Common Hand and Finger Injuries

NCAFP Sports Medicine for the Active Patient

August 8, 2020

Ryan Draper, D.O, ABFM, CAQSM
Program Director
Cone Health Sports Medicine Fellowship
Associate Clinical Professor
UNC School of Medicine, Dept of Family Medicine

1

Disclosures

- Neither I, nor my family, have any disclosures as it pertains to this lecture

2

Injuries to be discussed today

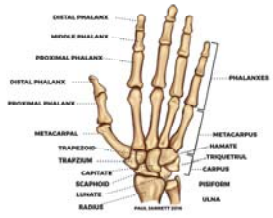
- Nail bed injuries
- Jersey finger
- Mallet finger
- PIP dislocation
- Boutonniere deformity
- Gamekeeper's thumb
- MCP dislocations
- Phalanx fractures
- Metacarpal fractures

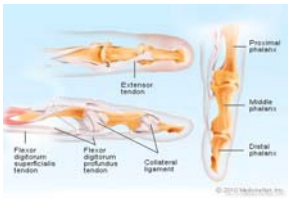
3

Objectives

- Review basic anatomy of the hand and fingers
- Be able to recognize the most common types of injuries
- Learn which injuries you can manage in your office and which injuries you should refer

4





5

Physical exam

- Inspection: Swelling, ecchymosis, deformity
- Palpation: tenderness, crepitus
- Range of Motion
- Stability: Important for ligamentous injuries
- Strength: Important to differentiate between true strength deficit and decreased strength secondary to pain
- Neurovascular status: radial and ulnar arteries, capillary refill

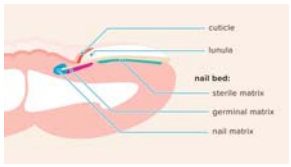
6

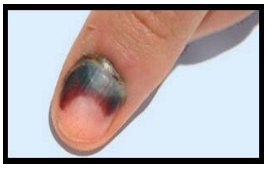
Nail bed injuries

- Disruption of the sterile or germinal matrix of the nail bed
- Usually result of a crush injury but can also be seen with an axial load injury to the fingertip
- Small hematomas (<50% of the nail bed): No treatment
- Can trephinate if painful
- Large hematomas: Remove nail and inspect nail matrix; suspect underlying fracture

7

Nail bed injuries





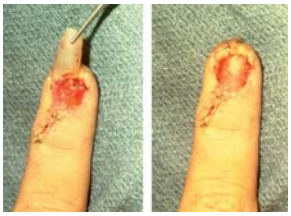
8

Trephination

9

Nail bed repair

- Digital block and remove nail
- Irrigate
- 7-0 resorbable suture for the nail bed
- 5-0 nylon suture for adjacent skin
- Replace nail and secure
- Splint distal phalanx
- Follow up in 3-5 days
- No need for antibiotics
- Suspect underlying fracture



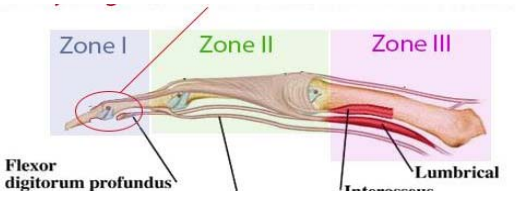
10

Prognosis and return to play

- If no nail bed repair, RTP immediately
- Following nail bed repair, can RTP with splinting
- Refer open fractures through the nailbed and displaced distal phalanx shaft fractures
- Prognosis for new nail growth is related to anatomical restoration of the nail bed and the ability to keep the eponychium open

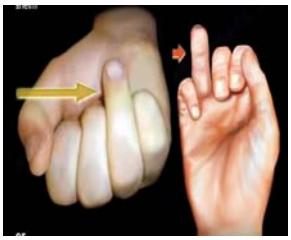
11

Jersey Finger: Avulsion injury of the FDPfrom insertion at the base of the distal phalynx

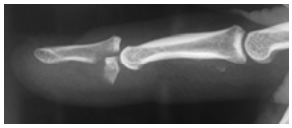


12

- Forced extension of a flexed DIP joint
- Variable degree of pain and swelling
- Can be a tendon avulsion or avulsion fracture
- Loss of active DIP joint flexion

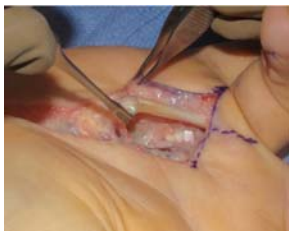


13



14

Treatment and RTP

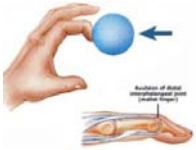


- Refer to orthopedics
- Tendon avulsions: 12 weeks of protected activity
- Bony avulsions: 6 weeks of protected activity
- Extensive hand PT post-op

15

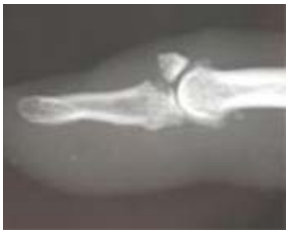
Mallet Finger

- Loss of terminal extensor mechanism attachment to the distal phalanx



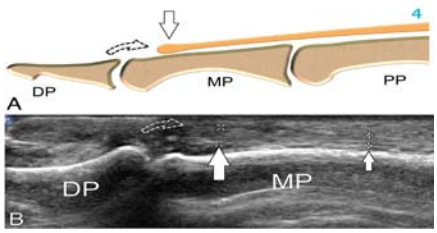
16

- Exam
  - Tenderness, swelling
  - Unable to fully extend isolated DIP
  - Swan neck deformity
- Xray
  - Bony avulsion fracture
  - Tendon rupture with no avulsion



17

Ultrasound



18

Treatment

- Non-operative
  - Nondispalced bony injury - Splint in extension, 6-8 weeks, continuously
    - volar splinting has less complications
    - avoid hyperextension
    - begin progressive flexion exercises at 6 weeks
- Operative
  - Volar subluxation of distal phalanx
  - >50% of articular surface involved (relative indication
- May return to play within a week while splinted

19

Finger Dislocations

- PIP joint most common
- Usually result of an axial load which forces the joint into extension
- Reduction can be done using a digital block if needed
- Once reduced, fingers can simply be buddy taped
- Occasionally, volar plate or flexor tendon will become lodged in the joint making it irreducible
- Be aware of volar plate fractures
- Swelling associated with this injury may be permanent

20

21

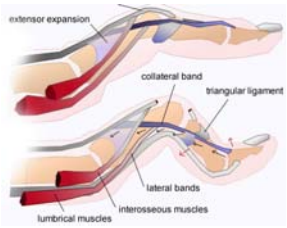
Return to Play

- May return as soon as symptoms allow with protection (buddy tape, splint)
  - Monitor for signs of loss of reduction or malrotation
  - Protect until radiologic signs of healing

22

Boutonniere Deformity

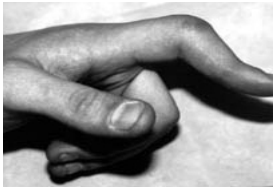
- rupture of the central slip over PIP joint
  - causes the extrinsic extension mechanism from the EDC to be lost
  - prevents extension at the PIP joint
- Causes
  - Traumatic
  - RA complication



23

Boutonniere Deformity

- Exam
  - Flexed PIP, Extended DIP
  - Elson Test (most reliable way to diagnose a central slip injury before the deformity is evident)
    - bend PIP 90° over edge of a table and extend middle phalanx against resistance
      - in presence of central slip injury there will be
        - weak PIP extension
        - the DIP will go rigid
      - in absence of central slip injury DIP remains floppy because the extension force is now placed entirely on maintaining extension of the PIP joint; the lateral bands are not activated
- Xrays possibly to rule out associated fx



24

Treatment

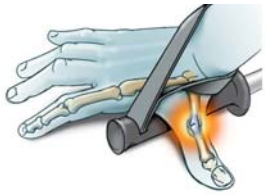
- FULL-TIME extension splinting of the PIP with active DIP flexion/extension for 6-8 weeks
- Important to recognize early (within 2-3 weeks) as delayed presentations are difficult to treat (terminal extensor release and PIP fusion)

Oval-8® Finger Splint- Worn to reduce Boutonniere Deformity

25

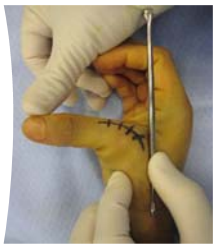
Gamekeeper's Thumb

- Ulnar Collateral Ligament rupture (Gamekeeper's thumb, skier's thumb)
  - Fall on outstretched thumb with hyperabduction of MCP joint
    - Common in:
      - Alpine skiing- caused by traction created when isolated thumb is pulled away from rest of hand when using pole.
      - Baseball
      - Cross-country skiing
      - Ice Hockey
      - Lacrosse
      - Swimming
      - Tennis
      - Water Polo
      - Wrestling



26

- Physical exam:
  - Swelling and tenderness over the ulnar aspect of thumb MCP joint
  - MCP instability on radial stress (assess with MCP in 30 degrees of flexion)
  - Palpable lump, or gross instability- could be sign of Stener lesion
    - Torn end of UCL displaces superficially to the aponeurosis of adductor pollicis



27

Imaging: US or MRI

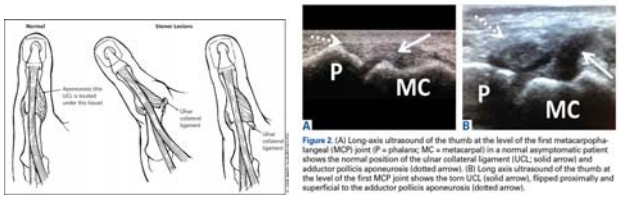


Figure 2. (A) Long-axis ultrasound of the thumb at the level of the first metacarpophalangeal (MCP) joint (P = phalanx; MC = metacarpal) in a normal asymptomatic patient shows the normal position of the ulnar collateral ligament (UCL; solid arrow) and adductor pollicis aponeurosis (dotted arrow). (B) Long axis ultrasound of the thumb at the level of the first MCP joint shows the torn UCL (solid arrow), flipped proximally and superficial to the adductor pollicis aponeurosis (dotted arrow).

28

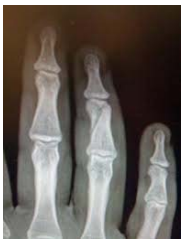
Gamekeeper's Thumb

- Treatment:
  - Immobilization for 4 weeks in thumb spica splint
  - Protected splinting for 2-4 months during competitive athletics
  - Surgical intervention with reattachment of UCL
    - Any injury with greater than 30-35 degrees of instability in flexion
    - any instability in extension
    - stener lesion
    - large bony avulsion

29

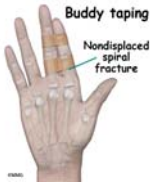
Phalanx Fractures

- Proximal and middle
  - Common with contact sports, and catching balls
  - Proximal typically have volar angulation with proximal flexed (interossei) and distal extended (extensor tendons)
  - Middle can have either dorsal or volar angulation



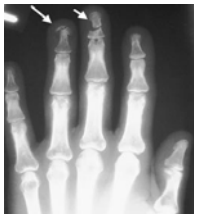
30

- Treatment
  - Needs correction of any rotational deformity
  - No > than 10 degrees angulation in any plane
  - Nondisplaced can be treated with buddy taping and early ROM
    - Need to repeat xrays serially to ensure no displacement
  - Displaced required closed reduction and immobilization



31

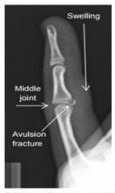
- Distal
  - 50% of hand fx
  - fibrous septa of skin minimized displacement
  - Examine for nail bed injury
    - Must repair nail bed to prevent deformity
  - immobilized DIP for 3-4 weeks, then ROM
  - Risk of **mallet finger** deformity if there is bony or tendinous disruption
    - Continuous extension splinting of the DIP for 6 weeks
      - Followed by removal of splint for ROM exercises for 2 weeks



32

Volar Plate Avulsion Fractures

- Proximal middle phalanx volar plate
  - If involves >30% joint space, needs referral to surgeon
  - Early immobilization otherwise
    - Either buddy tape or extension block finger splint for 5 to 10 days
    - Reassess every week to check for signs of malalignment or displacement.
    - Repeat xrays at 1 and 4 weeks

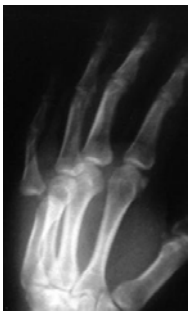


Picture 1 In an x-ray of the finger, you can see the small avulsion fracture on the lower right side of the middle joint.

33

MCP Dislocations

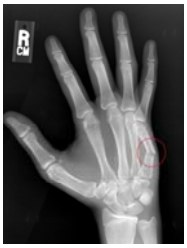
- Can be simple or complex
- Hyperextension injury at level of the MCP (border digits most common)
- Acute pain/ swelling and hyperextension of MCP joint
- Closed reduction vs open reduction in OR
- RTP with protection for6-12 weeks



34

Metacarpal Fractures

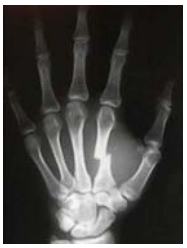
- Metacarpal fractures
  - Account for 14% of all emergency room visits
  - Often from direct blows or crush type injuries, falls to hand
  - Typically present with apex dorsal angulation from intrinsic muscles force



35

Metacarpal Fractures

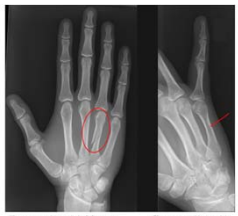
- Transverse
  - Apex dorsal angulation- intrinsic muscle force
    - Reduction indicated if Angulation:
      - >20 degrees for ring finger
      - >30 degrees for pinky
  - Treatment:
    - Stable- non op with cast immobilization for 2 weeks, followed by orthoplast of digit and its neighbor for two weeks, followed by buddy taping at 4 weeks out
    - MUST CORRECT rotational deformity
    - Reduction and pinning/ORIF needed if surgical



36

Metacarpal Fractures

- Oblique and spiral
  - From torsional forces
    - If untreated, will likely shorten and rotate
      - 5 degrees of malrotation can lead to 1.5-2.0 cm of overlap of digits
      - 5 mm shortening is functionally acceptable
  - Treatment:
    - Isolated, minimally displaced be treated like transverse fx
    - Otherwise, will need surgical pinning or ORIF

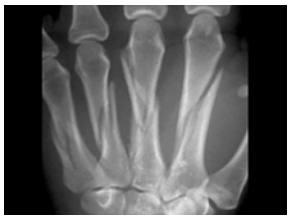


4th metacarpal spyral shaft fracture 5th metacarpal incomplete spyral fracture

37

Metacarpal Fractures

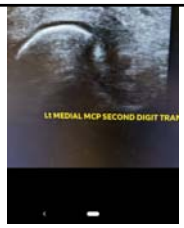
- Comminuted
  - May have associated soft tissue loss
  - Often requires ORIF or external fixation to maintain length
  - may need delayed or primary bone grafting



38

Metacarpal Fractures

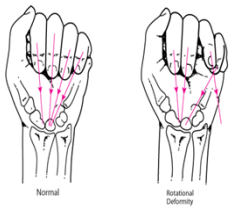
- Head fractures
  - Rare
  - Occur from axial loading or direct trauma
    - Ensure not from "fight bite"
  - Nondisplaced treated non-op with initial splint mobilization, followed by buddy taping and early mobilization.
  - Can lead to limited motion and arthritis if immobilized too long.
  - Displaced need ORIF, with early mobilization.



39

Metacarpal Fractures

- Neck fractures
  - Most common- ring and pinky (boxer's fx)
  - apex dorsal angulation and volar comminution make it difficult to maintain reduction
    - "10, 20, 30, 40" rule
    - Normal MC head to neck angle is 15 degrees
  - Treatment:
    - immobilize in short arm gutter splint with fingers in intrinsic plus position
      - 2 weeks of immobilization, then buddy taping
    - Weekly X-ray to ensure reduction is not lost
      - If lost, or if reduction is not achievable, refer for surgical evaluation



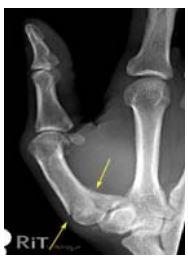
40

Return to Play

- Return to Play:
  - May be initiated 1-2 weeks after injury depending on demands of sport
  - Protection for 8-12 weeks depending on demands
  - With surgery, early ROM at 2 weeks
    - 5-6 weeks can be buddy taped

41

First Metacarpal Fractures



42

In Summary

- Suspect a possible underlying distal phalanx fracture in subungual hematomas>50%
- Refer jersey fingers urgently for surgical repair
- Mallet fingers need 6 weeks of continuous extension at the DIP joint
- Be sure to recheck "jammed" PIP joints or PIP dislocations 2-3 weeks post injury to r/o early boutonniere deformity
- Many phalanx fractures can be treated with buddy tape and early ROM
- PIP dislocations are common and easily reducible if caught early
- Treatment of MC fractures (2-5) depends on amount of displacement and malrotation
- Refer all 1st MC fractures to Ortho

43

References

- Watson J, Weikert, D, van Zeeland, N (2018) Hand and wrist injuries. In Netter's Sports Medicine (p391-401).Philadelphia PA: Elsevier
- Saladino R, Antevy P: Management of fingertip injuries. In Stack A, Wolfson A, Wiley J (Eds) UpToDate Waltham MA. 2019
- Bloom,J: Overview of metacarpal fractures. In Eiff, P, Asplund C, Grayzel J (Eds) UpToDate Waltham MA. 2019

44