

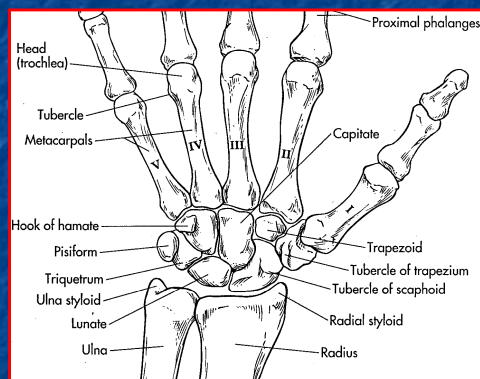
Fractures and Dislocations of the Wrist



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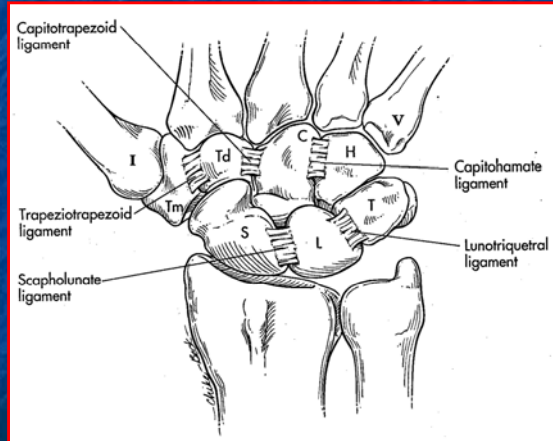
Questions Only

Carpal Anatomy

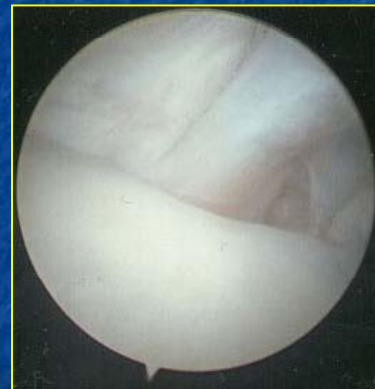
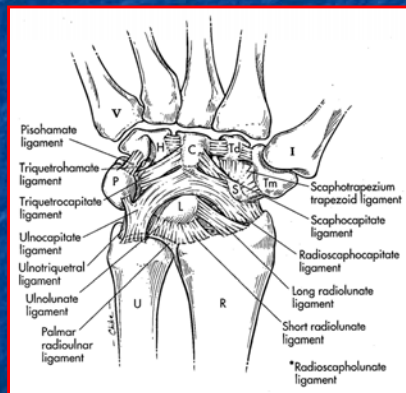


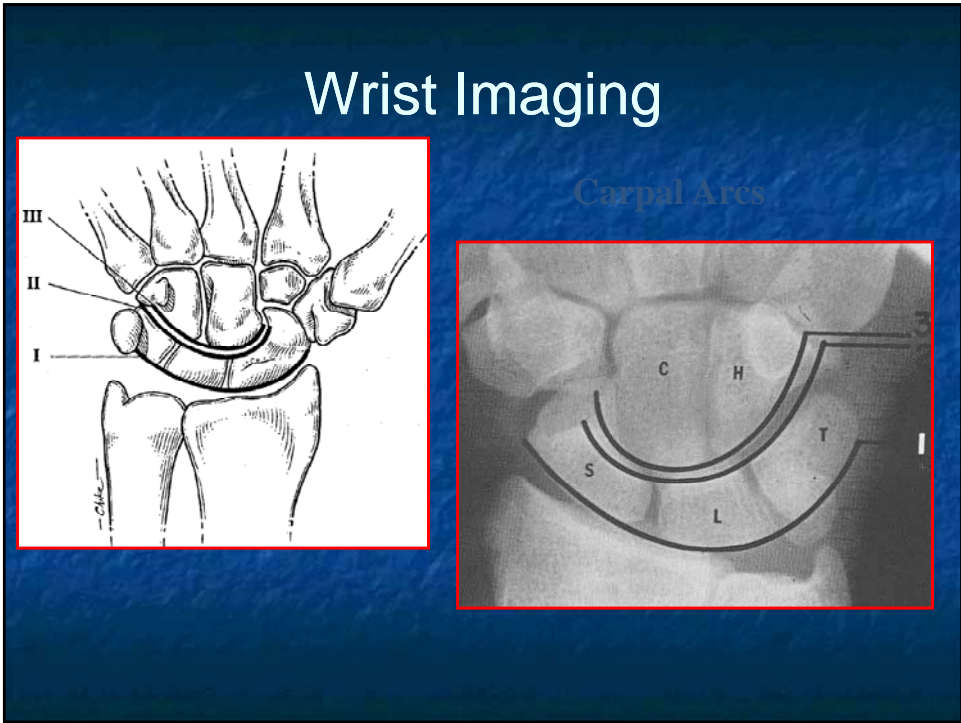
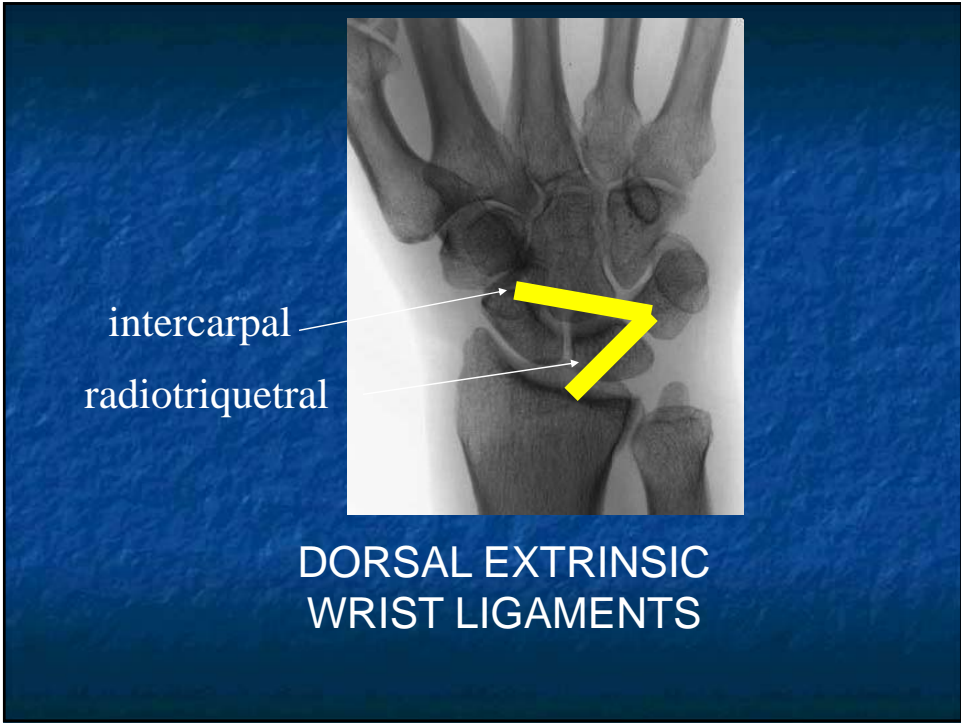
Proximal Row is an intercalated segment

Intrinsic Ligaments



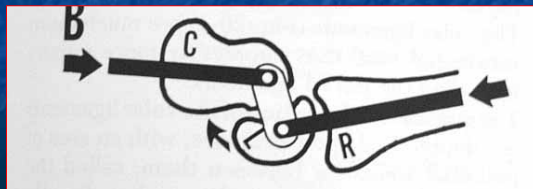
Extrinsic Ligaments





Wrist Imaging

Normal SL angle 47 degrees **CTQ**

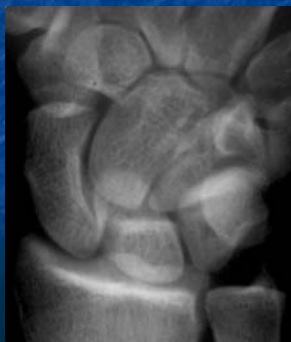


“THREE D’S” of the triquetrum

In ulnar Deviation the triquetrum:

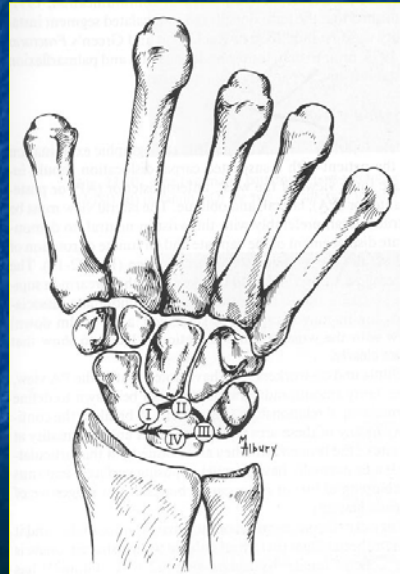
Dorsiflexs

Descends



Mayfield Stages of Instability

1. SL Tear
2. Arcuate Ligament
3. LT Tear
4. Lunate/Perilunate Dislocation



Greater/Lesser Arc Injuries

- Lesser Arc is purely ligamentous
- Greater Arc is across the scaphoid, styloids, +/- capitate and triquetrum



Radiocarpal Dislocation

- Volar extrinsic ligaments
- May be associated with a radial styloid fractures
- Better prognosis with a larger radial styloid fx
- ORIF vs radiolunate fusion

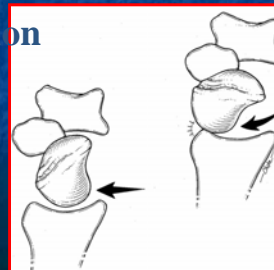


Scapholunate Ligament Tear

WATSON SHIFT TEST



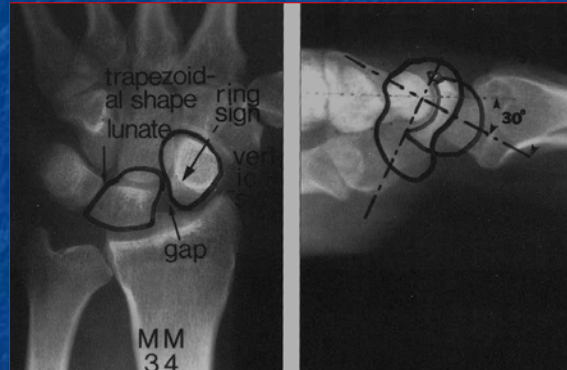
- Clinical Diagnosis Radial Deviation
- MRI not helpful
- Arthrogram may be of some value
- Arthroscopy is gold standard



Wrist Imaging

Abnormal SL Angle >65 deg or < 30 deg
SI Gap > 4 mm on AP view

CTQ



SL dissociation

DISI

SLAC Wrist

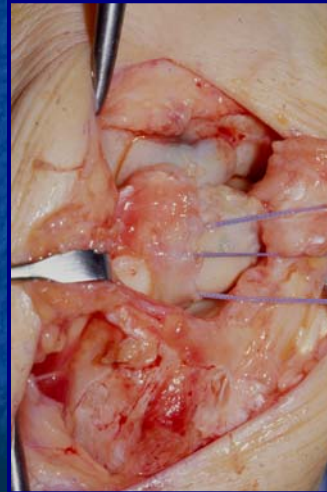
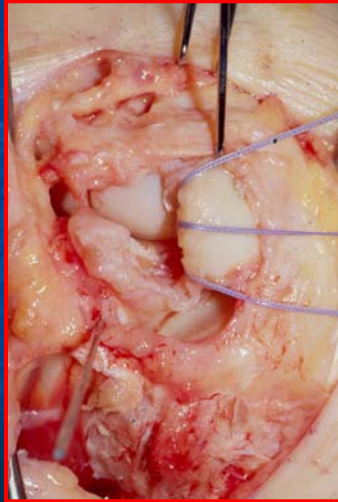
Scapholunate Advanced Collapse

- Uniformly develops > 10 -20 years
- Preventable with repair of SL ligament
- Radioscaphoid $>$ lunocapitate
- Radiolunate preserved
- CTQ
- RX: scaphoid excision and intercarpal fusion



TREATMENT

Scapholunate Ligament Tear



SL Ligament Reconstruction

- Repair not possible > 3- 6 mo s/p injury
- NO Intercarpal fusions ie SC or STT
- Brunelli or RASL
- Scaphoid excision and 4 bone fusion ?

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TIFF (Uncompressed) decompressor
are needed to see this picture.

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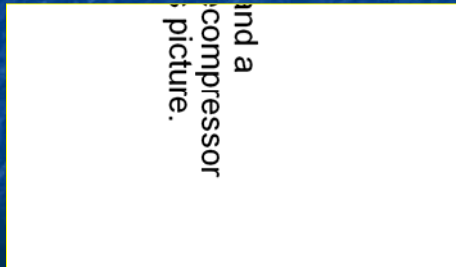
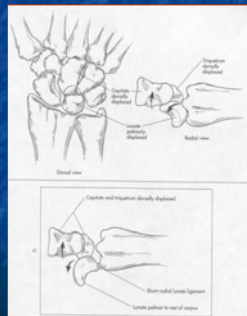
Volar Lunate Dislocation

- “Spilled tea cup” “Scrambled wrist”
- Dislocates through Space of Poirier
- Commonly associated with CTS
- Up to 50% missed in ER !!!! **CTQ**



Dorsal Perilunate Dislocation

Lunate stay home and distal row dislocates dorsally



Treatment of Perilunate Dislocations

- Reduction
- Repair of SL ligament or ORIF scaphoid
- Repair of volar ligaments?



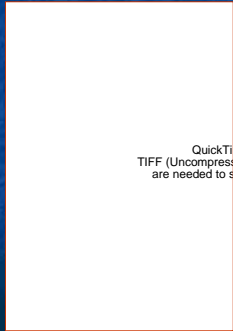
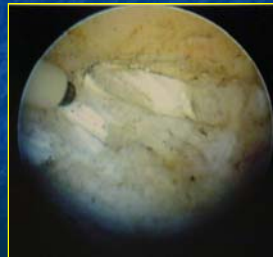
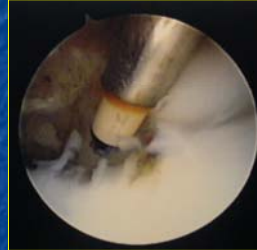
Volar intercalated segment instability (VISI)

- Lunotriquetral tear assoc with tear of dorsal radiocarpal ligament
- Midcarpal Instability: Shift if distal and proximal carpal rows



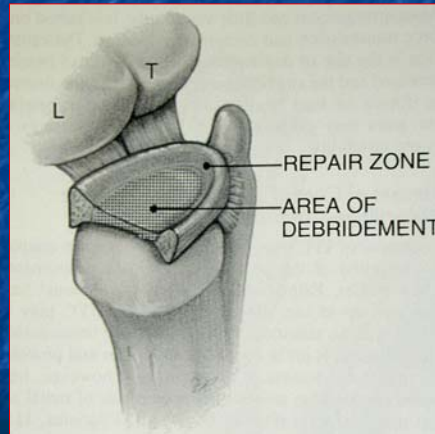
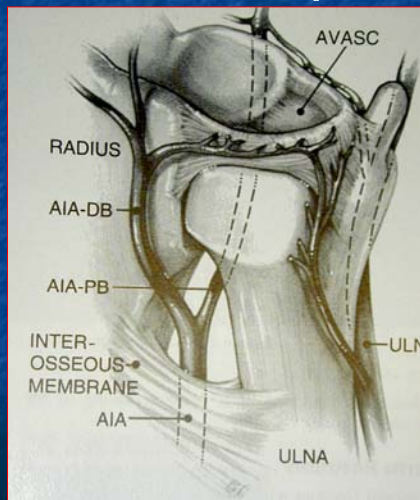
Treatment of Midcarpal Instability

- Midcarpal Fusion
- Thermal Shrinkage



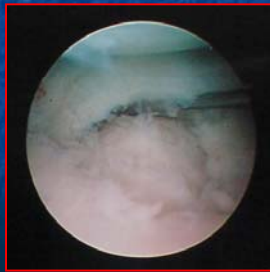
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Triangular Fibrocartilage Complex (TFCC)



TFCC

- Degenerative associated with ulnar positive variance I.e. ulnar impaction syndrome
- Radial and Ulnar tears are repairable either arthroscopically or open

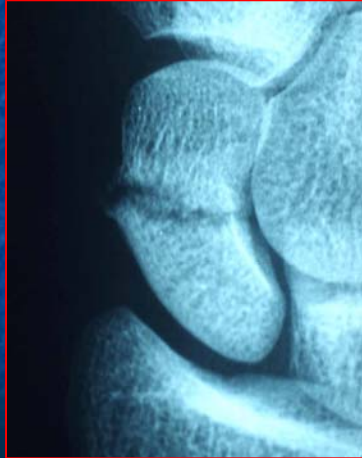


Ulna Impaction Syndrome Adjuvant Treatment

- Darrach
- Ulnar Shortening Osteotomy
- Wafer or Dome resection
- Hemiresection
- Suave-Kapandji

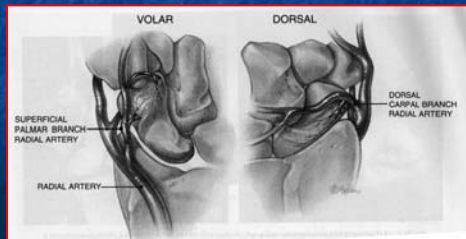


Scaphoid Fractures



Scaphoid Fractures

- Most common carpal fracture
- Bridges proximal and distal carpal rows
- Blood supply most from dorsal **CTQ**
- Worse Prognosis with proximal pole fx



Scaphoid Fractures

WHEN DIAGNOSIS IS IN DOUBT
IMMOBILIZE IN A THUMB SPICA
CAST AND RE-XRAY IN TWO WEEKS

Bone scan or MRI are alternative testing
to make the diagnosis

Scaphoid Fractures

- 90 % Heal with Immobilization
- Healing time dependent on location
 - Distal: 6 - 8 weeks
 - Waist: 8 - 12 weeks
 - Proximal: 12 - 24 weeks

Immobilization of Scaphoid Fractures

- Controversial whether to include the thumb or even the index finger and the length of the cast
- Long arm thumb spica cast for 4 weeks then a short arm thumb spica until union

Indication for Scaphoid Fracture Fixation

- Displaced: $>1\text{mm}$
- SL angle $> 60\text{ deg}$
- ANY proximal pole fx even if it is nondisplaced **CTQ**
- “Humpback Deformity”



Open Reduction and Internal Fixation

- 90 - 95 % union
- 0% for proximal pole with AVN



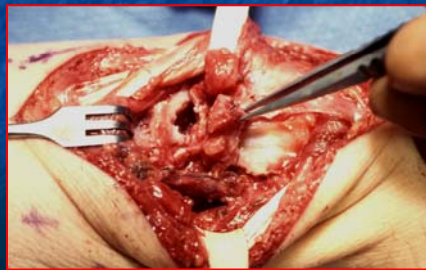
Avascular Necrosis

- MRI confirms
- Pathology
- Xrays not diagnostic **CTQ**



Vascularized Bone Graft

- Union 70 - 100%
- Time to union 11wks
- 1,2 supraretinacular vessel



Lunate Fractures

- Most commonly associated with Kienbocks Disease ie AVN
- Kienbock's assoc with ulnar minus variance
- Vascularity: Dorsal vessels inconsistent
- Rarely Traumatic



Kienbock's Disease Lichtman Classification

- 1: MRI only and no xray changes
- 2: Xray changes
- 3A: No widening of SL interval
- 3B: Widening of SL interval
- 4: Arthritis



Treatment of Kienbock's Disease

- No consensus
- Conservative Rx usually not successful
- Surgery does not correct xray changes
- Options: Radial shortening, vascularized bone graft (4,5 infraretinacular), capitate shortening, PRC

Distal Radius Fractures



CLASSIFICATION

DISTAL RADIUS FRACTURES

- Avoid Eponyms(i.e. Colles' Fx)
- Intra-articular vs Extra-articular
- Fractures of the ulnar styloid or DRUJ instability
- Associated carpal fractures or ligamentous instability
- Shear Fractures
- Stable vs Unstable

CLOSED TREATMENT

- Radiographic results not correlated with functional results
- 88% good or excellent results
- 56% with a deformity but none dissatisfied



YOUNG AND RAYAN JHS 2000

Functional Results

CTQ

- Gap and step-off most closely associated with functional results
- Loss of volar tilt has no affect on results
- Residual shortening correlated with poor results
- Poor prognosis with multiple articular fragments

Acceptable Reduction

CTQ

- Gap and Step off < 1mm
- Radial Shortening > 5mm
- Dorsal Angulation > 20 degrees?
- Intercarpal malalignment



OPERATIVE TREATMENT



NO functional evidence
that volar locked
plating better than
external fixation



OPERATIVE TREATMENT

Treatment Algorithm

- Reduction more important than fixation !!!!
- Unstable Extra-articular without comminution: Kapandji pinning
- Unstable Extra or Intra-articular with comminution: volar locked plate
- External Fixation: Neutralization device



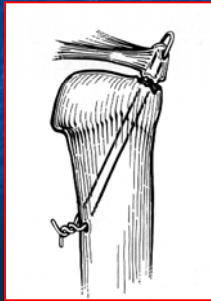
Treatment Tidbits

- Volar locked plates technically difficult
- Remove dorsal plates to avoid tendon rupture
- Ensure volar locked plate not into joint
- Liberal use of bone graft



Treatment Tidbits

- CTR if patient has sensory symptoms
- Avoid excess distraction with ext fix: midcarpal joint widened < 1mm to avoid CTS
- Fix Ulnar styloid if there is DRUJ instability



OITE Questions

Examinations of a 17-year-old girl who fell on her outstretched wrist reveals snuffbox tenderness. Radiographs are shown in Figure 45. Which of the following treatment options will allow an early return to activities and is most cost effective?

- 1- Short arm thumb spica cast immobilization
- 2- Long arm thumb spica cast immobilization
- 3- Percutaneous Kirschner wire fixation
- 4- Open reduction and internal fixation with autogenous bone graft



OITE Questions

A 52-year-old woman sustained a nondisplaced distal radius fracture 6 months ago and was treated with short arm casting. She now reports acute inability to extend her thumb. What is the treatment of choice?

- 1- Observation and reassurance
- 2- Primary repair of the extensor pollicis brevis
- 3- Primary repair of the extensor pollicis longus
- 4- Transfer of the brachioradialis to the extensor pollicis brevis
- 5- Transfer of the extensor indicis proprius to the extensor pollicis longus

Figures 14a and 14b show the radiographs of a 27-year-old man who injured his forearm after falling on his outstretched upper extremity. Despite anatomic restoration of the radius with plate osteosynthesis, the distal radioulnar joint remains irreducible. What structure is most likely obstructing reduction?

- 1 - extensor carpi ulnaris
- 2 - flexor carpi ulnaris
- 3 - pronator quadratus
- 4 - pronator teres
- 5 - palmaris longus

Instability of the lunotriquetral joint that results in volar tilt of the lunate as the result of injury to the lunotriquetral ligament and a tear of what other ligament?

- A. Scapholunate
- B. Radioscapholunate
- C. Ulnar collateral
- D. Volar radiolunar
- E. Dorsal radiotriquetral