Shoulder and Humerus Fractures and Dislocations

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Overview

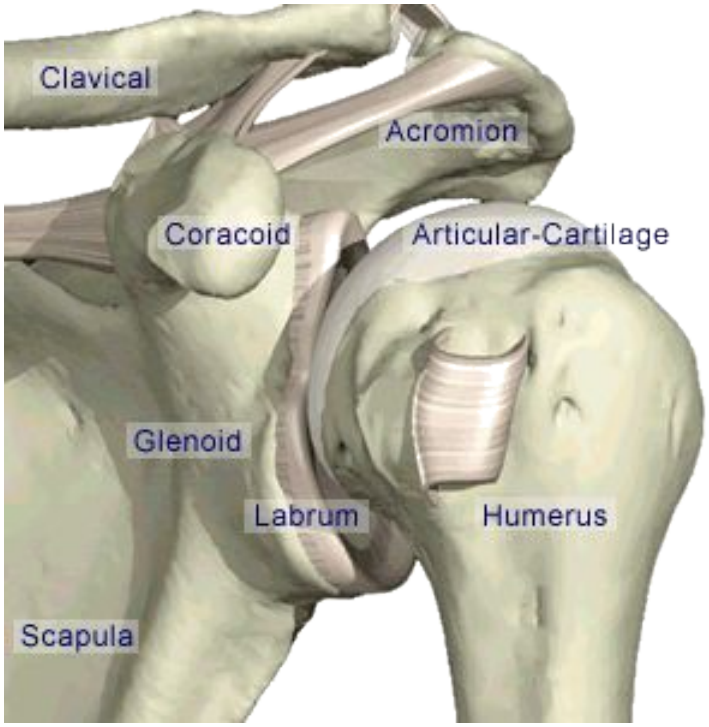
- Common shoulder and humerus injuries seen in the ED
- For each injury
  - Mechanism
  - Physical exam
  - Diagnostic imaging
  - Classification
  - Management
  - Watch out!

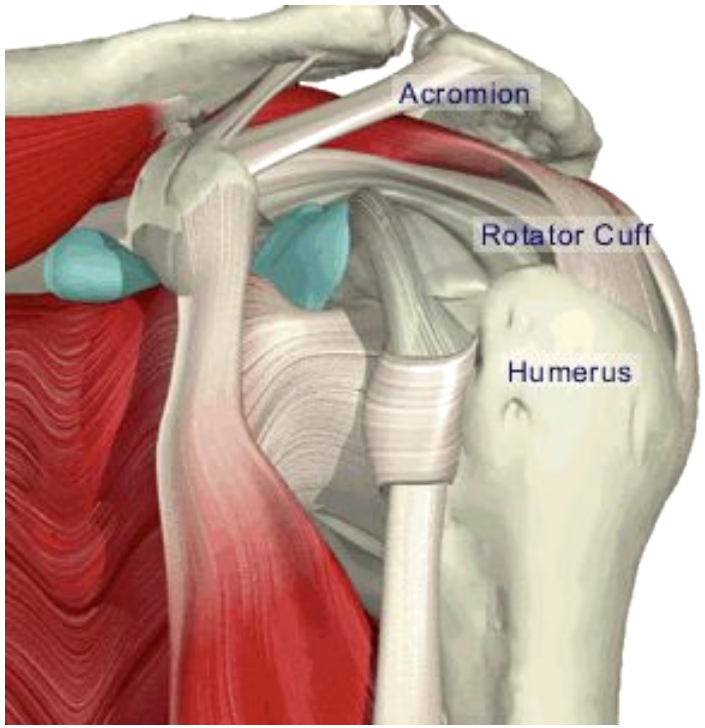
Mechanism of Injury

Injuries to be Covered

- AC separation
- Clavicle fracture
- Scapula fracture
- Shoulder dislocation
- Humeral Fractures
  - proximal
  - mid shaft

Shoulder Anatomy



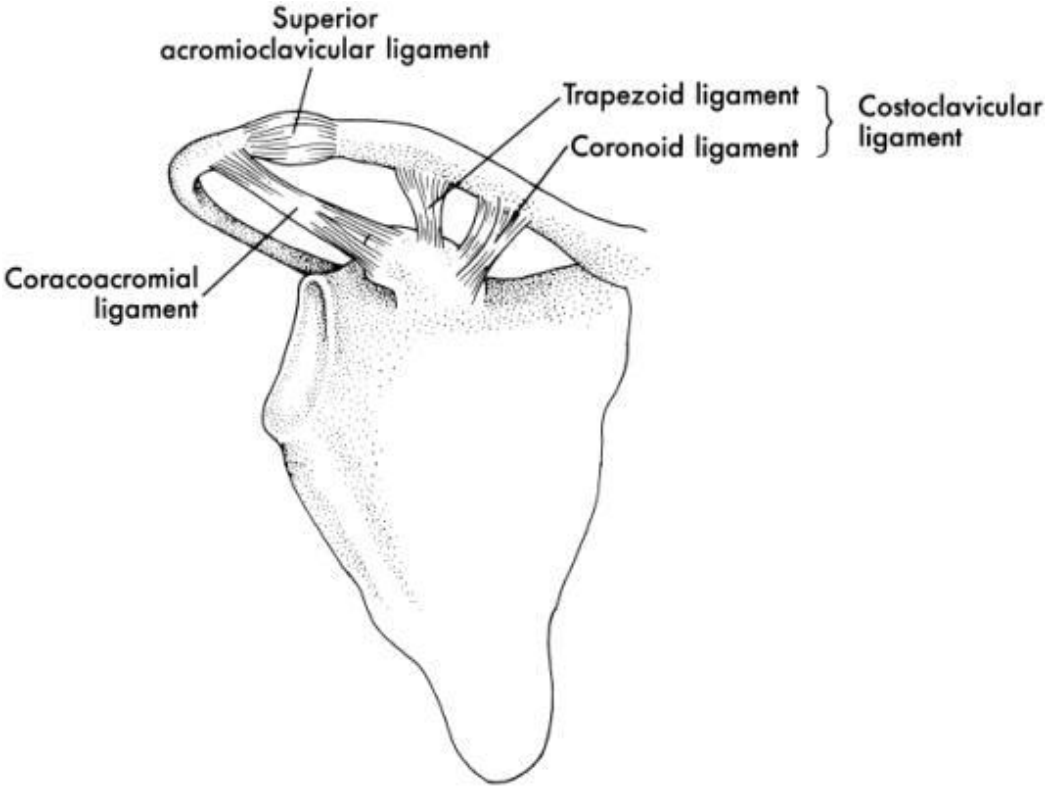


How bad is it doc??

AC Separation

- Mechanism
  - Downward force on tip of shoulder
  - AC and Costoclavicular ligaments disrupted
- Watch for associated # of clavicle, coracoid process

Normal AC joint

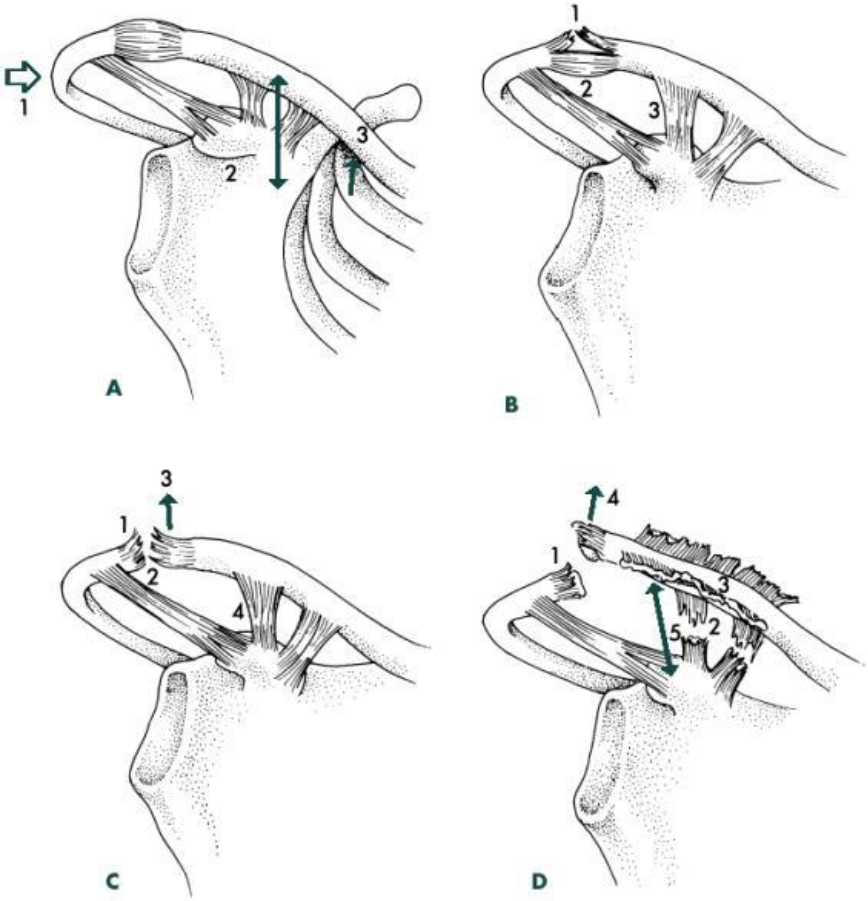


AC classification – Clinically

- Grade I
  - Mild tenderness over AC joint, mild swelling
  - Full ROM
- Grade II
  - Mod/severe pain, clavicle slightly displaced up
- Grade III
  - Arm kept in adduction, obvious deformity

AC Classification

Mechanism



Grade I

Grade II

Grade III

AC Imaging

- AP shoulder (cephalic tilt)
  - Normal CC distance 1.1-1.3cm (injury if > 5mm on comparison)
- Axillary lat view
- ?Stress views - 10-15lbs **tied** to wrists
- Watch for os acromiale
  - Secondary ossification centre on distal acromion

AC Separation

Management

- I and II
  - Conservative (sling, ice, analgesia, physio)
  - 6/52 before lifting
- III
  - Conservative with late distal clavicle excision
  - Refer to Ortho <72h

Ouch!

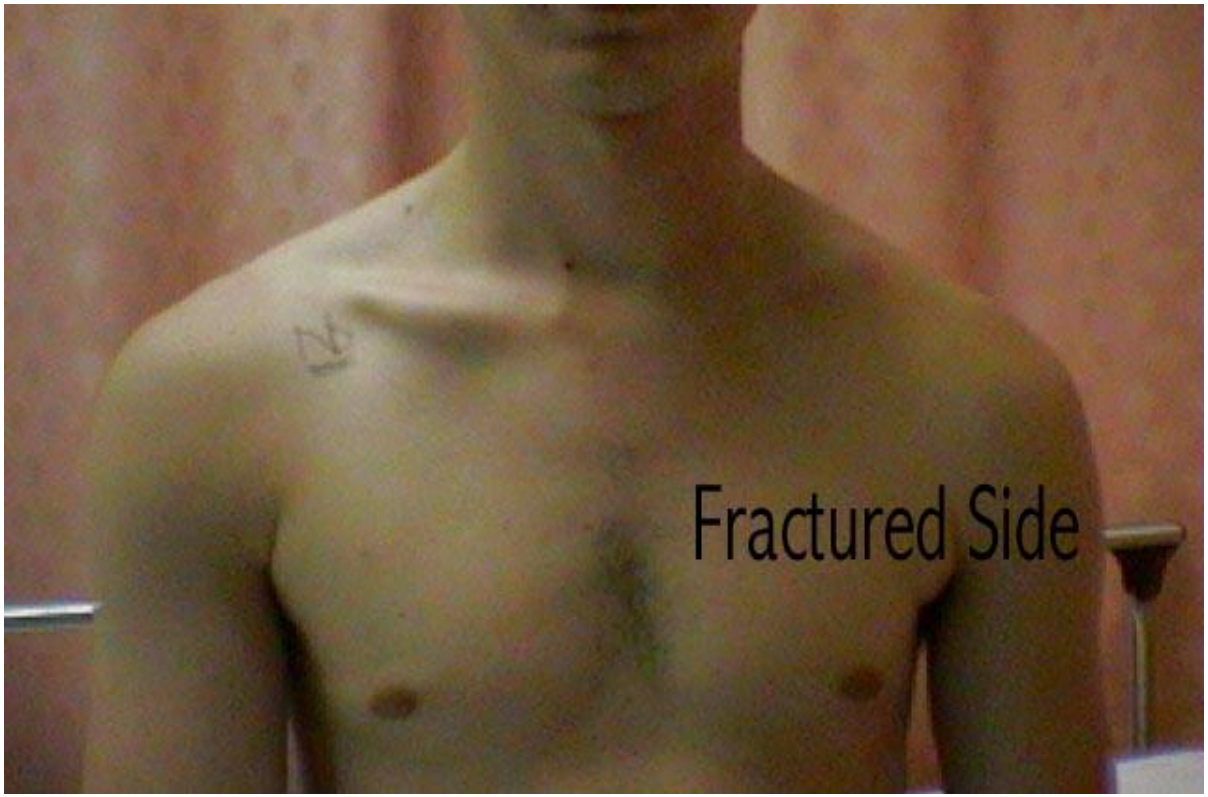
Clavicle Fractures

- Function
  - “strut”, only bony connection to axial skeleton
- Mechanism
  - direct blow > FOOSH

Clavicle - Physical Exam

- Gross deformity
- Palpation
- potential injury to medial cord (Ulnar N dysfunction)

Clavicle fracture



Clavicle Imaging

- AP
- 30 degree cephalad view

Is it Broke?

Classification

- Proximal/middle/distal third

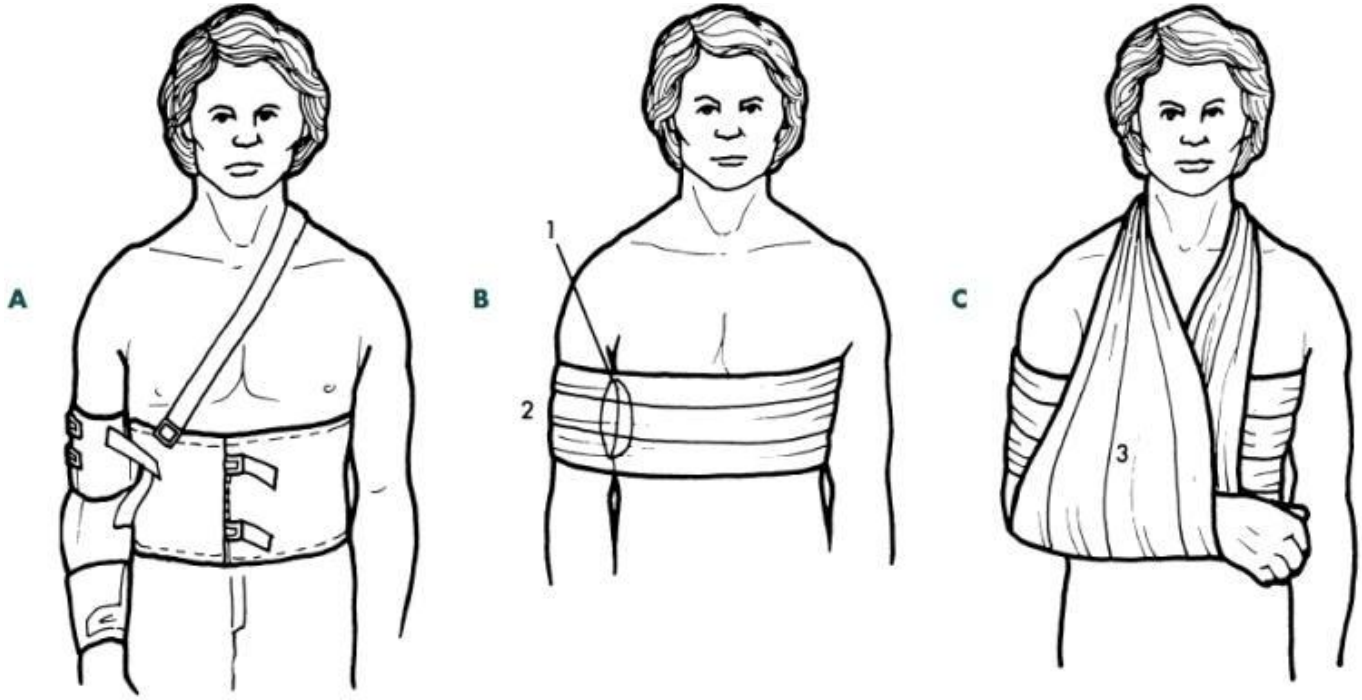
Clavicle # - Middle third

- 80% of fractures
- medial portion - displaced up by sternocleidomastoid
- lateral portion - displaced down by weight

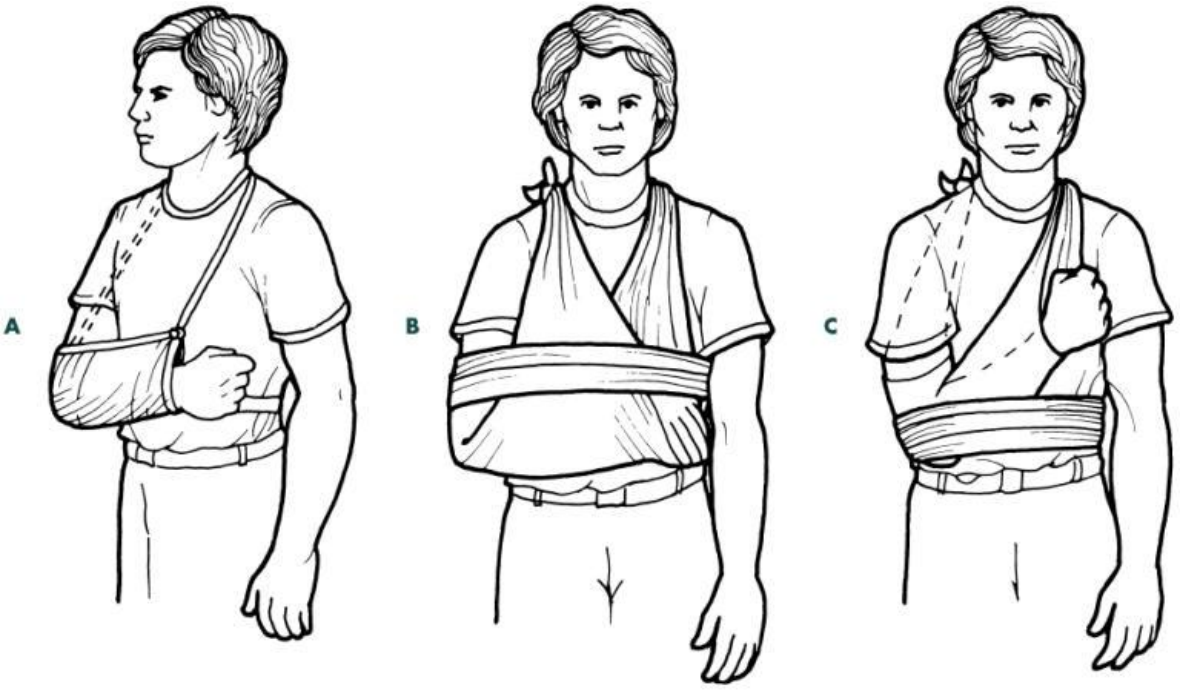
Clavicle # - Middle third Management

- Management
  - figure of eight vs sling (J Acta Ortho Scand 58 (1):71-4, 1987)
  - 2-4 wks kids, 4-8 wks adults
  - Kids: possible greenstick – immobilize and recheck in 7-10d
- Indication for OR (increases risk of non union) - cosmesis, tenting, open, vascular injury

Clavicle Fracture
Sling and Swathe



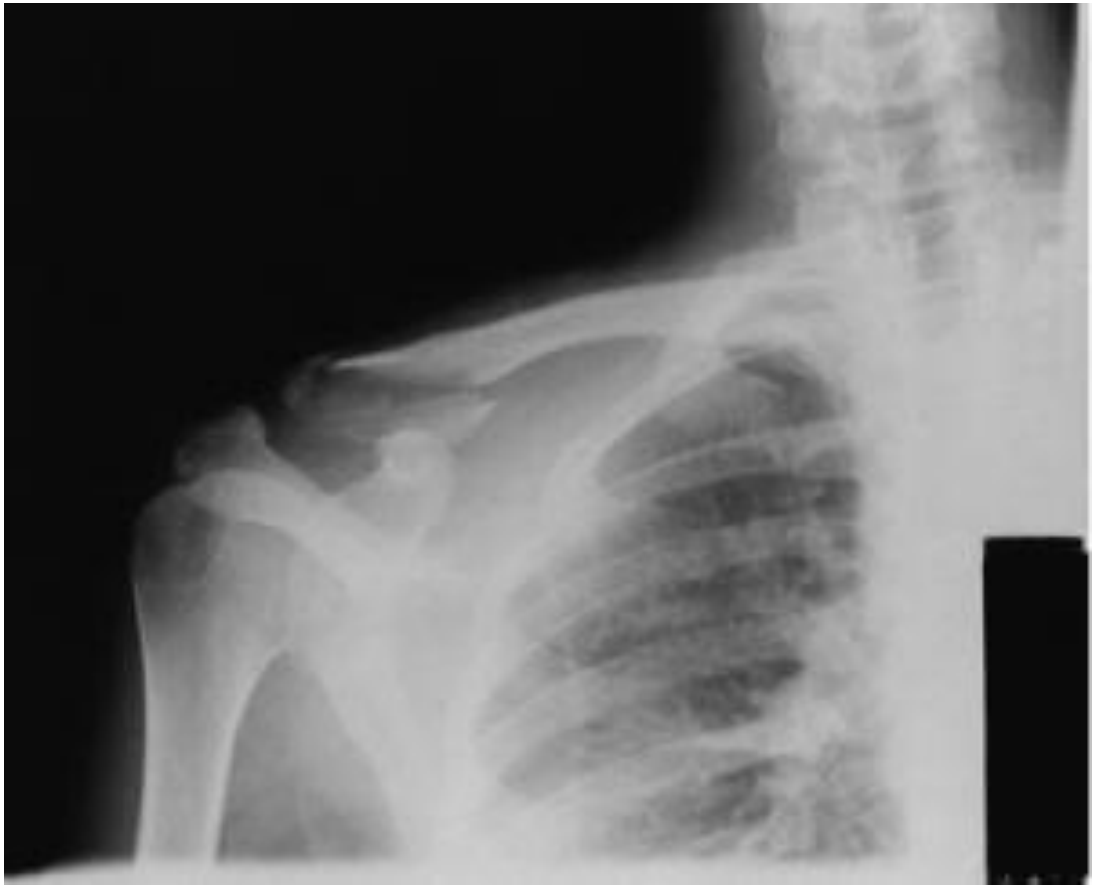
Clavicle Fracture
Velpeau



Clavicle # - Distal Third

- 10-15%
- Classification
  - I: minimal displacement
  - II: torn CC ligament, prone to non-union
  - III: articular surface (may mistake for 1st AC)
- Management
  - conservative (J. Acta. Ortho. Scand. 64 (1):87-91, 1993
  - ?OR for II (BJAS 23(1): 44-6, 1992.

Distal third



Clavicle # - complications

- Injury to brachial plexus, great vessels, lungs
- watch out for floating shoulder
  - if associated with scapular surgical neck #

Scapular Fractures

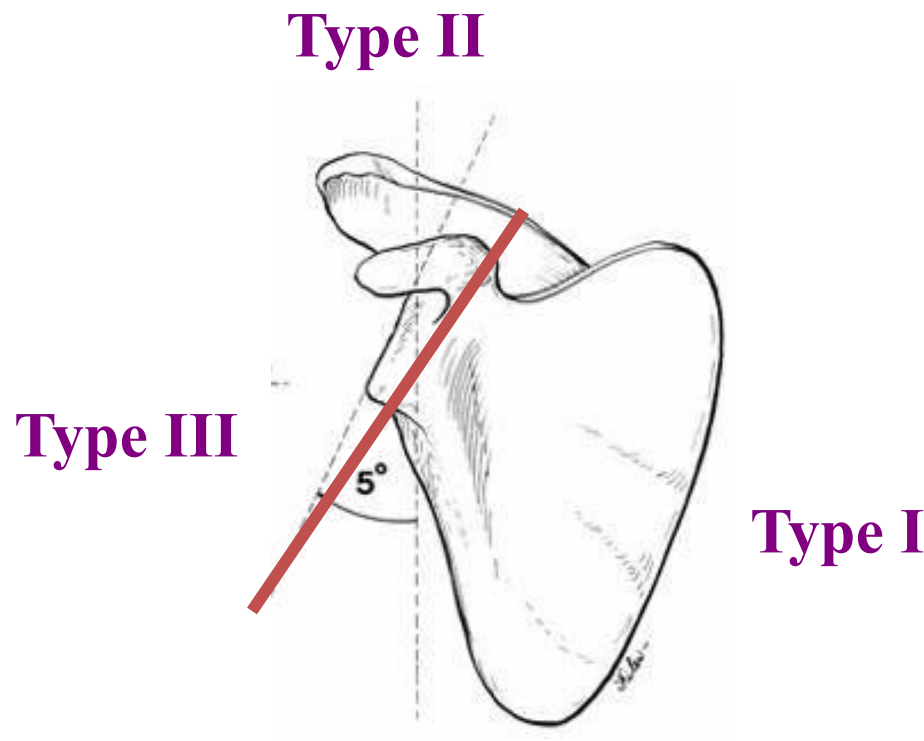
- Rare, high energy
- Males ~30 y.o.
- Associated with other injuries (lung, rib, clavicle)

Scapular # Clinically

- If awake, arm adducted
- Tender, crepitus, hematoma

Scapular # Classification

- Type I
  - Body and spine
- Type II
  - Acromion or coracoid process
- Type III
  - Scapular neck or glenoid fossa



Scapular Fracture

Scapular # - Management

- Conservative
- OR
  - Displaced acromial # impinging on joint
  - Associated coracoid # if CC ligament disrupted
  - Scapular neck/glenoid fossa #

Shoulder Dislocation

- Men 20-30, women 60-80 yo
- kids more prone to # through growth plate (joint capsule and ligaments 2-5x stronger than epiphyseal plate)

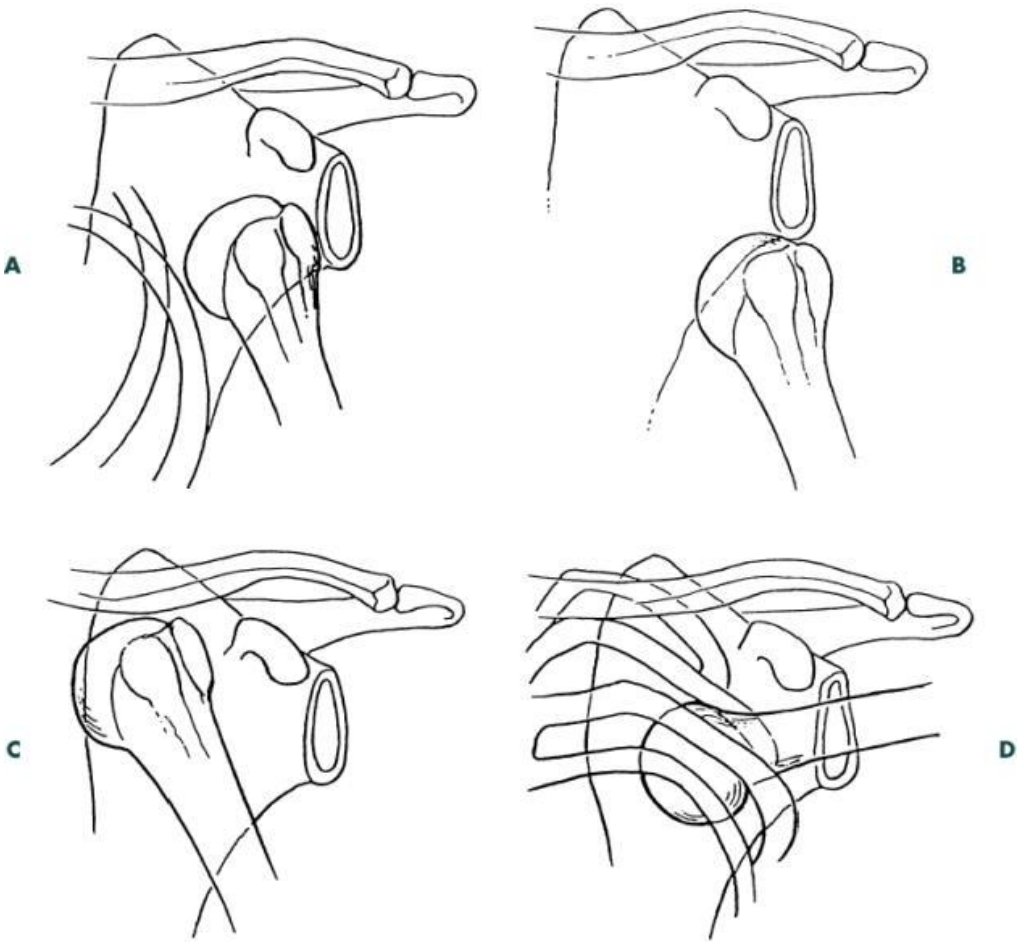
Shoulder Dislocation - Classification

- Anterior (95-97%)
  - Subcoracoid (most common)
  - subglenoid (1/3 associated with # greater tuberosity, or # glenoid rim)
  - subclavicular
- Posterior
- Inferior and superior

Shoulder Dislocation
Anterior dislocations

- Traumatic/nontraumatic
- Primary/recurrent

Shoulder Dislocation Anterior



Shoulder Dislocation Anterior

- Clinically
  - Slight abduction, ext rotation
  - Squared off, loss of coracoid process
- Mechanism
  - abduction+extension+posterior force
  - shoulder capsule torn

Shoulder Dislocation Anterior: Exam

- Check brachial plexus, Axillary N

Shoulder Dislocation - Imaging

- Do you want films?
  - Recurrent dislocation vs primary, ?nontraumatic
  - Avulsion # of greater tuberosity in 10-15%
- **True AP**
- **Axillary view**
- **trans-scapular view**
- Stryker Notch:
- West point Axillary
- Apical oblique view

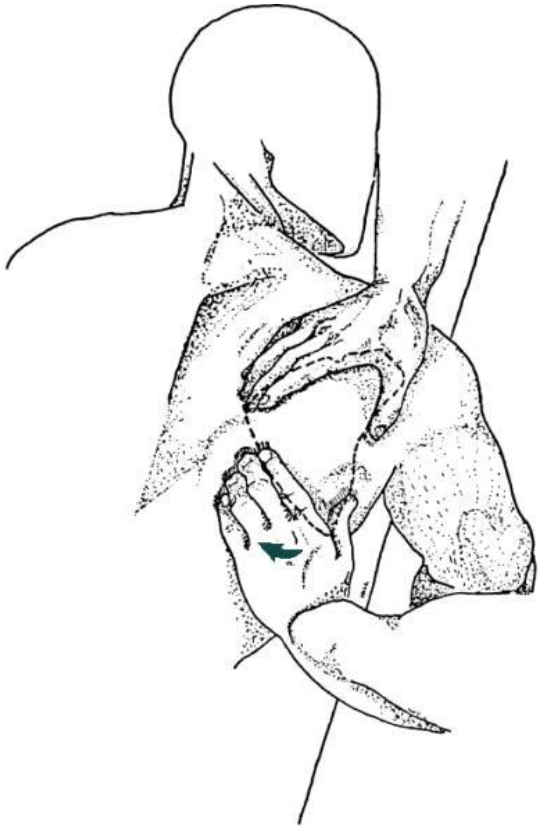
Anterior dislocation

Shoulder dislocation - Management

- Anesthesia - conscious sedation vs intra-articular lidocaine
- Reduction (“know three methods well”)
  - External rotation
  - Scapular rotation
  - Stimson’s
  - Milch

Shoulder Dislocation Reductions

Shoulder Dislocation Reductions



Shoulder dislocation - Management

- Check NV post reduction
- ? Repeat films (advised by Rosen)
- Sling and swathe, Velpeau
- Uncomplicated: sling x 3-4/52 if < 20 y.o., 1-2/52 if > 40 y.o. (early mobilization!)
- Complications: NV injury, rotator cuff tear, etc. f/u with ortho

Shoulder Dislocation - Complications

- Bankart lesion
  - primary lesion in recurrent ant instability
- Hill Sach lesion
  - 35-40% of ant dislocations, predisposes to recurrent injury
- recurrent dislocation
  - young adults redislocation in 55-95%
  - skeletally mature, < 30yo: ? Early arthroscopic reconstruction (Arthroscopy 15(5) 1999: 507-12)

Shoulder Dislocation Posterior

- 2-4% of shoulder dislocations
- Secondary to seizure, direct blow to shoulder
- Need to dx early to prevent long term complications

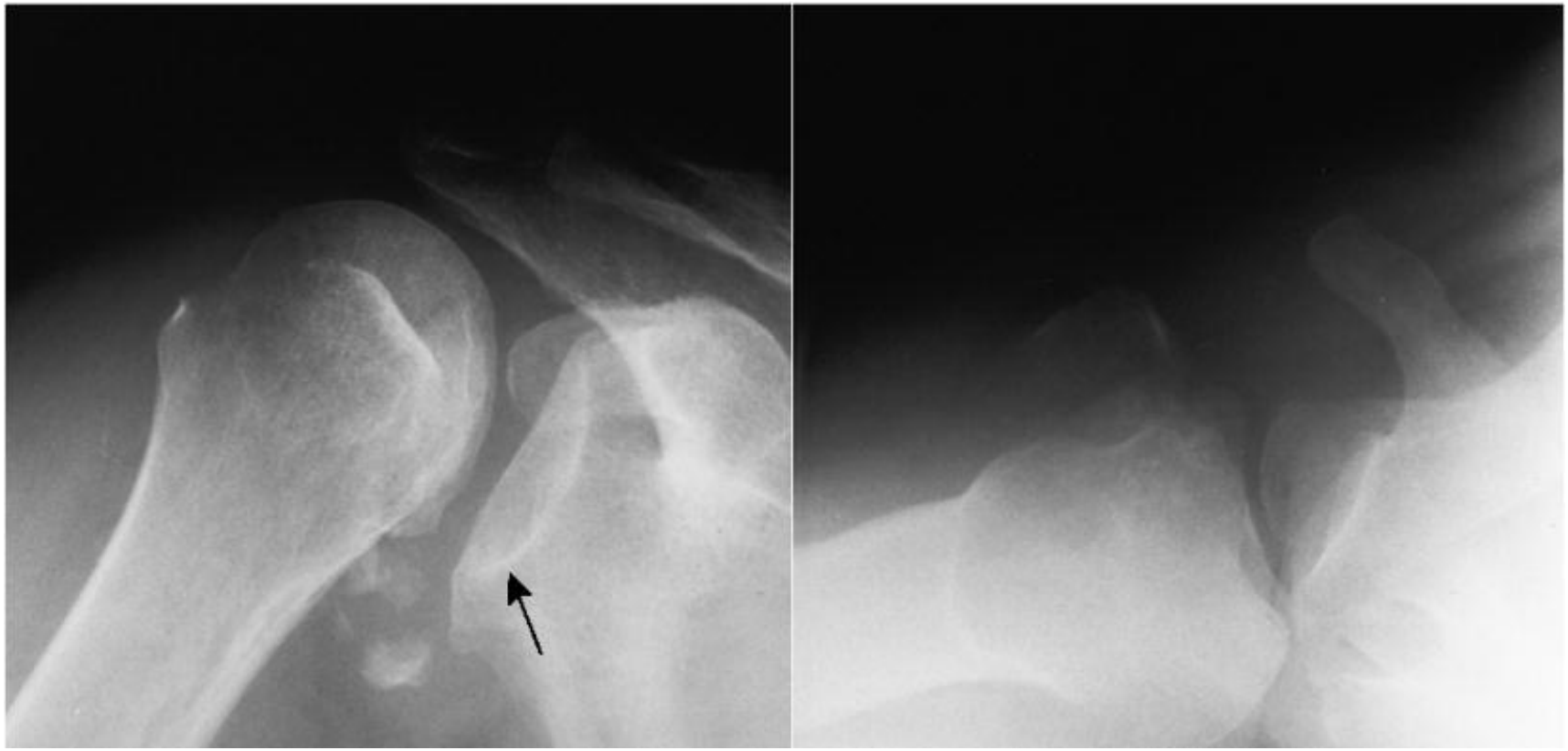
Shoulder Dislocation
Posterior: clinical features

- Arm held across chest
- Adducted
- Internally rotated
- Flat and squared off

Shoulder Dislocation Posterior: Imaging

- AP may appear normal!
- Loss of half moon elliptical overlap of humeral head and glenoid fossa
- “Rim sign” – increased distance between ant glenoid rim and articular surface of humeral head
- “light bulb” – int rotation of humeral head
- “trough sign” Reverse Hill Sachs (anteromedial impaction)

Shoulder Dislocation
Posterior: Imaging



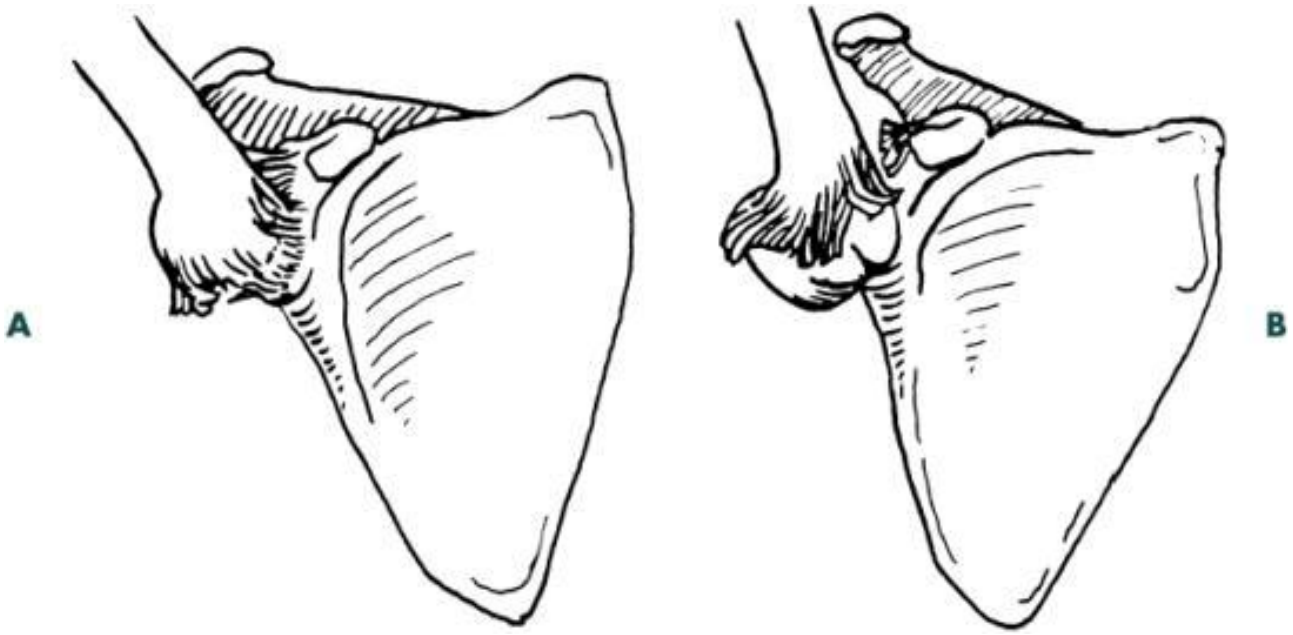
Shoulder Dislocation Posterior: Management

- Conscious sedation and closed reduction
- Axial traction, pressure on humeral head, external rotation
- Complications:
  - Missed Dx: “locked” – ORIF
  - # glenoid rim, tuberosities, humeral head

Shoulder Dislocation Inferior (Luxatio Erecta)

- Rare
- Arm locked overhead 110-160 deg abduction, hand resting on head
- AP radiograph: spine parallel to humerus
- Reduce with traction

Shoulder Dislocation Inferior (Luxatio Erecta)



Humerus Fractures

- Proximal
- Mid shaft
- Supra condylar

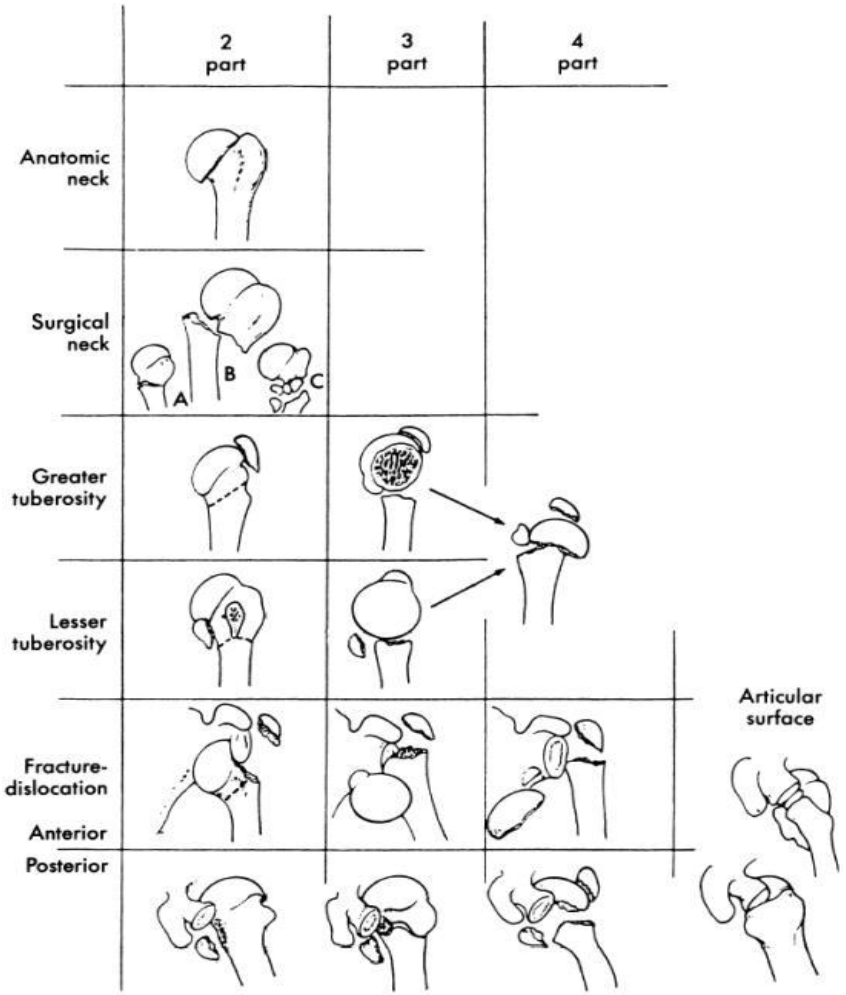
Proximal Humerus Fractures

- Primarily older population
- FOOSH, arm pronated limits abduction
- Older pts #, while younger pts dislocate
- Both if middle aged
- Arm held close to body, mov’t limited by pain
- Tender, hematoma, bruising

Proximal Humerus Fractures

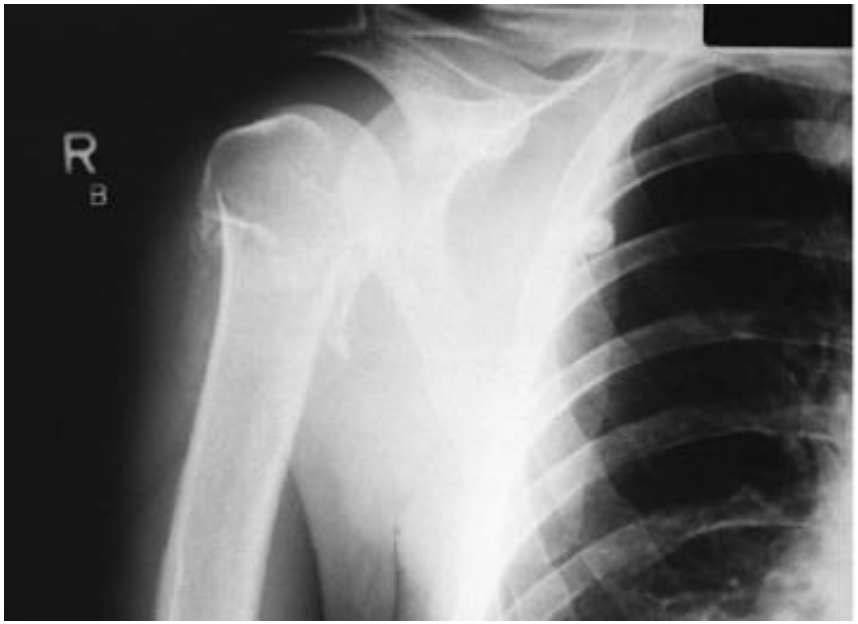
- 85% minimally displaced – conservative rx
- Separation along old epiphyseal lines
  - Articular surface (anatomic neck)
  - Greater and lesser tuberosity
  - Humeral shaft (surgical neck)
- Considered displaced if:
  - > 1cm away
  - > 45 degrees

Proximal Humeral Fractures
Neer's Classification



Proximal Humeral Fractures

- Minimal displaced 3 part #



Proximal Humerus Fractures Management

- Minimally displaced
  - # held together by capsule, periosteum, muscles
  - Analgesia, sling and swathe x 3-4/52
- 2,3,4 part – consult ortho
- Fracture/dislocation – caution with force, don't want to displace segments
- Complications: adhesive capsulitis

Proximal Humeral Epiphysis

- Rare
- Usually Males 11-17
- FOOSH
- # through zone of hypertrophy of epiphyseal plate
- Arm held close to body, swelling
- Classification: Salter Harris

Proximal Humeral Epiphysis

Proximal Humeral Epiphysis Management

- Potential for growth disturbance
- <6 yo : usually Salter I, analgesia, sling and swathe
- > 6 yo: usually Salter II
  - If > 20 deg need to reduce

Midshaft Humerus Fractures

- Mechanism
- Direct blow, severe twisting, FOOSH
- Obvious deformity, crepitus
- Shortened limb, rotated
- Assess radial nerve
- Exam shoulder and elbow

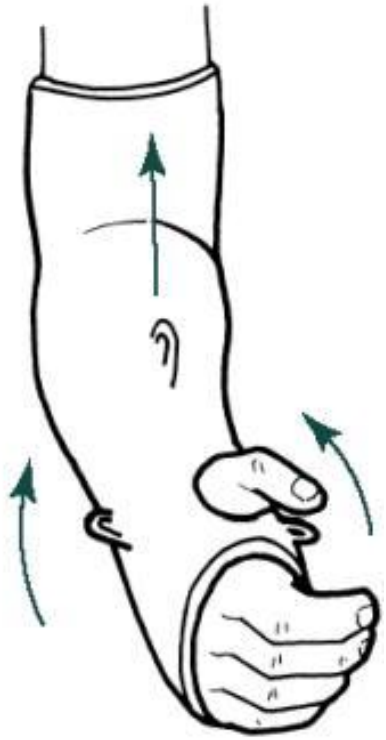
Midshaft Humerus Fractures

Midshaft Humerus Fractures

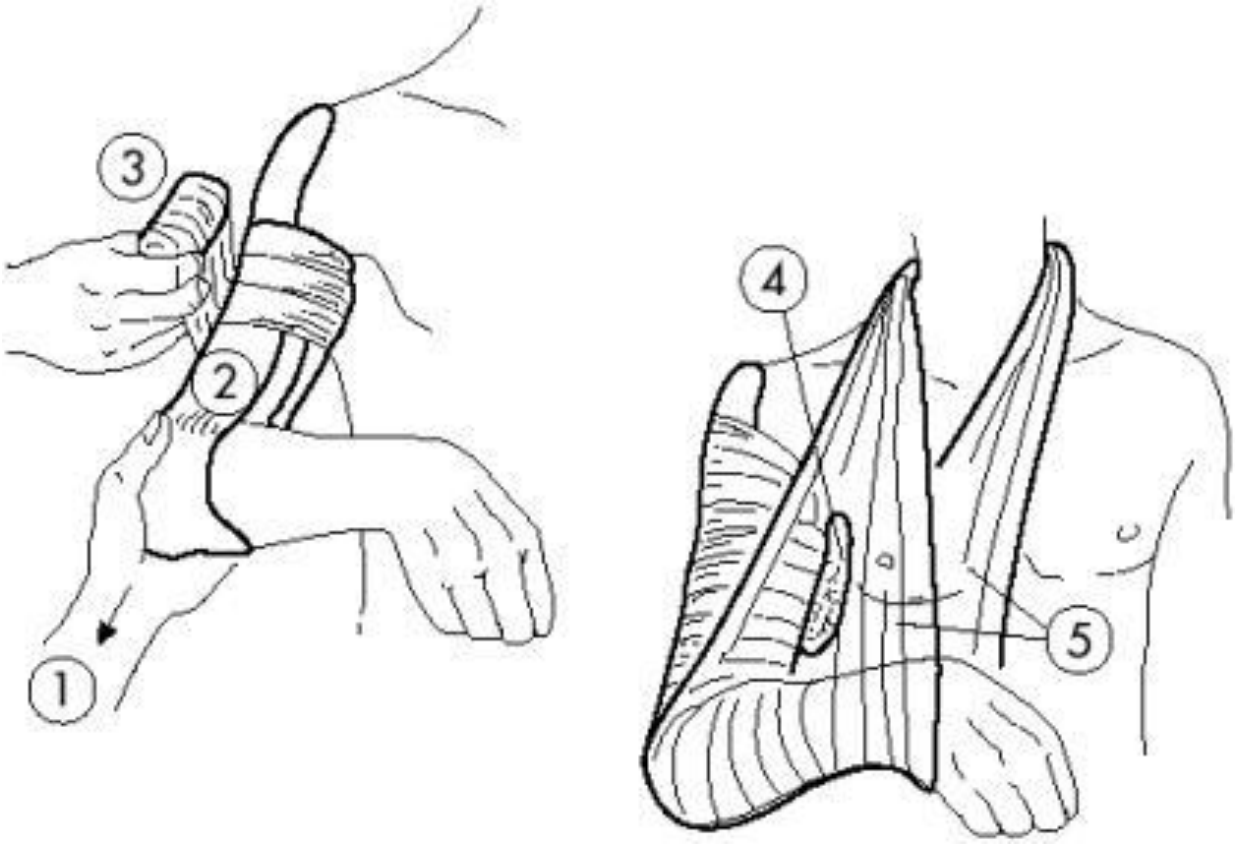
- Management
  - Hanging arm cast (displaced) / Sugar tong (nondisplaced)
  - F/U with ortho in 24-48h
  - overriding #: accept up to 1 inch shortening
- ORIF
  - unacceptable alignment, radial nerve involvement, segmental #, other upper extremity injuries, pathological #, limited to bedrest

Midshaft Humerus Fractures

1 in prox to #



Midshaft Humerus Fractures



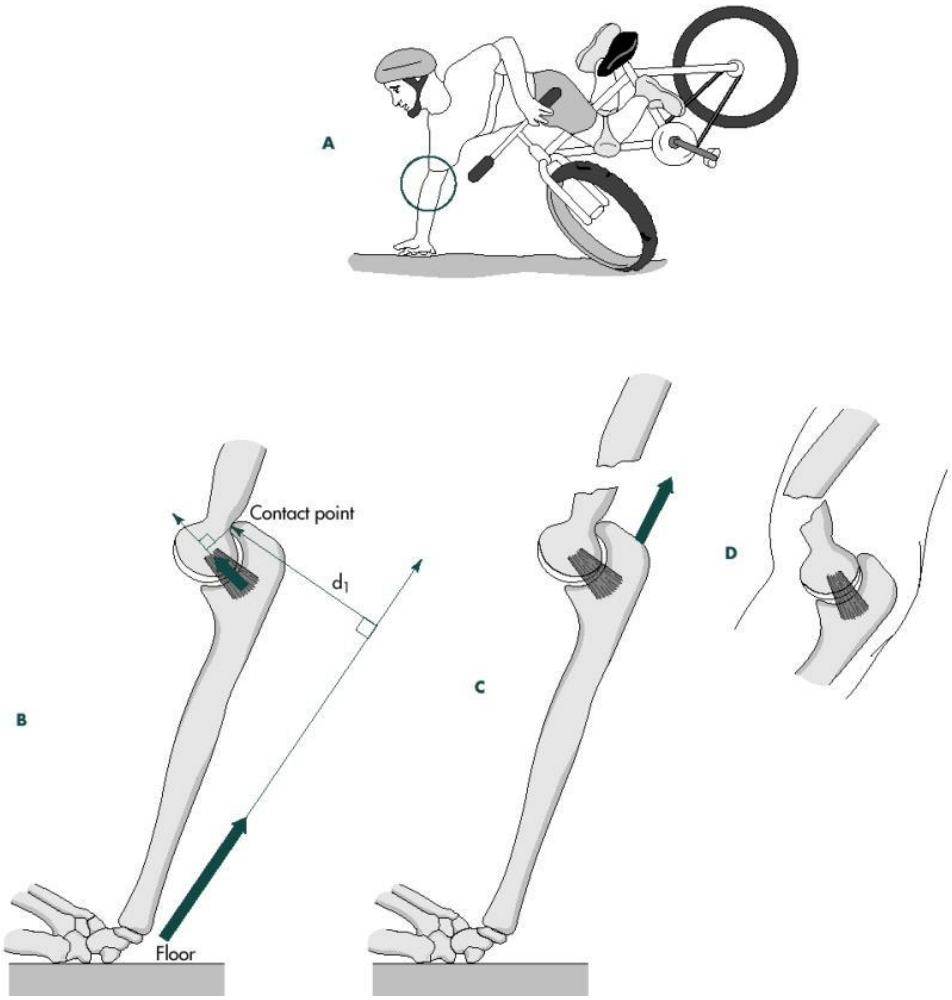
Midshaft Humerus Fractures Children

- Radial nerve injury is rare
- accept 1-1.5cm shortening, 15-20 deg angulation
- 4-6 wks in modified Velpeau or sling and swathe (compliance difficult for hanging cast)

Supracondylar Fracture

- Usually < 8yo
- Extension (95%) vs flexion

Supracondylar Fracture-Mechanism



Supracondylar Fracture- clinically

- Mild swelling to gross deformity
- arm held to side, immobile, extension
- S-shaped configuration

Supracondylar Fracture-Classification

- Gartland
- I - nondisplaced
- II - displaced with intact posterior cortex
- III - displaced fracture, no intact cortex
  - A: postermedial rotation of distal fragment
  - B: posterolateral rotation

Supracondylar Fracture-Management

- If NV compromise - urgent ortho consult
- if no response in 60 min may attempt 1 reduction
- watch brachial artery and median nerve
- Gartland I - splint and ortho f/u 24h
- Gartland II - controversy but most get pinned
- Gartland III - closed reduction and pin

Supracondylar Fracture-Reduction

Spot the

Spot the