

Elbow Trauma

Overview

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Shoulder Fellow

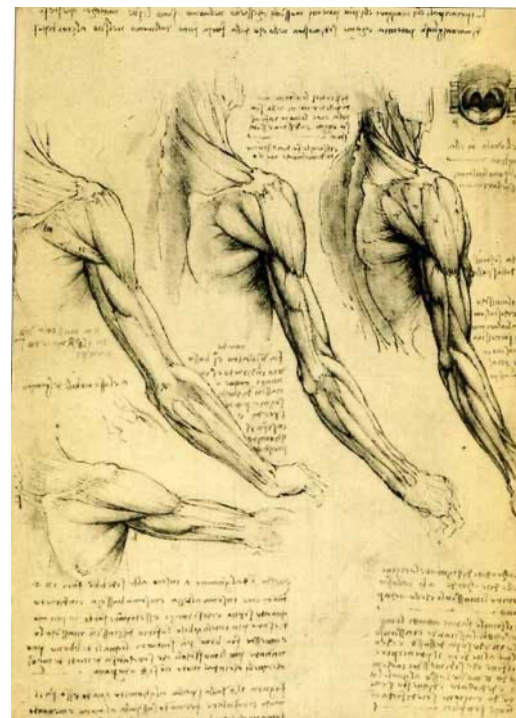
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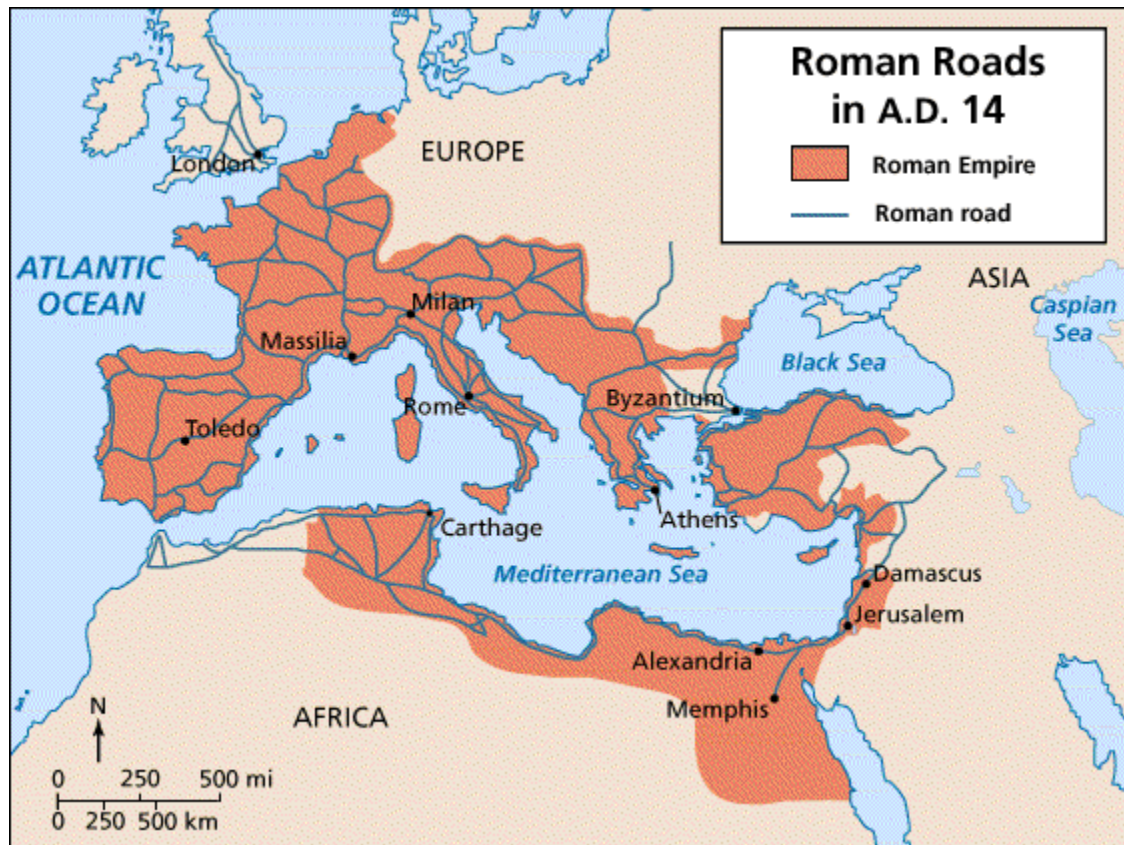
Structure

- Anatomy
- Fractures: Distal Humerus, Radial Head, Olecranon, Monteggia
- Distal biceps rupture
- Instability

-Aetiology, Investigations, Management, Approaches

- Take Home Messages





Anatomy

- 3 joints: UH, **RC**, RU
- ADL
- Flexion/extension 0-30-130°
- Slight Valgus

Anatomy

1° Stabilisers:

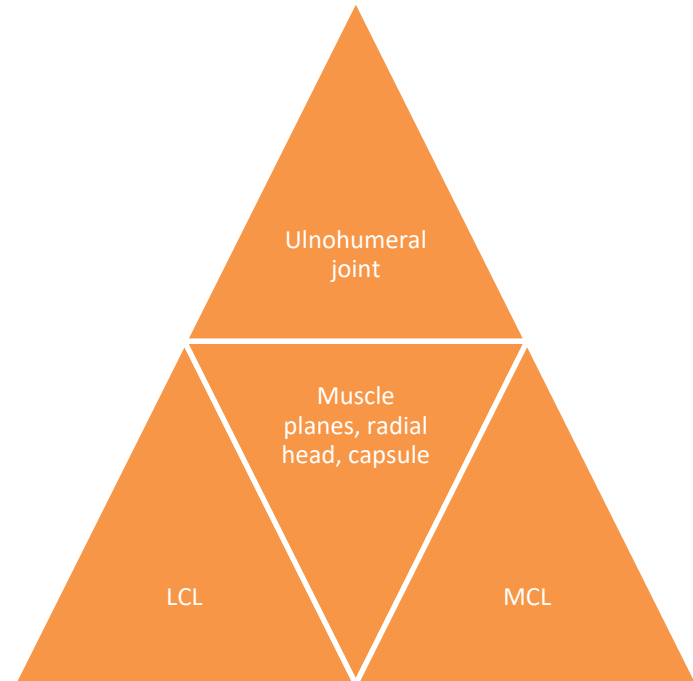
- UHJ (coronoid)
- MCL
- LCL

2° Stabilisers:

- RCJ
- Capsule
- Flexor/extensor origins

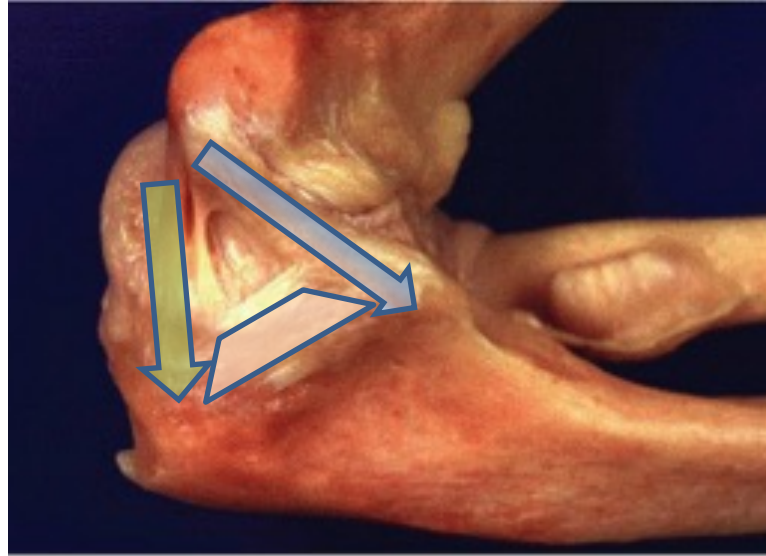
Dynamic stabilisers:

- Anconeus, brachialis, triceps, biceps



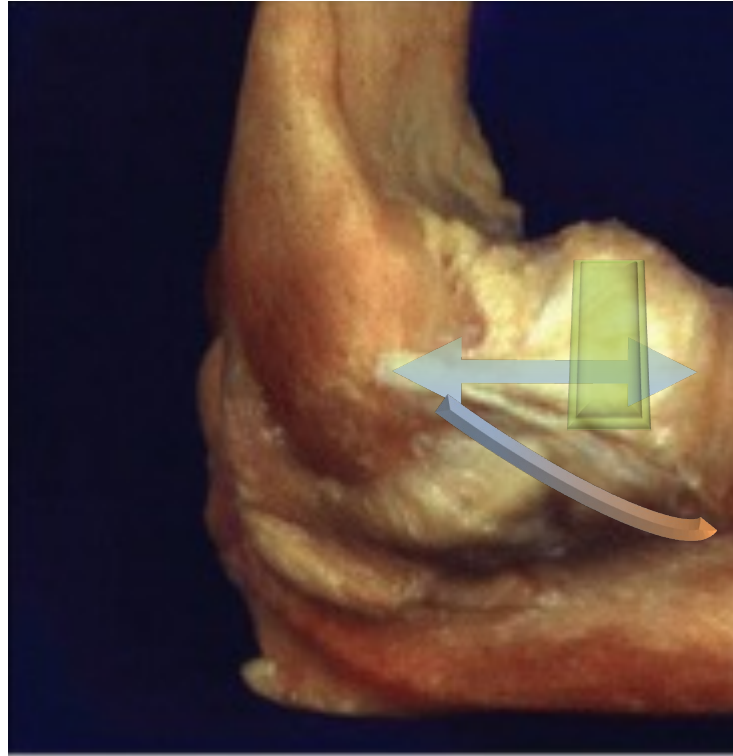
Medial

- Anterior bundle
- Posterior bundle
- Transverse bundle (Cooper)



Lateral

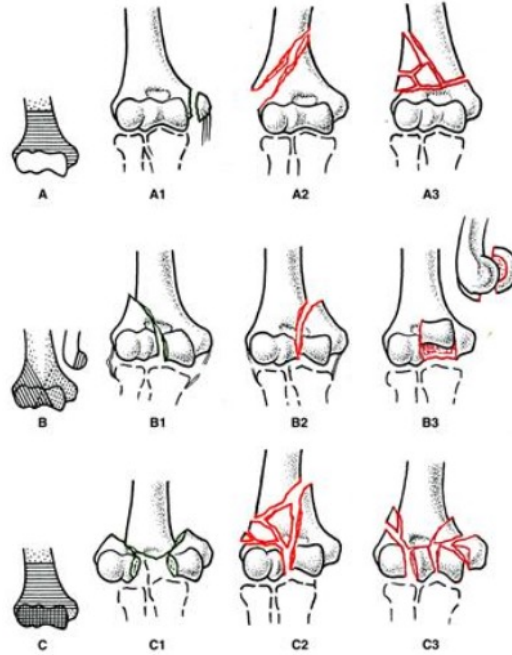
- Radial collateral ligament
- Lateral ulnar collateral ligament (LUCL)
- Annular ligament
- Accessory ligament



Distal Humerus - Aetiology

- 1/3 of elbow fractures (7% of all fractures)
- Bimodal distribution (high/low energy)
- Flexion $>90^\circ$ → intercondylar
- Flexion $<90^\circ$ → transcolumnar
- Complications: Dislocation, Terrible triad, Floating elbow, Volkmann contracture

Classification



Investigations

- Exclude neurovascular injury
- Immobilise
- XR, CT

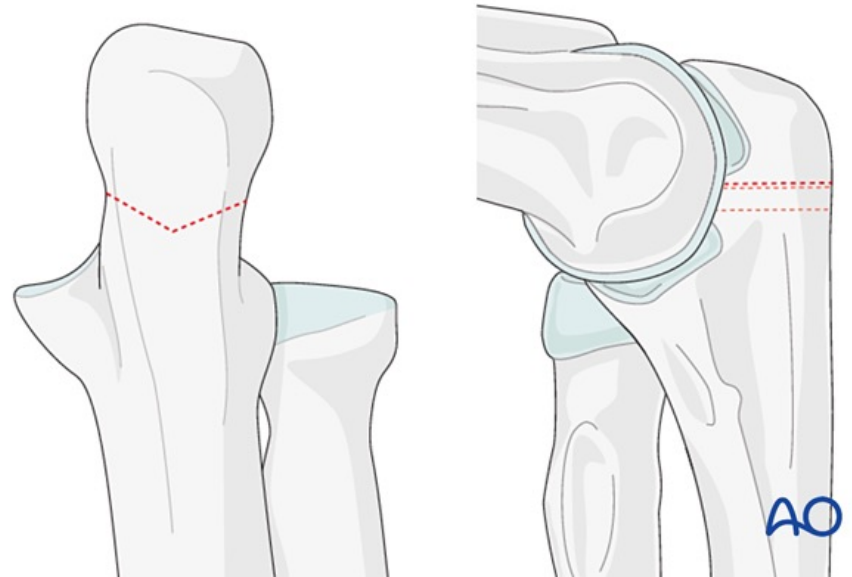


Management

- Conservative, only undisplaced Milch type I fractures
- If casting: supination for lateral condyle, pronation for medial condyle
- ORIF is the mainstay, TEA in elderly distal bicolunar fractures

Surgical approaches

- Positioning
- Posterior
- Olecranon osteotomy
- Triceps splitting

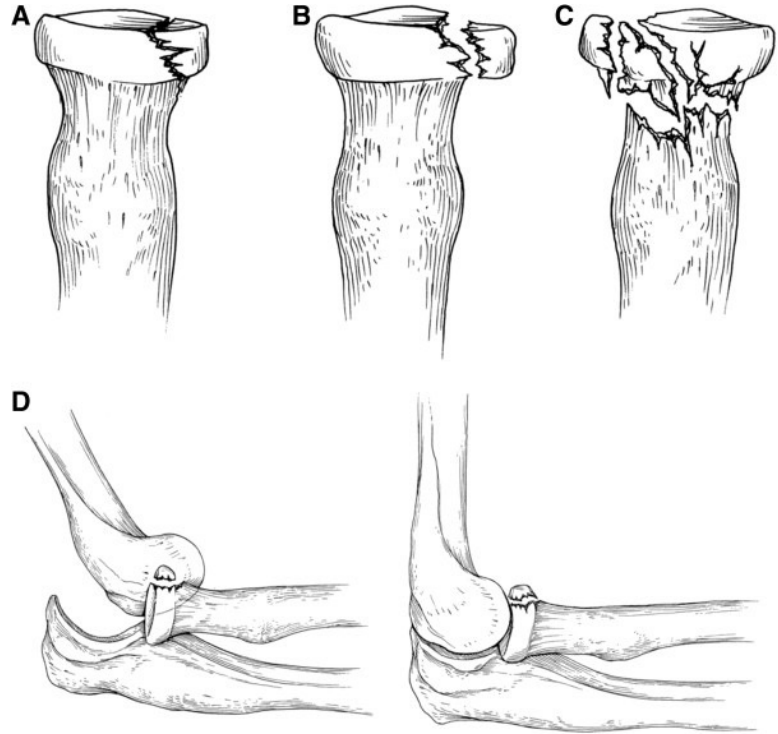


Radial Head - Aetiology

- 1-4% of all fractures, 85% 30-60 y.o., 30% with associated injuries
- Radial head confers valgus stability (important if MCL deficient), longitudinal stability
- Associated: DRUJ, instability, mechanical block
- FOOSH
- Associated: LCL (80%), MCL, Essex-Lopresti, Coronoid, olecranon, Monteggia, terrible triad

Classification

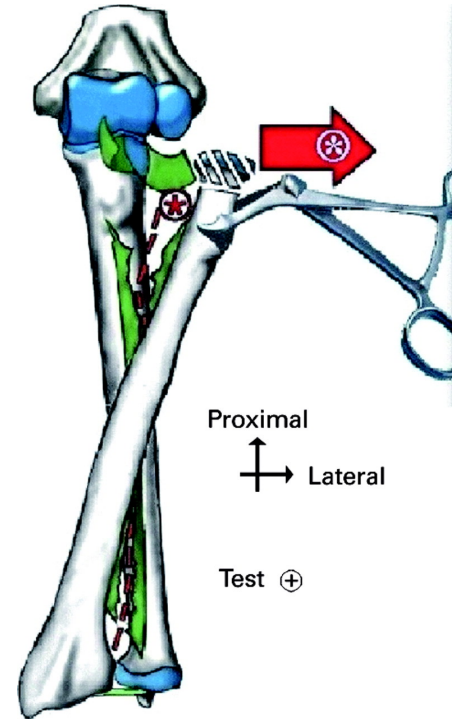
Type	Description
Type 1	Fissure or marginal fractures without displacement
Type 2	Marginal sector fractures with displacement (Segment of the lateral border of the radial head is separated from the other quadrants, is impacted and depressed, or is tilted out of line)
Type 3	Comminuted fractures involving the whole head of the radius



Reproduced with permission from Mason ML. Some observations on fractures of the head of the radius with a review of one hundred cases. *Br J Surg.* 1954;42:123–132.

Investigations

- Exclude mechanical block
- Immobilise
- XR, CT



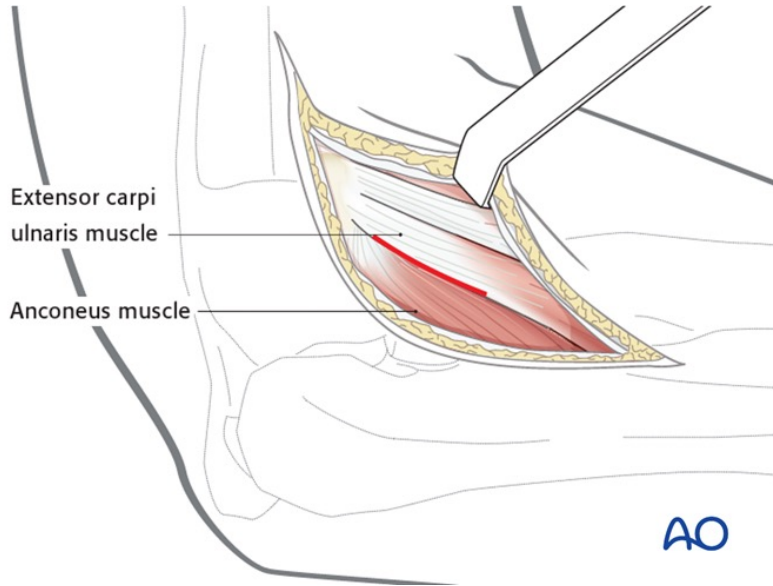
Investigations



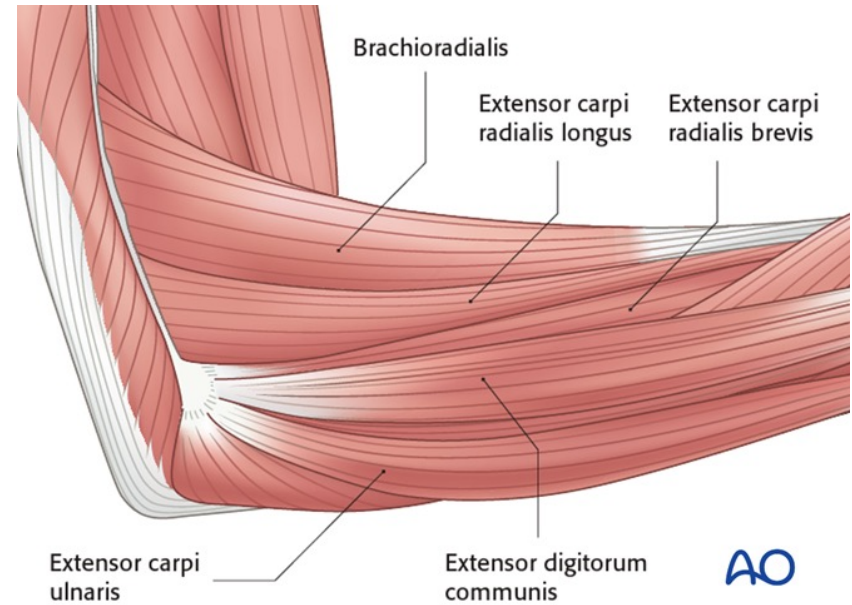
Management

- Conservative: Mason I without mechanical block
- ORIF/Radial Head Replacement/Resection

Surgical approaches



Kocher



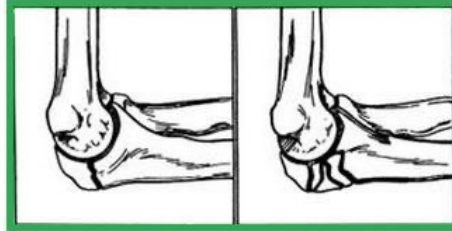
Kaplan

Olecranon- Aetiology

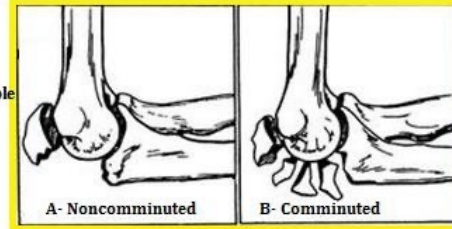
- 10% of upper extremity fractures
- Extensor mechanism
- Bimodal distribution
- FOOSH/direct blow

Classification

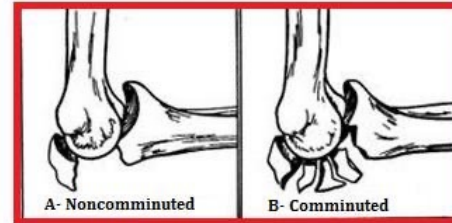
Type I
undisplaced



Type II
displaced-stable



Type III
unstable



Investigations

- Extensor mechanism
- Palpable defect
- XR (CT)

Investigations



Management

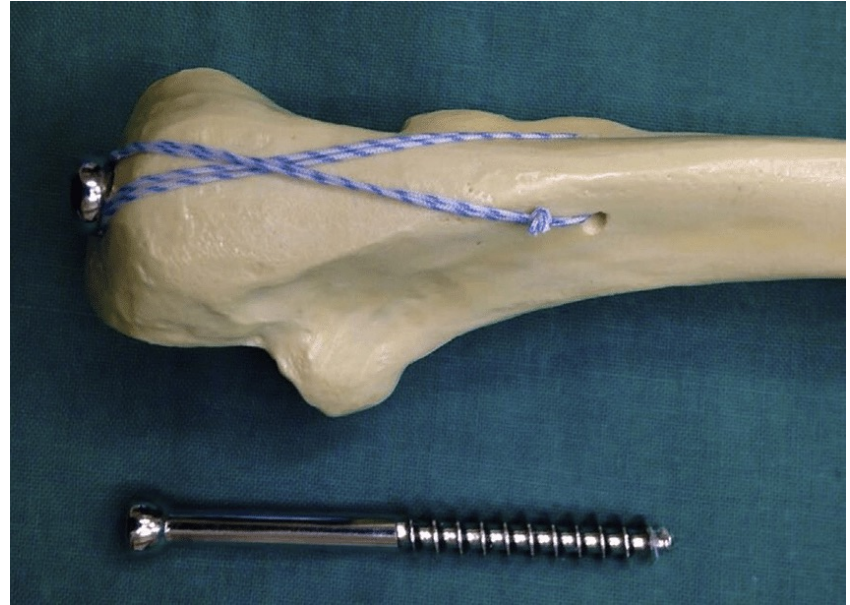
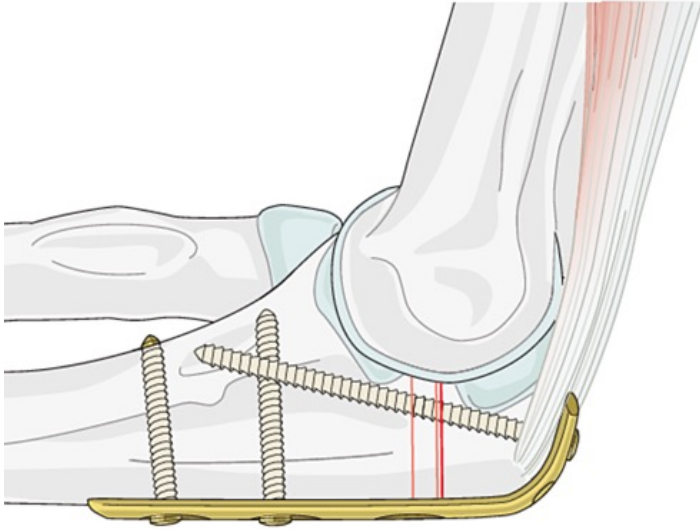
- Conservative: extensors intact, elderly/low demand
- TBW/plate and screw (Excision and triceps advancement)

Anatomical considerations

- Bare Area
- Varus angulation
- Anterior deviation (PUDA)



Surgical approaches



Monteggia fractures

- Proximal 1/3 ulna fracture, associated radial head dislocation
- 4-10 y.o.
- PIN neuropathy

Monteggia Fractures

Associated injuries:

- Olecranon
- Radial head
- Coronoid
- ‘Terrible Triad’

Classification

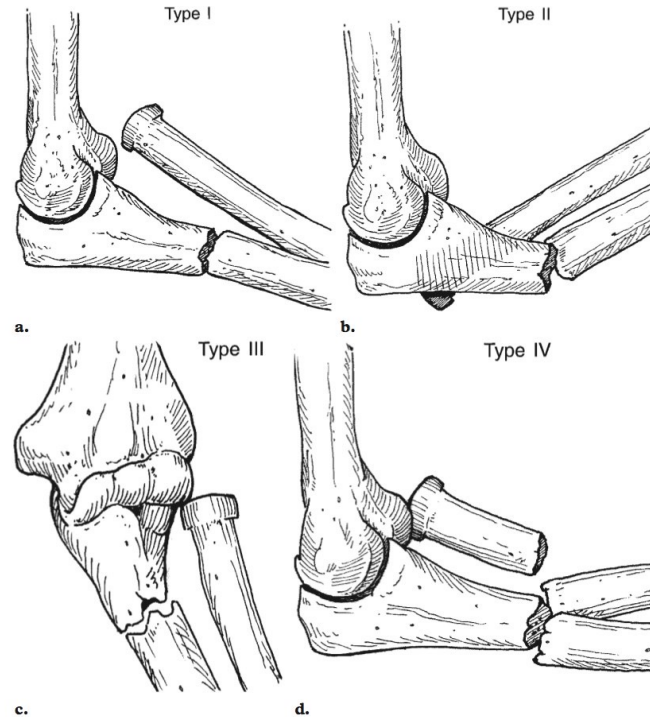


Figure 2. Drawings illustrate Bado's classification of Monteggia fractures: type I (a), type II (b), type III (c), and type IV (d). A type I Bado fracture represents the fracture-dislocation originally described by Monteggia, a fracture of the proximal one-third of the ulna with anterior dislocation of the radial head.

Treatment & Complications

Treatment:

- Virtually always operative
- Tension-band wiring, plate fixation

Complications:

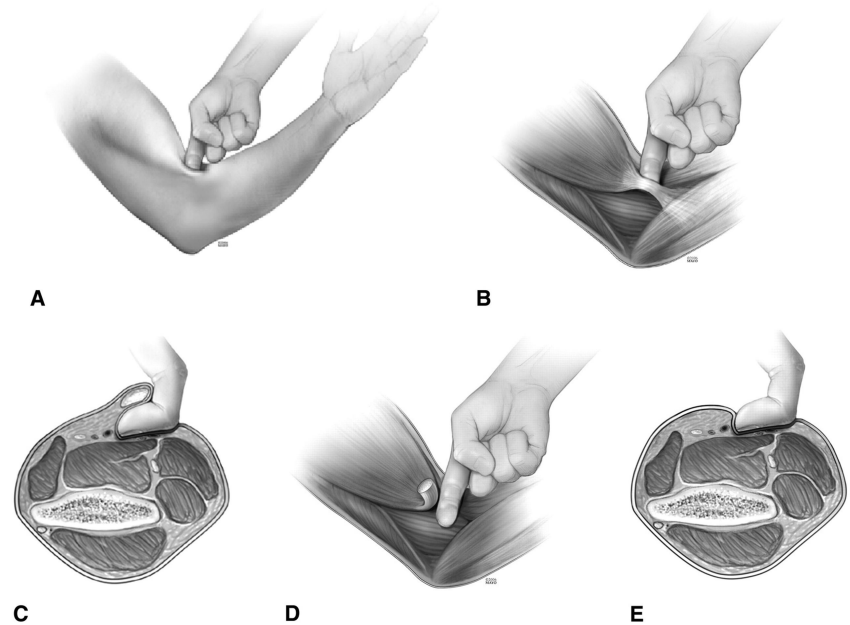
- PIN injury
- **Malunion/Non-union**

Distal Biceps rupture- Aetiology

- Rare
- 10% of biceps ruptures
- Dominant elbow (86%), men (93%) in their 40s.
- Risk factors: anabolic steroids, smoking (7.5x), (hypovascularity, intrinsic degeneration, mechanical impingement)
- Long head proximal radial tuberosity, short head distal (better flexor)
- 50-40-30

Investigations

- Weakness and pain in supination
- Hook test
- MRI



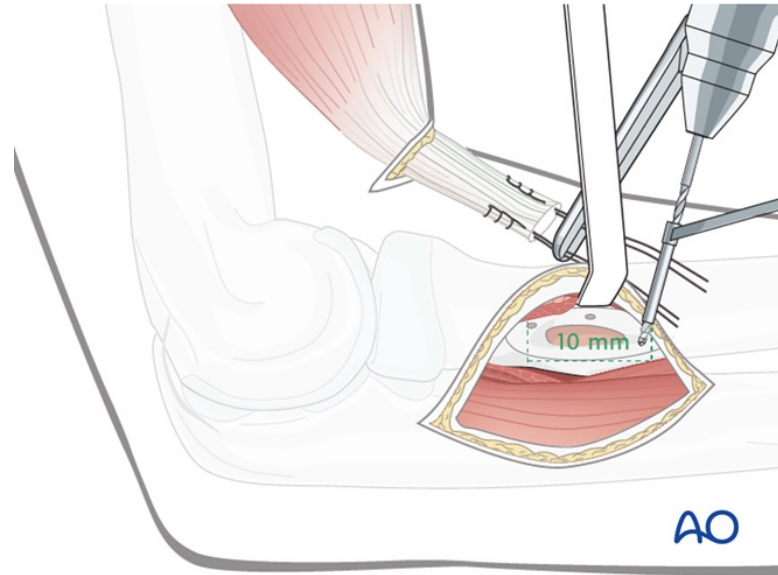
Investigations



Management

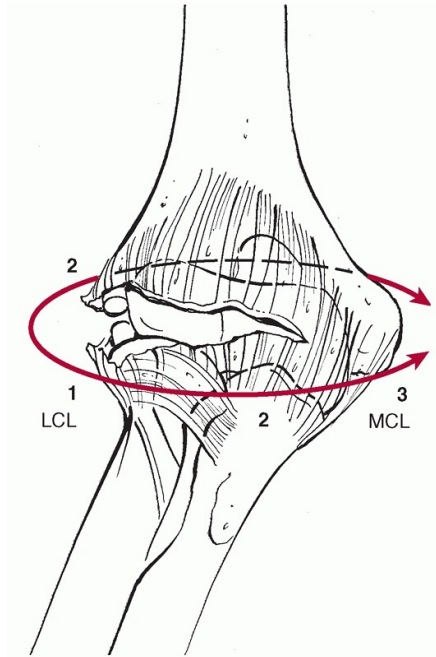
- Supination strength
- Time from injury
- Lacertus fibrosus

Surgical approaches



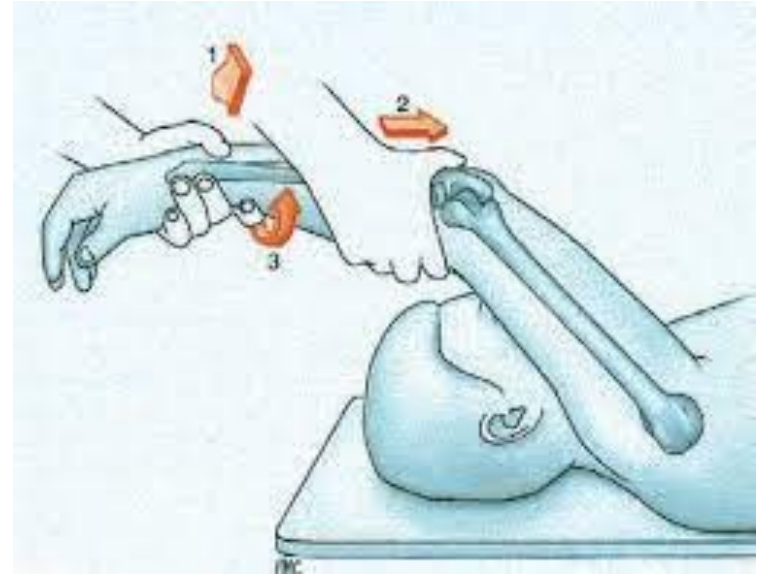
Dislocation - Aetiology

- Most common dislocation after shoulder
- 80% posterolateral
- 10-20 years
- Recurrence rare in simple dislocations



Exam

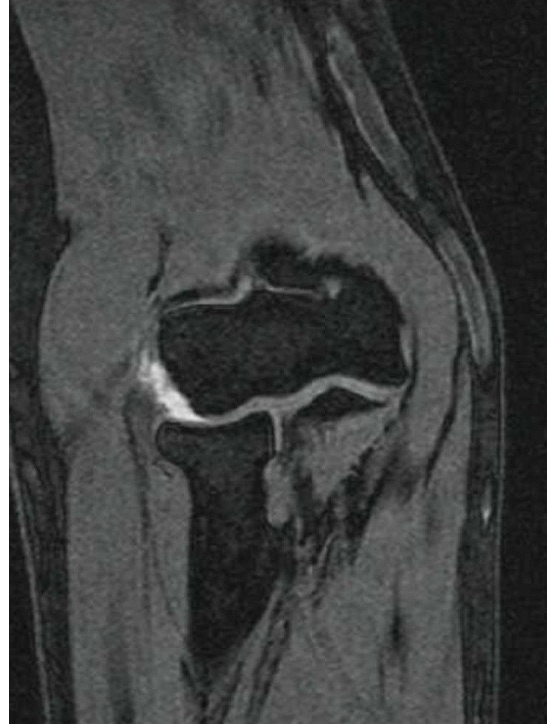
- Soft tissues
- ROM
- Stability
- Neurovascular injury



Investigations

- X-ray
- MRI
- MR Arthrogram

MRI

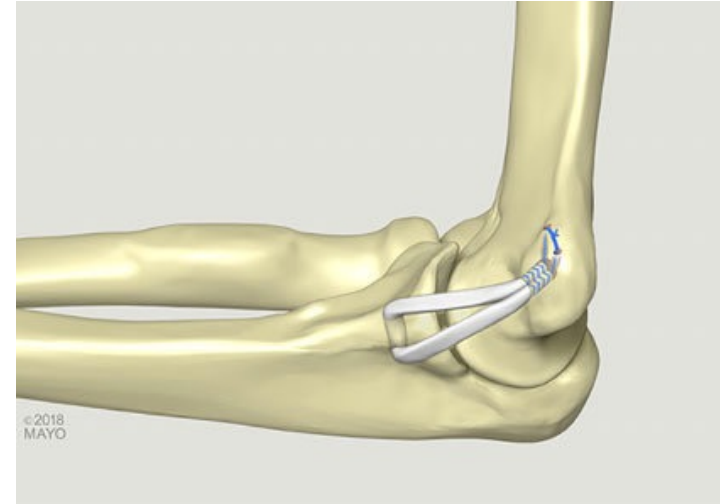


Management

- Conservative: Acute simple dislocations
- ORIF/external fixator: concurrent fracture, persistent instability after reduction ($>60^\circ$ flexion to maintain reduction), closed impossible

Approaches

- Ligament repair
- Associated fracture(s)
- LUCL repair / reconstruction with graft



Take home messages

- Stabilisers
- Functional demand
- Stiffness