

## COMMON CARPAL INJURIES IN ATHLETES

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I HAVE NO CONFLICTS OR DISCLOSURES TO REPORT

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## OUTLINE

- The carpus
- Scaphoid fracture
- Scapholunate ligament tear
- Perilunate fracture/dislocation
- Dorsal triquetral avulsion fracture
- Hook of hamate fracture



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## THE CARPUS

• 8 small bones that make up the wrist joint

- Scaphoid
- Lunate
- Triquetrum
- Pisiform
- Trapezium
- Trapezoid
- Capitate
- Hamate



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## RADIOCARPAL JOINT



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## MID CARPAL JOINT



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## SCAPHOID FRACTURE

- Most common carpal bone fracture in the wrist
- 3 types:
  - waist 65%
  - proximal pole 25%
  - distal pole fractures 10% (but most common in kids)
- Retrograde blood flow
- Requires careful management




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## HEALING POTENTIAL

- Distal pole > waist > proximal pole

100%      85%      30%




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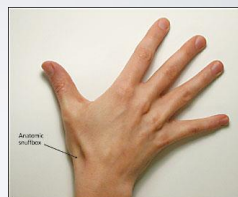
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## PRESENTATION & EXAM

- Fall on outstretched hand, wrist extended and radially deviated
- Swelling dorsally and radially
- Tenderness in anatomic snuff box
- Pain with wrist radial and ulnar deviation




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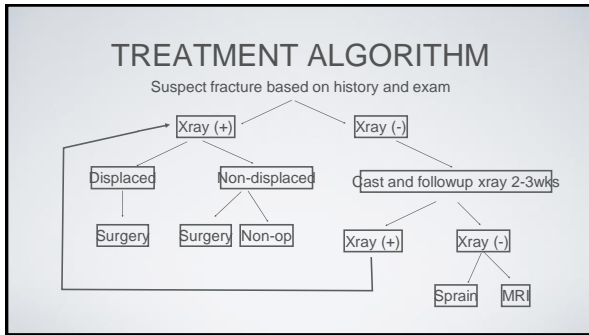
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### MANAGEMENT

- Non-operative management indicated in non-displaced fractures
  - Casting: long arm vs. short arm vs. thumb spica
  - 6wks to 20wks
  - No return to play until fully healed on X-ray or CT scan
  - Union rate 90-95%



1.00:1 Film Scale Original Image  
DCM W 4096 L 2047 R JK

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### SURGICAL MANAGEMENT NON-DISPLACED FRACTURE

- Consider surgical fixation in non-displaced fractures, especially athletes
- Percutaneous vs open
- Why?
  - decreased time to union
  - faster return to work/sports
  - same cost as casting
- Union rate 90-95%
- Time union 5-7wks shorter than non-operative management
- Less overall time in cast



1.00:1 Film Scale Original Image  
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1.00:1 Film Scale Original Image  
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## SURGICAL MANAGEMENT DISPLACED FRACTURE

- Almost always require surgery with open reduction and fixation
- Must achieve reduction and correct the deformity in displaced fracture



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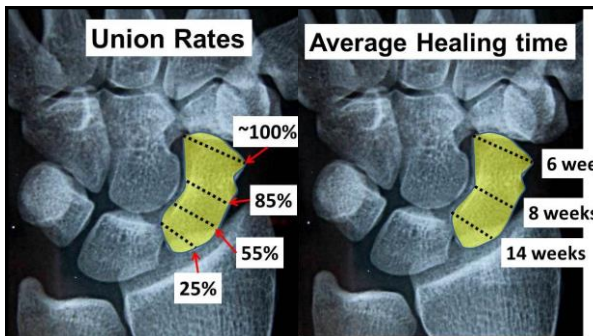
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### Union Rates

### Average Healing time



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## COMPLICATIONS

- Nonunion - 5-10%
- Union rate after revision surgery 70-90%
- Avascular necrosis
  - proximal 1/5 - 100%
  - proximal 1/3 - 60-70%



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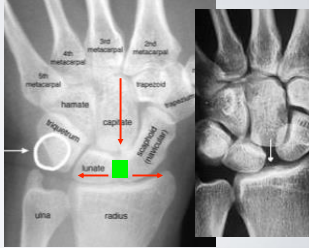
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## SCAPHOLUNATE LIGAMENT TEAR

- Ligament connects the scaphoid to the lunate
- Injury usually occurs during a fall when wrist is extended and ulnarly deviated




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## EXAM & DIAGNOSIS

- Swelling radial wrist
- Tenderness dorsally over scapholunate ligament and within anatomic snuff box
- + scaphoid shift test
- Wrist X-rays + power grip view
- MRI




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## MANAGEMENT

- Non-operative management only indicated in acute, non-displaced tears
- Many surgical ways to reconstruct and/or repair the ligament
  - Direct repair
  - Ligament reconstruction
  - RASL
  - Capsulodesis




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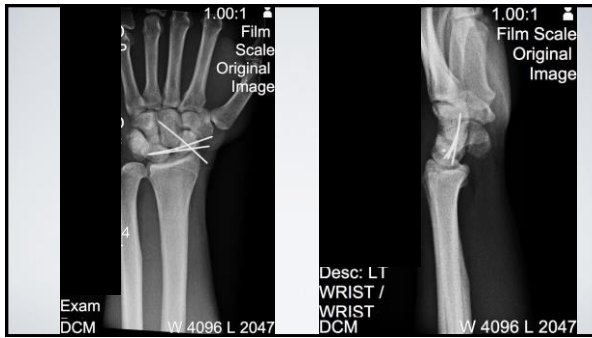
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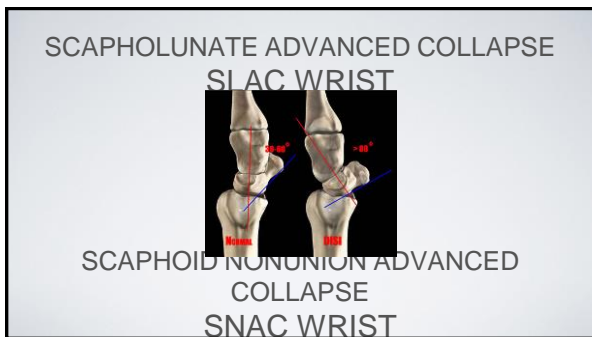
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## PERILUNATE DISLOCATION

Most common carpal dislocations

Common in men 20-30yrs

Common mechanism is hyperextension, ulnar deviation, and intercarpal supination with applied axial load

Result from hyperextension of wrist caused by fall from height, MVA, MCC, contact sports

Rare in elderly bc without good bone stock the distal radius falls before carpal bones or ligaments

In kids the hyperextension force usually injures the radial physis rather than carpal ligaments

66% of carpal dislocations have associated trans-scaphoid fracture

8% of all fracture dislocations of wrist also have a capitate fracture



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## STAGES OF INJURY

- Stage 1 - scapholunate dissociation
- Stage 2 - lunocapitate dislocation
- Stage 3 - luno-triquetral disruption
- Stage 4 - lunate dislocation



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## OUTCOMES

- Even with early recognition and surgery patients still have poor outcomes
- Expect significant loss of ROM
- Loss of grip strength
- Persistent pain in wrist
- May ultimately require limited or total wrist fusion



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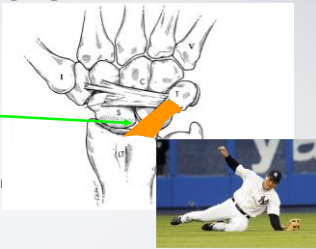
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## DORSAL TRIQUETRAL AVULSION FRACTURE

- 2nd most common carpal fracture
- Represent avulsion of the dorsal radiotriquetral ligament
- May also develop from impingement with ulnar styloid
- Fall on outstretched hand +/- ulnar deviation



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## EXAM & MANAGEMENT

- Dorsal ulnar wrist pain with focal tenderness
- Non-operative management
- Wrist brace or cast for 4wks
- May resume activity/sport as pain allows



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## HOOK OF HAMATE FRACTURE

- Classically occur with stick handling sports, i.e. golf, hockey, tennis, baseball
- Most common type of hamate fracture



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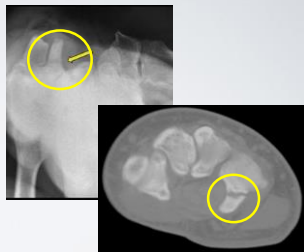
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## HOOK OF HAMATE FRACTURE

- Ulnar artery and nerve pass adjacent to hook of hamate
- May have ulnar nerve symptoms
- Weak or painful grasp
- Hypothenar tenderness
- Pain with resisted small finger flexion



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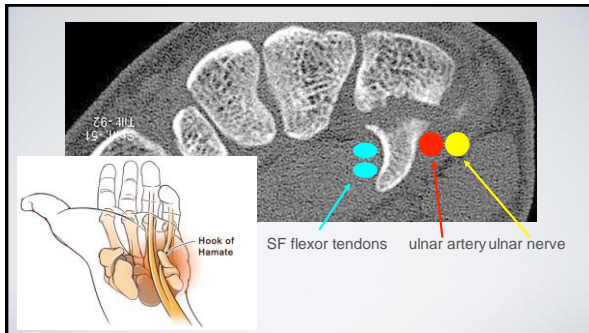
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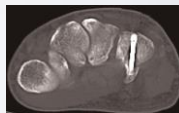
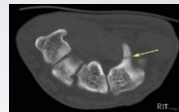
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## MANAGEMENT

- Non displaced fractures treated 6wks in cast
- Displaced fractures may require surgery
- Nonunions
  - asymptomatic - observation
  - symptomatic - bone grafting and fixation or excision



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THANK YOU



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