


**Common (and Not So Common) Hand Injuries**

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**Disclosures**



- None

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**Objectives**



- Review presentation, physical exam and treatment options for common hand injuries
- Review presentation, physical exam and treatment options for select hand injuries that may be easily missed



When you hear hoof beats...  
 So without further ado,

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**Skier's Thumb**



- Acute injury to the thumb MP joint ulnar collateral ligament (UCL)
- When chronic, called gamekeeper's thumb
- Treatment depends on extent of injury



<http://gettyimages.com/news/748img/148m-thumb-injury-fall-skiing>

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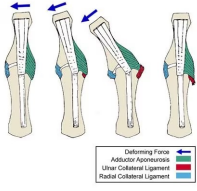
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**Skier's Thumb**





- Physical exam
  - Tenderness over thumb MPJ ulnarly
  - Increased pain/laxity with stress of the UCL
  - Possible Stener lesion (palpable lump at ulnar MPJ)
  - Weakness in pinch and grip

← Ulnar Deviation Force  
 ← Adductor Aponeurosis  
 Ulnar Collateral Ligament  
 Radial Collateral Ligament

<https://www.fixbones.com/orthopedic/13148712-overview/10114961/>

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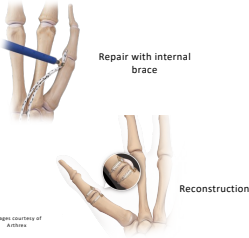
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**Skier's Thumb**





- Treatment
  - If acute and < 15° laxity when compared to other side, immobilize (thumb spica brace vs cast) ~6 weeks
  - If > 15° laxity and/or has a Stener lesion, fix it.
    - Direct ligament repair with internal brace vs reconstruction
    - Immobilize 4-6 weeks postop depending on fixation
    - Early motion
    - Return to activity 2-3 months postop

Images courtesy of Arthro

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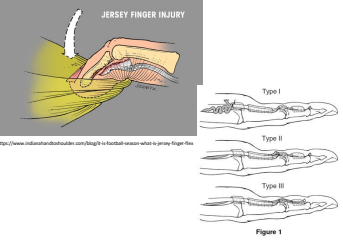
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**Jersey Finger**

• Traumatic flexor digitorum profundus (FDP) avulsion from volar base of distal phalanx

- Finger wants to flex, something else wants it to extend
- Type 1-3 (furthest to nearest), 4-5 (bony involvement)
- Involves ring finger ~75% of the time



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**Jersey Finger**

• Physical exam

- Loss of active flexion at DIP joint
- May have palpable lump along course of tendon if retracted
- Finger may lie in extension/ altered tenodesis effect



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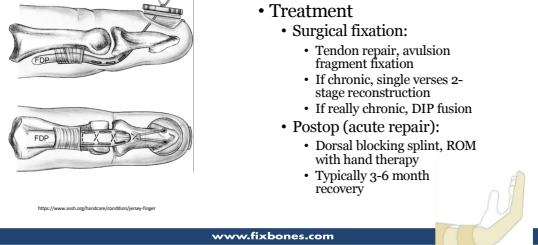
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**Jersey Finger**

• Treatment

- Surgical fixation:
  - Tendon repair, avulsion fragment fixation
  - If chronic, single versus 2-stage reconstruction
  - If really chronic, DIP fusion
- Postop (acute repair):
  - Dorsal blocking splint, ROM with hand therapy
  - Typically 3-6 month recovery



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**Mallet Finger**

• Traumatic terminal tendon avulsion from dorsal base of distal phalanx

- Finger wants to extend, something else wants it to flex
- If avulsion fracture = bony mallet
- Most commonly involves long digit

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**Mallet Finger**

• Physical exam

- Loss of active extension at DIP joint
- Tenderness over dorsal DIP
- Finger may lie in flexion (droop)

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**Mallet Finger**

• Treatment

- If acute soft tissue or bony mallet without subluxation, extension splinting
- If acute bony mallet with subluxation, or chronic without OA, DIP pinning
  - If chronic with OA, DIP fusion

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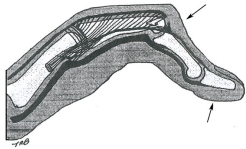
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**Boutonniere Deformity**



• Rupture of central slip of extensor tendon (FDS will flex PIP, terminal tendon will still extend DIP)

• Lateral bands will slip down the side of the PIP and act to flex the PIP joint

<http://www.ortho.org/orthopaedics/orthopaedics/boutonniere-deformity>

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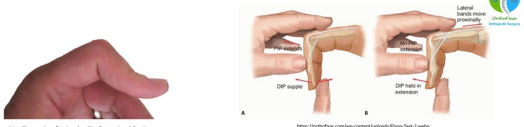
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**Boutonniere Deformity**

• Physical Exam

- PIP flexion with DIP extension
- Unable to actively extend at PIP joint
- Positive Elson's test

**Elson Test**



<http://www.ortho.org/orthopaedics/orthopaedics/boutonniere-deformity>

<http://orthofix.com/wp-content/uploads/Elson-Test-2.pdf>

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**Boutonniere Deformity**

• Treatment

- Splint PIP full time in extension x 6 weeks, wean out over 4-6 weeks
- If avulsion fracture or open lac, central slip repair
- If chronic, terminal tendon tenotomy/lat band relocation/tendon reconstruction
- If RA, PIP OA, consider PIP fusion



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**Boxer's Fracture**



• 5th metacarpal neck fracture

- Typically results from hand hitting a more solid object while in the clenched position
- ? relationship to social issues (EtOH, ♀)

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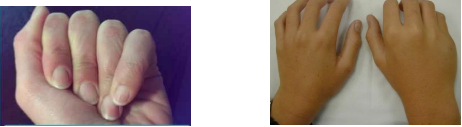
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**Boxer's Fracture**

• Physical exam

- Pain in ulnar hand
- May have rotational deformity
- Loss of knuckle profile/loss of extension at MP joint



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**Boxer's Fracture**

• Treatment

- If no rotational deformity and less than 50-70° of apex dorsal/volar angulation, cast immobilization +/- reduction
  - Ulnar gutter vs P1 blocking cast vs short arm cast with buddy taping
  - Transition to brace with buddy taping at about 4 weeks

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**Boxer's Fracture**

o If unacceptably aligned, surgical fixation  
 ▪ CRPP vs ORIF

Copyright, Ltd. & Warriner, Wilson & Jones, Osteomyelitis & Bone, 4th (2008), Metacarpal Head Fractures: Advances in Surgical Approaches and Techniques, Section of Trauma Research, in Press, 02/08/2008

http://www.fixbones.com/boxer-fracture

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**DeQuervain's disease**

- First dorsal compartment tendonitis
  - Abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons
  - May have a subsheath present

Griffith (1996) Essentials of Musculoskeletal Care, 3rd Edition, Rosecrance, S. American Academy of Orthopaedic Surgeons, 2005.

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**DeQuervain's disease**

- Physical exam
  - Tenderness over the first dorsal compartment
  - Pain with gripping and lifting (new mother's disease)
  - Positive Finkelstein's test (may hurt in a normal wrist, too)

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**DeQuervain's disease**

**Treatment**

- Brace (forearm based thumb spica)
- Steroid injection



**Surgery**



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**Hand Injuries Not To Miss (A Case Based Sample)**

- When in doubt, refer to hand surgery; maybe sooner rather than later...



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**Case Study #1**

- 67 year old male, sustained cat bite to left thumb.
- Presented to ER 2 days later with pain over the volar thumb that increased with motion.

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**Case Study #1**



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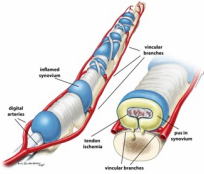
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**Case Study #1: Septic flexor tenosynovitis**



- Kanavel's Signs
  - flexed posturing of the involved digit
  - tenderness to palpation over the flexor tendon sheath
  - marked pain with passive extension of the digit
  - fusiform swelling of the digit

Patel A, Ascha M, Purjaji A, et al. (May 14, 2020) Pyogenic Flexor Tenosynovitis Caused by *Stenotrophomonas maltophilia*. Cureus 12(5): e8113. doi:10.7759/cureus.8113

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**Case Study #1: Septic flexor tenosynovitis**

- Underwent urgent I&D with wound closure, no further issues



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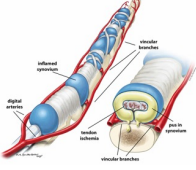
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### Case Study #1: Septic flexor tenosynovitis



**Pearls**

- Infection of the synovial sheath that surrounds the flexor tendon.
- Diagnosis is made clinically with the presence of the 4 Kanavel signs.
- Treatment is urgent irrigation and debridement of the flexor tendon sheath with IV antibiotics (relative emergency).

<https://www.orthobullets.com/hand/1205/pyogenic-flexor-tenosynovitis>

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### Case Study #2



- 54 year old painter, sprayed hand with paint sprayer earlier in the day
- Presented to ER in delayed fashion with worsening pain, normal workup (XR, labs)

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### Case Study #2: High pressure injection injury

- Rare. Often benign entrance wound. May lead to severe soft tissue injury/compartament syndrome.
- Risk of amputation varies by substance injected (oil based paint > organic solvents> latex paint> water).
- Urgent surgical intervention decreases risk of long term complications.

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**Case Study #2**

• Taken to OR  
 • Underwent successful debridement

(Different patient to show progression of injury)

1 12 hr post injection 2 After open debridement

3 48 hr post injection 4 Further debridement required

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**Case Study #2: High pressure injection injury**

• Pearls

- High-pressure injection injuries are characterized by extensive soft tissue damage associated with a benign high-pressure entry wound.
- Diagnosis requires obtaining a careful history and inspection of the digit involved.
- Treatment involves emergent surgical debridement.

<https://www.orthobullets.com/hand/12104/high-pressure-injection-injuries>

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**Case Study #2 : ?Compartment syndrome**

• Hand Compartment Syndrome is a devastating upper extremity condition where the compartment pressure rises to a level that decreases perfusion to the hand and may lead to irreversible muscle and neurovascular damage.

• Diagnosis is made with

- Pain out of proportion/ with passive motion (most sensitive)
- Tense compartments
- Parasthesias, pulselessness, paralysis, poikilothermia and pallor are late signs and do not bode well...

• Treatment is emergent fasciotomies.

<https://www.orthobullets.com/trauma/1064/hand-and-forearm-compartment-syndrome>

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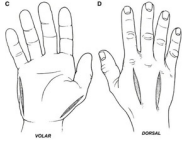

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**Case Study #2: ?Compartment syndrome**

<https://www.orthobullets.com/trauma/1064/hand-and-forearm-compartment-syndrome>

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**Case Study #2: ?Compartment syndrome**


<https://www.orthobullets.com/trauma/1064/hand-and-forearm-compartment-syndrome>

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**Case Study #3**



- 53 yo male, motorcycle accident
- Left proximal humerus fracture, right wrist and hand pain

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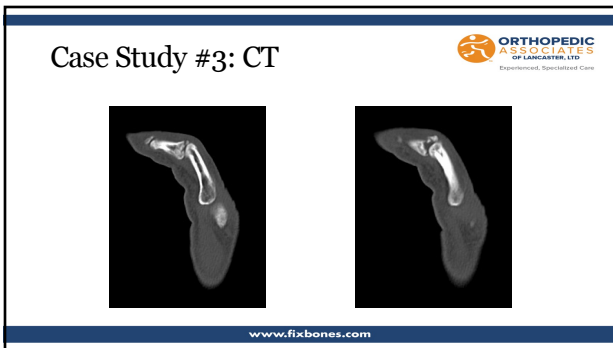
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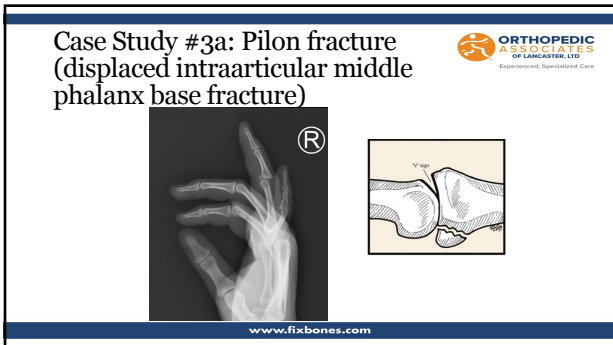
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### Case Study #3: Finger pilon fracture

- High energy axial compressive force
- May be subtle on XR (have low threshold for ordering CT)
- May be amenable to dorsal blocking splint
- Often require some type of surgery:
  - Dorsal blocking pin, cerclage, volar plate advancement/arthroplasty, ORIF, dynamic external fixator, hemihamate autograft

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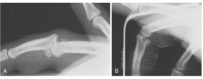
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### Case Study #3: Finger pilon fracture


Dorsal blocking splint




Cerclage



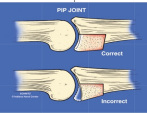
Volar plate advancement




Dynamic external fixator



PIP JOINT



Hemihamate autograft



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### Case Study #3: Finger pilon fracture

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**Case Study #3a: Finger pilon fracture**




At most recent follow up, still stiff, but doing well.

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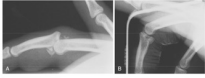
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**Case Study #3: Finger pilon fracture**



- Pearls:
  - "V" sign on lateral XR
  - Reduce if necessary/able.
  - Splint (likely in a dorsal blocking splint)
  - CT if unsure of amount of articular involvement

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**Case Study #4**



- 12 yo male caught finger in car door

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**Case Study #4: Initial XR**



Journal of Hand Surgery 2013 38:2267-2270DOI: 10.1054/j.hns.2013.08.104

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**Case Study #4**

(Different patient)



<https://www.orthobullets.com/hand/6000/>

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**Case Study #4: Seymour fracture**

- Seymour fractures are displaced distal phalangeal physis fractures with an associated nailbed injury.
- Clinical diagnosis, with the presence of nail plate lying superficial to the eponychial fold and radiographs potentially showing widened physis or displacement at the physis.
- Treatment is usually antibiotics, open reduction and pinning across DIPJ with nailbed repair.



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A case series of pediatric Seymour fractures related to nailbed injury, increasing trend with changing wristwear  
Wojcik  
Author: A.E. Kozicki, F. Abdouh, A.M. Abdujbar, M. Alkhatib, H. Alkhatib, M. Alkhatib, International Journal of Orthopedic Surgery, London, 2017

<https://www.orthobullets.com/hand/6000/seymour-fracture>

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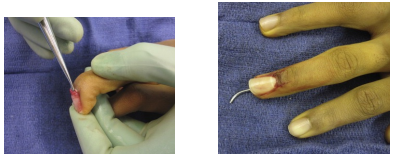
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Case Study #4: Seymour Fracture  ORTHOPEDIC ASSOCIATES OF LANCASTER, LTD.  
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Journal of Hand Surgery 2013 38:257-270DOI: 10.1016/j.jhsa.2013.08.104

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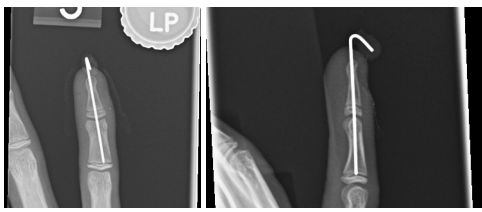
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Case Study #4: Seymour fracture  ORTHOPEDIC ASSOCIATES OF LANCASTER, LTD.  
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Case Study #4: Seymour fracture  ORTHOPEDIC ASSOCIATES OF LANCASTER, LTD.  
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- Pearls
  - Nail plate avulsion/nail bed injury with a distal phalanx fracture in someone with open growth plates
  - Nail often outside the skin proximally



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**Case Study #5**



- 54 year old female, fell down steps at home, injuring right wrist
- Evaluated at outside urgent care, splinted in situ
- Came to orthopedic urgent care where injury evaluated and dispo'd.
- Sent for urgent follow up with hand surgeon

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**Case Study #5: Initial XR**

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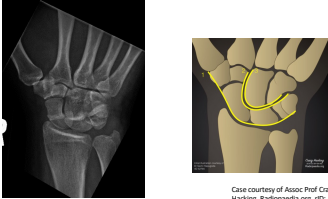
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**Case Study #5**

Gilula's lines

Case courtesy of Assoc Prof Craig Mackay, Radiopaedia.org, ID: 61351

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**Case Study #5**

"spilled teacup" sign

Anastasi V. Navarathnan, Simon Ball, Claire Emerson, Rupert Eckersley  
DOI: 10.1186/s13047-020-00101-9 Published 6 November 2020  
www.fixbones.com

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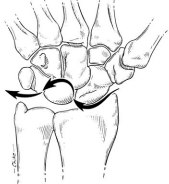
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**Case Study #5: Perilunate injuries**



- Lunate/perilunate dislocations are high energy injuries to the wrist associated with neurological injury and poor functional outcomes.
- Diagnosis requires careful evaluation of plain radiographs (up to 25% missed on initial evaluation).
- Treatment requires urgent closed versus open reduction and stabilization.



https://www.orthobullets.com/hand/6045/lunate-dislocation-perilunate-dislocation  
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**Case Study #5: Perilunate injuries**



- Taken to OR for :
  - Right open carpal tunnel release
  - Volar wrist ligament repair
  - Scaphoid ORIF
  - PIN resection
  - Lunotriquetral ligament repair



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**Case Study #5: Perilunate injuries**



1 year postop

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- ROM stiff when compared to contralateral side (~15 degrees in flex/extend)
- Healed without pain

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**Case Study #5: Perilunate injuries**



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- Pearls
  - Recognition is key (spilled teacup sign), arcs don't line up
  - Prompt reduction
  - Likely remains unstable after reduction, so should be fixed

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**Case Study # 5A**



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- 39 year old male, pedestrian struck
- Complains of right wrist/elbow pain
- NVI

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**Case Study # 5A : Initial XR**

• Grade 1 open 4<sup>th</sup>/5<sup>th</sup> metacarpal fractures, right distal radius volar lip fracture with carpal dislocation, right elbow coronoid tip fracture

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**Case Study # 5A**

• Bedside I&D, closed reduction in ER  
 • Planned admission to trauma service; signed out AMA  
 • Returned to ER next day

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**Case Study # 5A: Carpal dislocation**

• Underwent ORIF of wrist and hand fractures with hand surgeon. Ex fix scheduled to be removed at 6 weeks postop.

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**Case Study #6**

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- 29 year old professional baseball player developed ulnar sided hand pain while batting



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**Case Study #6: Initial XR**

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PA view      Lateral view      Carpal tunnel view

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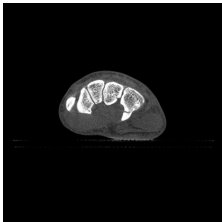
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**Case Study #6: CT**

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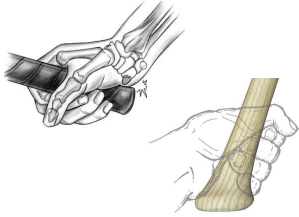
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### Case Study #6: Hook of hamate fracture



- Hook of hamate fractures are rare, often missed, injuries generally as a result of a direct blow to the hamate bone most commonly seen in athletes.
- Diagnosis is confirmed with either a radiographic carpal tunnel view or CT scan.
- Treatment is either observation, surgical excision, or surgical fixation depending on the severity of the symptoms and activity demands of the patient.

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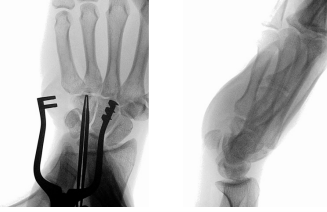
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### Case Study #6: Hook of hamate fracture



- Treated with surgical excision of the fragment
- Returned to baseball without further complaint

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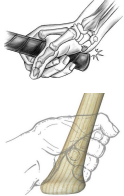
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### Case Study #6: Hook of hamate fracture

- Pearls
  - Volar ulnar hand/wrist pain
  - Carpal tunnel view helpful for diagnosis
  - CT if unsure radiographically but likely not needed
  - Treatment based on activity level (observation/excision/fixation)



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09-17-23

**A backyard accident led this dad to design a new bat that is changing Major League Baseball**

After nearly recovering from a grave leg injury, Patrick invented a new bat knob, and 17 years later some of baseball's brightest stars are launching moon shots with his design.



<https://www.fastcompany.com/90952749/how-a-graphic-designer-created-a-new-bat-for-major-league-baseball>

Photo: iStock Photo

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**Case Study #7: A Cautionary Tale**

- 11 yo male, fall on outstretched hand off of a trampoline on July 4th

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**Case Study #7: Initial XR**



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### Case Study #7: Pediatric distal radius fracture

- Evaluated by ortho trauma surgeon.
- Casted and sent for 1 month follow up.

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### Case Study #7: Pediatric distal radius fracture



- At 1 month, has loss of radial height and about 40° dorsal angulation in cast.

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### Case Study #7: Pediatric distal radius fracture

- Taken to OR for malunion correction and pinning
- Placed in a cast until 1 month postop, planned pin removal in office.
- 2 of 3 pins disappeared



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### Case Study #7: Pediatric distal radius fracture

- Pearls
  - If a fracture stands a chance of displacing, follow it for 1-2 weeks so it doesn't catch you by surprise later.
  - Make sure casts are well molded to help prevent displacement.
  - Pad pins well.

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### Summary

- Common things are common
- Have a high index of suspicion when an XR or history doesn't line up with the clinical picture (hurts more or looks worse than XR/story implies)
- When in doubt, refer to hand sooner rather than later.

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### Questions?



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