Patterns of peri-lunate dislocation

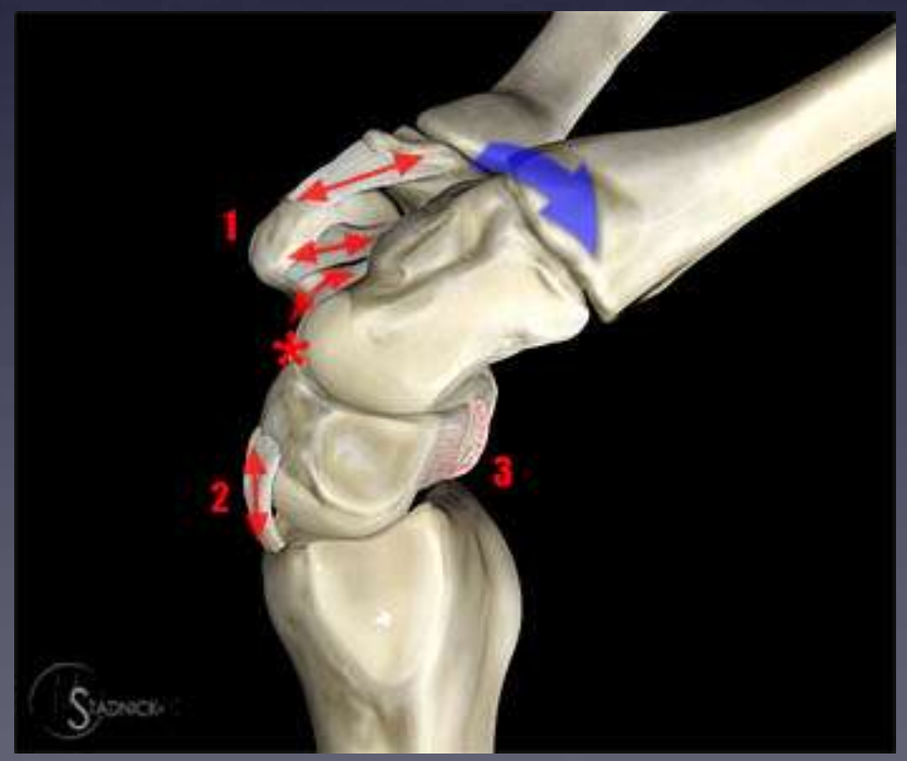
Sarah Klenka
Consultant Hand and Wrist Surgeon

Introduction

- High energy injuries with a poor outcome
- Commonly missed on initial presentation (25%)

Mechanism

- traumatic, high energy
- occurs when:
- wrist extended
- ulnarly deviated
- leading to intercarpal supination



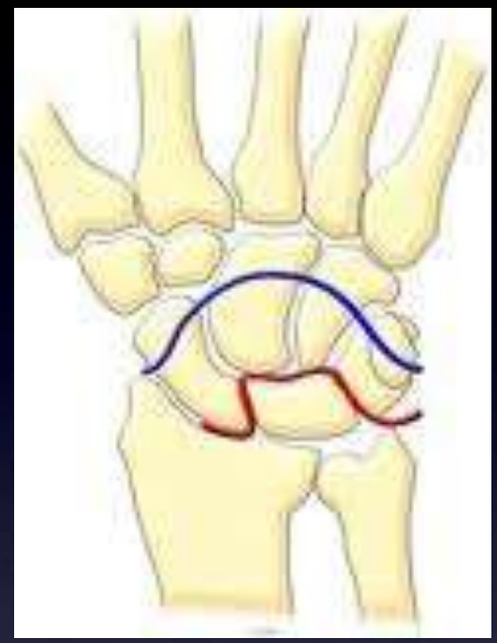
Patterns

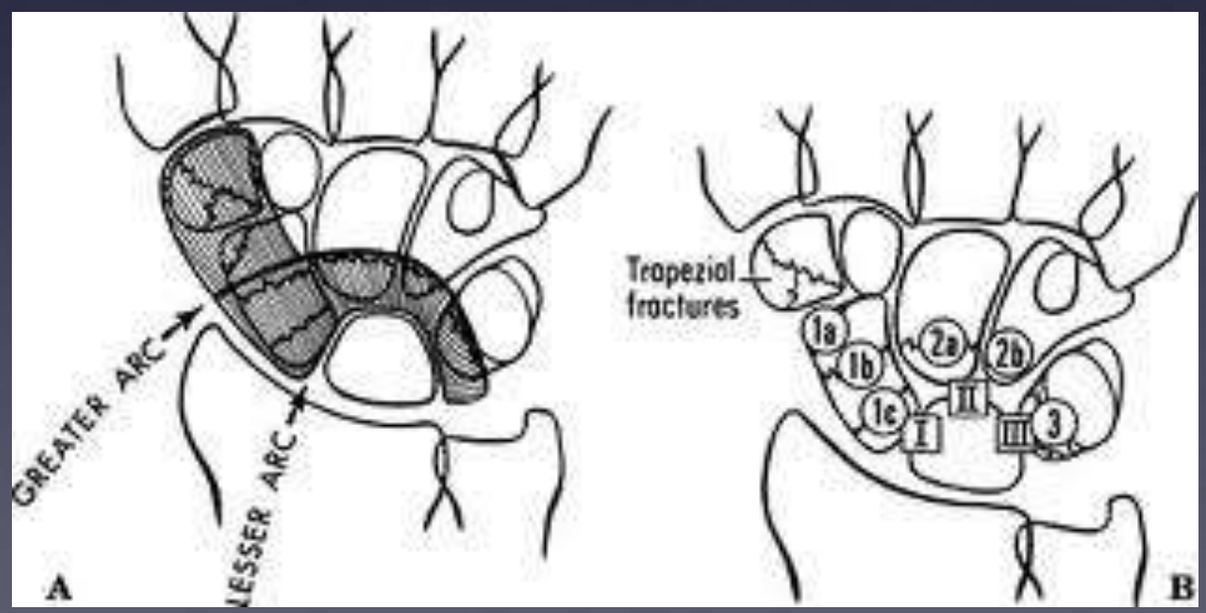
- dislocation can course through:

- bone (greater arc)

- ligaments (lesser arc)

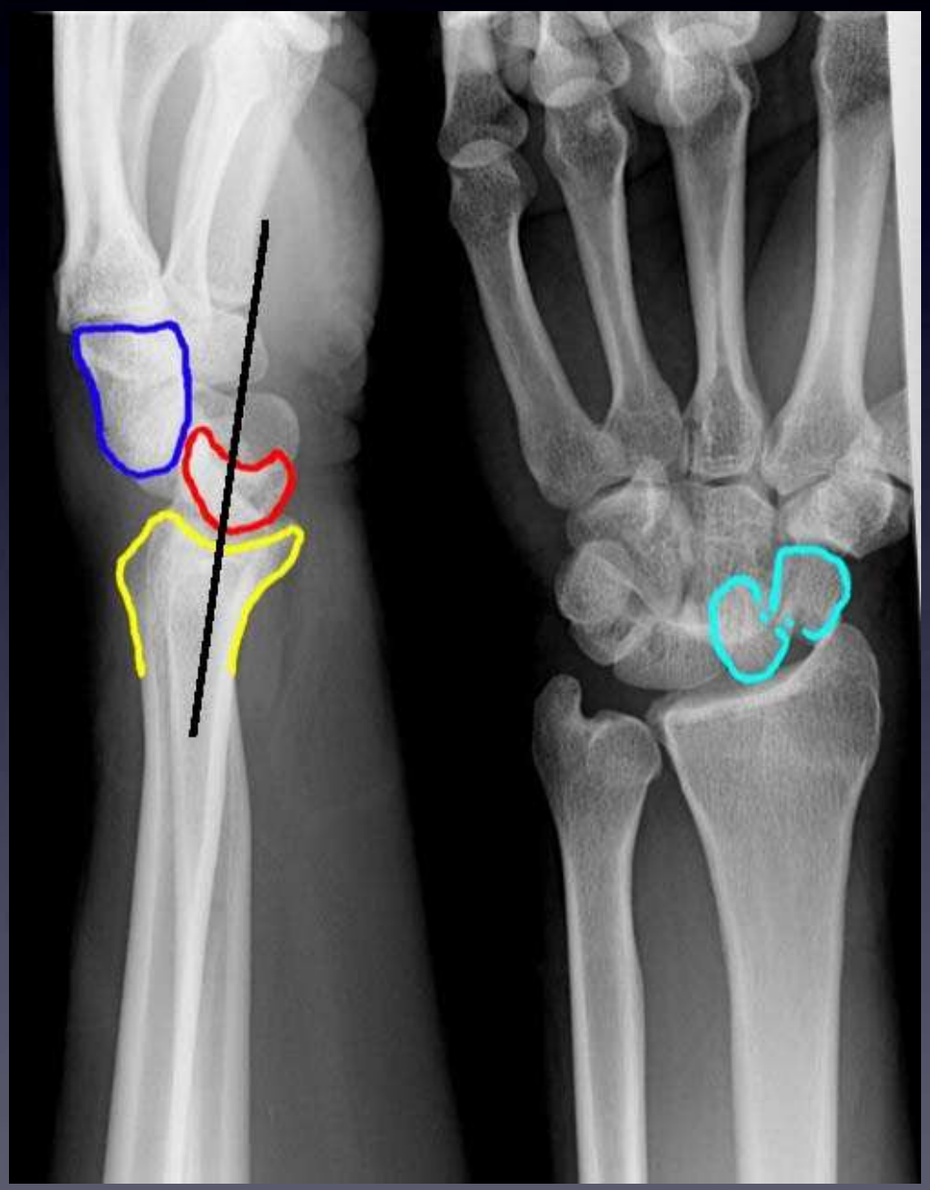
- combination of both bone and ligaments





Categories - perilunate

- Lunate stays in position and carpus dislocates
- Transscaphoid-perilunate
- Perilunate
- Transscaphoid-trans-capitate-perilunate
- Trans-styloid perilunate

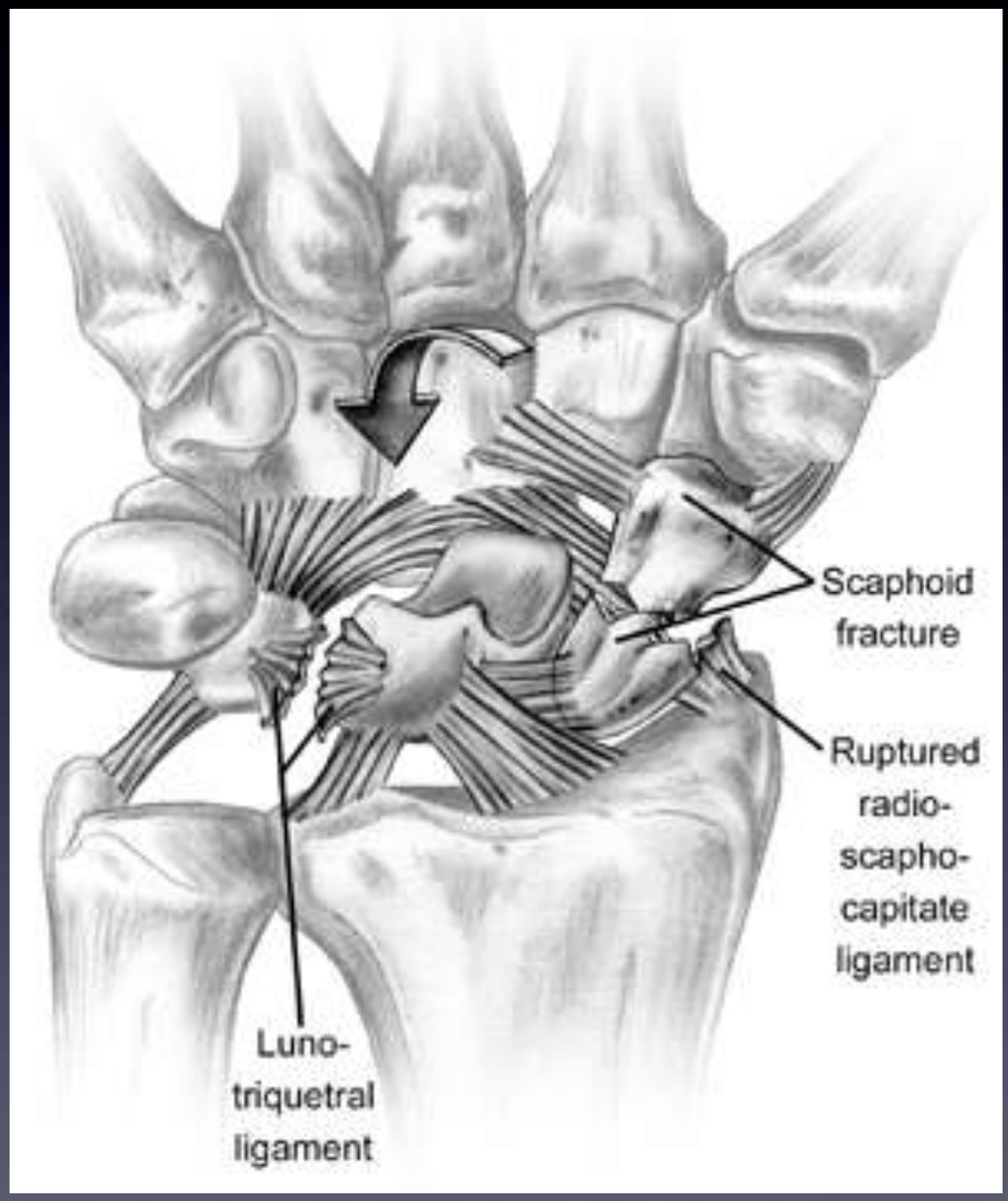


Categories - lunate dislocation

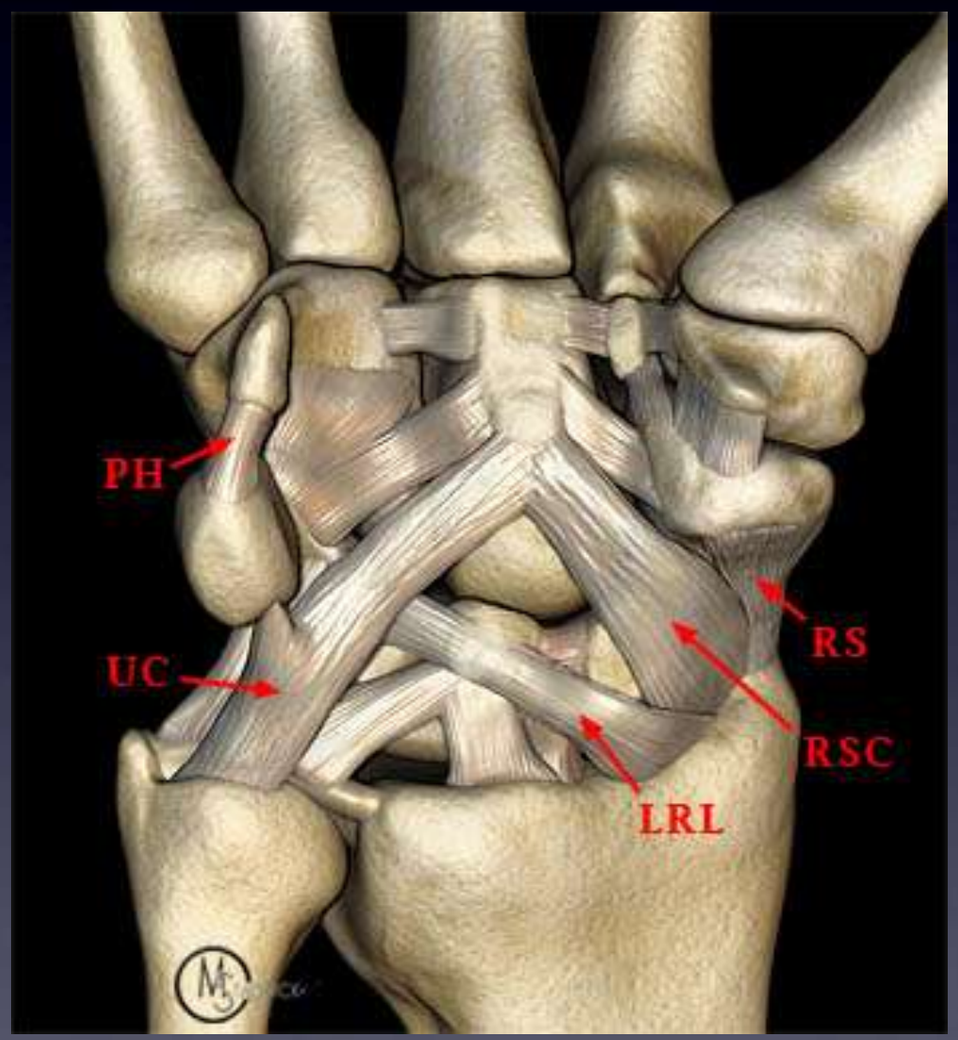
- Lunate forced volar or dorsal while carpus remains aligned

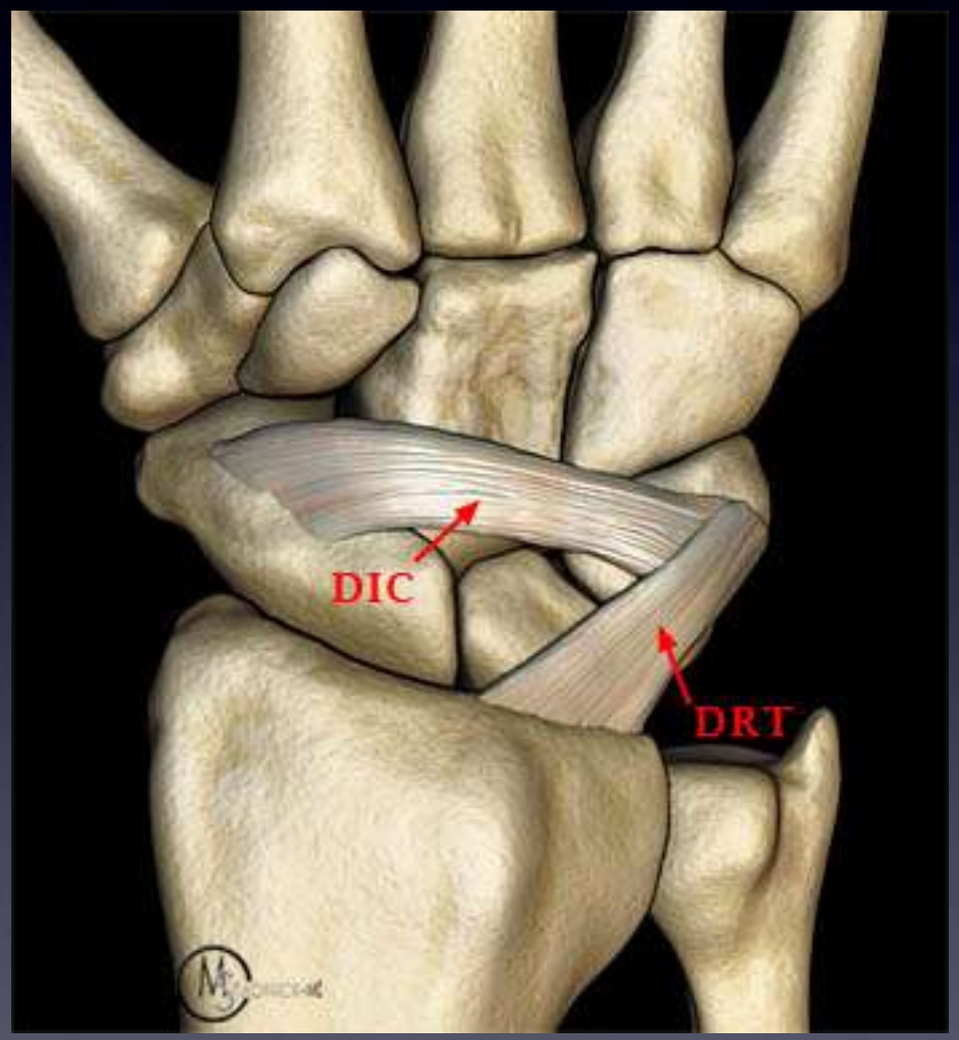
Pathoanatomy

- pattern usually begins radially (styloid)
- de-stabilizes scaphoid (fracture or scapholunate interval)
- force then transmitted ulnarly through SPACE OF POIRIER (between lunate and capitate)
- further force disrupts the luno-triquetral articulation
- failure of volar radiocarpal ligaments, SRL/UL
- lunate rotates and dislocates into the carpal tunnel



Volar and Dorsal wrist ligaments





Mayfield classification

- Stage I: scapholunate dissociation
- Stage II: + lunocapitate disruption
- Stage III:+ lunotriquetral disruption
- Stage IV: lunate dislocation
- lunate dislocated from lunate fossa (usually volar)
- associated with median nerve compression

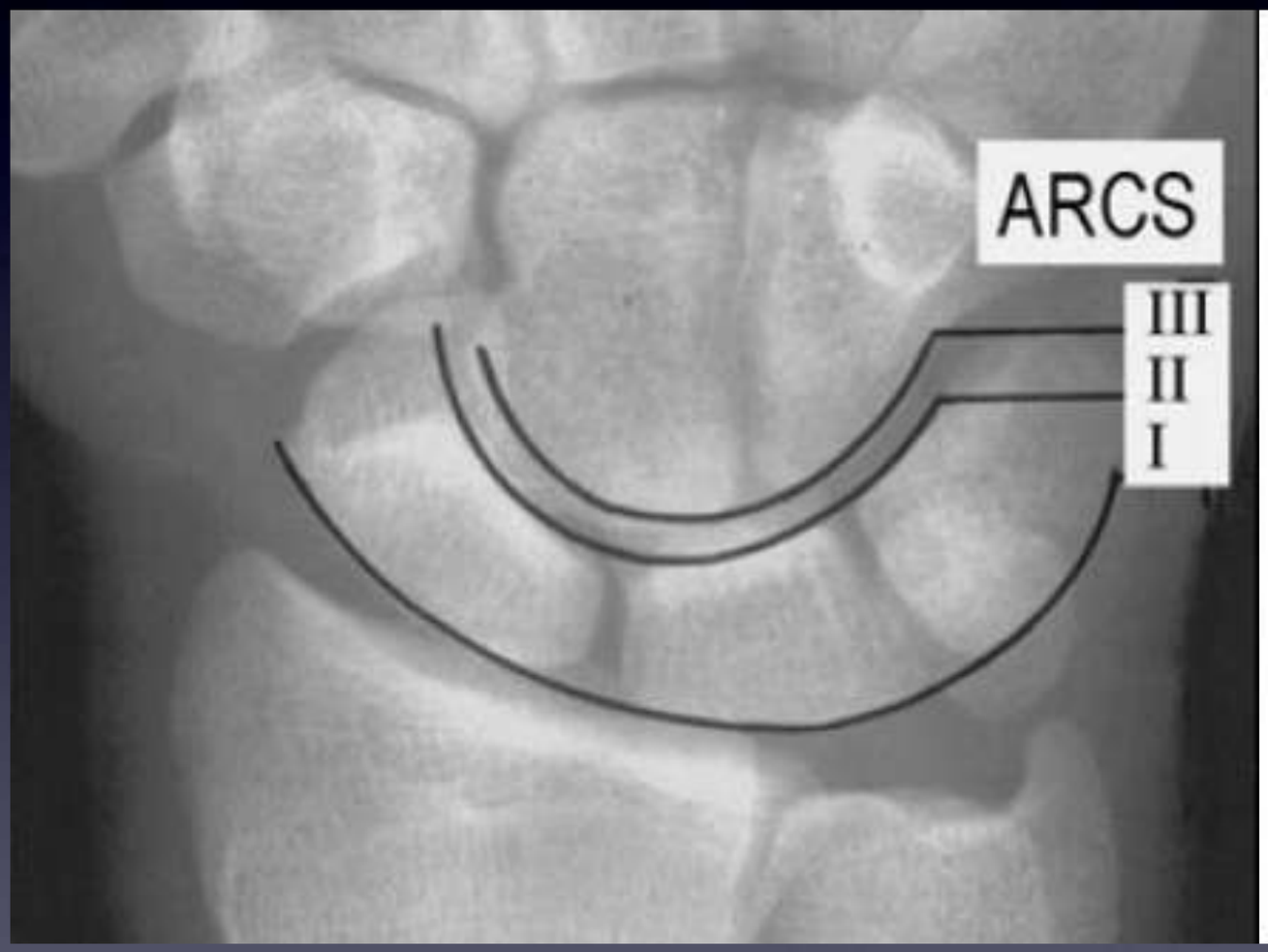
Presentation

- Symptoms
  - acute wrist swelling and pain
  - median nerve symptoms may occur in ~25% of patients

Imaging

- Radiographs - PA/lateral wrist
    - lateral
        - loss of colinearity of radius, lunate, and capitate
        - SL angle >70 degrees
    - findings on AP
        - break in Gilula's arc
        - lunate and capitate overlap
        - lunate appears triangular "piece-of-pie sign"
- MRI
- usually not required for diagnosis

Gilula’s arcs



Treatment

- Nonoperative
  - closed reduction and casting
    - no indications
      - universally poor functional outcomes
      - recurrent dislocation is common

Operative

- **emergent closed reduction/splinting followed by open reduction, ligament repair, fixation, possible carpal tunnel release**
    - All acute injuries <8 weeks old
    - return to full function unlikely
    - decreased grip strength and stiffness are common decreased risk of cartilage damage
    - decreased risk of median nerve damage

Salvage

- **proximal row carpectomy**
  - chronic injury (defined as >8 weeks after initial injury)
  - not uncommon, as initial diagnosis frequently missed
- **total wrist arthrodesis**
  - useful for chronic injuries with degenerative changes

Techniques

- **Closed Reduction in A&E**

  - dorsal dislocations are reduced through wrist extension, traction, and flexion of wrist

  - finger traps, elbow at 90 degrees of flexion

  - hand 5-10 lbs traction for 15 minutes

  - apply sugar tong splint

  - follow with surgery

Techniques - approaches

- **Open reduction, ligament repair and fixation +/- carpal tunnel release**
  - dorsal approach
    - longitudinal incision centered at Lister's tubercle
    - excellent exposure of proximal carpal row and midcarpal joints
    - does not allow for carpal tunnel release
  - volar approach
    - extended carpal tunnel incision just proximal to volar wrist crease
  - combined dorsal/volar
    - pros
      - added exposure
      - easier reduction
      - access to distal scaphoid fractures
      - ability to repair volar ligaments
      - carpal tunnel decompression
    - cons
      - some believe volar ligament repair not necessary
      - increased swelling
      - potential carpal devascularization
      - difficulty regaining digital flexion and grip

Cooney et al 1987

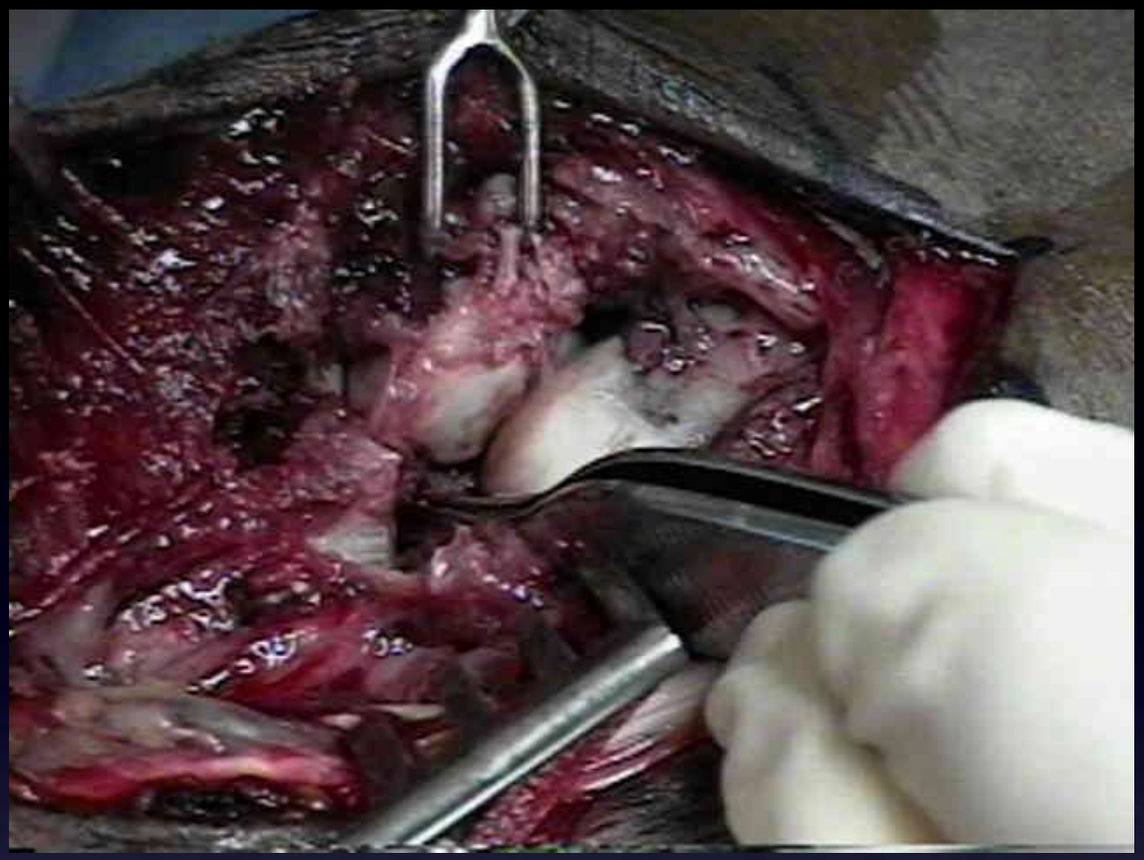
Technique

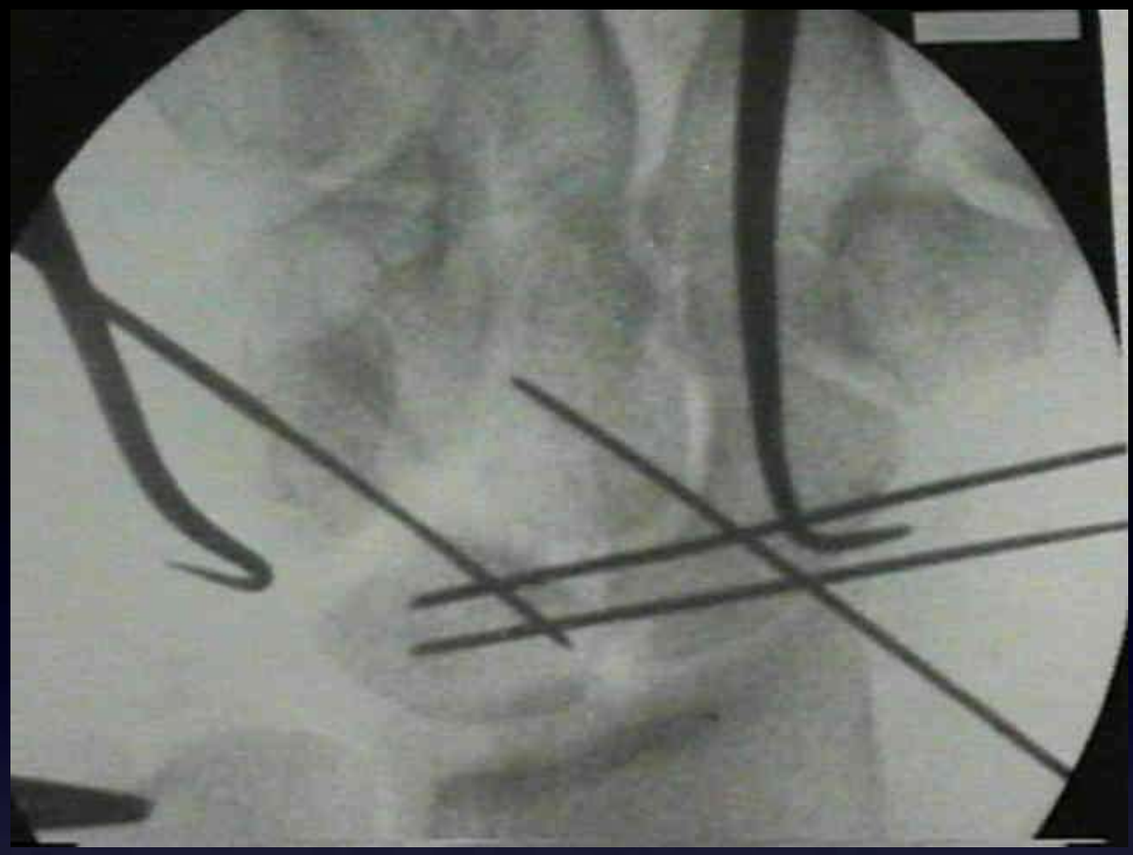
- Repair scapholunate ligament
  - suture anchor fixation

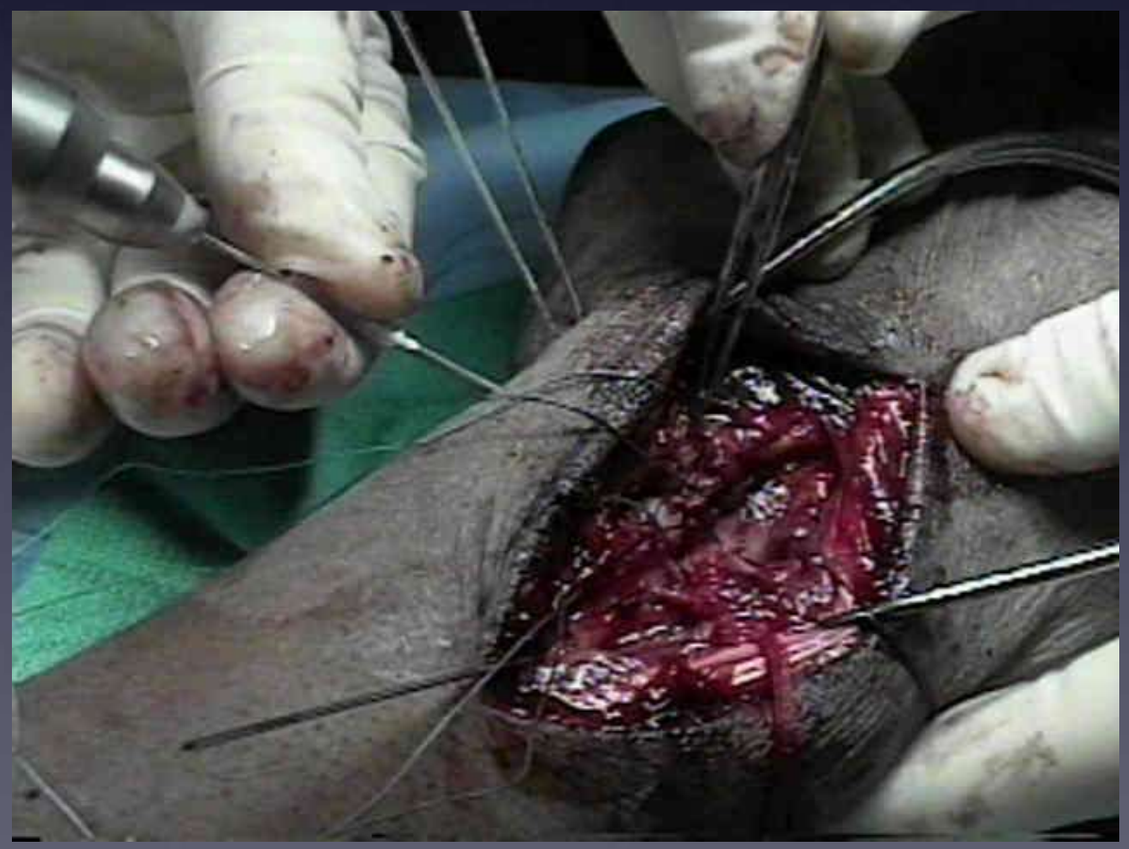
- Protect scapholunate ligament repair - controversy of k-wire versus intraosseous cerclage wiring

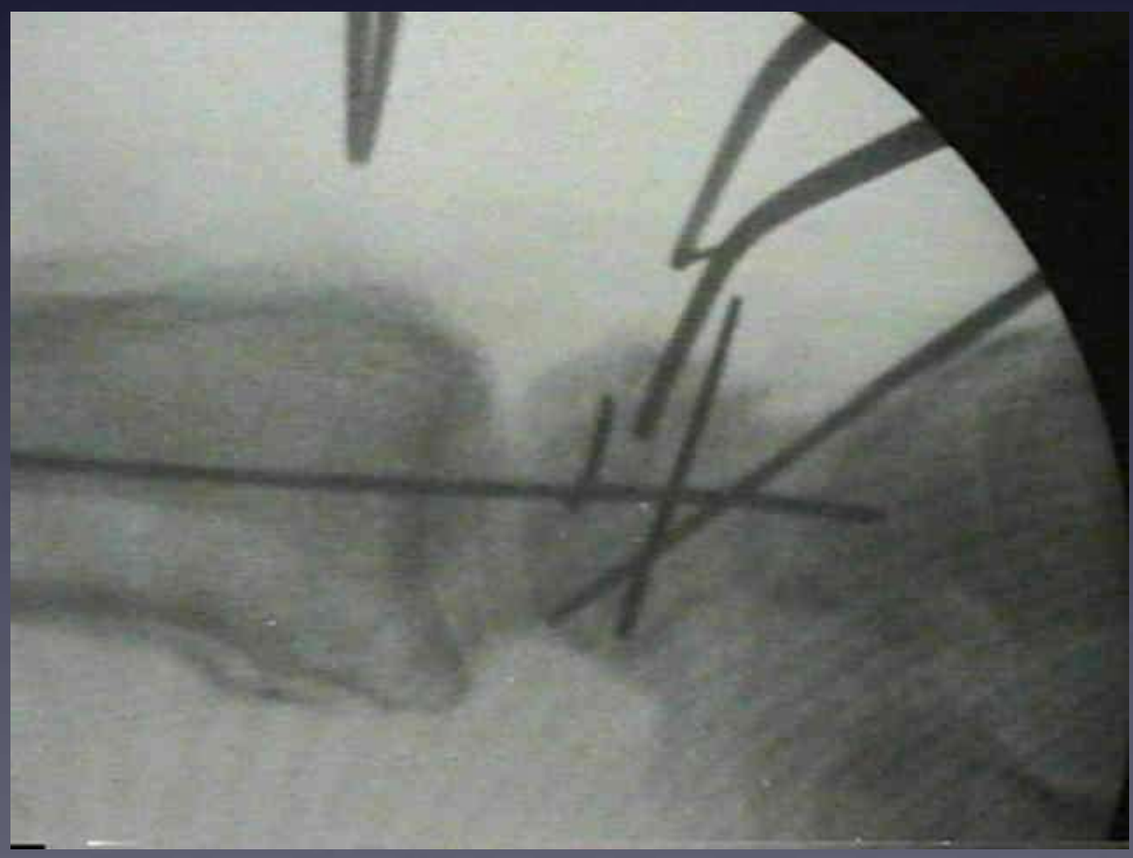
- Repair of lunotriquetral interosseous ligament - surgeon preference (no shown improved results)

- Fix associated fractures



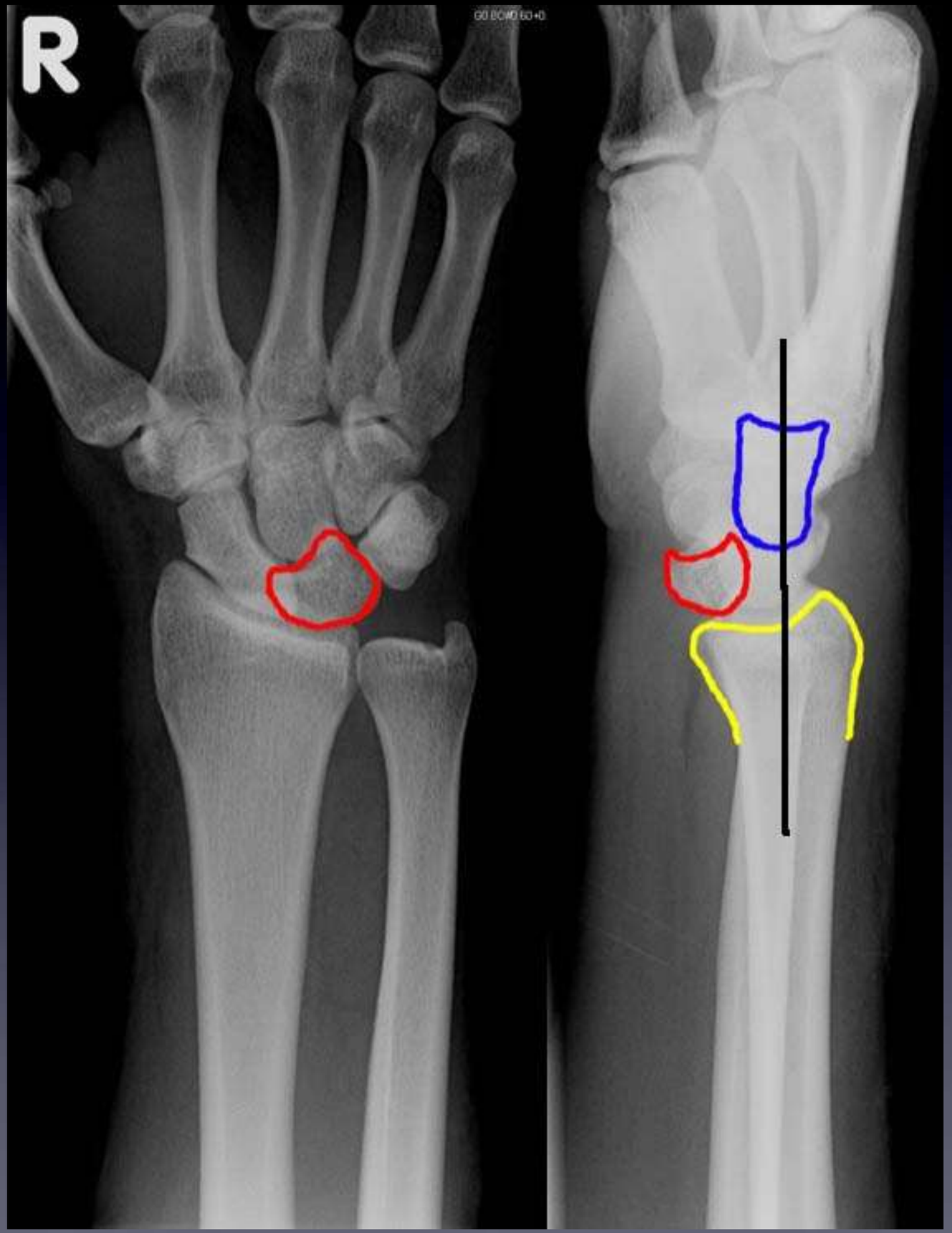







R


R


R


A
B
C