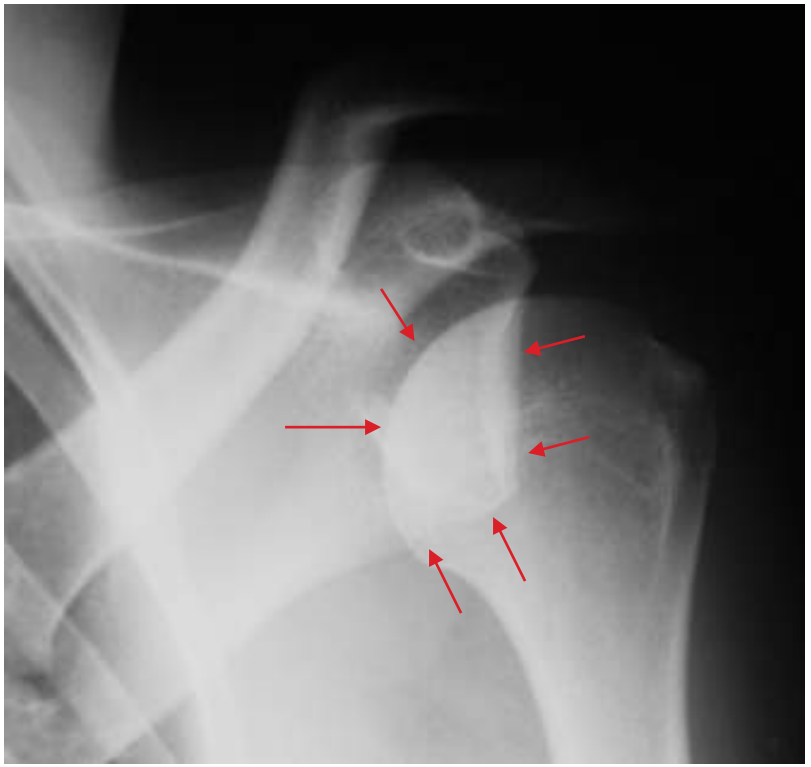
Shoulder Dislocation

Normal shoulder on X-ray

Shoulder Dislocation

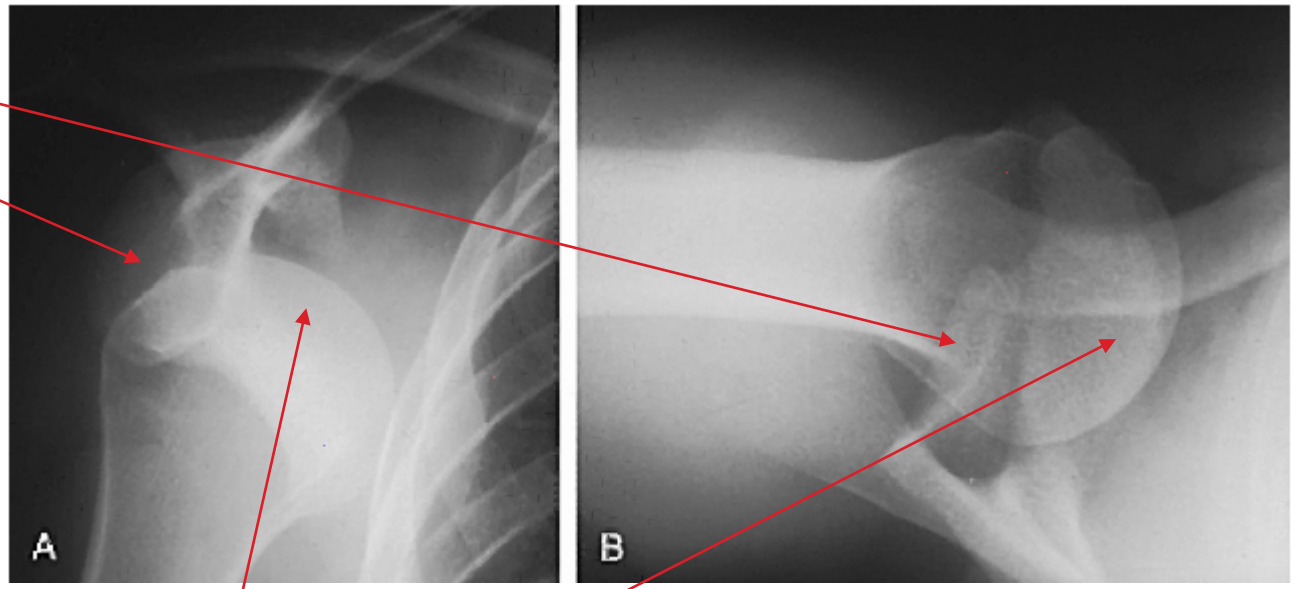
Anterior Dislocation

Note the superposition of the humeral head on the glenoid (The head is anterior to the glenoid)



Shoulder Dislocation

Anterior Dislocation (contd)



Posterior Dislocations

- Makes up5% of shoulder dislocations
- 60% are missed initially

Why?

Because:

- The correct views were not done!
- AP views are not very good for Posterior dislocation
- ALWAYS get a LATERALLY or an AXILLARY view -or both!

Luxatio Erecta

- A subtype of Anterior Dislocation with a higher incidence of neurovascular injury.
- Dramatic presentation: Arm is raised over head and locked! (Nazi salute position?)

Shoulder dislocations Causes

As a result of significant trauma

- Athletic injuries
- Falls
- Road Traffic Injuries

Usually due to indirect forces

- Various combinations of abduction, extension and external rotation leads to Anterior dislocations
- Posterior dislocations are due to hyper-abduction forces

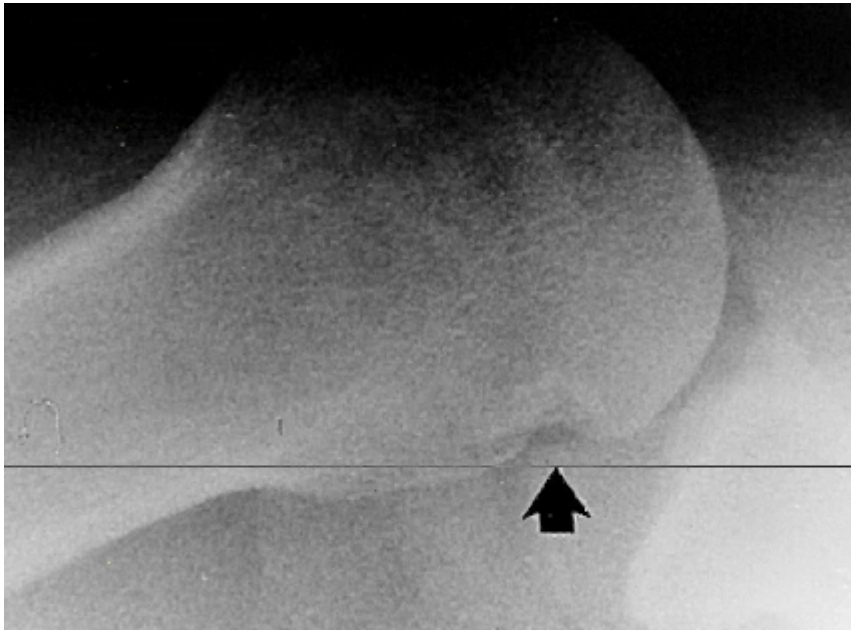
Fall

Shoulder dislocations Associated injuries

- Fracture of the greater tuberosity of the humerus
- Fracture of the glenoid rim
- Rotator cuff tears
- Axillary nerve injury
- Coracoid rocess fractures

Shoulder dislocations: Associated injuries

Hill-Sachs Fracture: Depression Fracture of the posteriorlateral part of the humeral head



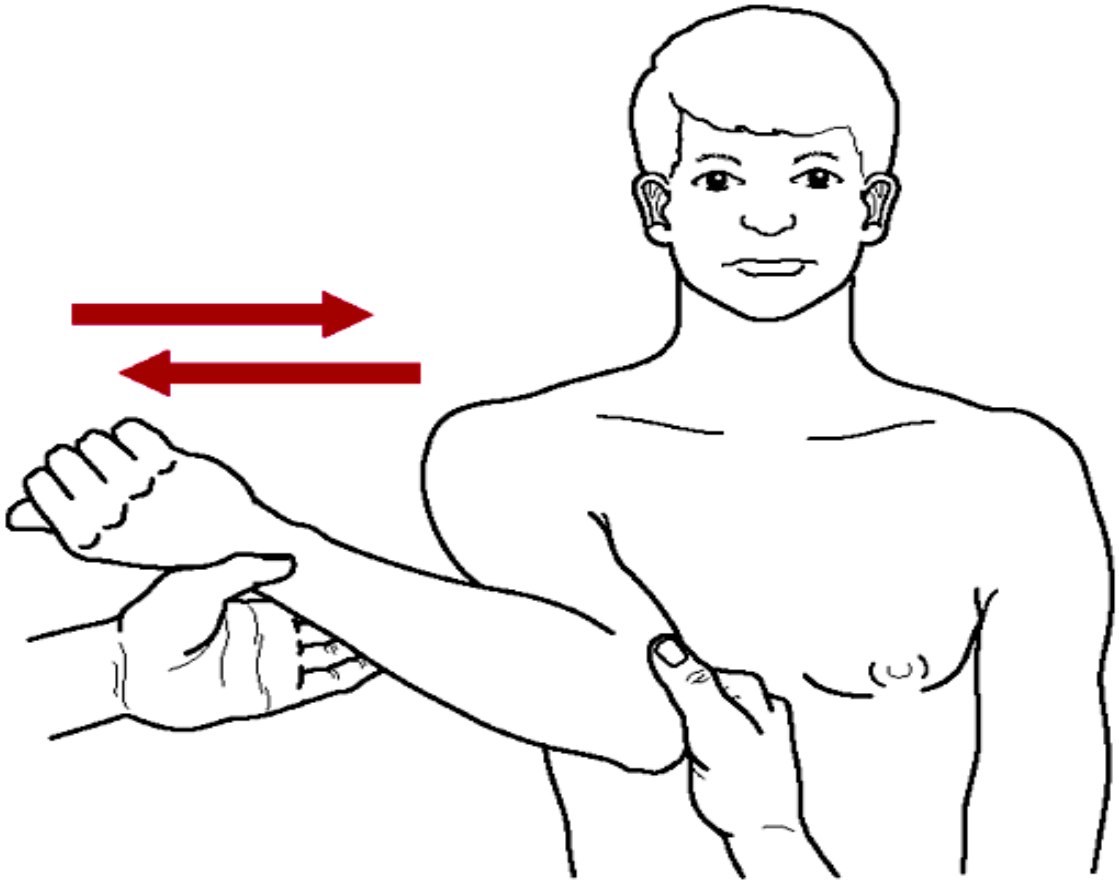
Shoulder Dislocation
Clinical features

- Pain
- Loss of function: Patient usually supports the injured limb with the other
- Marked deformity
- Swelling of the shoulder region
- Tenderness
- Flattened deltoid

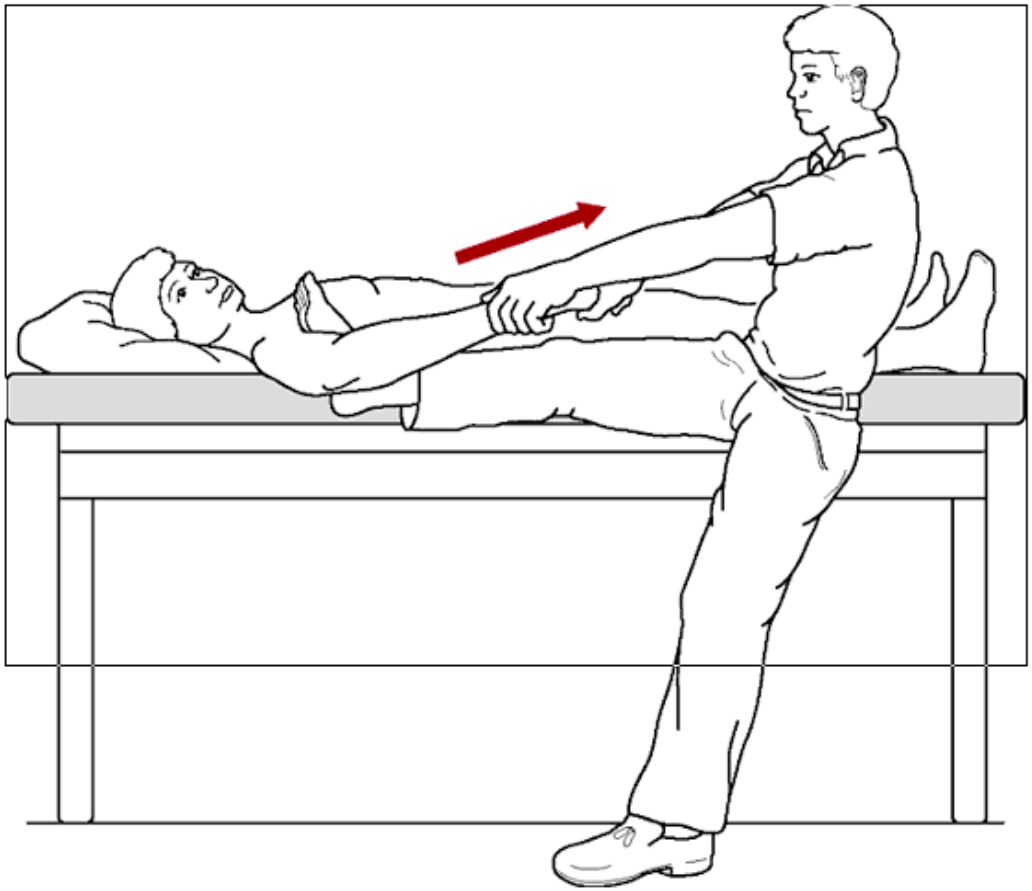
Shoulder Dislocation Treatment

- An emergency!
- Reduction under anesthesia
- Followed by immobilization in a Velpeau strapping.

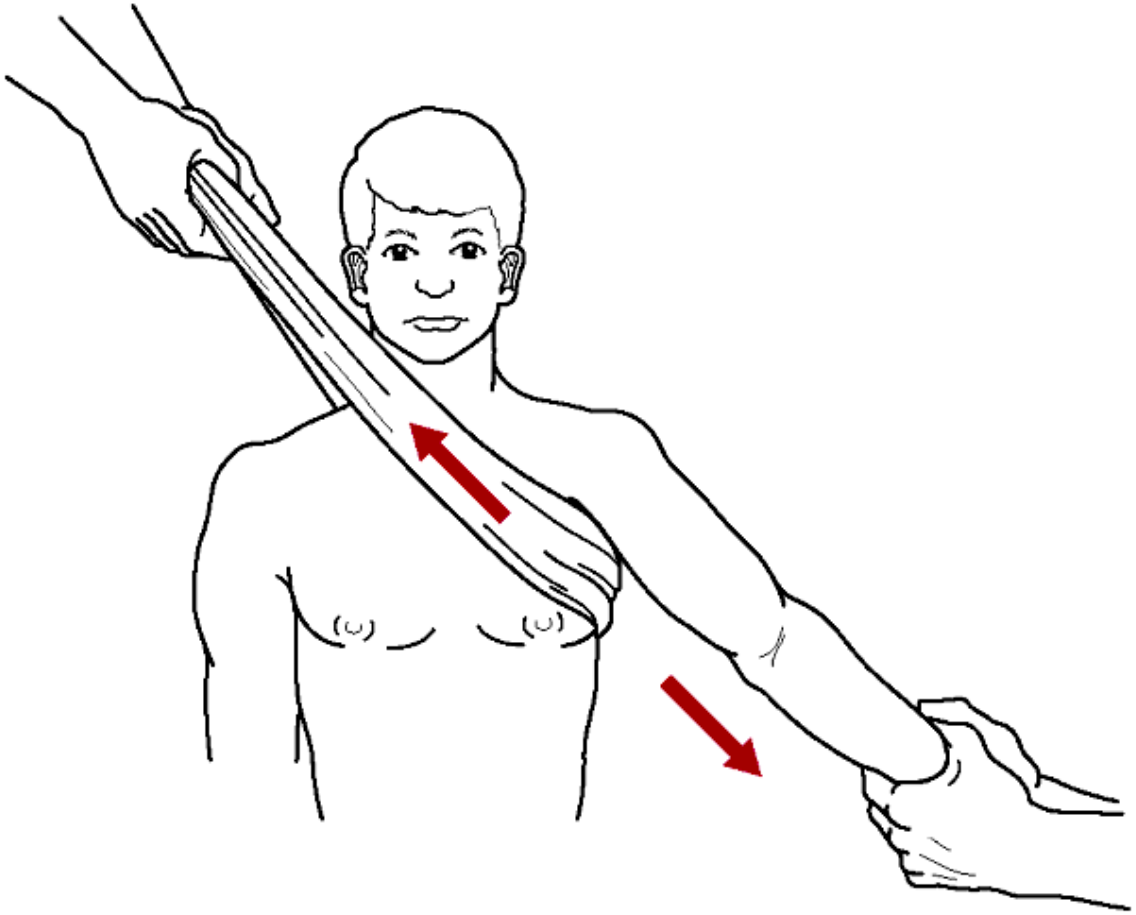
Shoulder Dislocation
Kocher's method



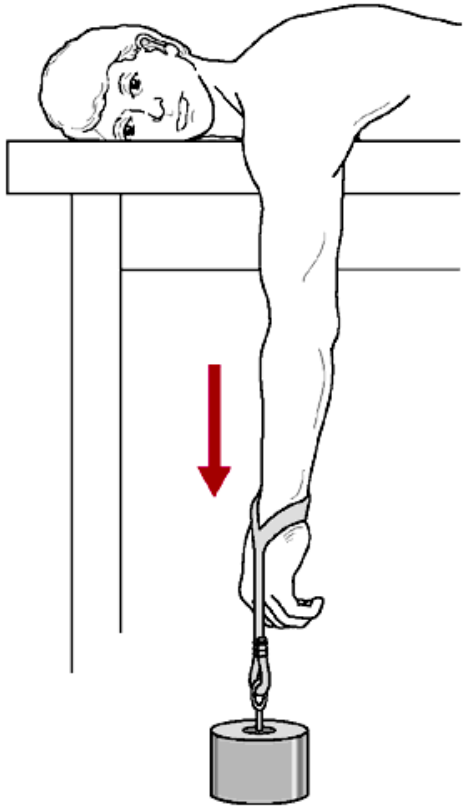
Shoulder Dislocation Hippocratic method



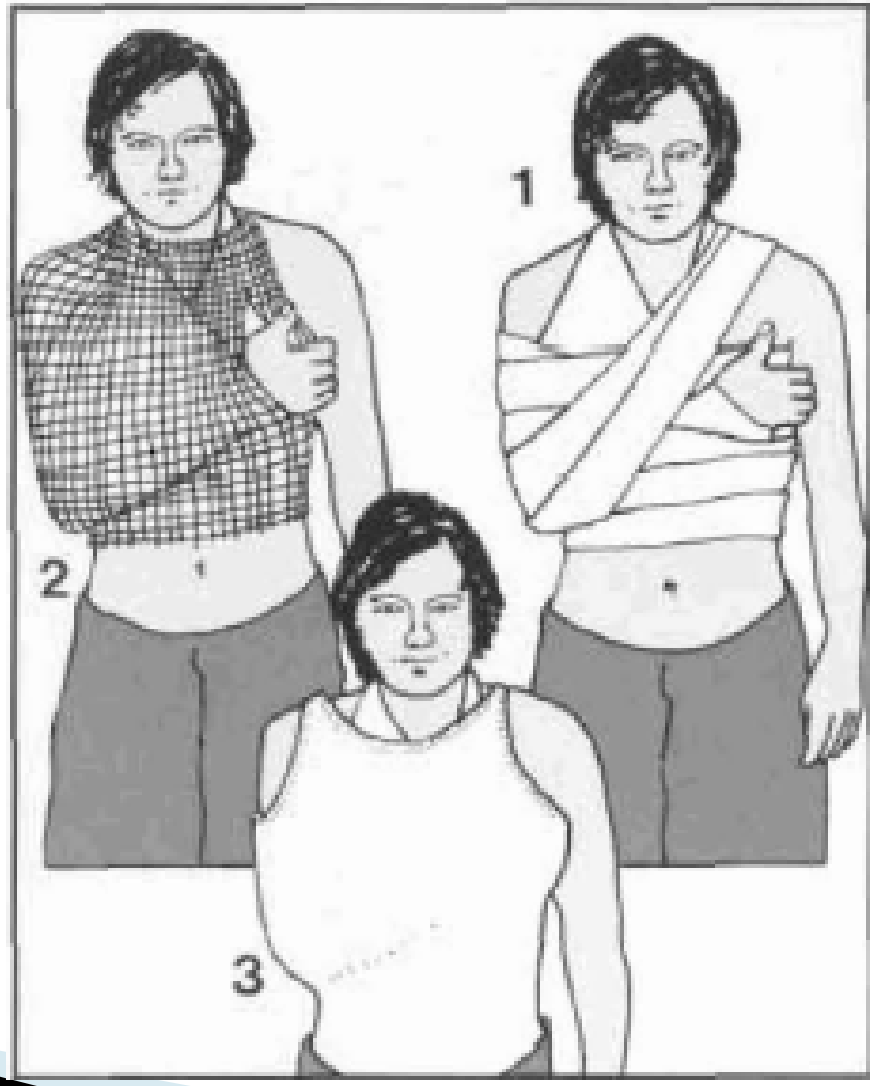
Shoulder Dislocation
Traction-Counter traction Technique



Shoulder Dislocation
Stimson's technique



Velpeau Strapping



Shoulder Spica

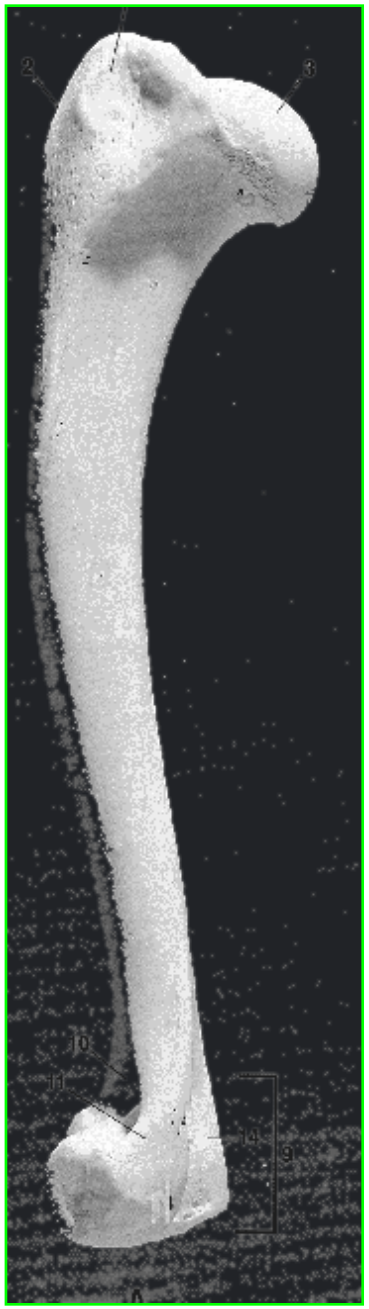
- For unstable dislocations

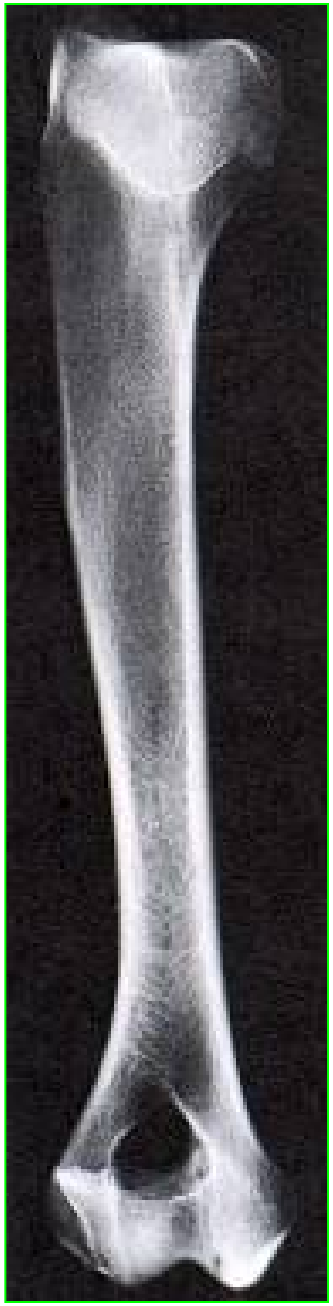
Complications

- Joint stiffness
- Recurrent dislocations
- Axillary Palsy
- Deltoid atrophy

B. Humeral Fractures

- Majority: middle & distal third





Humerus Fracture

- Mechanism
  - Direct trauma
  - Fall on an outstretched arm
- Signs and Symptoms
  - Sudden pain
  - Loss of function
  - Tenderness
  - Deformity
  - Rapid Swelling

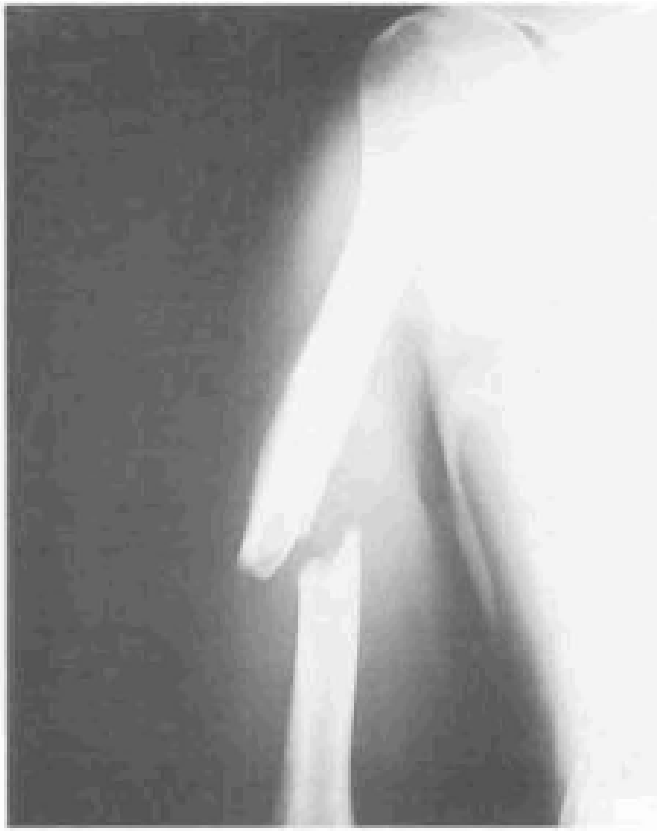
Proximal Humerus Fractures

- Most common locations are surgical neck, anatomic neck, greater and lesser tubercles

Proximal Humerus Fractures

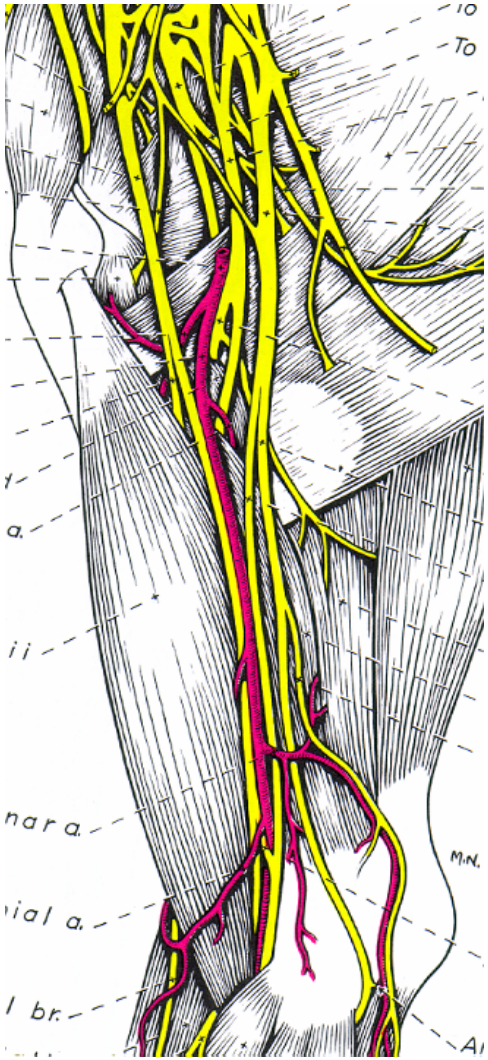
- Usually, elderly patient with osteoporosis, ground level fall.
- 80% can be treated with simple immobilization.
- The rest need closed or open reduction or joint replacement.

Humeral Shaft



Humeral Shaft

- Assess neurovascular integrity!
  - Due to its location on the bone in the posterior radial grove, the radius nerve is the one that is most frequently injured in these fractures. So, check for
    - Motor
    - Sensation

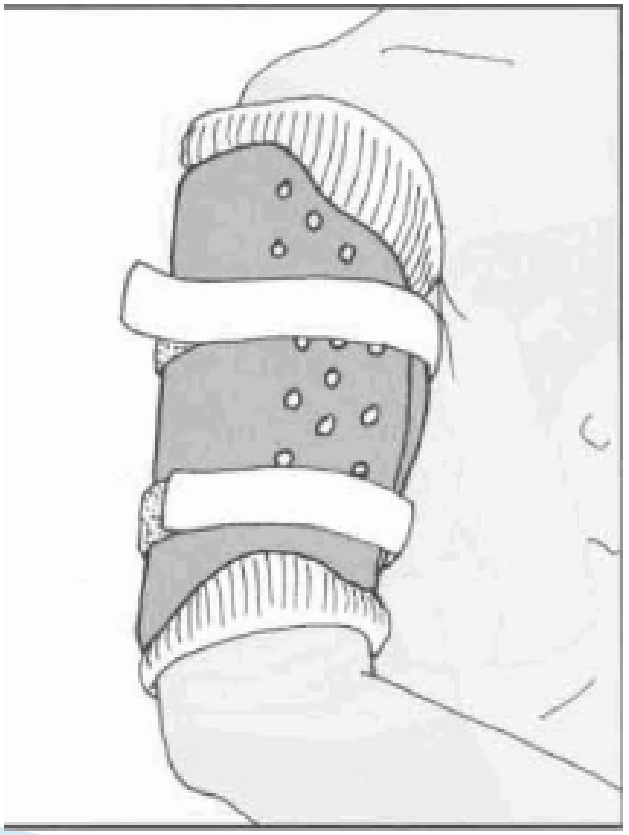


Humeral Shaft Treatment

Reduce and place in U-Cast

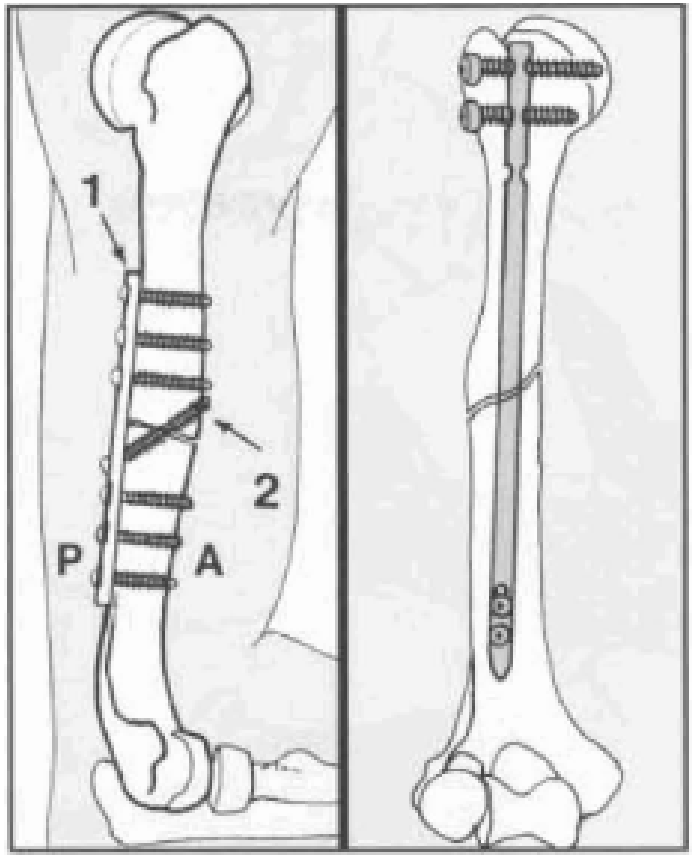
Humeral Shaft

- Cast Brace
- Has the advantage of avoiding stiffness of the shoulder joint as the shoulder is not immobilized



Humeral Shaft

Open Reduction and Internal Rotation (ORIF)



Supracondylar fracture of the humerus

- Most common fracture around the elbow in children (60 percent of elbow fractures)
- 95 percent are extension type injuries, which produces posterior displacement of the distal fragment
- Occurs from a fall on an outstretched hand
- May be associated with a distal radius or forearm fracture

Supracondylar fracture of the humerus

Supracondylar fracture of the humerus

Supracondylar fracture of the humerus (Associated injuries)

- Nerve injury incidence is high: 7-16 % (radial, median, and ulnar nerve)
- Anterior interosseous nerve injury is the most commonly injured nerve
- In many cases, assessment of nerve integrity is limited , because children can not always cooperate with the exam
- 5% have associated distal radius fracture

Supracondylar fracture of the humerus (Treatment)

For Undisplaced Fractures:

- In most cases, these can be treated with immobilization for approximately 3 weeks, at 90 degrees of flexion. If there is significant swelling, do not flex to 90 degrees until the swelling subsides.

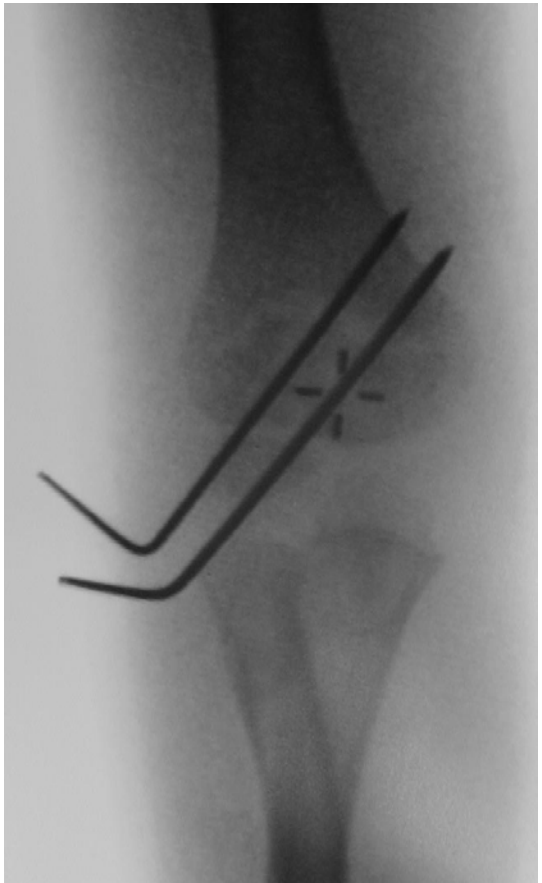
Supracondylar fracture of the humerus

For displaced fractures, The options are:

- MUA and application of a back-slab POP
- MUA and percutaneous pinning. Image intensifier is a prerequisite for this.
- In rare cases, open reduction might be necessary, especially in cases of vascular disruption.

Supracondylar fracture of the humerus (Treatment)

- Percutaneous pinning



Supracondylar fracture of the humerus (Treatment)

Continuous traction

- a. Skeletal traction through olecranium or
- b. Skin traction applied to the forearm [also called Dunlop's traction]
- Traction is usually used for the initial management so that swelling can subside.

Supracondylar fracture of the humerus: Complications

- Cubitus Varus or gun-stock deformity

Supracondylar fracture of the humerus: Complications

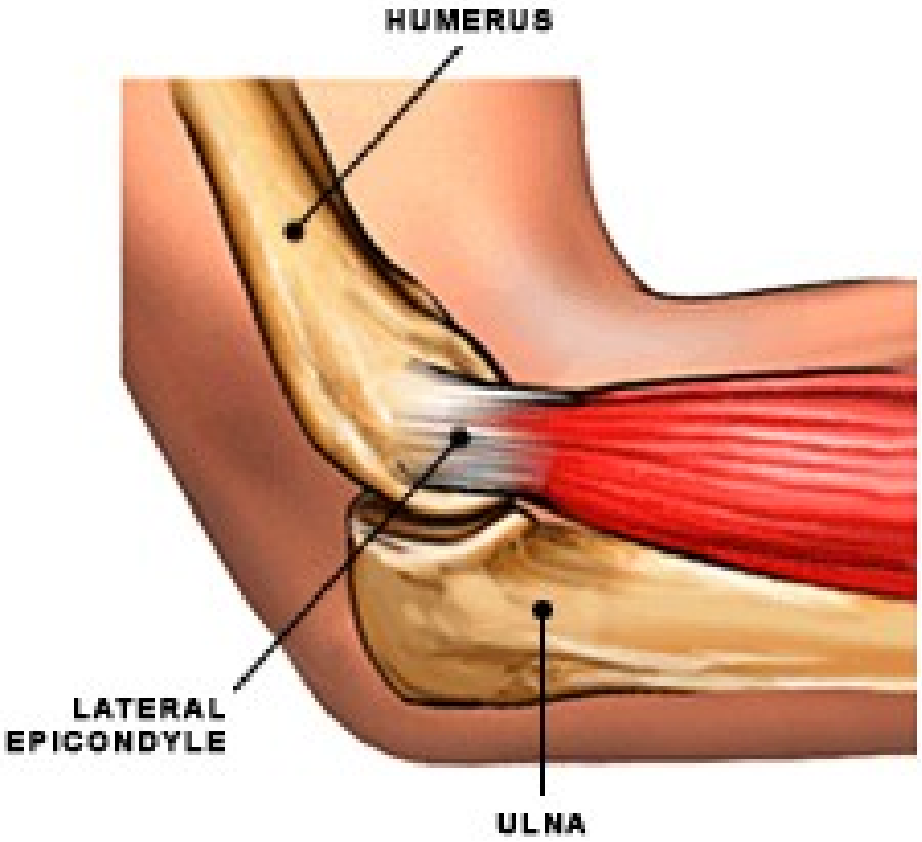
- Compartment syndrome
- Vascular injury / compromise
- Joint stiffness
- Pin track infection
- Myositis ossificans
- Neurovascular injury

Supracondylar fracture of the humerus: Flexion Type

Dislocation of the elbow

- More common in the adult than children.
- Classified according to the direction of displacement – posterior, posterolateral, lateral, and posteromedial or anterior.
- Posterior or posterolateral dislocations account for 90% of the cases.

The Elbow



Dislocation of the elbow

- There may be associated fractures of the coronoid or radial head or the olecranium.
- Associated fractures make dislocations unstable and therefore liable to re – dislocation.

Dislocation of the elbow
Clinical features

Mechanism

- – Fall on the outstretched hand with the elbow in extension

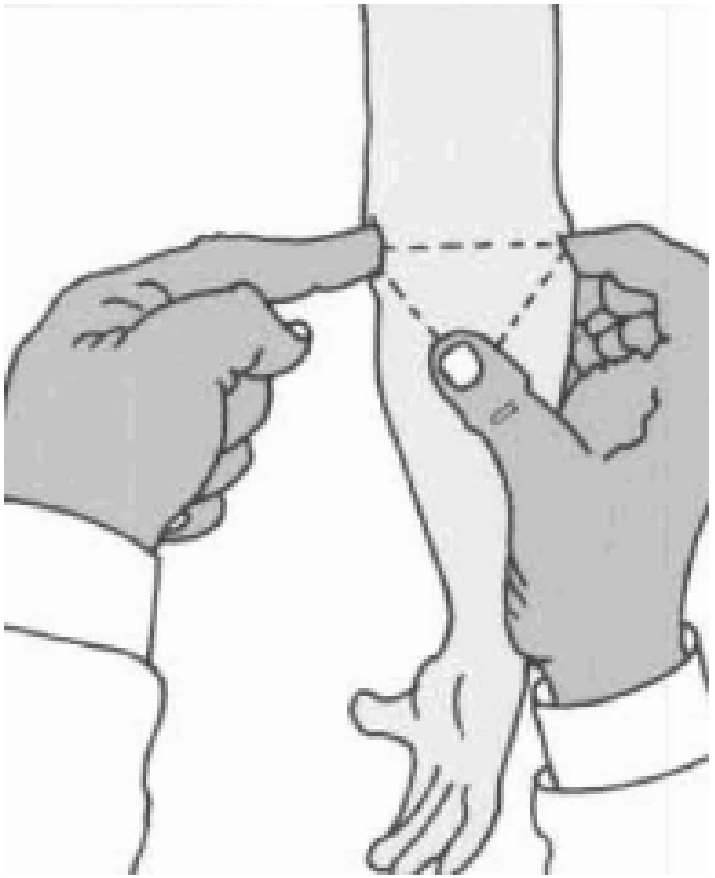
Clinical features

- – History of trauma
- – Patient supports his or her forearm with the elbow in slight flexion.
- – The bony landmarks [olecranon and epicondyles] are abnormally placed.
- – Examine the hand for sign of vascular or nerve damage

Dislocation of the elbow
Examination: Deformity is obvious

Differential dislocation of dislocation and supracondylar fracture

Normally, the condyles and the tip of the olecranium have a triangular relationship to each other. In dislocation, this relationship is disrupted. In supracondylar fractures, it's maintained.



Dislocation of the elbow: Investigations

X – ray

- – Confirms the diagnoses
- – Identifies associated fractures

Other Investigations

- CT Scan
- Compartment pressure monitoring

Dislocation of the elbow
X-ray Lateral View

Dislocation of the elbow: Treatment

- It is an emergency!
- Uncomplicated dislocations are reduced under anaesthesia and then placed in a POP back slab for 3 weeks.
- Dislocations with associated fractures are reduced and the fractures fixed by ORIF.

Complications

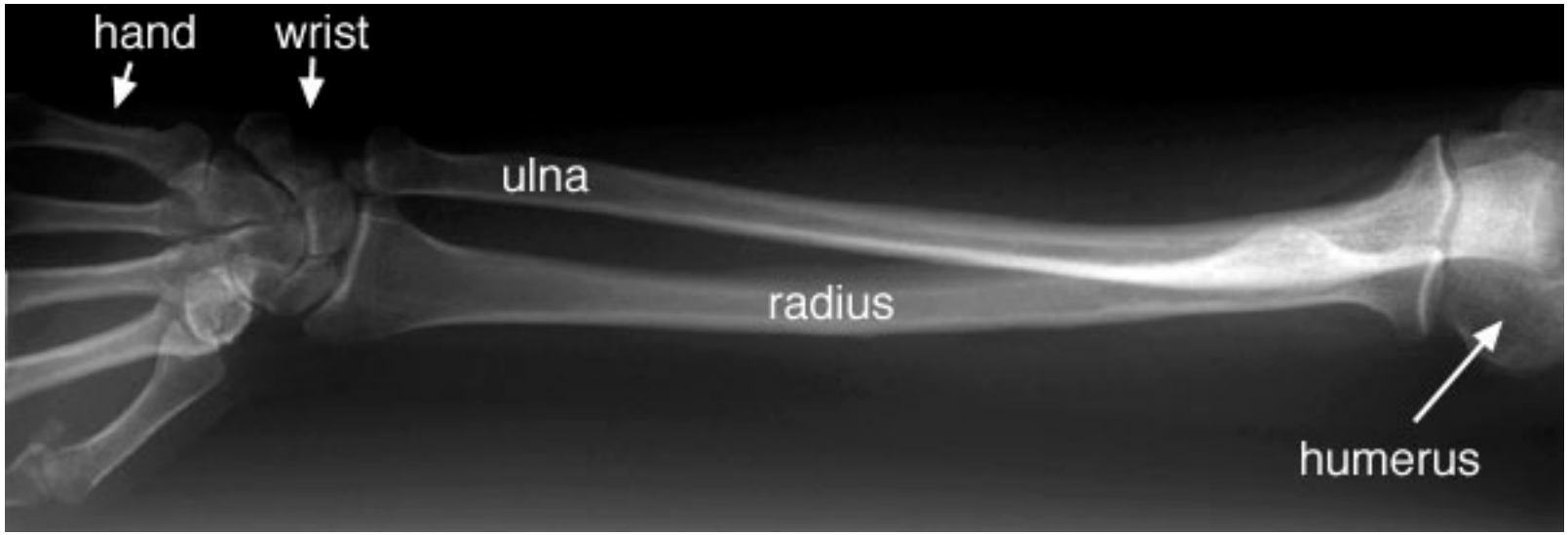
Early

- Vascular injury – Brachial artery damage
- Median or ulna nerve injury
- Compartmental syndrome

Late

- Joint stiffness
- Myositis ossificans
- Recurrent dislocation
- Osteoarthritis

Radius and Ulna



Olecranon Fractures

- More common in adults

Radial Head fractures

Causes of Radius and Ulna Fractures

- Falling on outstretched arm
- Direct blow
- Automobile accidents
- Child abuse
- Gunshot

Radius and Ulna Fractures

- Fractures of both radius and ulna
- Fracture of one forearm bone only
- Fracture-dislocations of the Forearm
- Fractures of the distal radius

Fractures of both radius and ulna

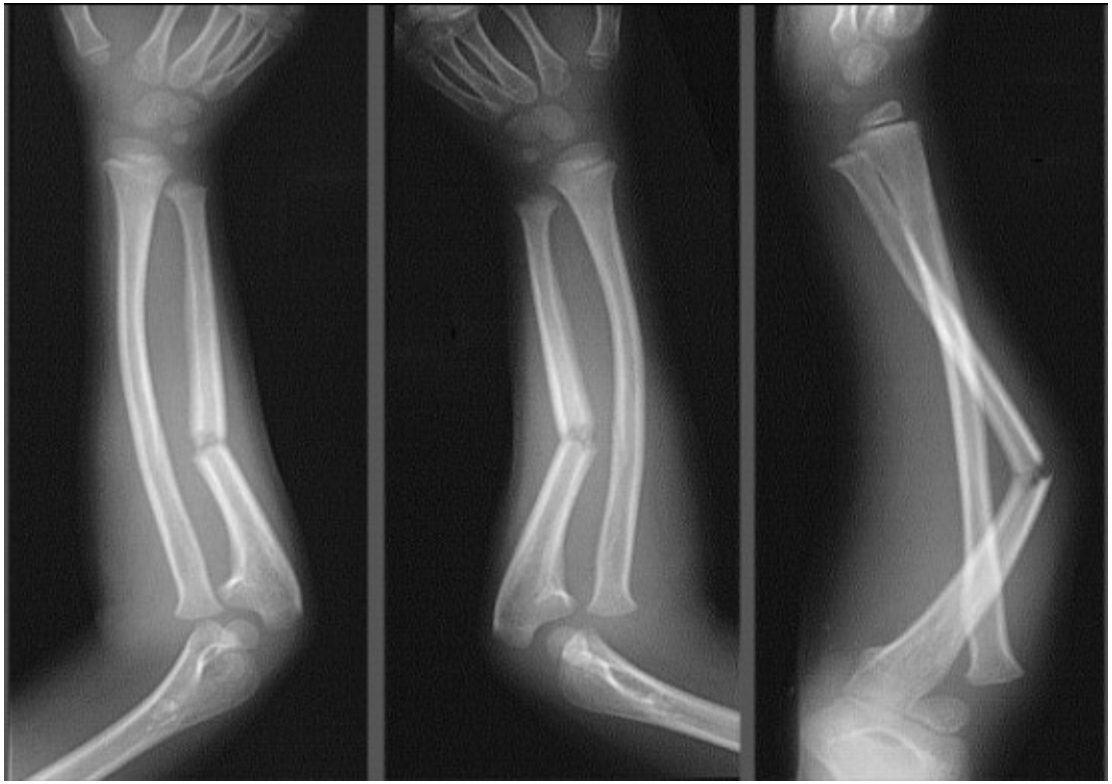
Fracture of one forearm bone only

- Usually due to direct trauma
- Also called night-stick fractures
- Displacement and angulation is usually minimal
- Ulna is more commonly involved than the radius

Fracture-dislocations of the Forearm

- Monteggia fracture
  - Defined as a fracture of the ulna (usually proximal one third) with dislocation of the radial head.
- Galeazzi fracture
  - Defined as a fracture of the distal one third of the radius with dislocation of the distal radioulnar joint

Monteggia Fracture



Monteggia Fracture

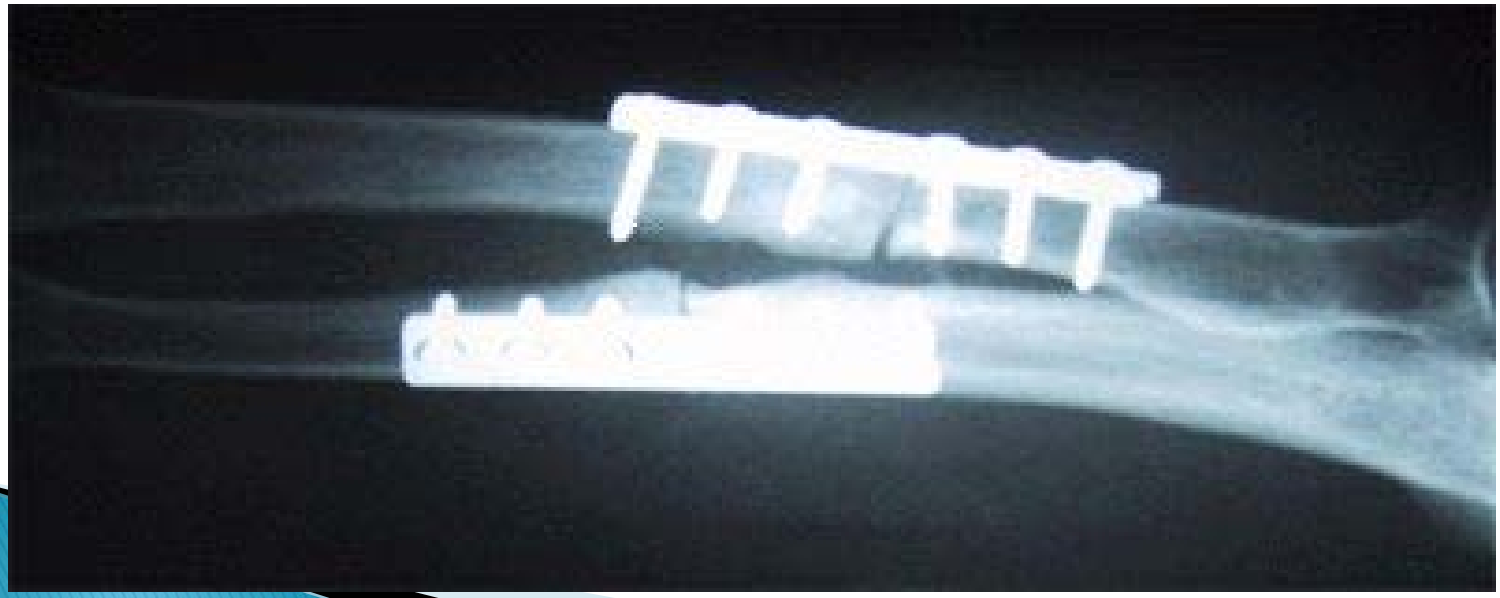
Galeazzi Fractures

Treatment

- MUA and Cast application
  - plaster and fiberglass casts
  - cast-braces
  - External fixation
- Internal fixation methods
  - Plates and Screws
  - Intramedullary nails and pins

Treatment (Contd)

- Monteggia and Galleazzi fractures should be treated by ORIF in adults. Non-surgical methods are not usually successful in adults. In children, MUA and casting works



Treatment (Contd)

- ORIF offers the best chance for successful alignment and functional result when the radius and ulna are both fractured together .

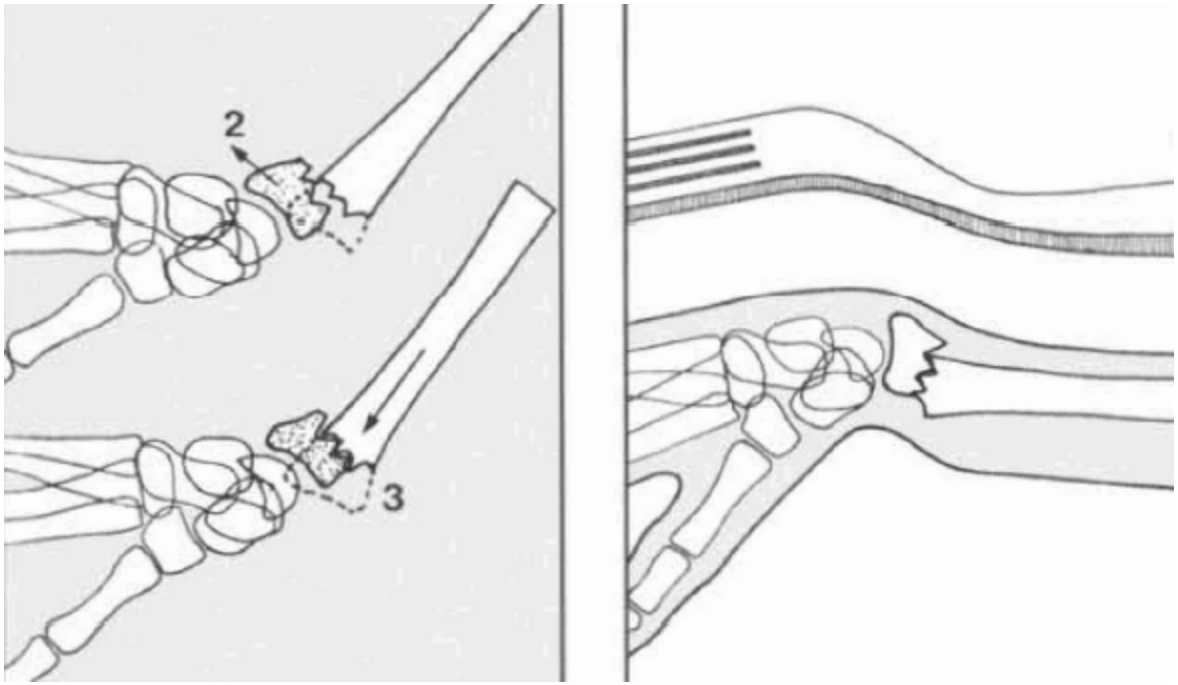
Colles' fracture

- Most common fracture of the distal radius
- Most commonly seen in elderly women whose bones are osteoporotic
- Usually due to a fall on the outstretched hand

Colles' fracture: Clinical features

- Local pain & tenderness
- Swelling
- Deformity (Dinner fork)

Colles' fracture
Clinical features: Dinner fork deformity



Colles's fracture
X-ray features

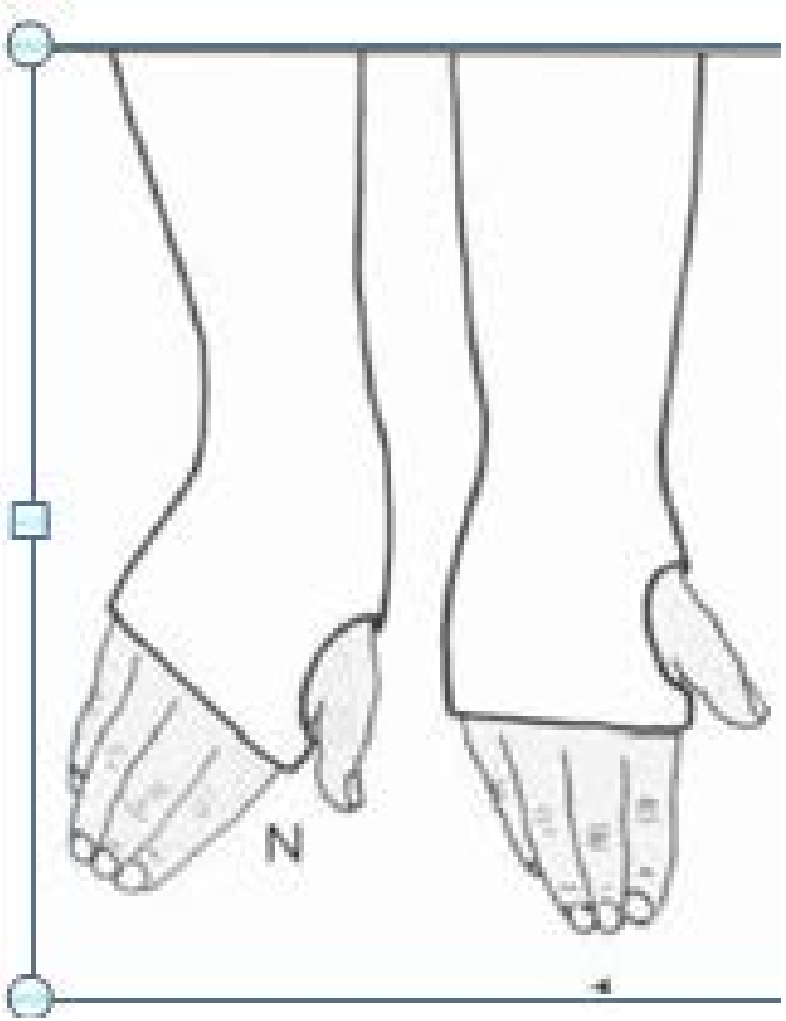
i. Transverse fractures of the radius at about 2.5cm above the wrist. It may or not be comminuted. It may also involve the radiocarpal or the distal radioulnar joints.
ii. it is dorsally displaced
iii. It is dorsally angulated
iv. it is laterally displaced
v. it is laterally angulated and
vi. it is impacted

Colles' fracture
X-ray appearance

Colles' fracture Treatment

- MUA and application of a Colles' cast
- External fixation

Colles' Cast



Colles' Fracture
External fixation

Colles' fracture: Complications

i. Wrist stiffness
ii. Median nerve palsy
iii. Malunion
iv. Osteoarthritis
v. Delayed rupture of the extensor policis longus
vi. Sympathetic dystrophy (Sudeck's atrophy)

The End

Thank You