# Evaluating the Hand and Wrist

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# Disclosures

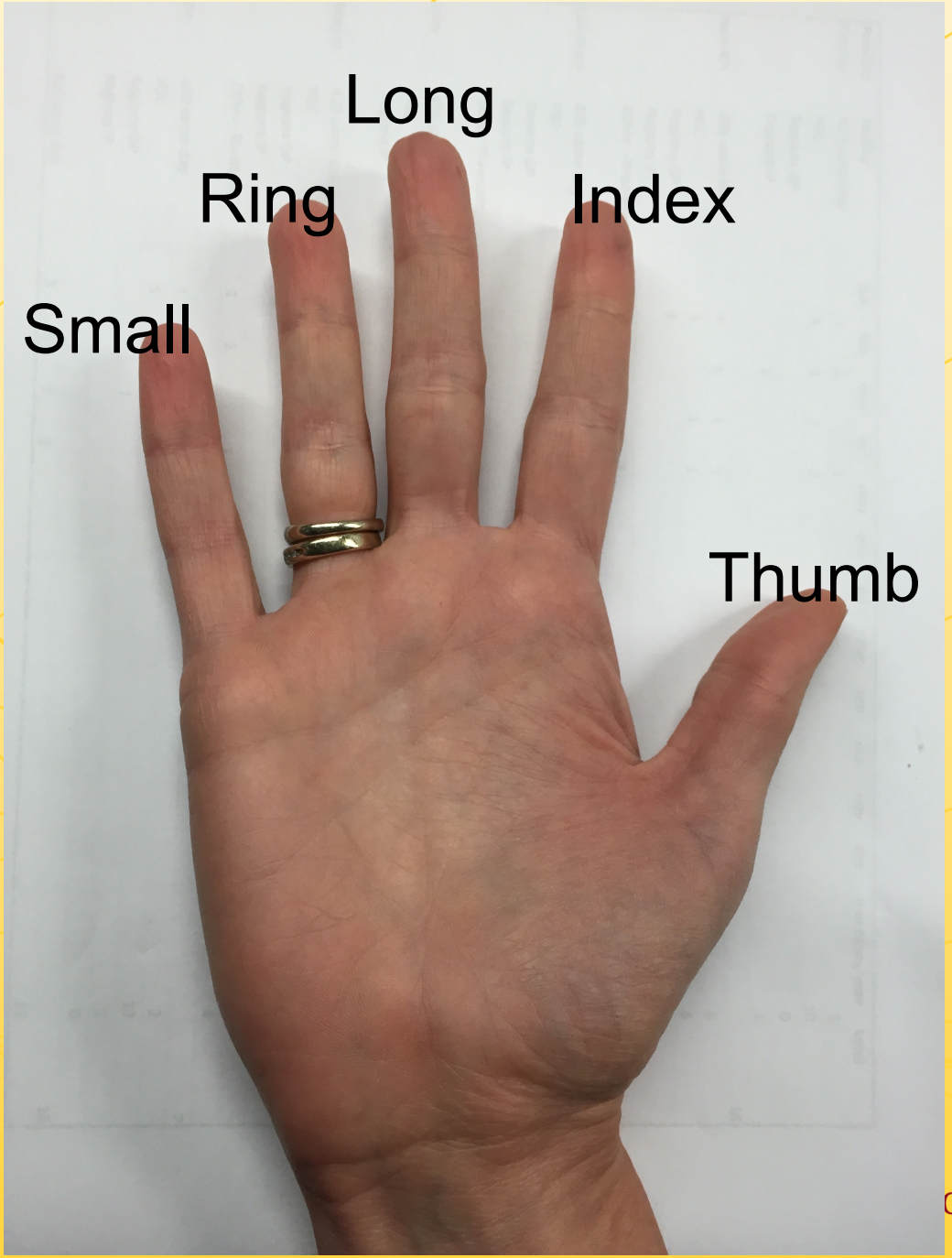
- I have no disclosures that are pertinent to this presentation

# Objectives

At the end of this presentation, learners will be able to

- Describe injuries to the hand and wrist
- Identify structures at risk from those injuries (nerves and tendons)
- Initiate care for those injuries, and arrange appropriate followup
- Initiate care for common hand and wrist conditions, including distal radius and carpal fractures, Dequervains tenosynovitis, and arthritis.

# Terminology

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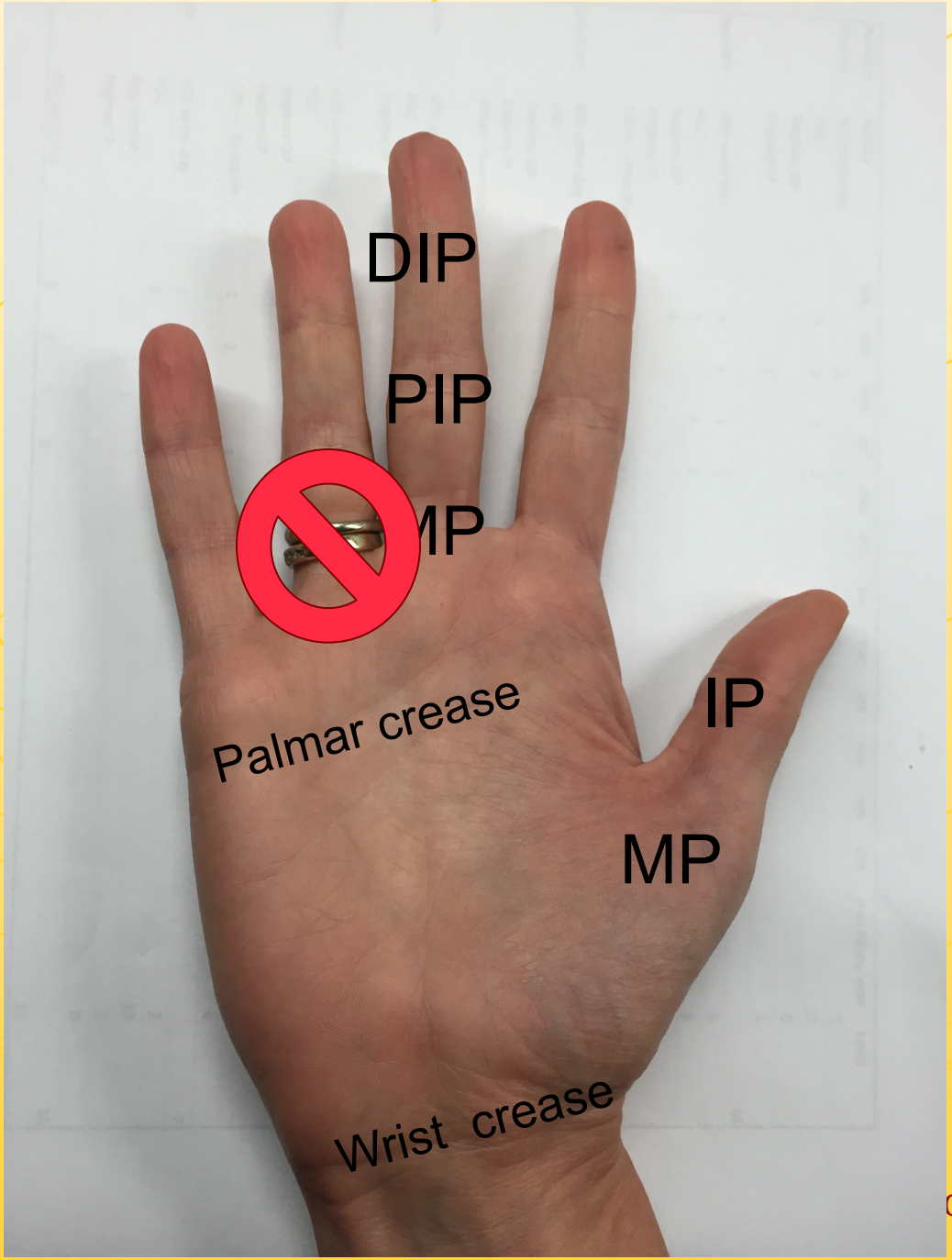
# Terminology

DISTAL

ULNAR RADIAL

PROXIMAL

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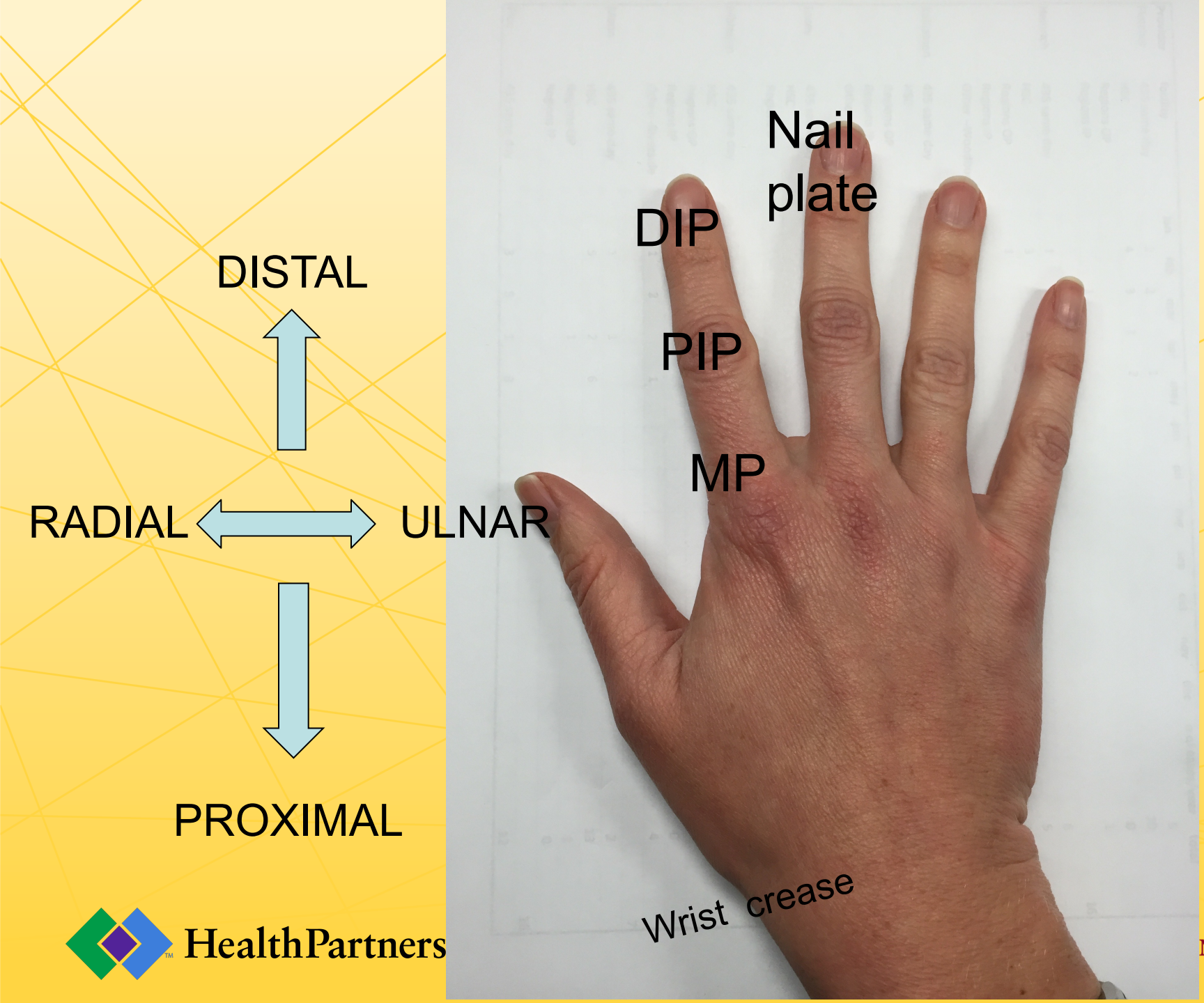


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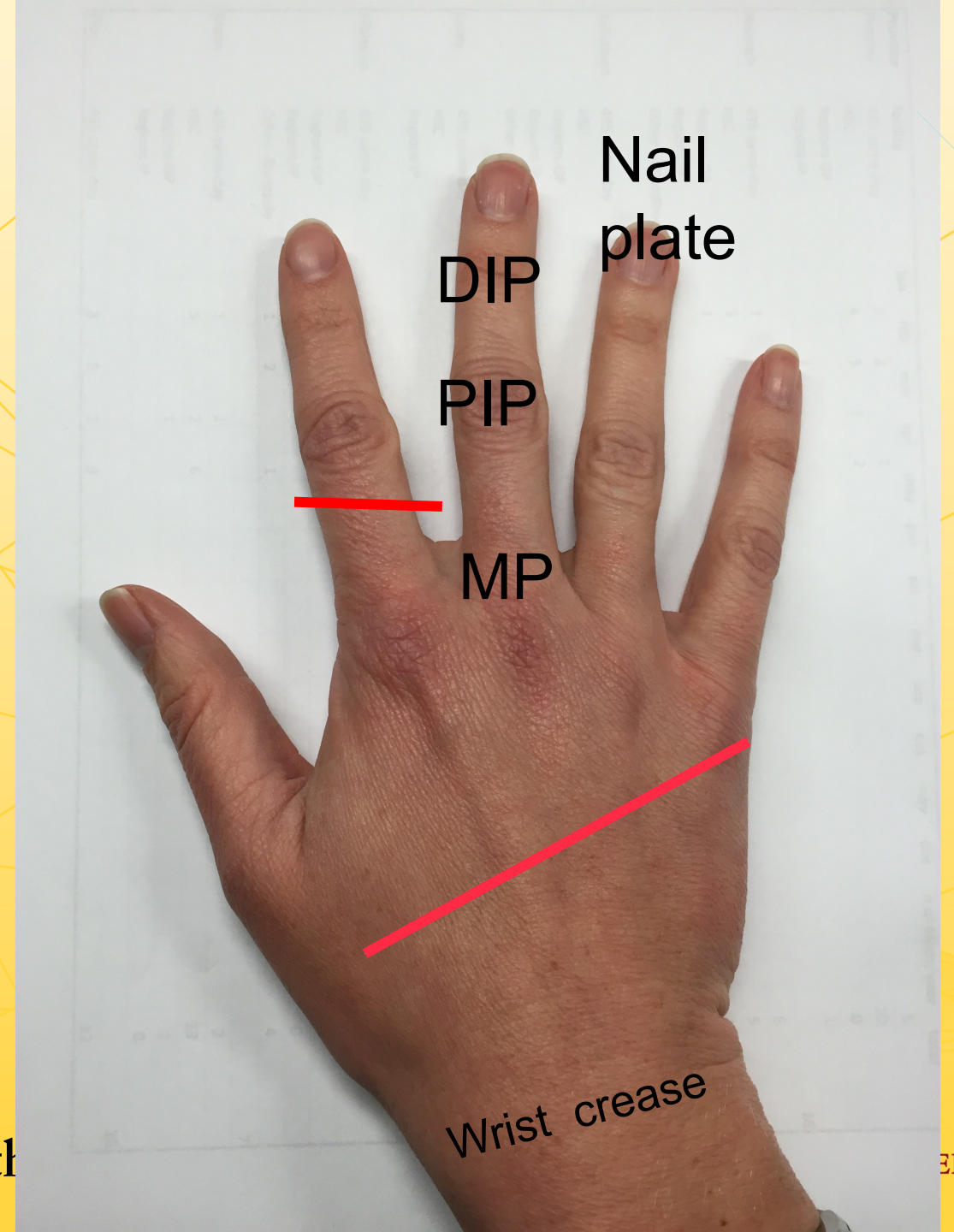
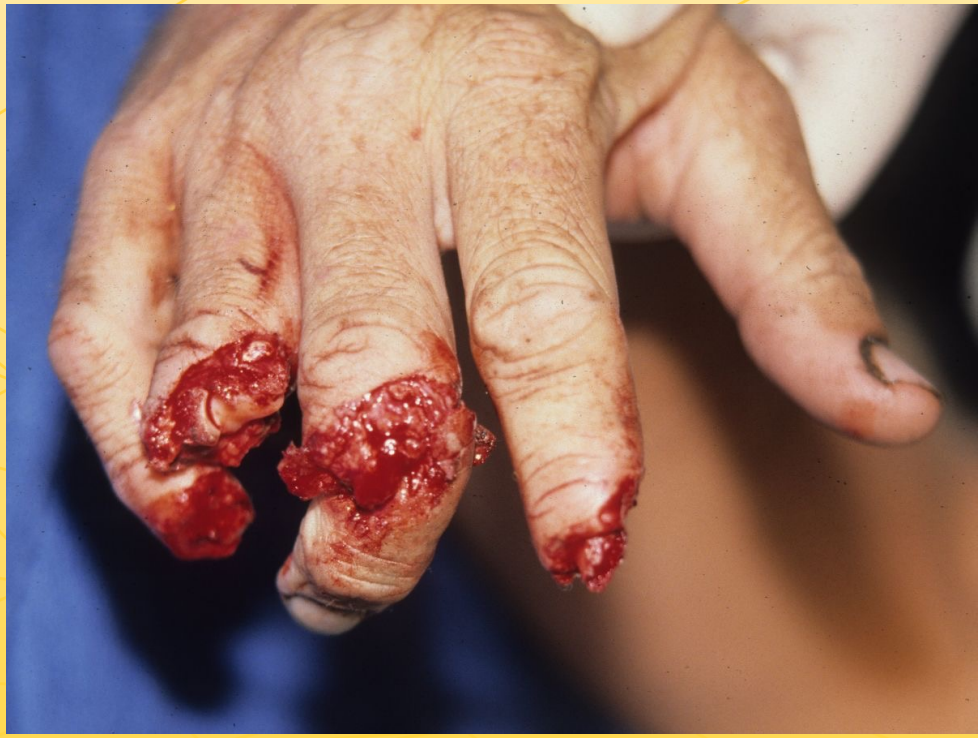

Nail plate
DIP
PIP
MP
Wrist crease

# Other useful terms

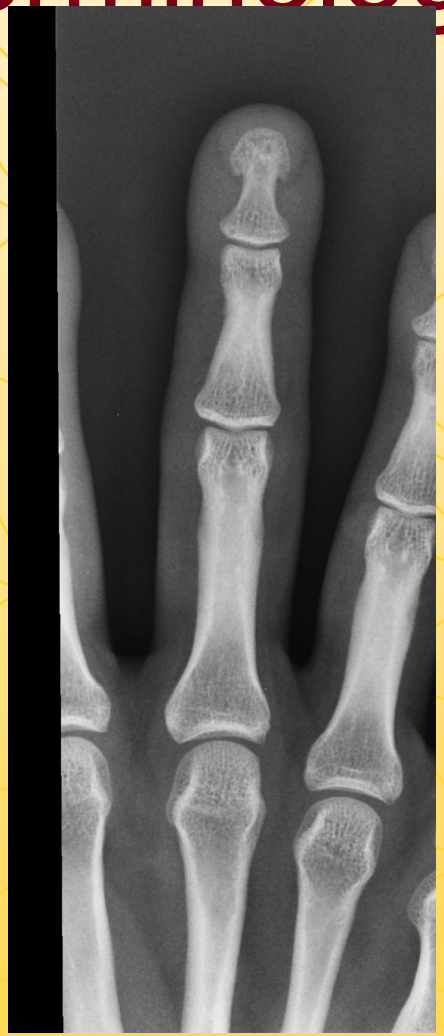
- Near amputation
  - Bone completely cut, skin on one side cut
  - “dusky dangler”
- Complete amputation
  - Finger in a bucket
- Fingertip injury
  - Anything distal to the DIP
  - Not going to be replanted

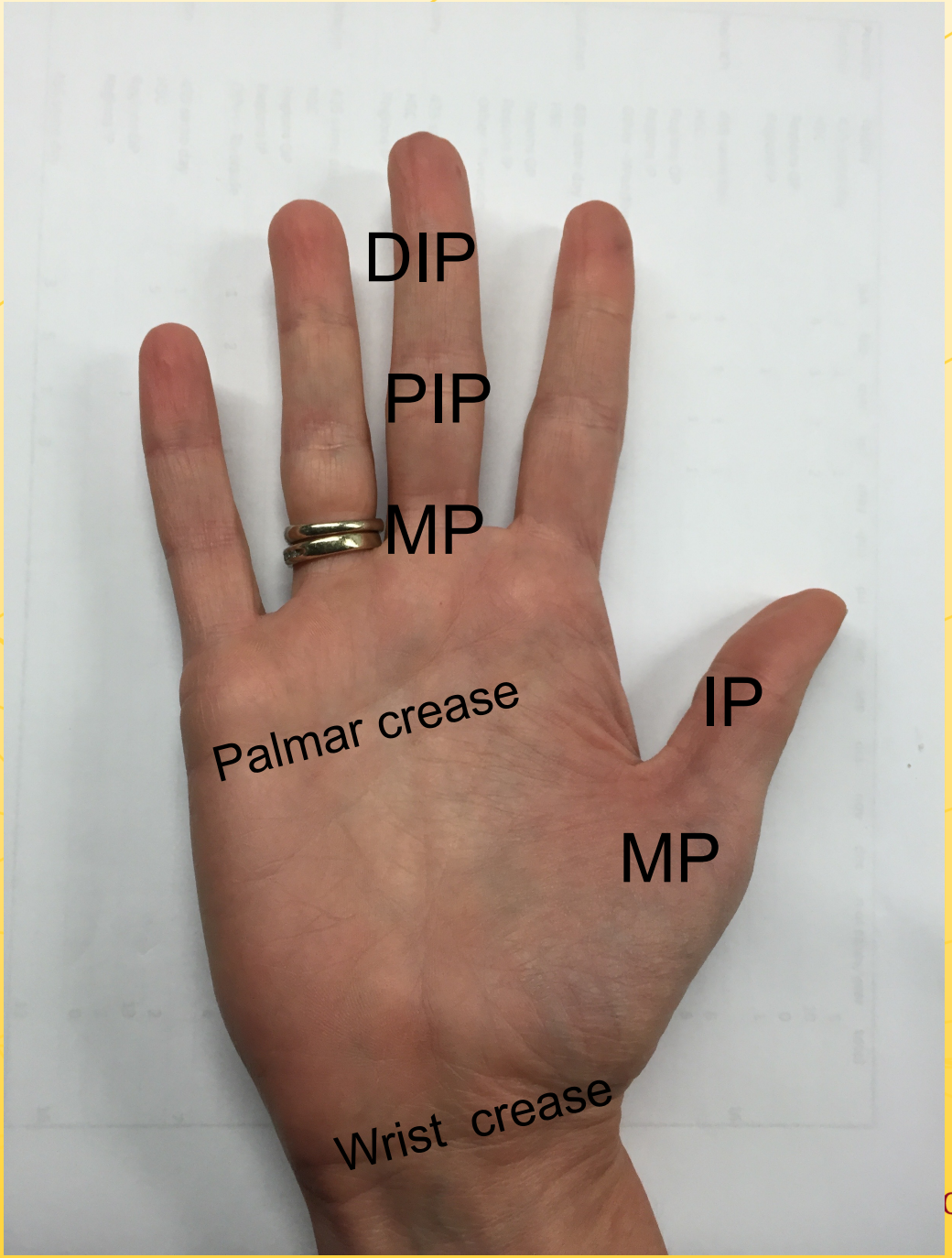


# A word on exploration . . .

- Decision for operative intervention is based on clinical exam NOT what is seen in the wound

# Terminology



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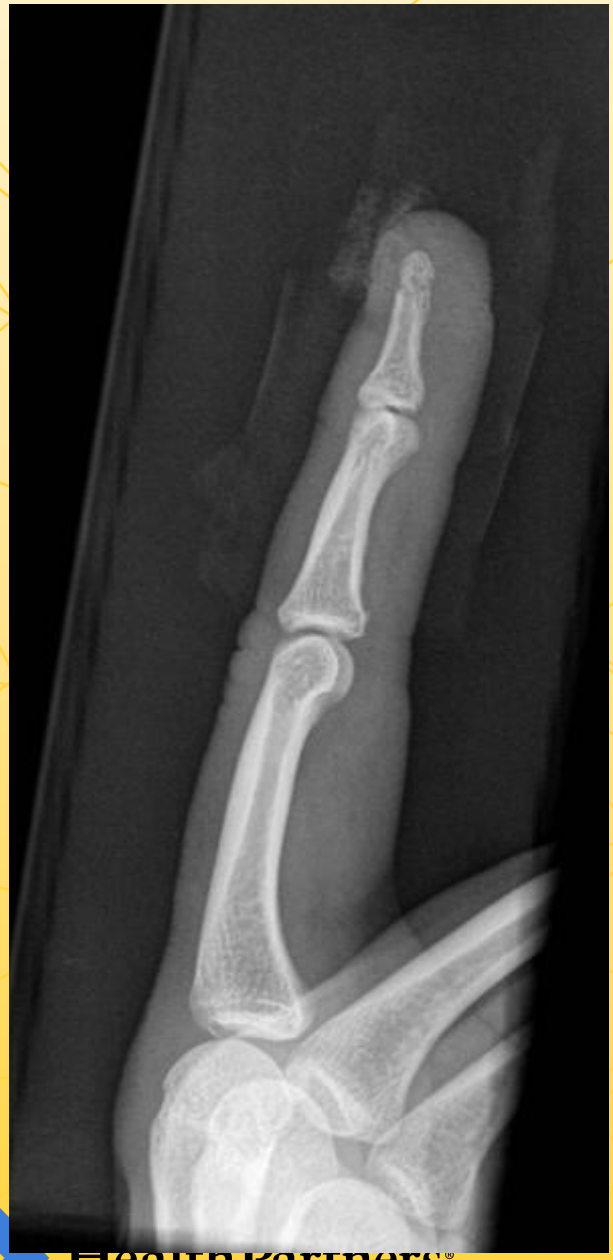

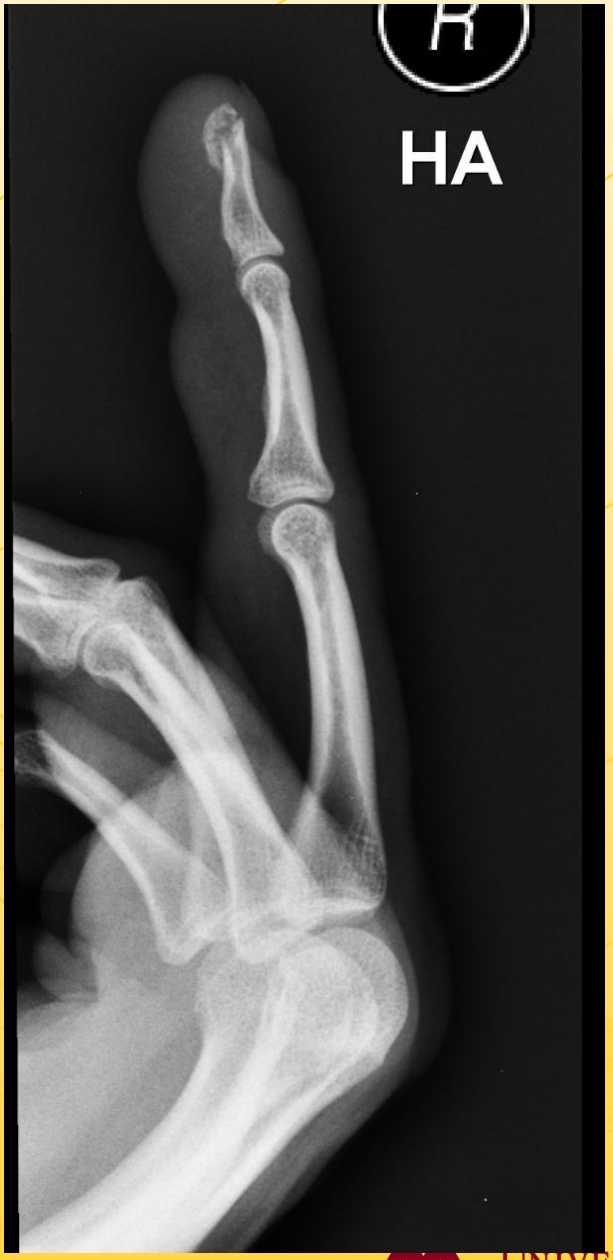
R
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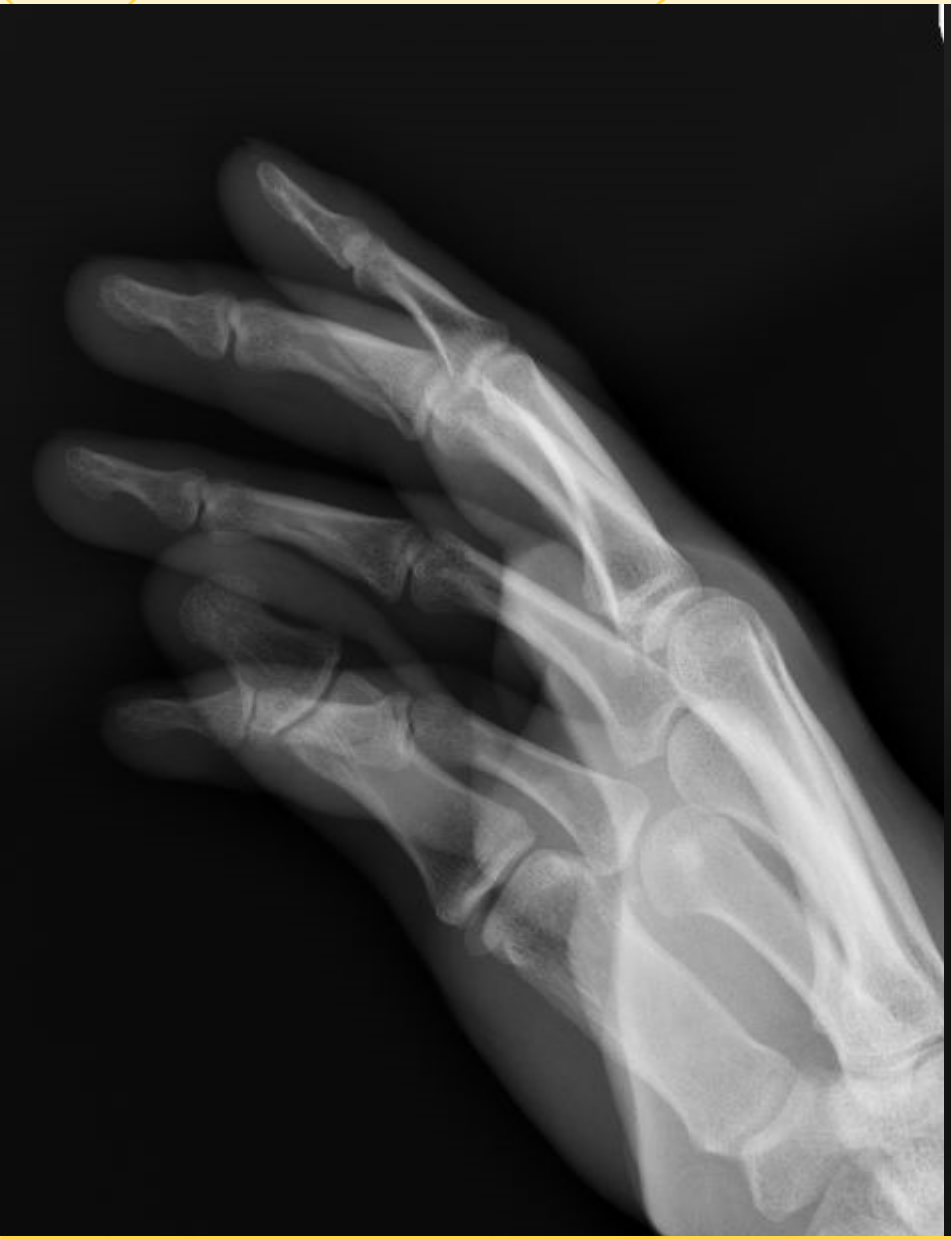

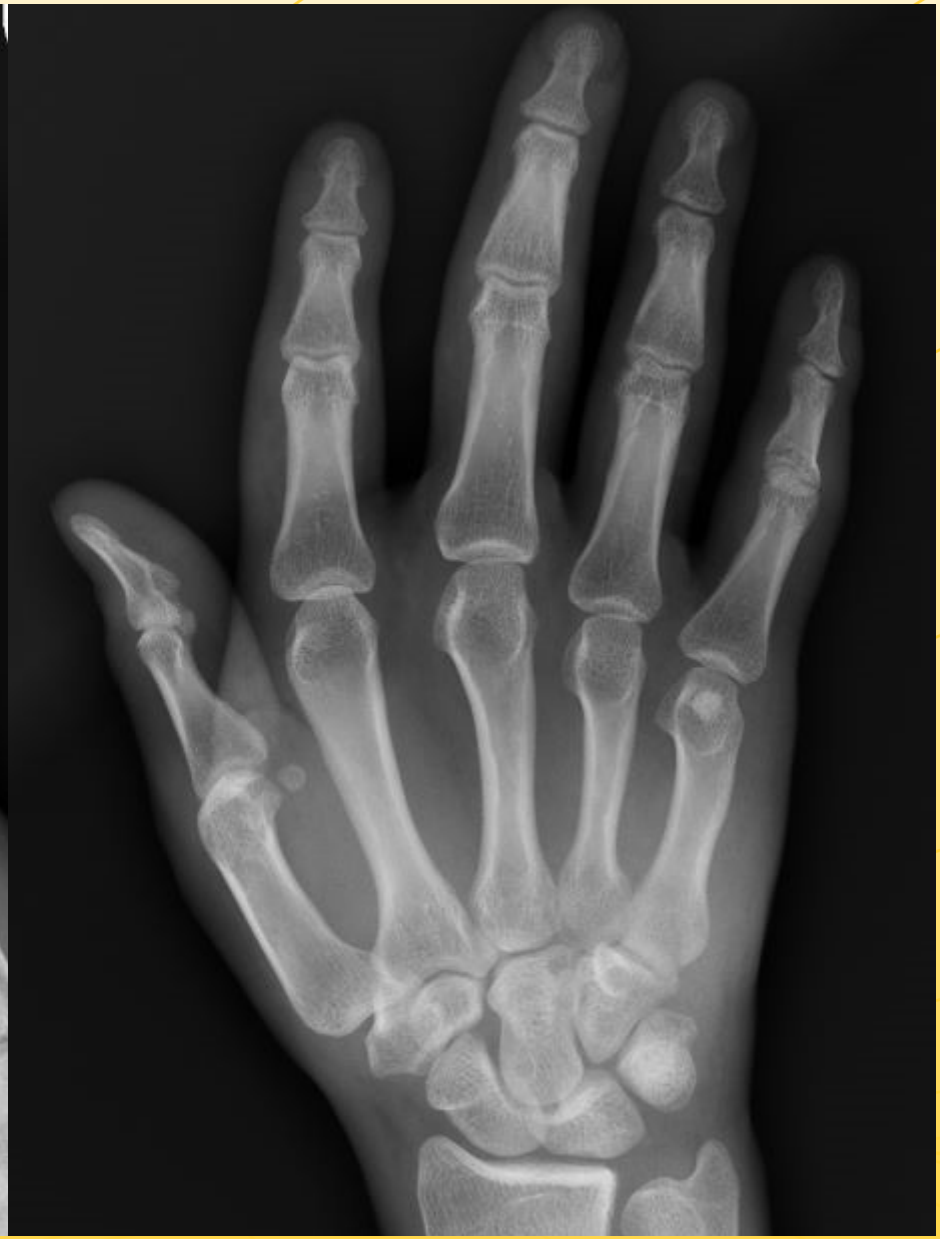

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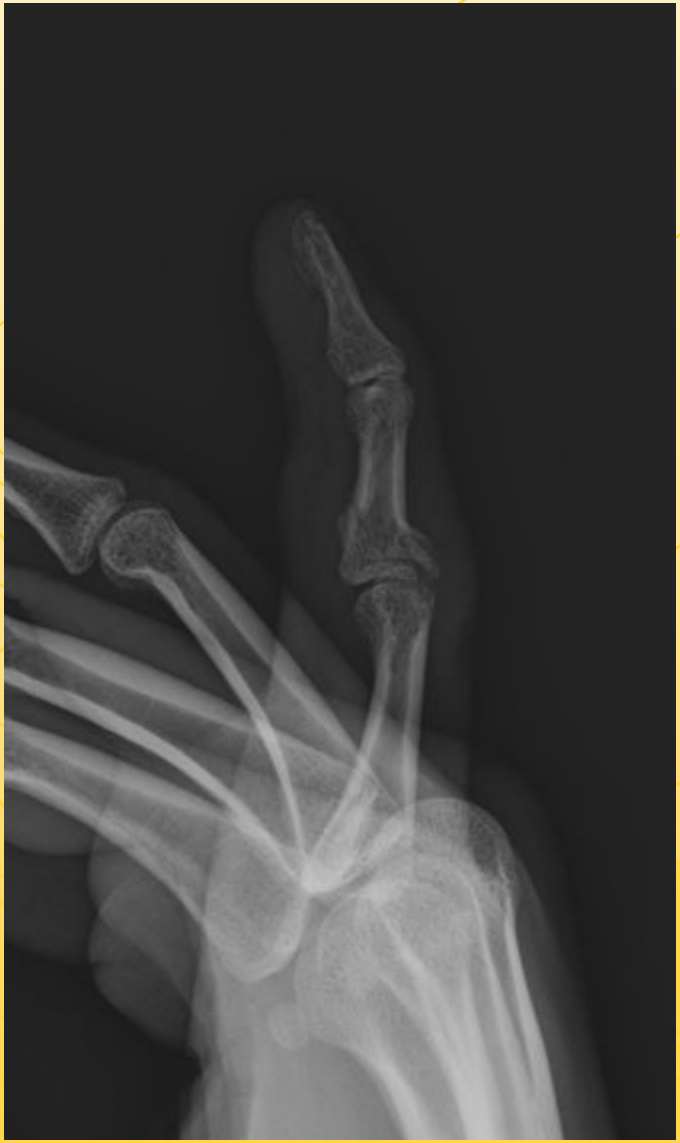

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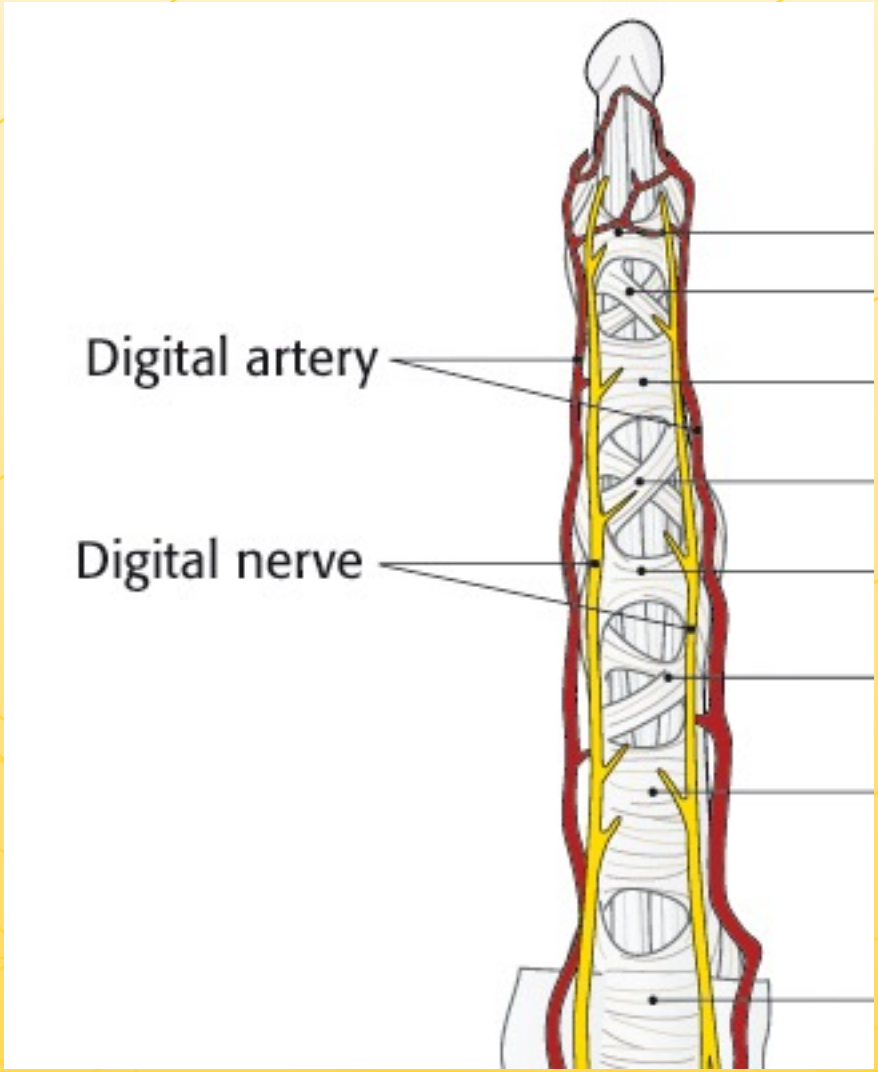
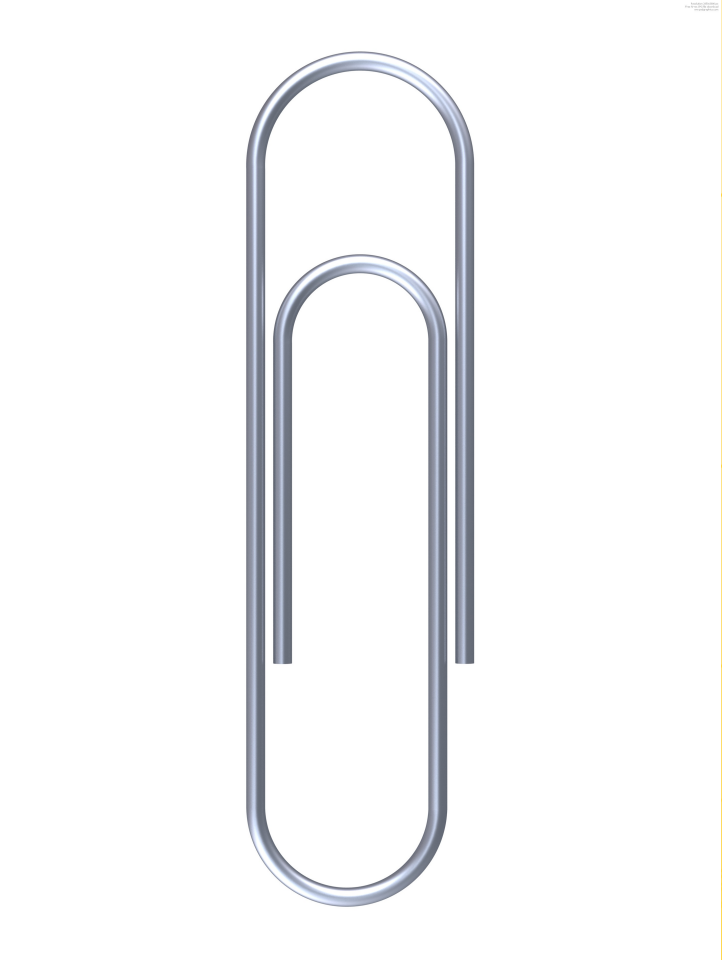
# Volar finger

- Digital nerve
- Digital artery- usually can't cut the digital artery without cutting the digital nerve
- Flexor tendon



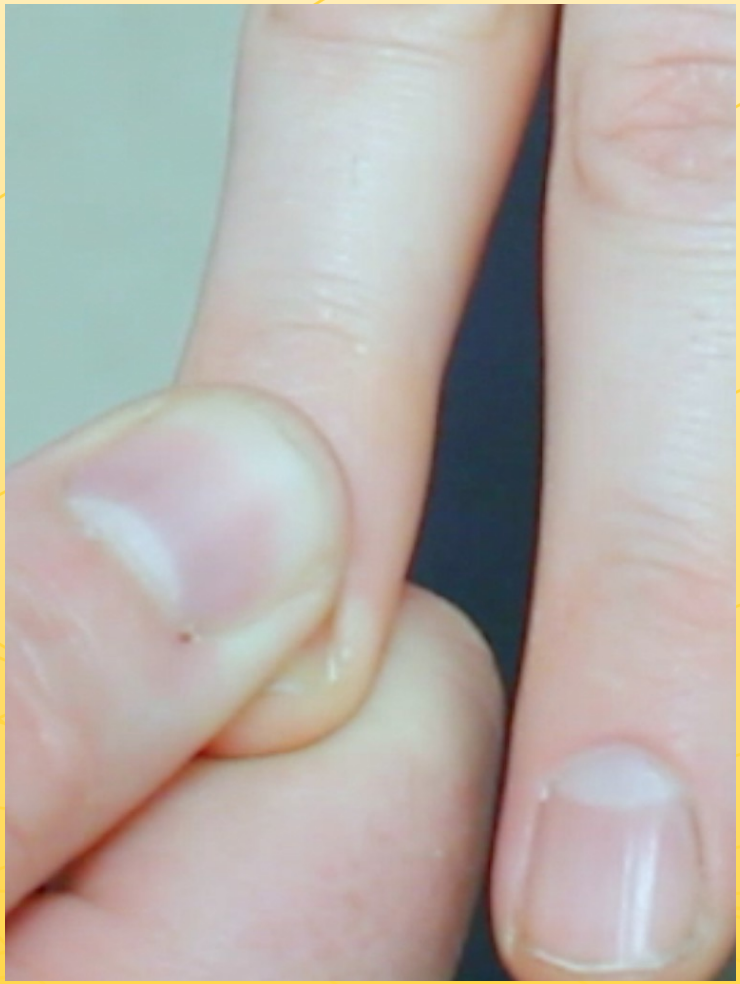
# Testing digital nerves

- Do not numb up the finger first
- Check both ulnar and radial sides



# Digital artery injury

- Only need one intact digital artery to survive
- Check cap refill
- Fingertip color
- Turgor



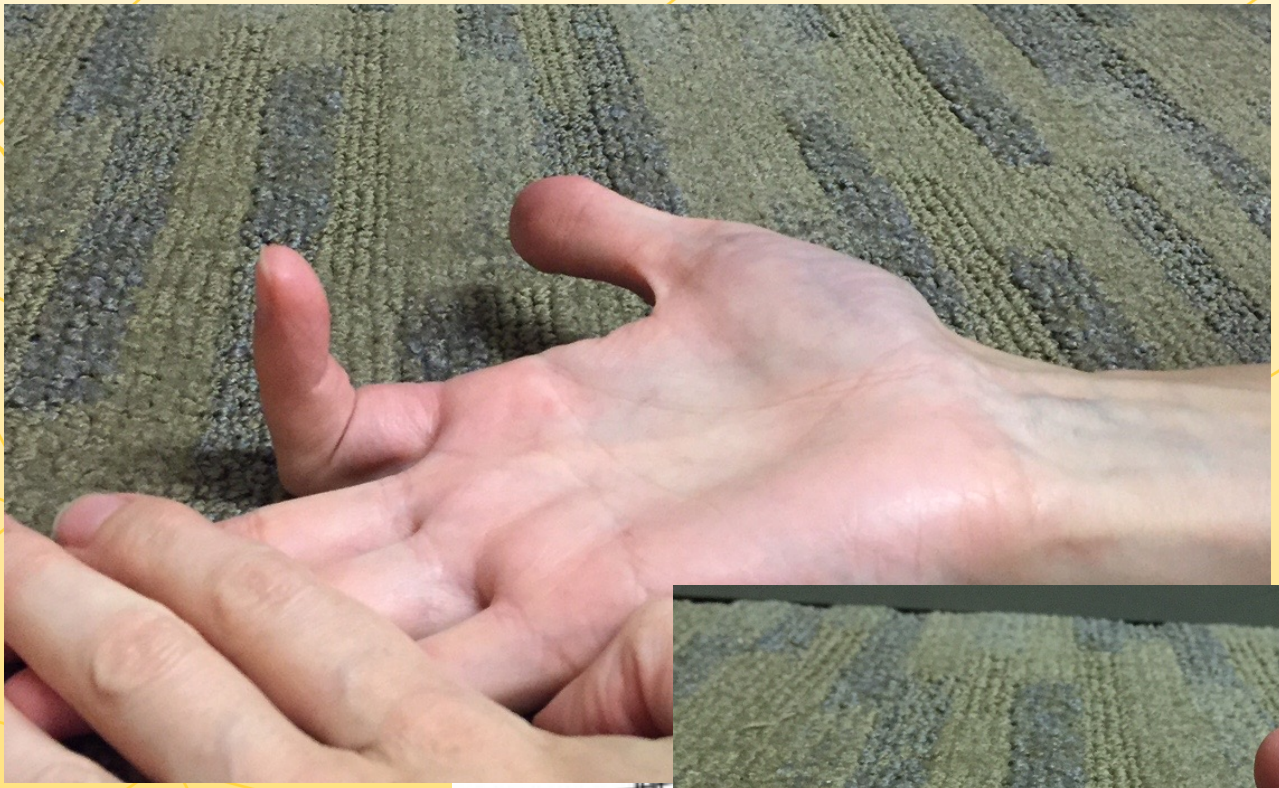
# Testing flexor tendons

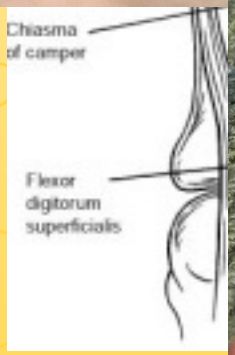
Rests in extension

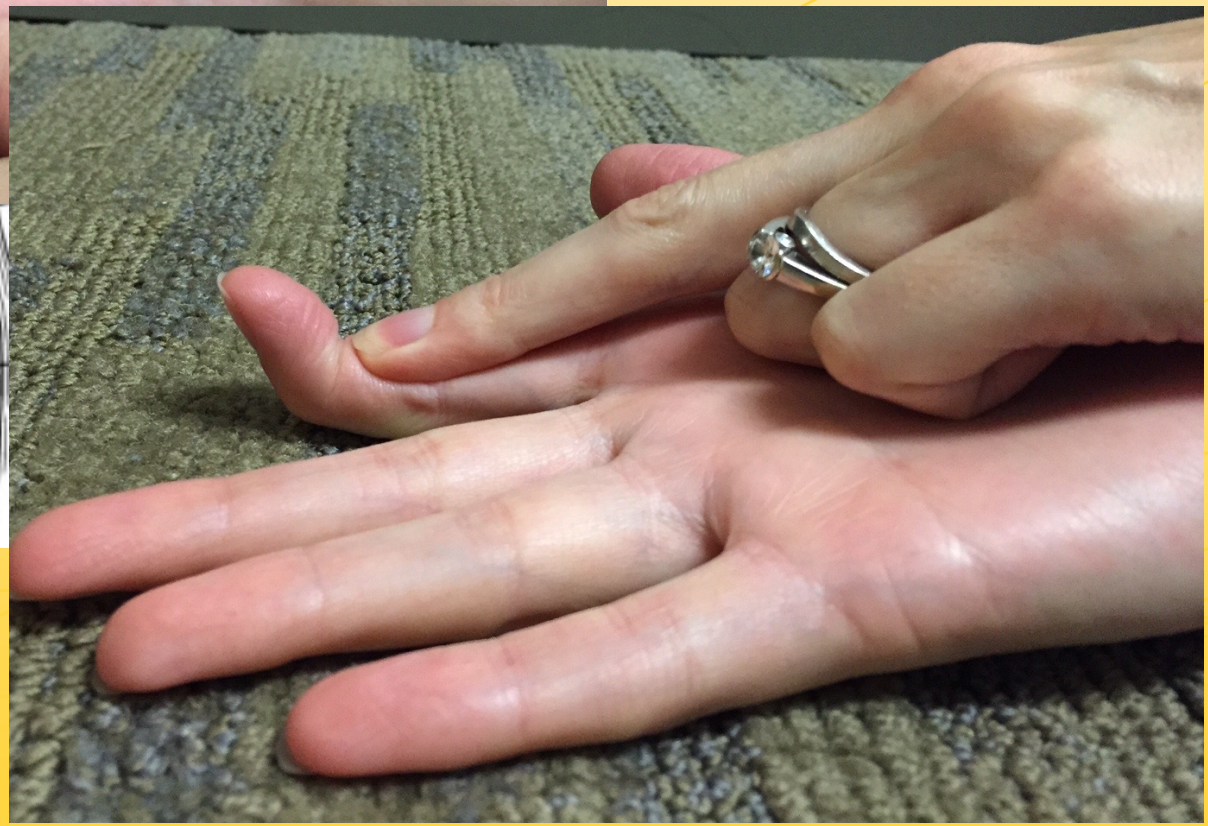
No flexion with tenodesis

Squeeze test

# Testing FDS





# Testing FDP

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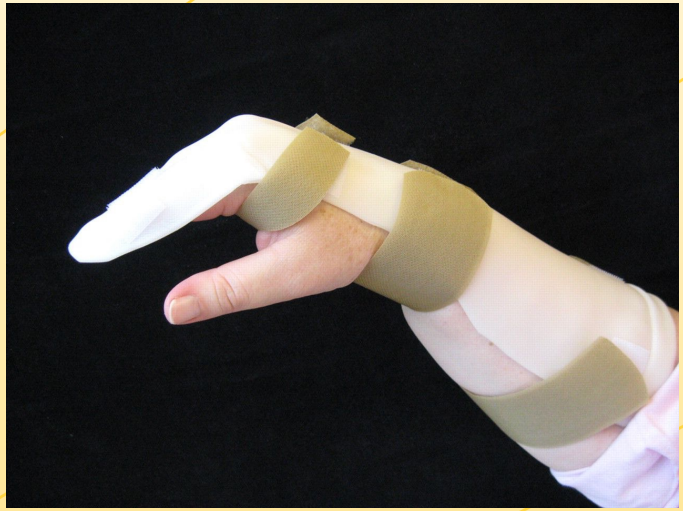
# Lacs on the volar finger injure…

| | |
|---|---|
| Digital nerve | Surgical repair ideally within 10-14 days |
| Digital artery | One artery: no treatment (but digital nerve is likely cut)<br>Two arteries: dysvascular finger SURGICAL EMERGENCY |
| Flexor tendon | Surgical repair within 7-10 days |

# Initial care



- Antibiotics
- Tetanus
- Dorsal block splint
- Primary wound closure
- Arrange follow up with hand surgeon
  - **If you leave follow up to the patient, make sure they understand the importance of timely follow up**

# Case example

Transverse laceration over volar long finger just distal to the PIP joint

Finger is well perfused

Unable to flex at DIP or PIP joints

Diminished sensation on ulnar digit

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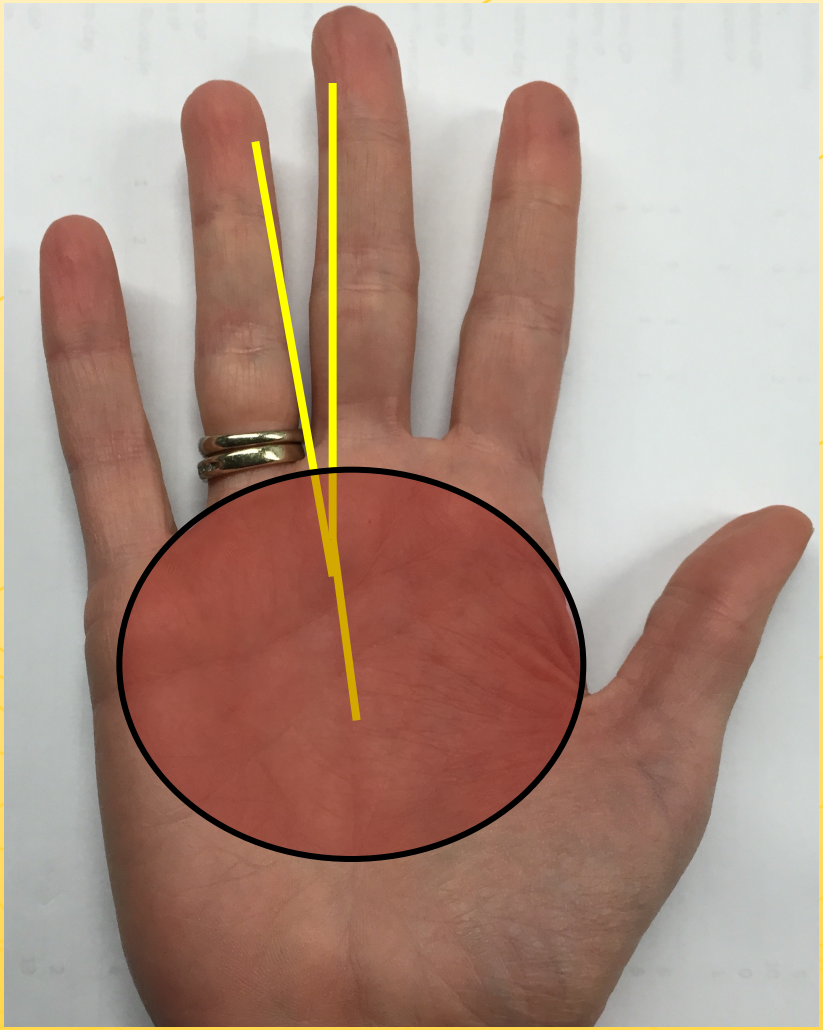
# Volar hand- distal to carpal tunnel

- Common or proper digital nerve
- Digital artery- or superficial arterial arch
- Flexor tendon: FDS and FDP

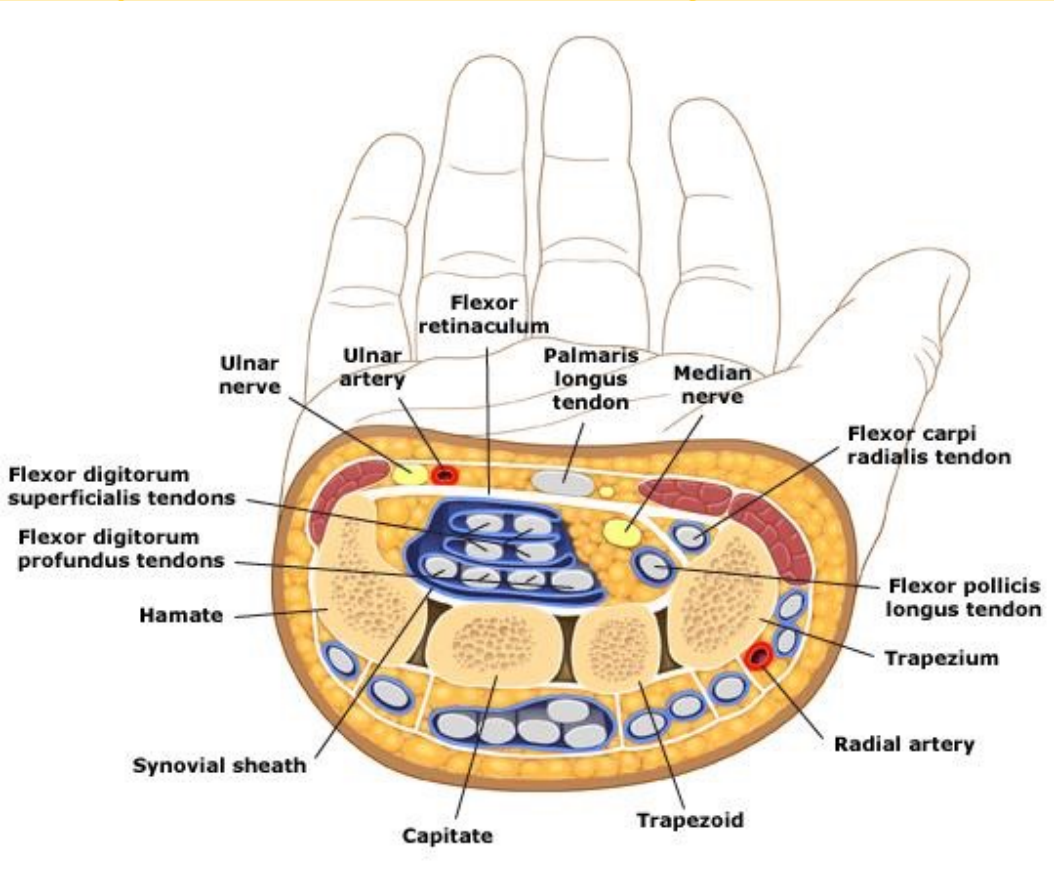


# Lacs to the palm injure . . .

| | |
|---|---|
| Digital nerve | Surgical repair ideally within 10-14 days |
| Digital artery | One artery: no treatment (but digital nerve is likely cut)<br>Two arteries: dysvascular finger SURGICAL EMERGENCY |
| Flexor tendon | Surgical repair within 7-10 days |

# Volar hand- carpal tunnel and proximal

- Median nerve
- Ulnar nerve
- Radial artery
- Ulnar artery
- Flexor tendon: FDS and FDP




**RARE TO CUT ONLY ONE STRUCTURE**

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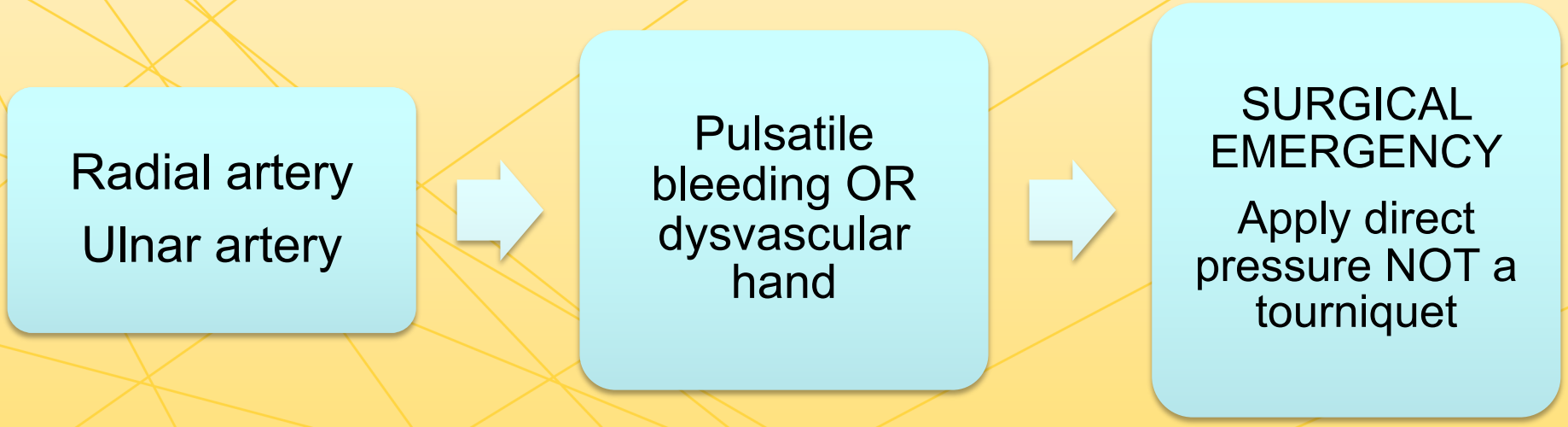


- Rarely injure only the ulnar artery- almost always injure ulnar nerve as well

Median nerve → Lack of sensation over volar thumb, index, long finger → Surgical repair in 10-14 days

- Median nerve injury can result from small puncture wound.
- Partial median nerve injuries are COMMON
- Often associated FDS injury

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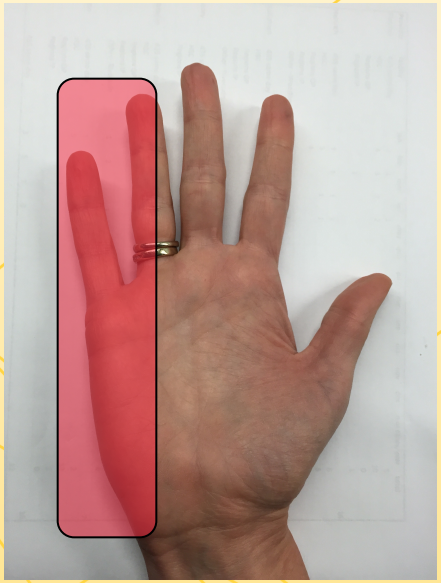

Ulnar nerve

Lack of sensation over small and ring fingers

Inability to abduct/adduct digits (cross fingers)

Surgical repair in 7-10 days

- At this level, can have partial injury of ulnar nerve (either motor or sensory)

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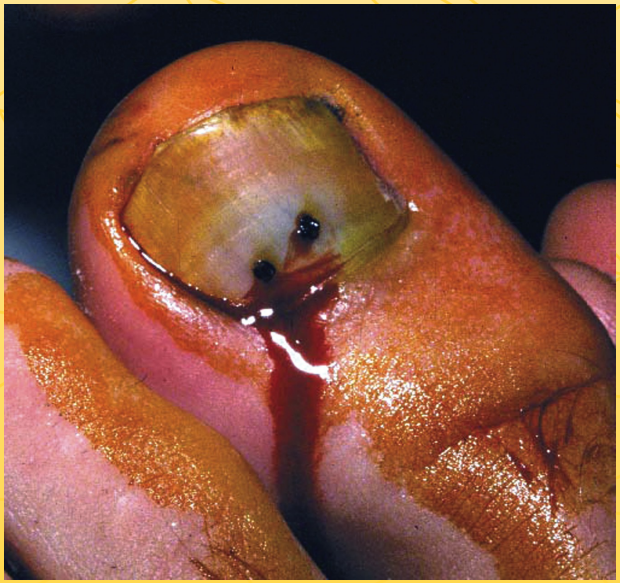
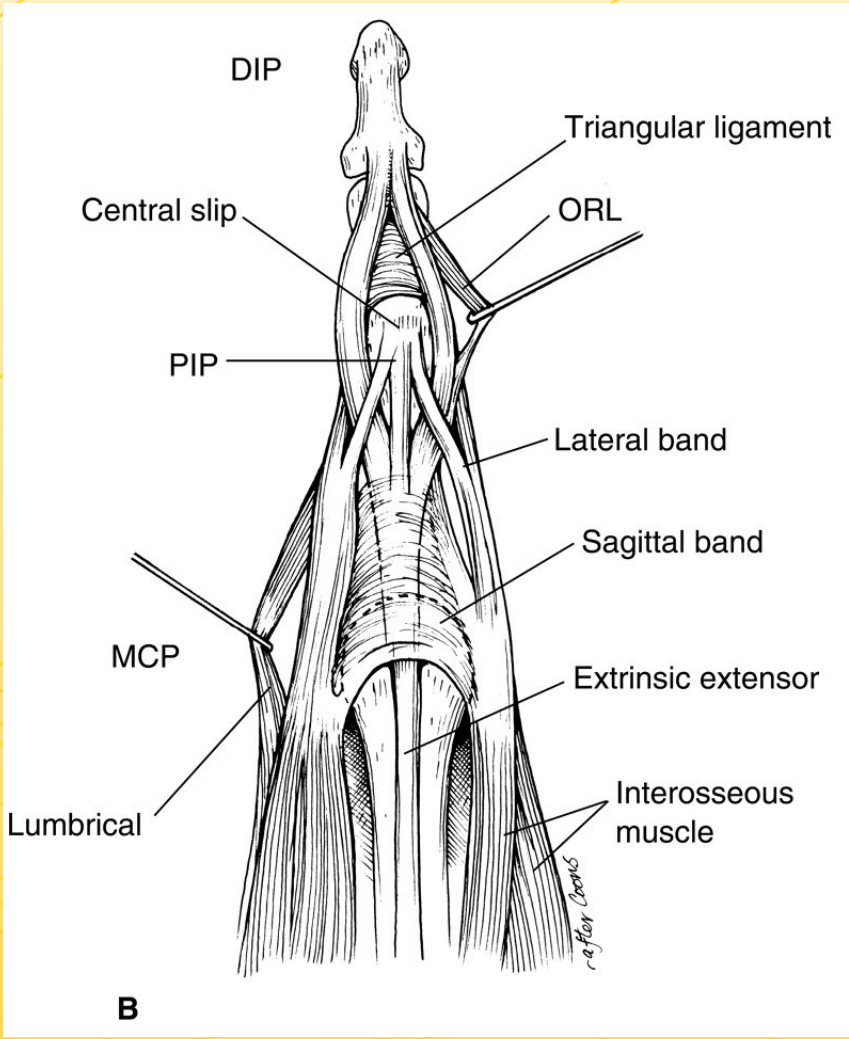
# Dorsal finger

- Nailplate/ nail bed
- Extensor tendon



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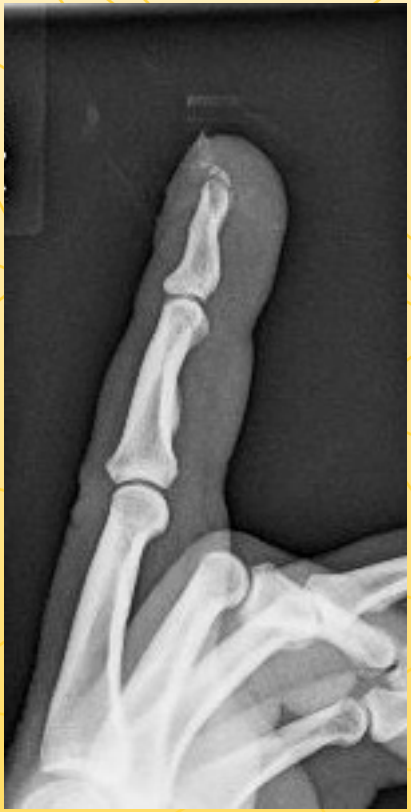
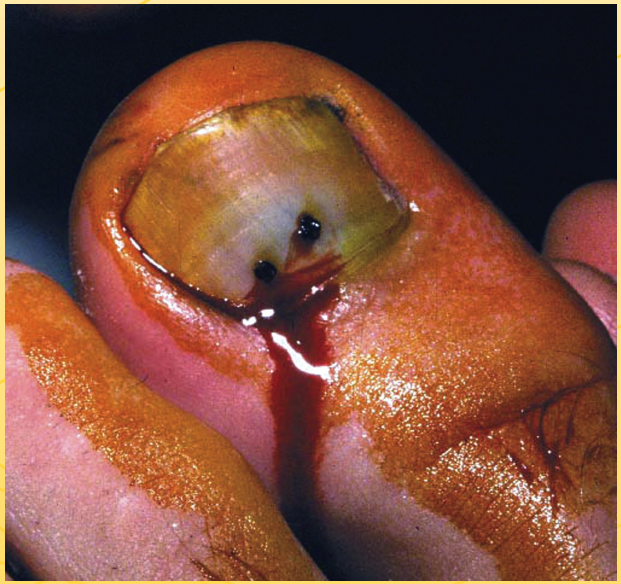
# “Tuft” fractures

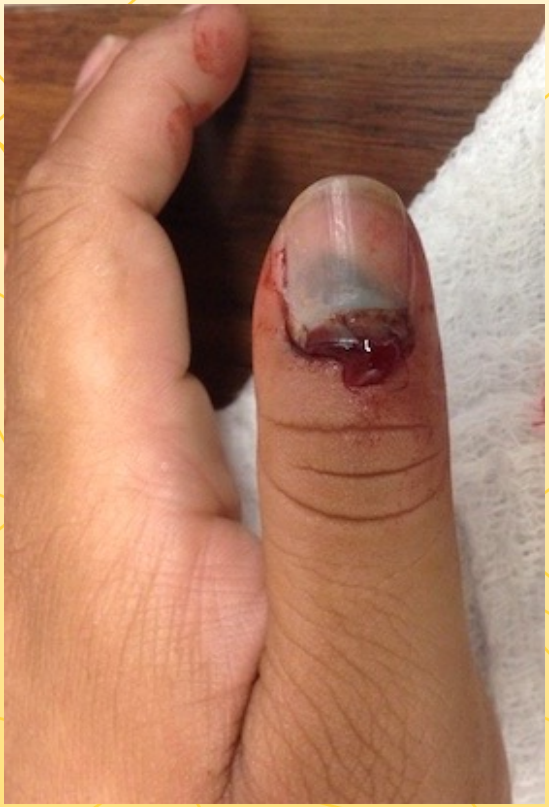


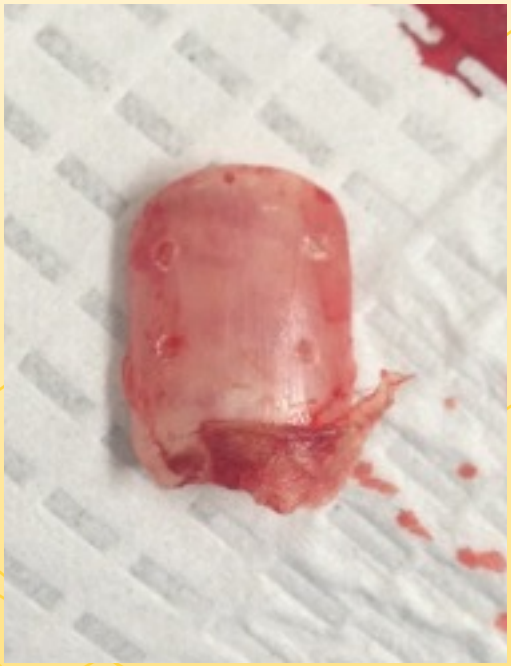
- Common tip of distal phalanx fractures, usually from a crushed finger
- Almost never require surgical intervention
- Nail plate acts as splint

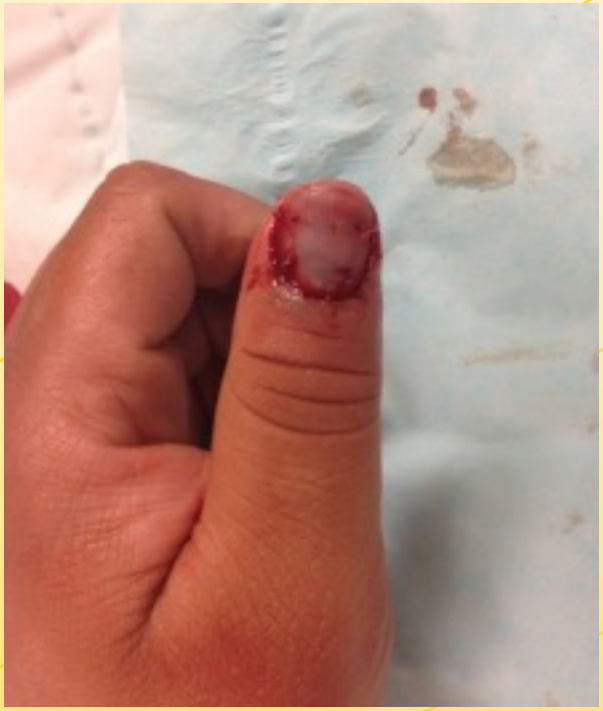
# Tuft fractures

- Often associated with subungual hematoma
  - DO NOT need to remove the nail plate if it is intact
  - Nail trephination does NOT turn it into an open fracture (does not need antibiotics)
  - Just splint at DIP joint, not PIP joint to prevent finger stiffness









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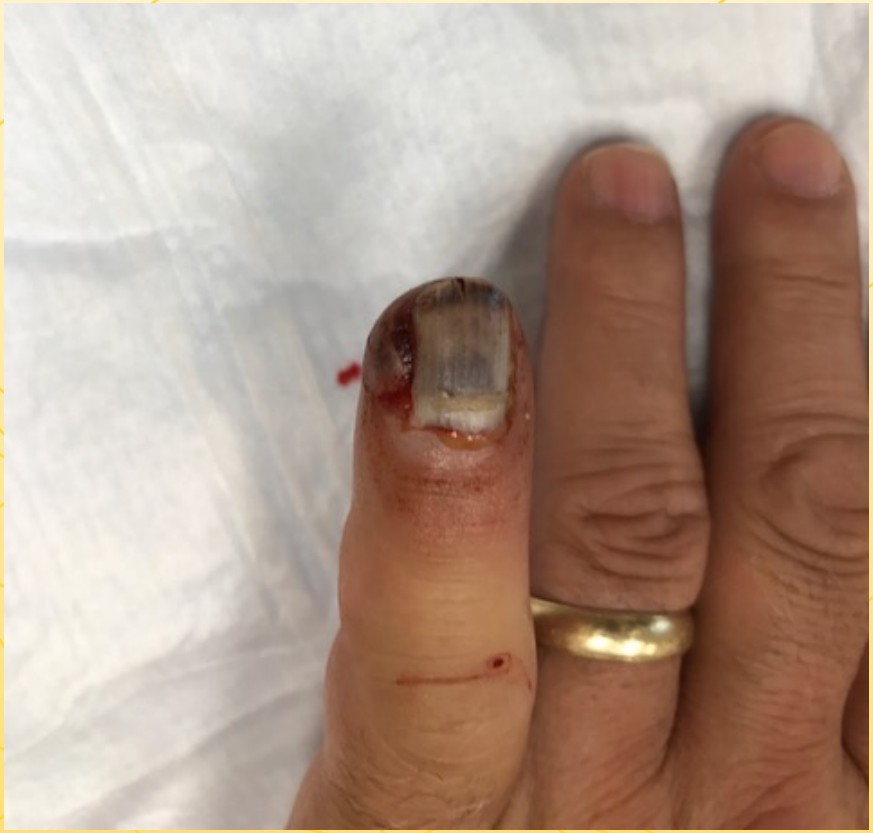
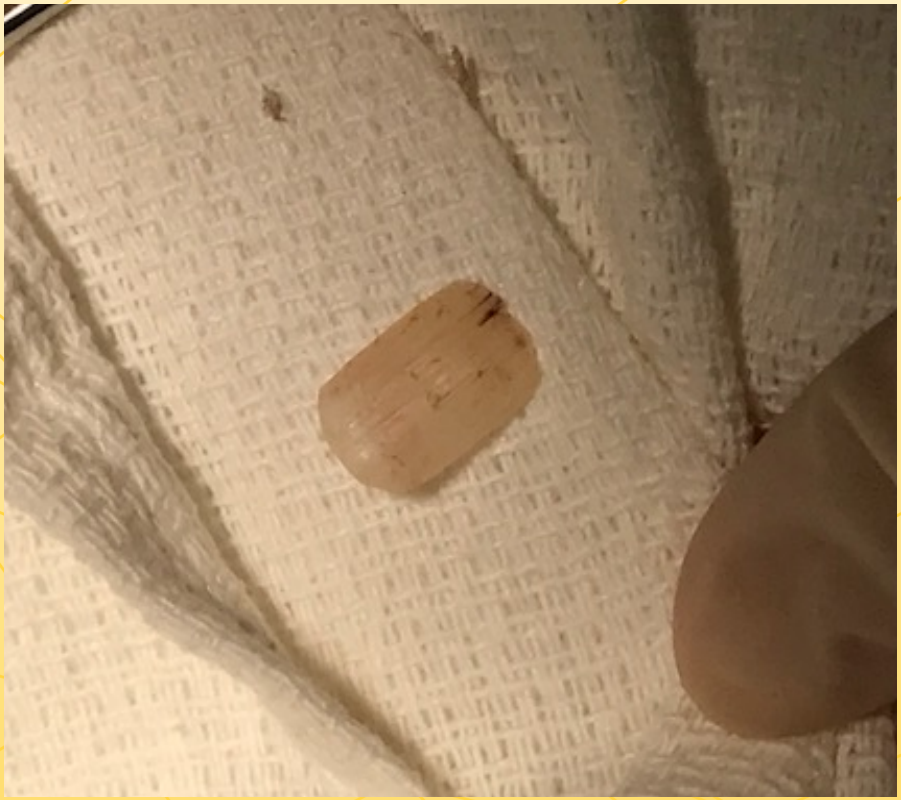
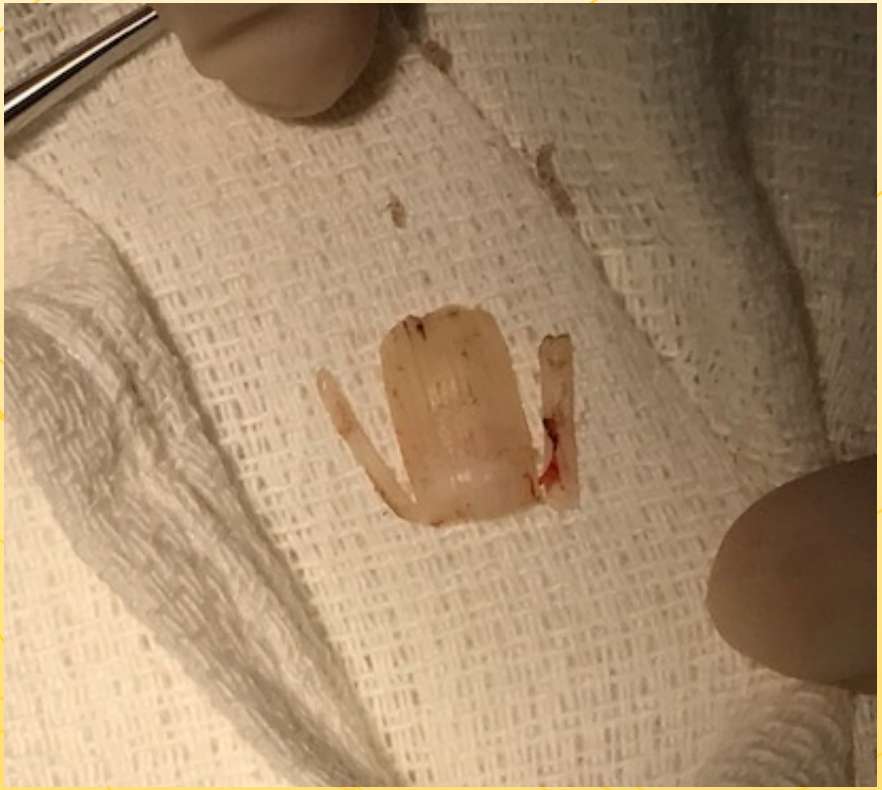


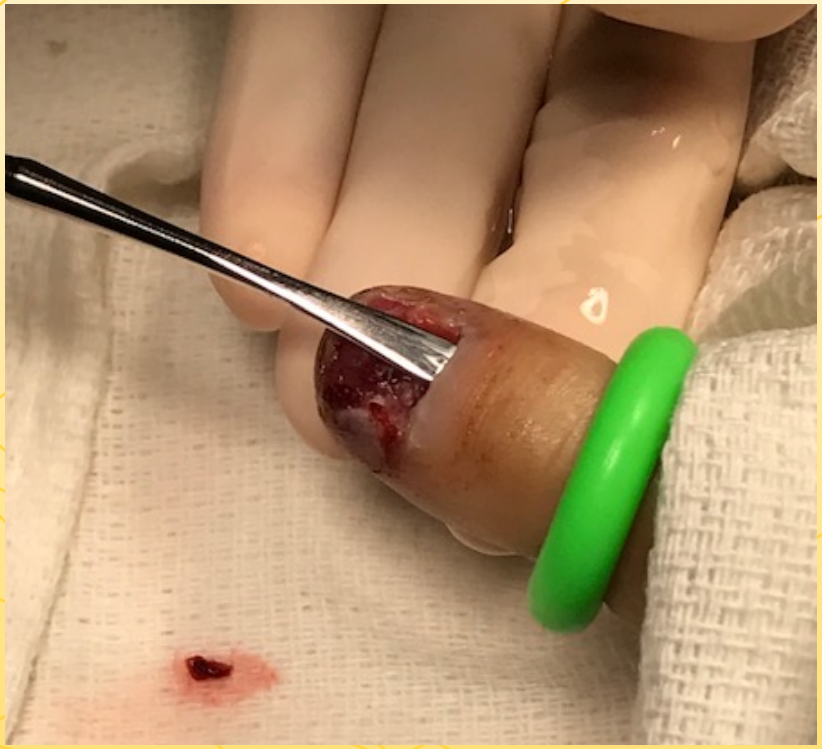
**Proximal nailplate sitting on top of nail fold**



Nailplate removed and cleaned



**Trim the edges of the nail AND the proximal feathery end**



**Suture repair along edges of finger first,**
**then nailbed if absolutely necessary**
**Establish nailfold with elevator.**
**Irrigate thoroughly**

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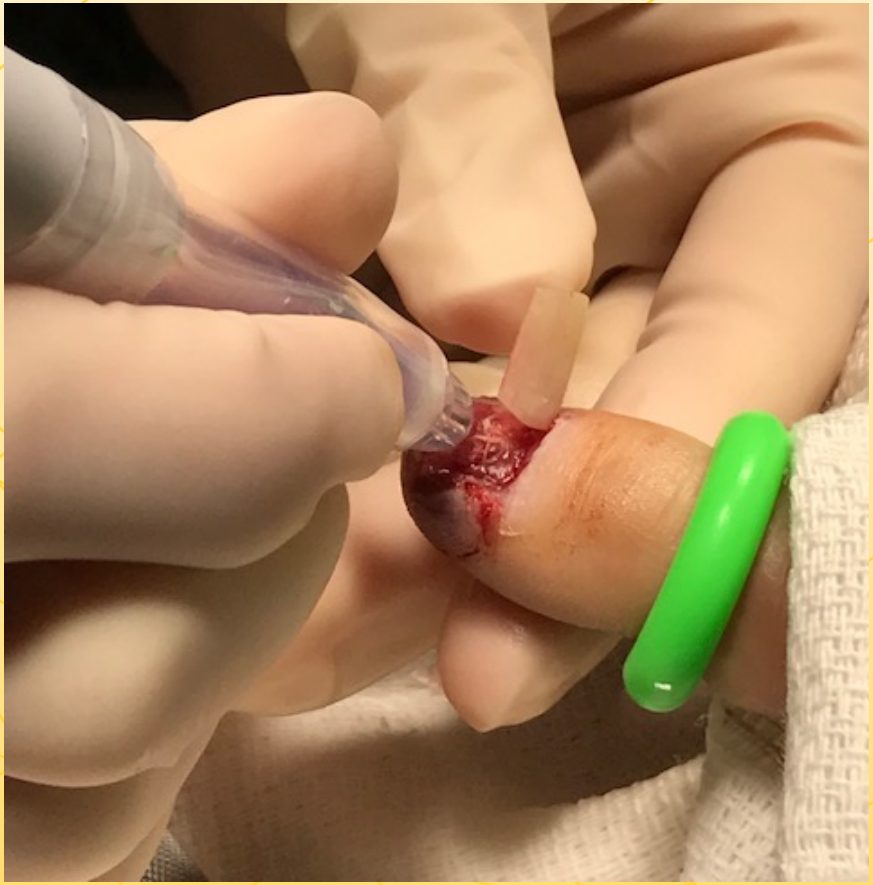
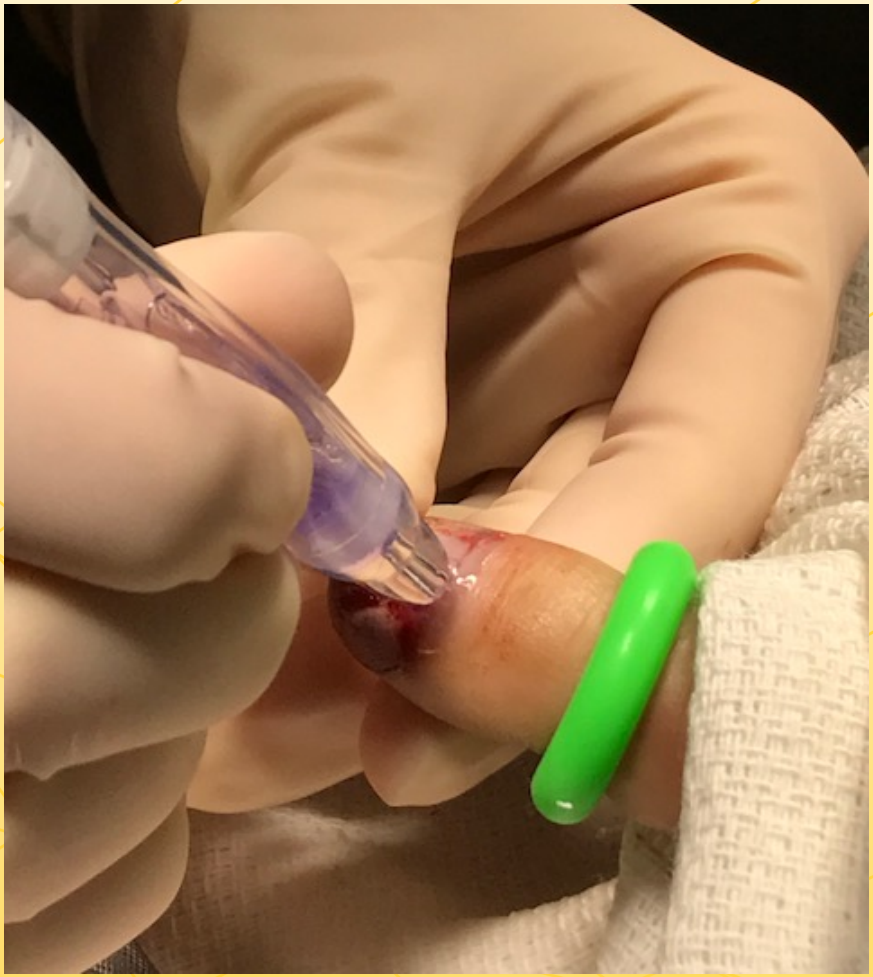


A dot of dermabond on the sterile supporting matrix



**Nail plate under the nailfold and dermabond at the fold**

**Finger tourniquet controls bleeding so dermabond can dry**

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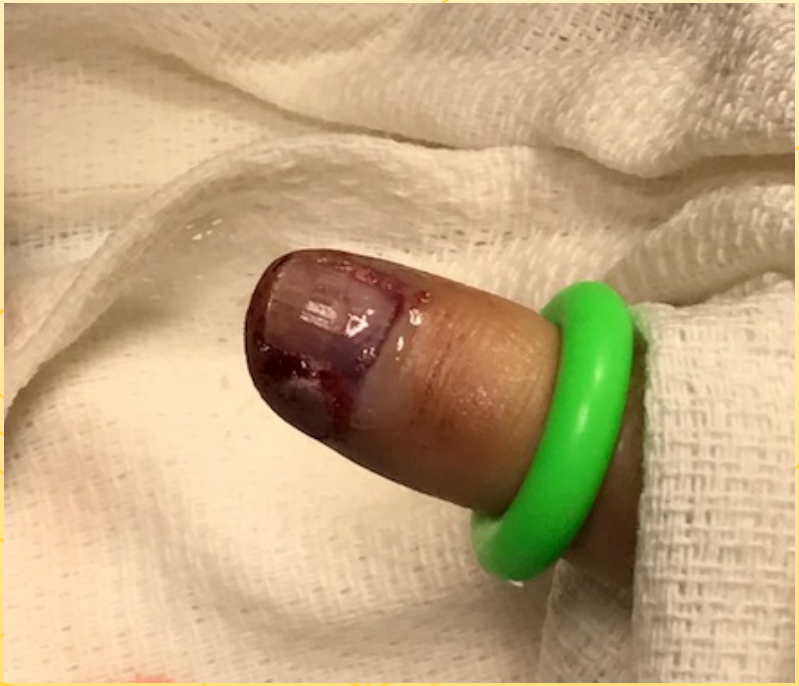

**Leave tourniquet until the dermabond is dry- but don’t forget to remove it before the patient leaves**

**Nail under the nail fold**

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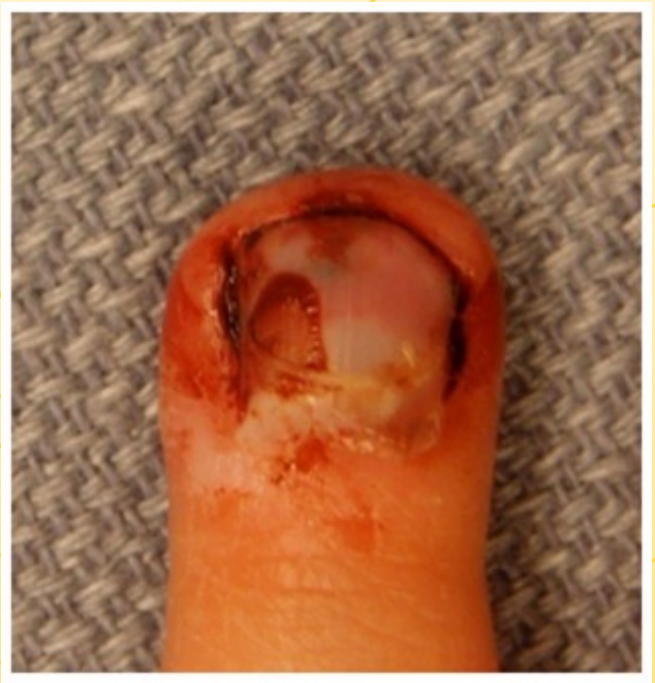

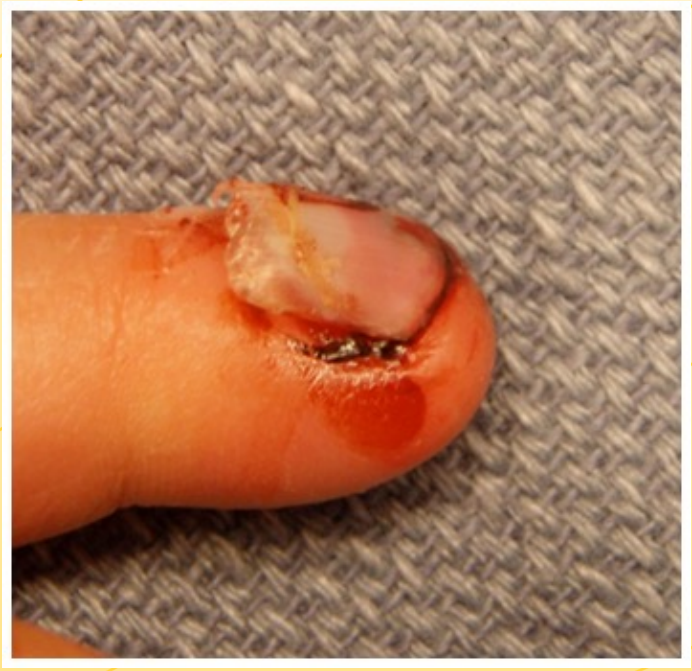

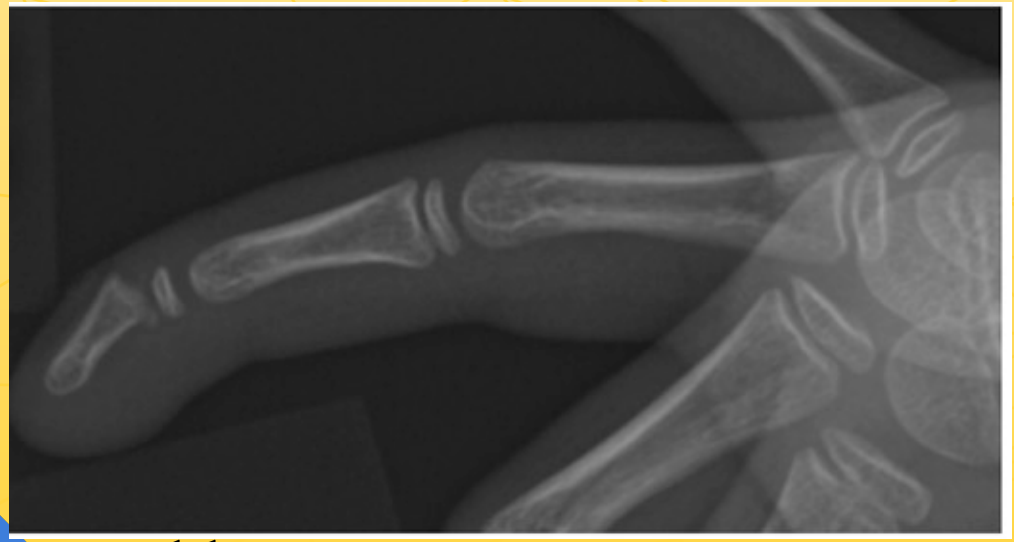

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# Seymour fractures

- Pediatric fracture through the physis
- Needs to be washed out within 24 hours, typically in the OR (to facilitate pinning)

  <24 hours → 0 infections

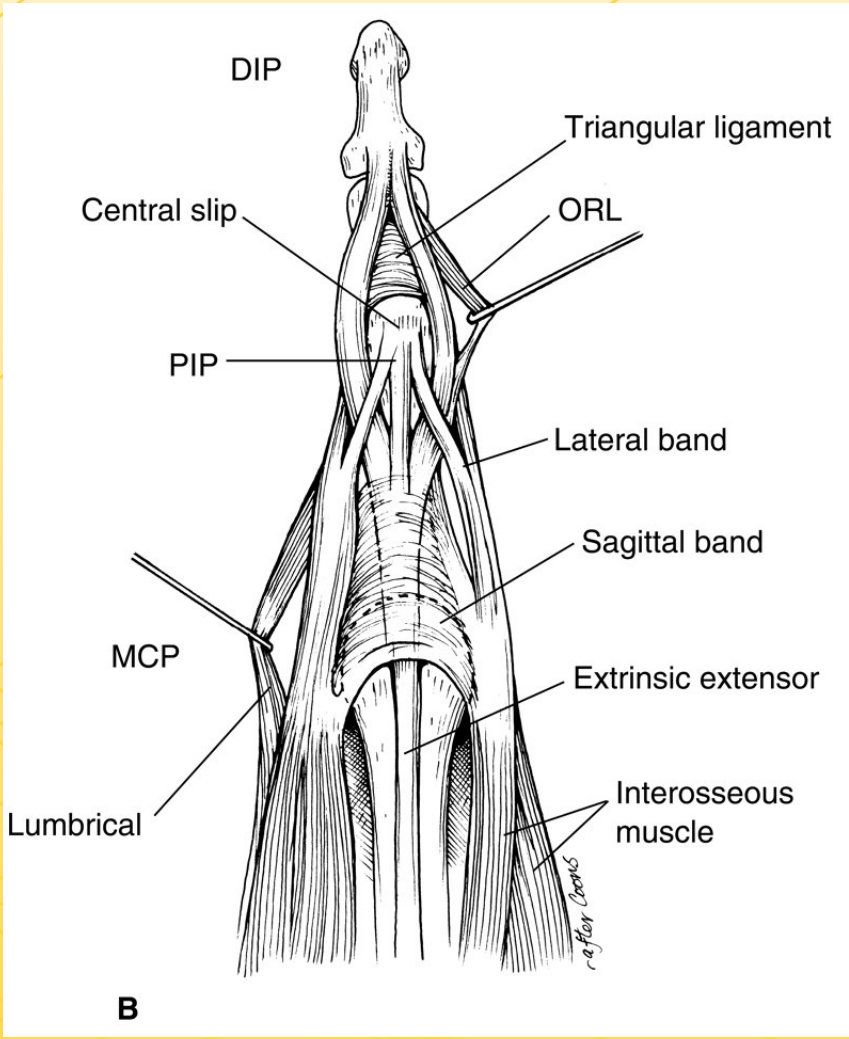
  acute, partial treatment→ 15% infections

  delayed treatment→ 45% infections

# Extensor tendons

- At the PIP (boutonniere)

- At the DIP (mallet)

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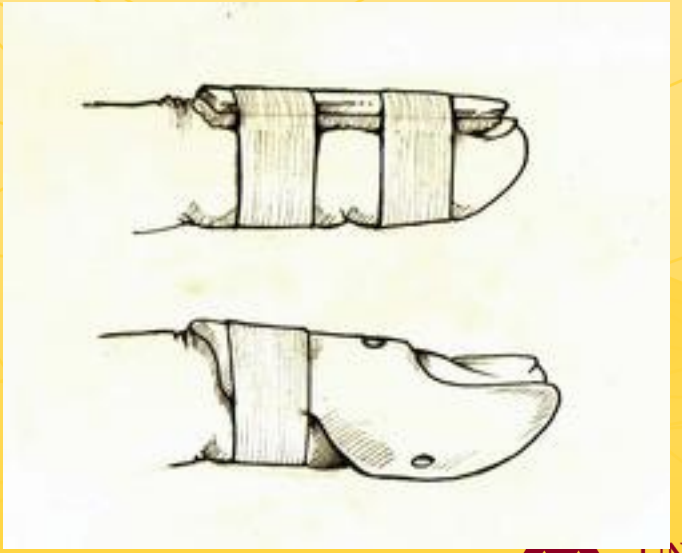
# Mallet finger (minus laceration)

- disruption of distal end of extensor tendon
- Common even with minor trauma
- Splint with the DIP in extension and the PIP free.  FULL TIME SPLINT X 6-8 WEEKS.



# Lacs to the dorsal finger injure…

| | |
|---|---|
| Subungual hematoma (+/- tuft fracture) | Decompress or nothing |
| Nail plate disrupted | Same day repair in the office or ER vs f/u in clinic |
| Extensor tendon | Surgical repair within 7-10 days |

# Dorsal hand

- Extensor tendon…..
  that's about it

Extensor tendon → Surgical repair within 7-10 days

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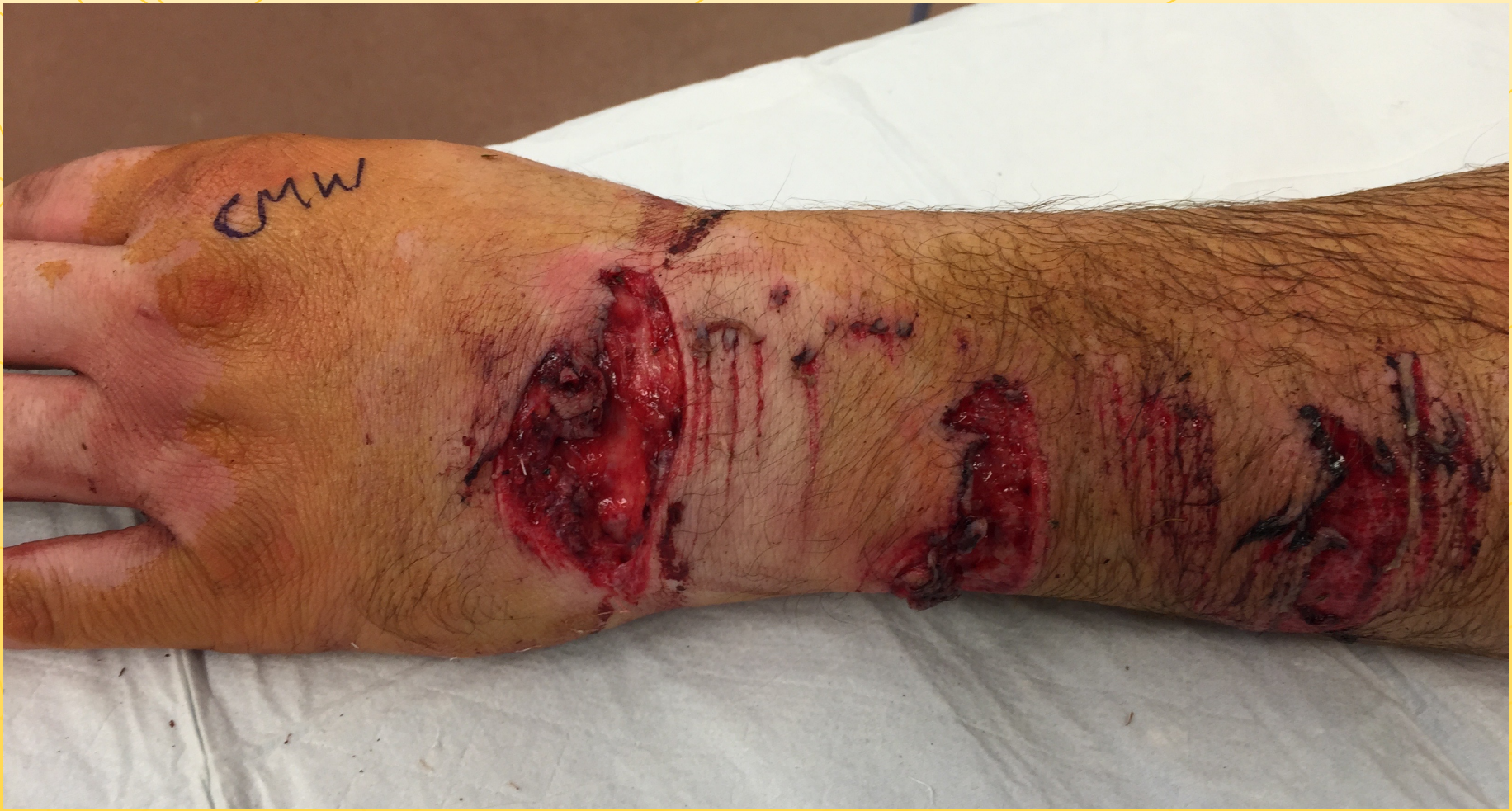

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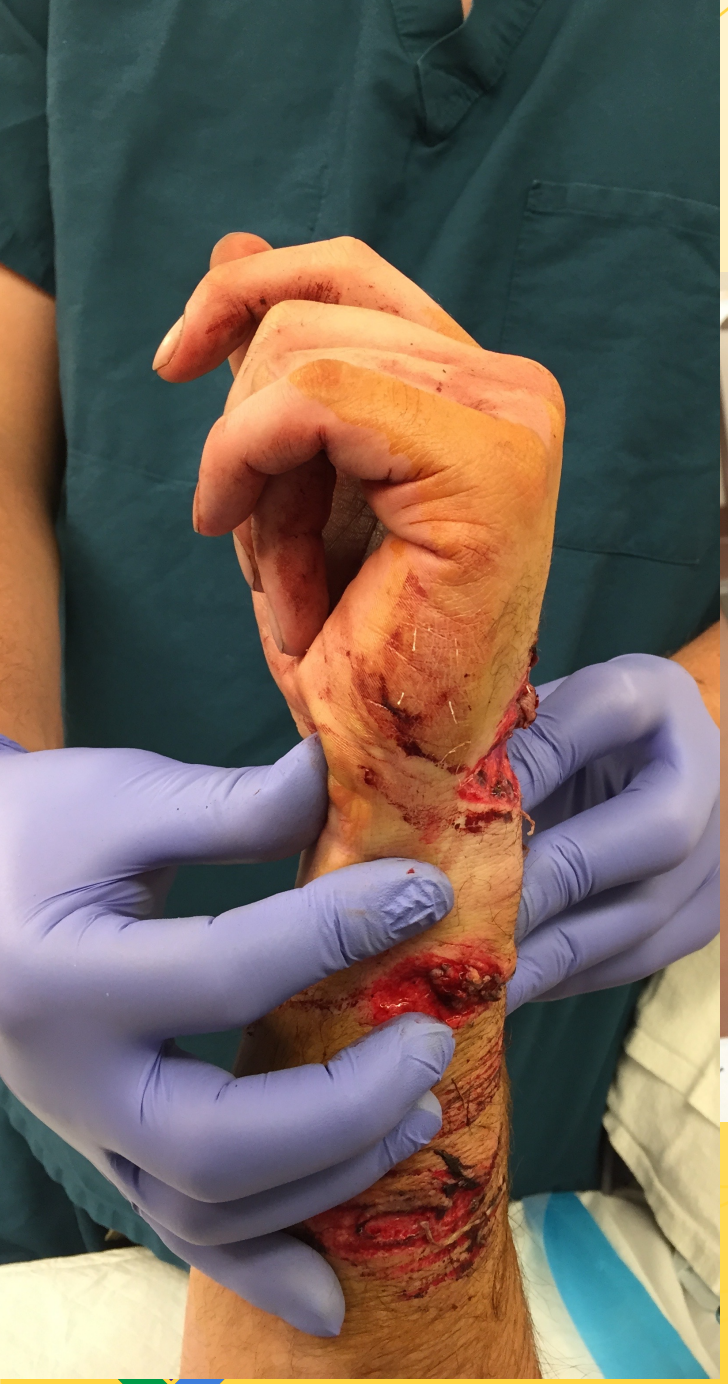
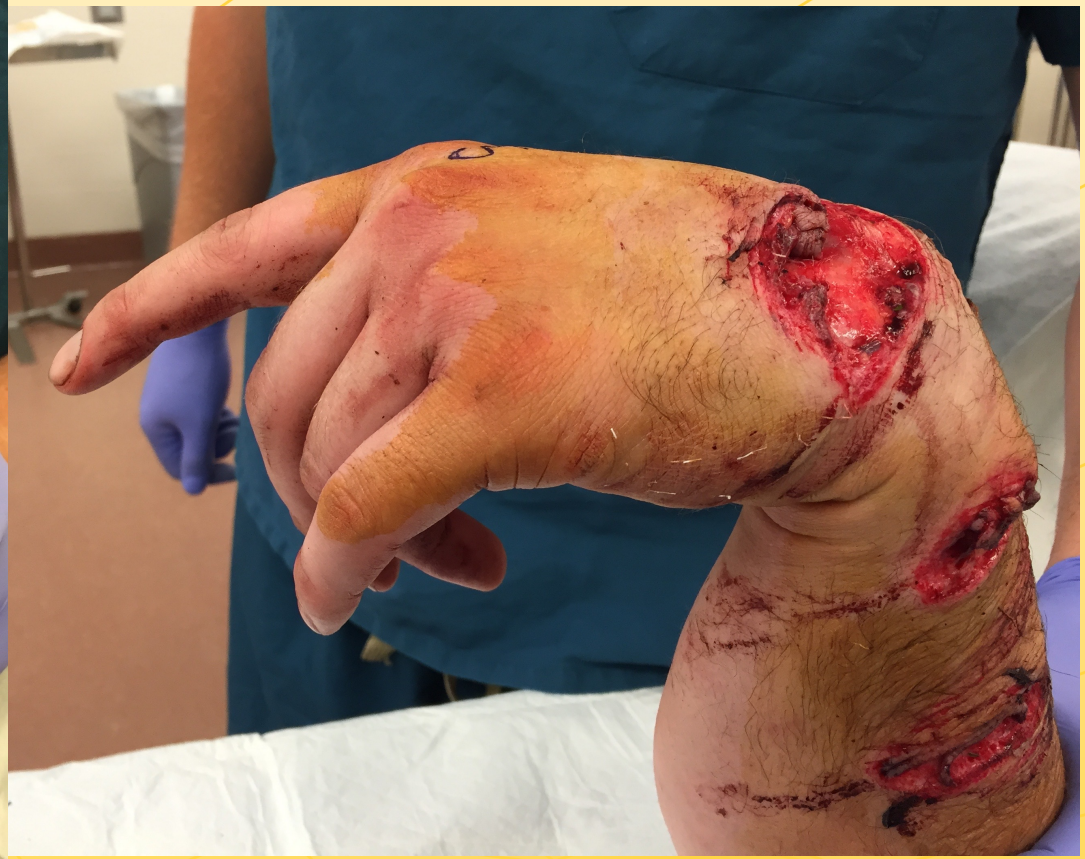
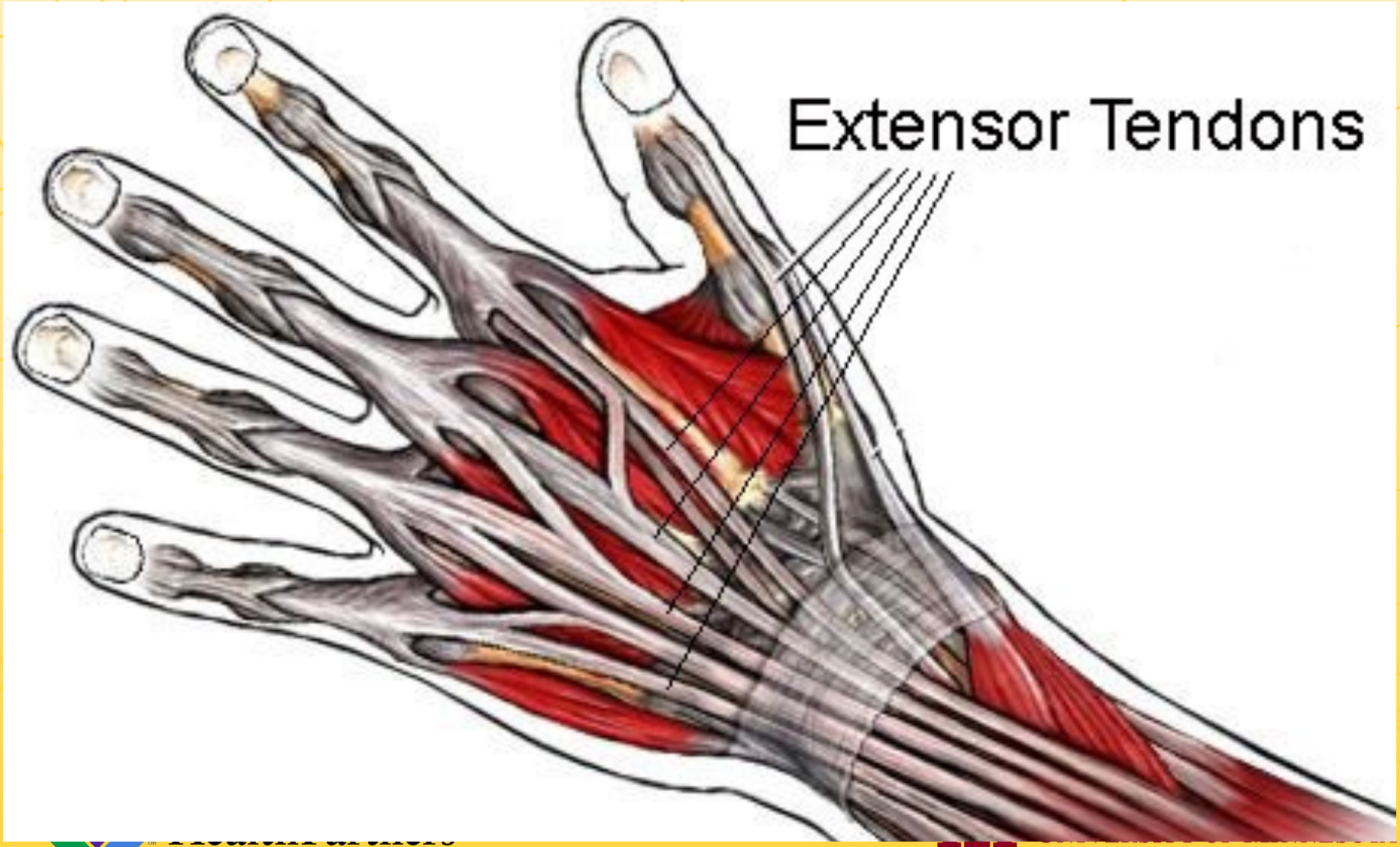
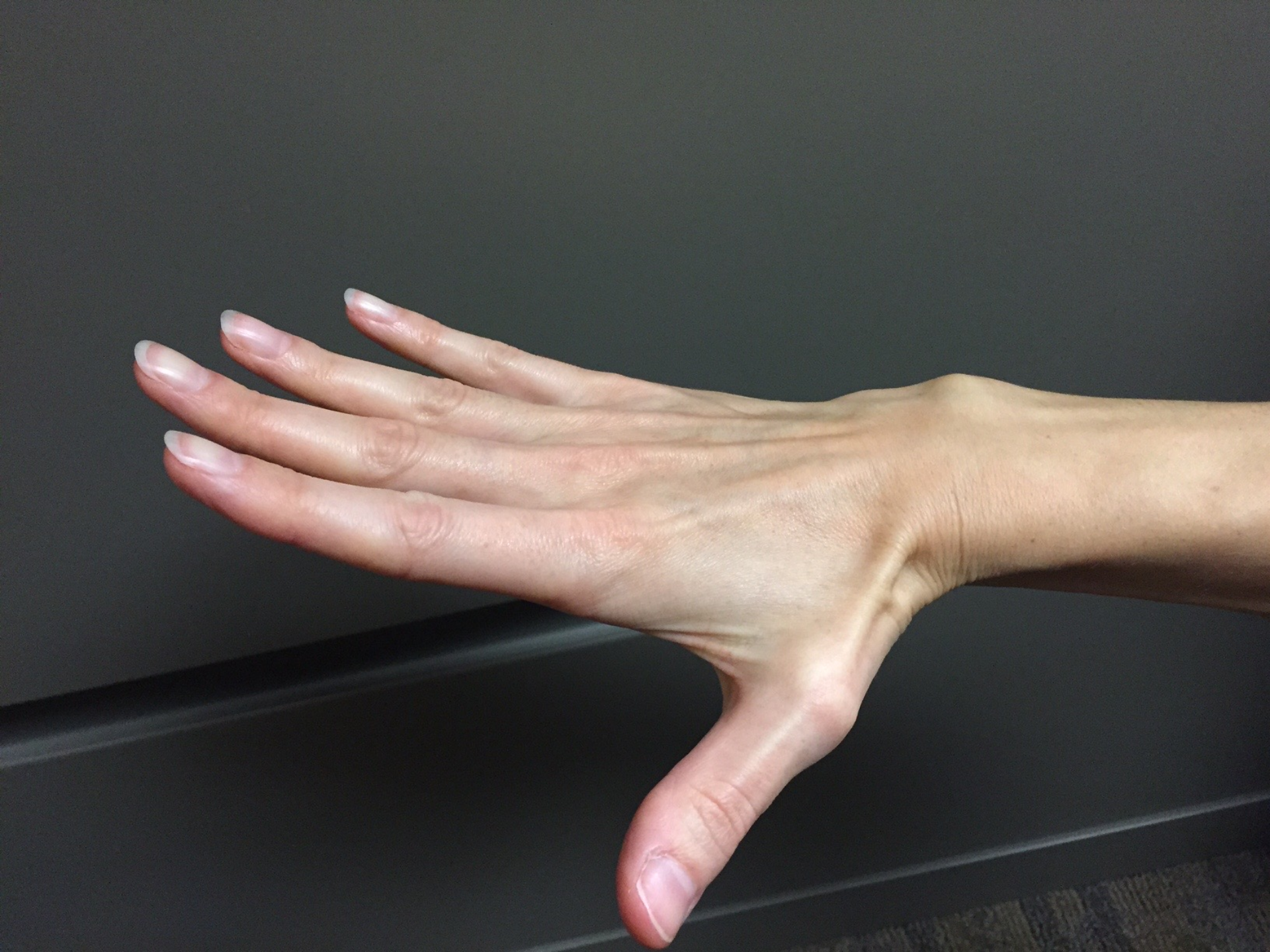




# Redundancy of extensors



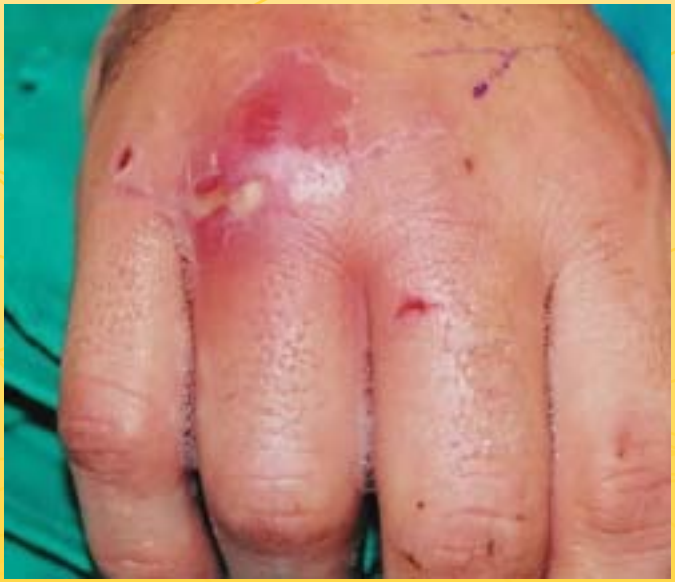


# Initial care (dorsal hand)

- Antibiotics
- Tetanus
- **Splint wrist and fingers in extension**
- Primary wound closure
- Arrange follow up with hand surgeon
  - If you leave follow up to the patient, make sure they understand the importance of time to f/u

# A word about fight bites …

- Small lac over dorsal MP joint from punching someone's mouth
- Extensor tendon typically fully functional
- Needs xrays, good irrigation and debridement, as well as antibiotics



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- Volar hand
  - Flexor tendons
  - Median and ulnar nerves, digital nerves
  - Radial and ulnar arteries
- Dorsal hand
  - Nailbed
  - Extensor tendons
  - Fight bite
- If you are uncertain, splint and refer for prompt repeat exam

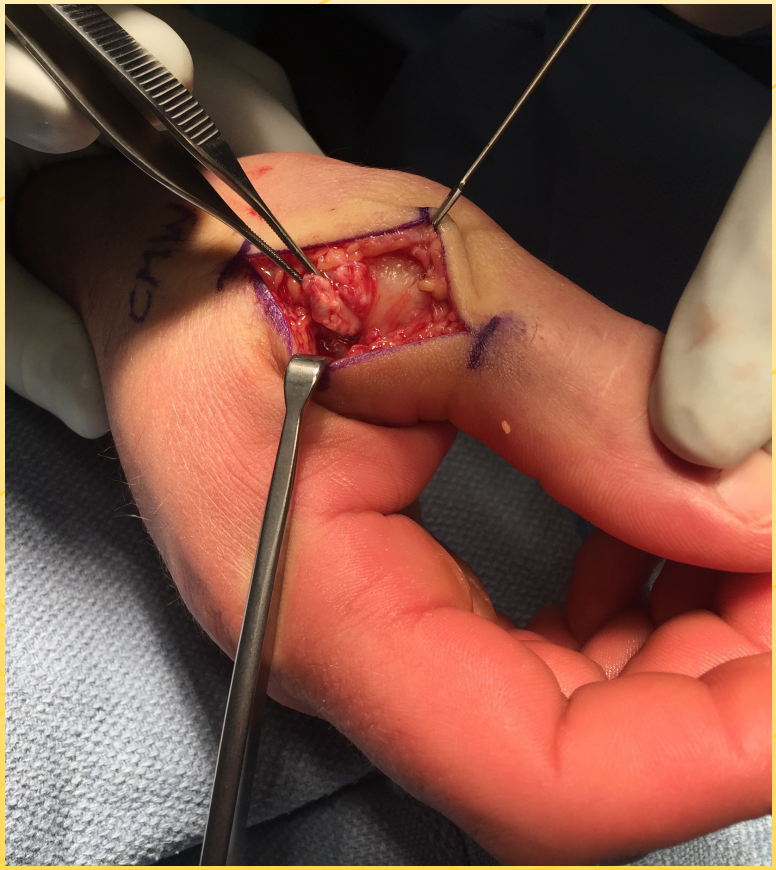
# Other common hand pathology

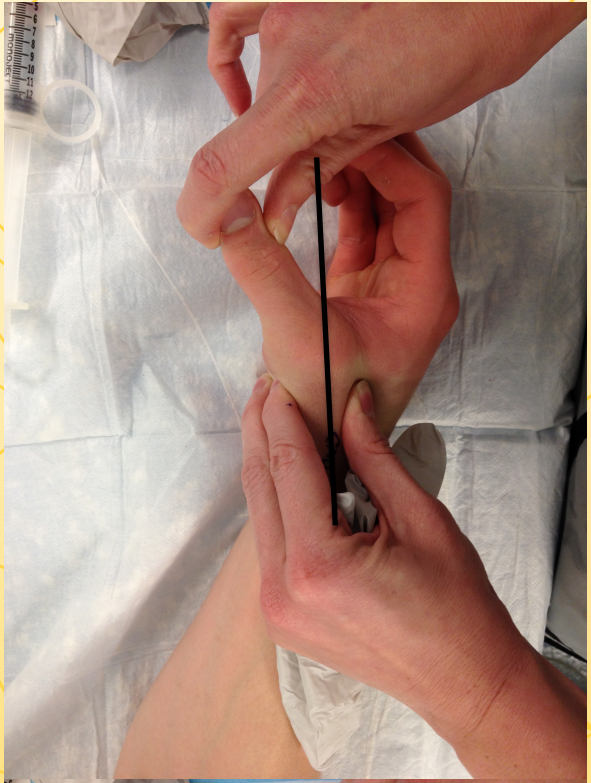
- Thumb MP collateral ligament injuries
- Carpal tunnel syndrome
- Thumb CMC osteoarthritis
- Dequervains tenosynovitis
- Trigger finger
- Distal radius fractures*

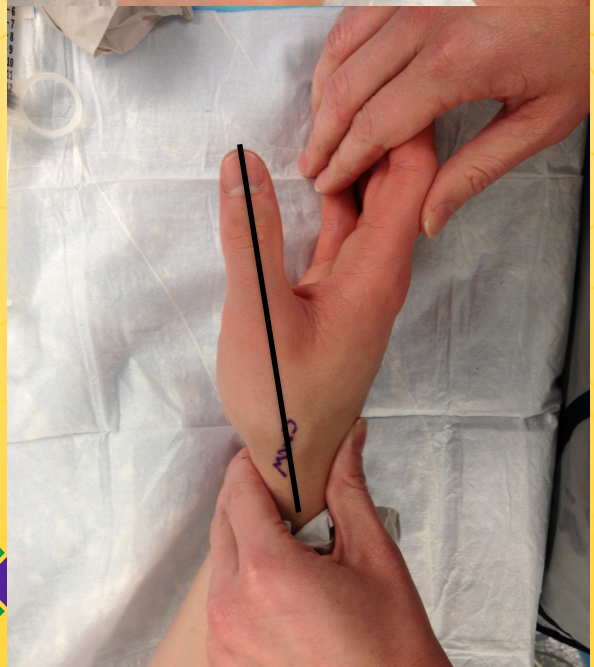
# Thumb MP injuries

- Aka “skier’s thumb”, “gamekeepers thumb”
- Forceful abduction of thumb

- Ulnar collateral ligament typically tears off of proximal phalanx
  - Stener lesion

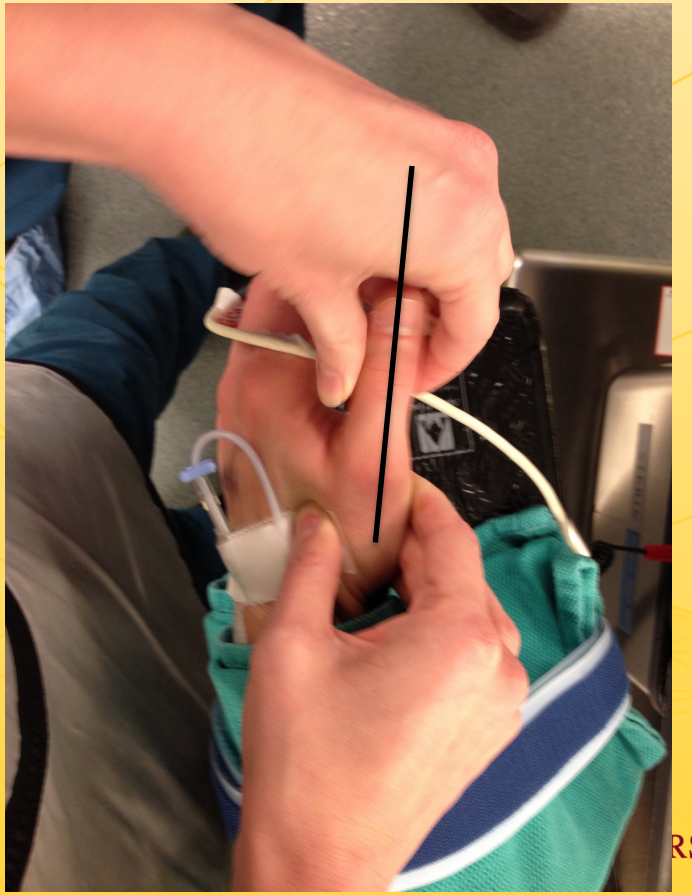






Tenderness over ulnar MP joint

Laxity with stress



# Treatment

- Pain and tenderness at UCL, but no laxity → partial tear → cast in adduction x 3-4 weeks

- Laxity → surgical repair
  - 6 weeks of immobilization, 2-3 months before return to sport

# Carpal tunnel syndrome

- Pain and numbness in a median nerve distribution
- Often complain of waking at night, shaking out hands, hands falling asleep while driving

- Diminished 2 point discrimination, monofilament testing
- Weakness of thumb abduction
- Positive Phalen's test

**Symptoms and History**

1. **Numbness predominantly or exclusively in the median nerve territory** _____ **(3.5)**
   Sensory symptoms are mostly in the thumb, index, middle and/or ring fingers

2. **Nocturnal numbness** _____ **(4)**
   Symptoms are predominantly the patient sleep; numbness wakes patient from sleep

**Physical examination**

3. **Thenar atrophy and/or weakness** _____ **(5)**
   The bulk the thenar area is reduced or where manual motor testing shows strength of grade 4 less

4. **Positive Phalen's test** _____ **(5)**
   Flexion of the wrist reproduces her worsened symptoms of numbness in the median nerve territory

5. **Loss of 2 point discrimination** _____ **(4.5)**
   Failure to discriminate 2 points held 5 mm or less apart from one another, in the median innervated digits

6. **Positive Tinel sign** _____ **(4)**
   Light tapping over the median nerve at the level of the carpal tunnel causing radiating paraesthesias

**Total** _____ **(26)**

>12 = 0.80 probably of carpal tunnel syndrome
>5 = 0.25 probably of carpal tunnel syndrome

# Carpal tunnel syndrome: treatment

- Nighttime bracing
- Steroid injection
  - 30-50% no further intervention at 1 year
  - Can be diagnostic
- Surgical carpal tunnel release

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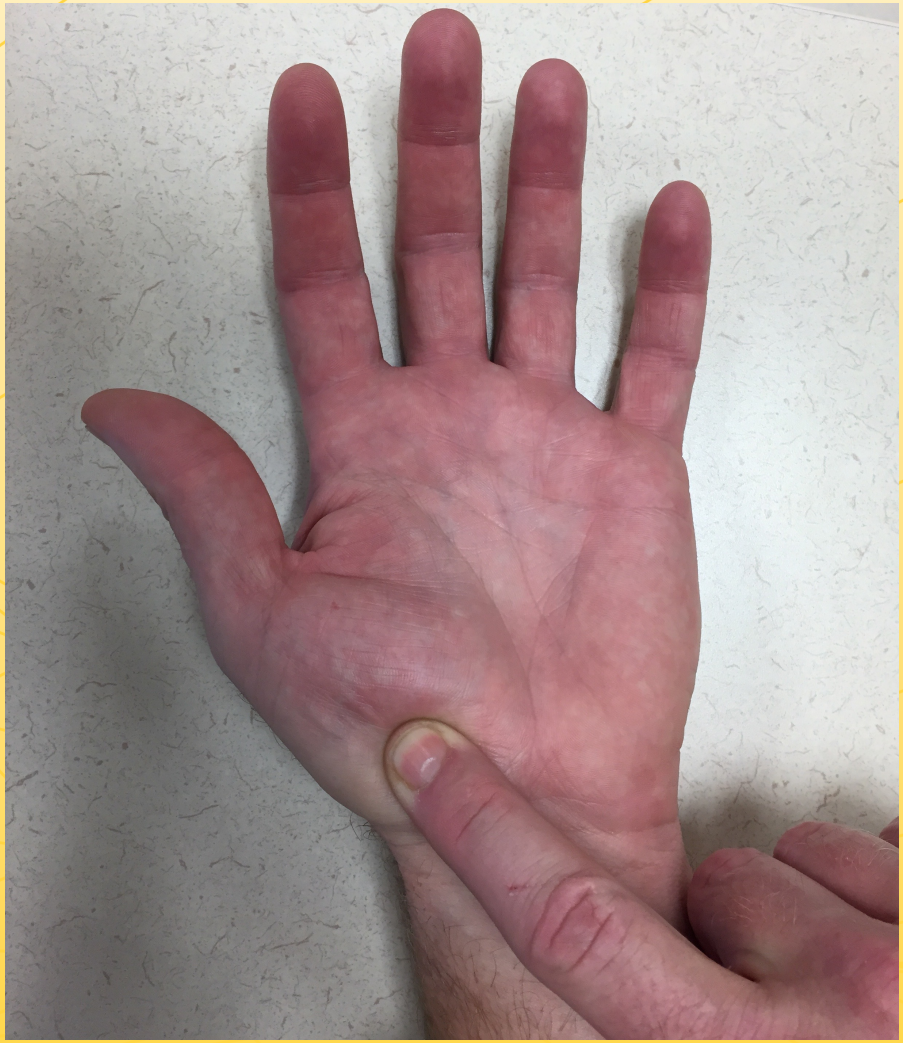
# Thumb CMC arthritis

- women >> men
- > 50 years old
- Pain with grip, opening jars
- 30% with concomitant CTS



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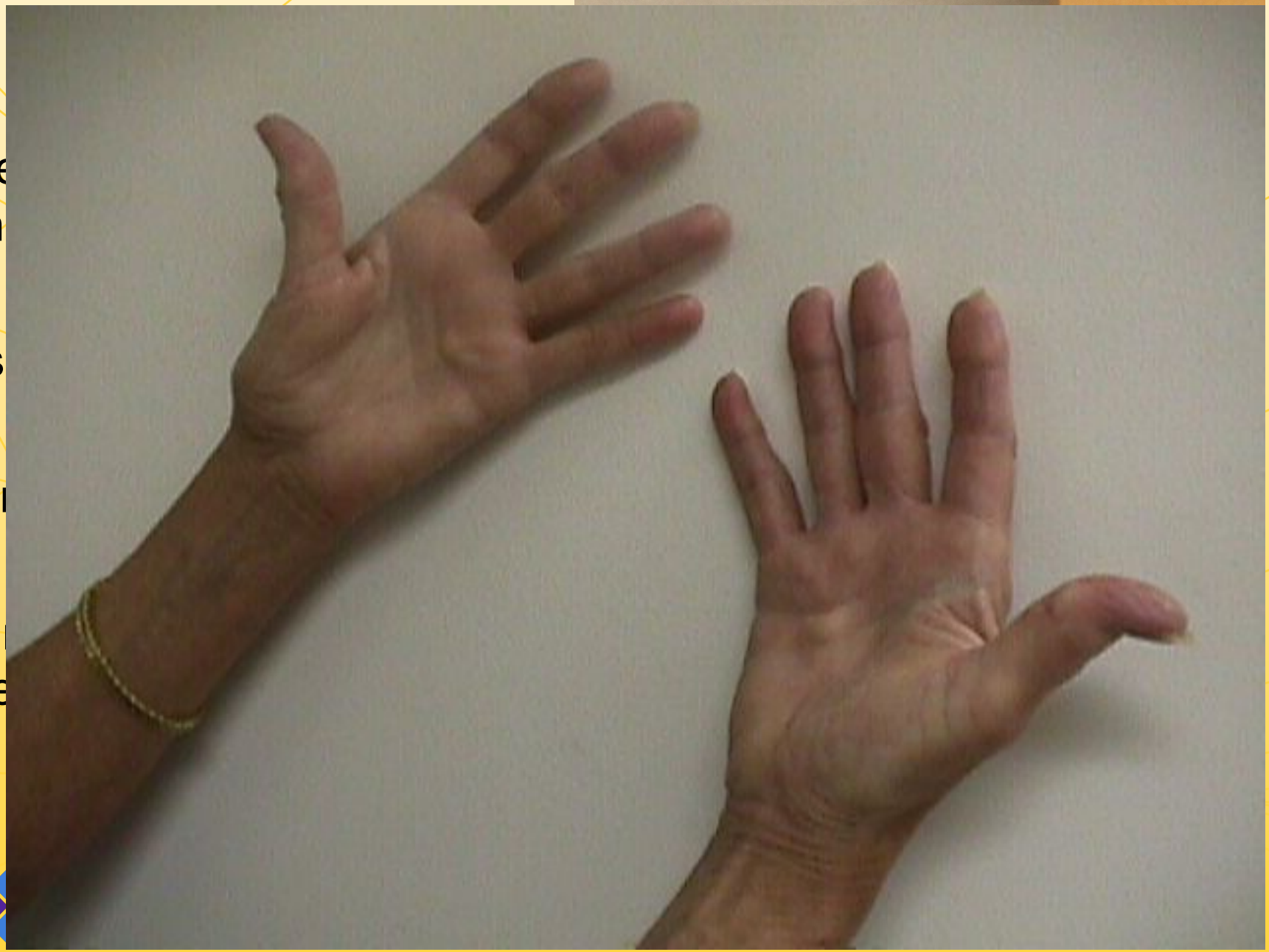
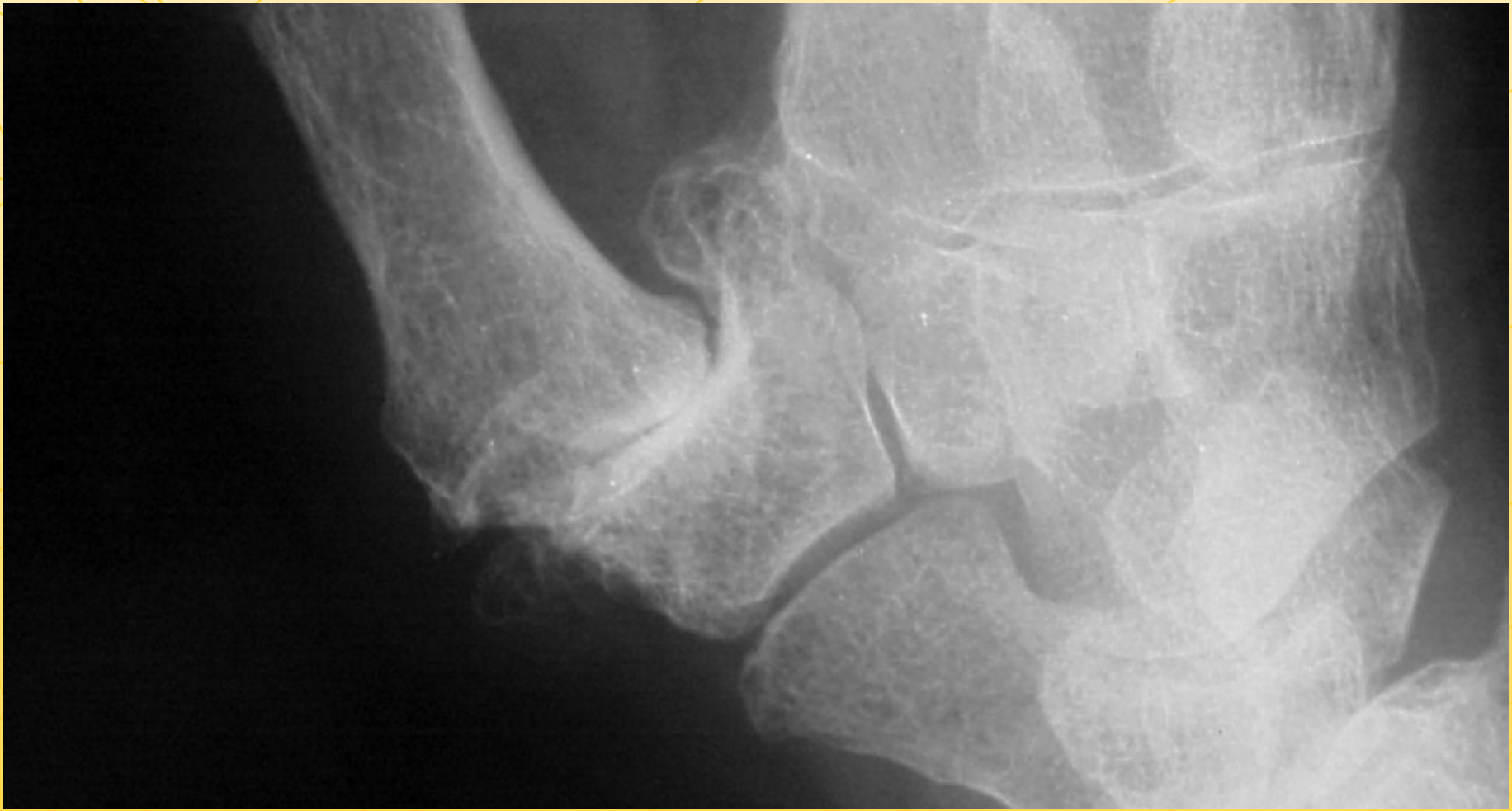


# Thumb CMC arthritis



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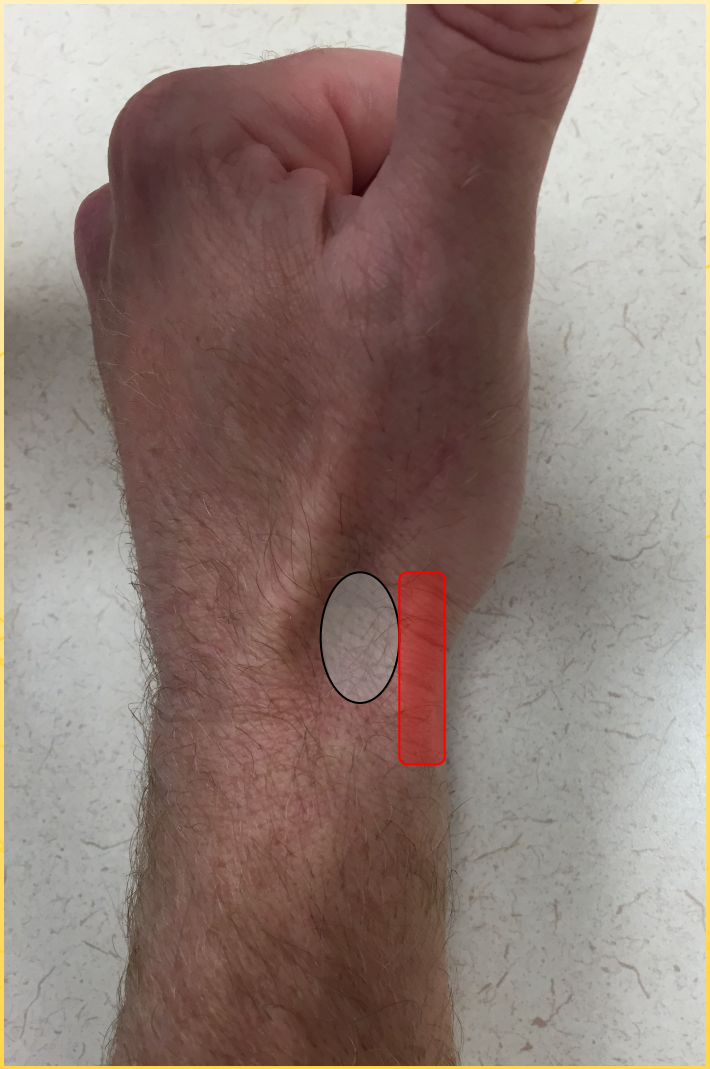
# Treatment options

- Hand therapy
- Splints or braces
- Steroid injection
- Surgery
  - Variety of techniques
  - 3 to 4 months to recover
  - *(think of it like knee replacement surgery)*

# Dequervains tenosynovitis

- New moms, esp if breastfeeding
- SHARP pain

- Tender on 1st dorsal compartment
- Finkelsteins test
- WHAT test- Wrist Hyperflexion Abduction of the Thumb



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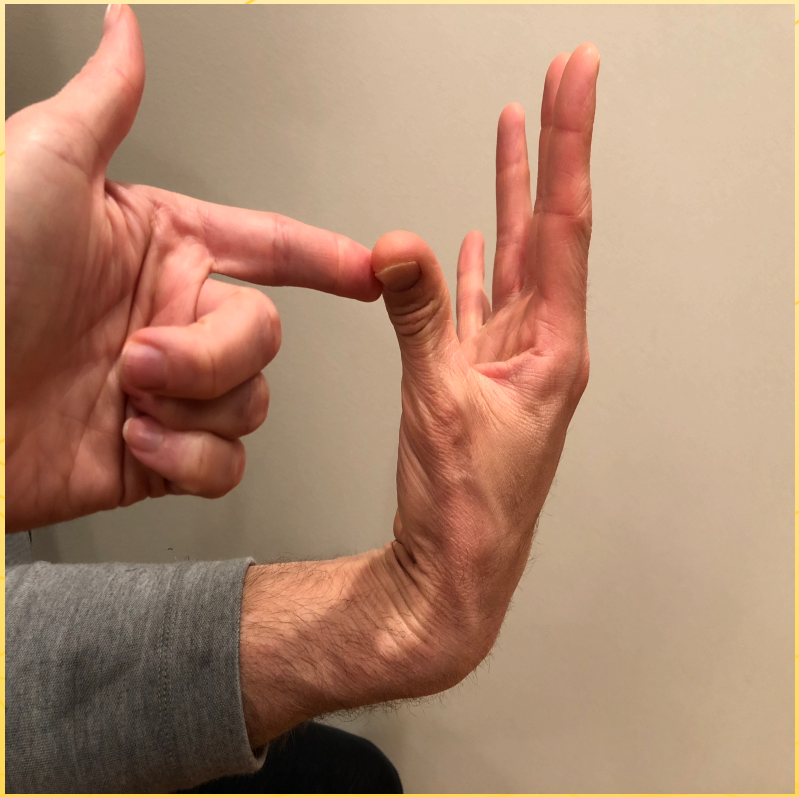
# Dequervains tenosynovitis- WHAT test

Patient flexes wrist and brings thumb away from palm against resistance.

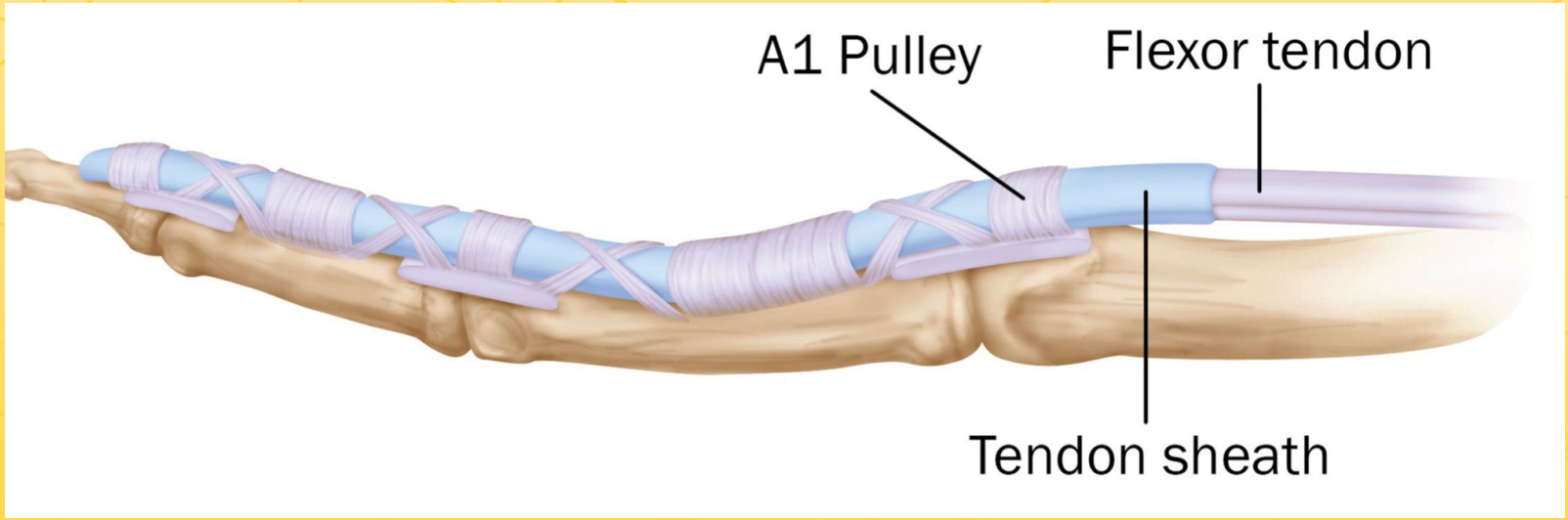


# Dequervains tenosynovitis

- Bracing and NSAIDs
  - 50-60% improve
  - Must include the thumb
- Steroid injection
  - Injection + bracing: 90% improve
  - Steroid atrophy
- Occasionally surgical release

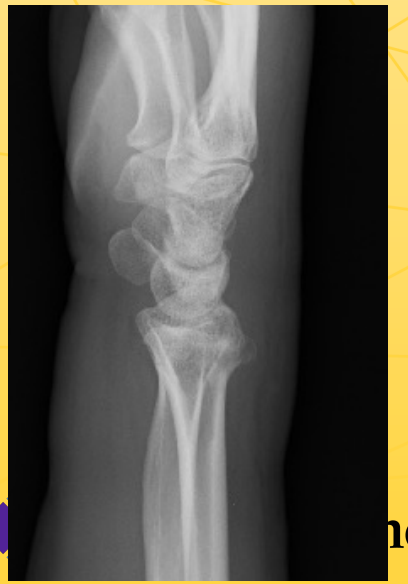
# Trigger finger

- Associated with increased age, diabetes
- Stenosing tenosynovitis (like Dequervains)
- Pain where flexor tendons enter tendon sheath (A1 pulley)
- Catching and locking of the digit



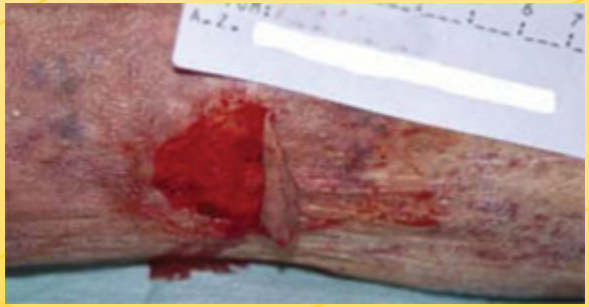
# Epidemiology

- Wide spectrum of injury
- Most common mechanism is a FOOSH
- Older patients- low energy
- Younger patients- high energy



# Reduction

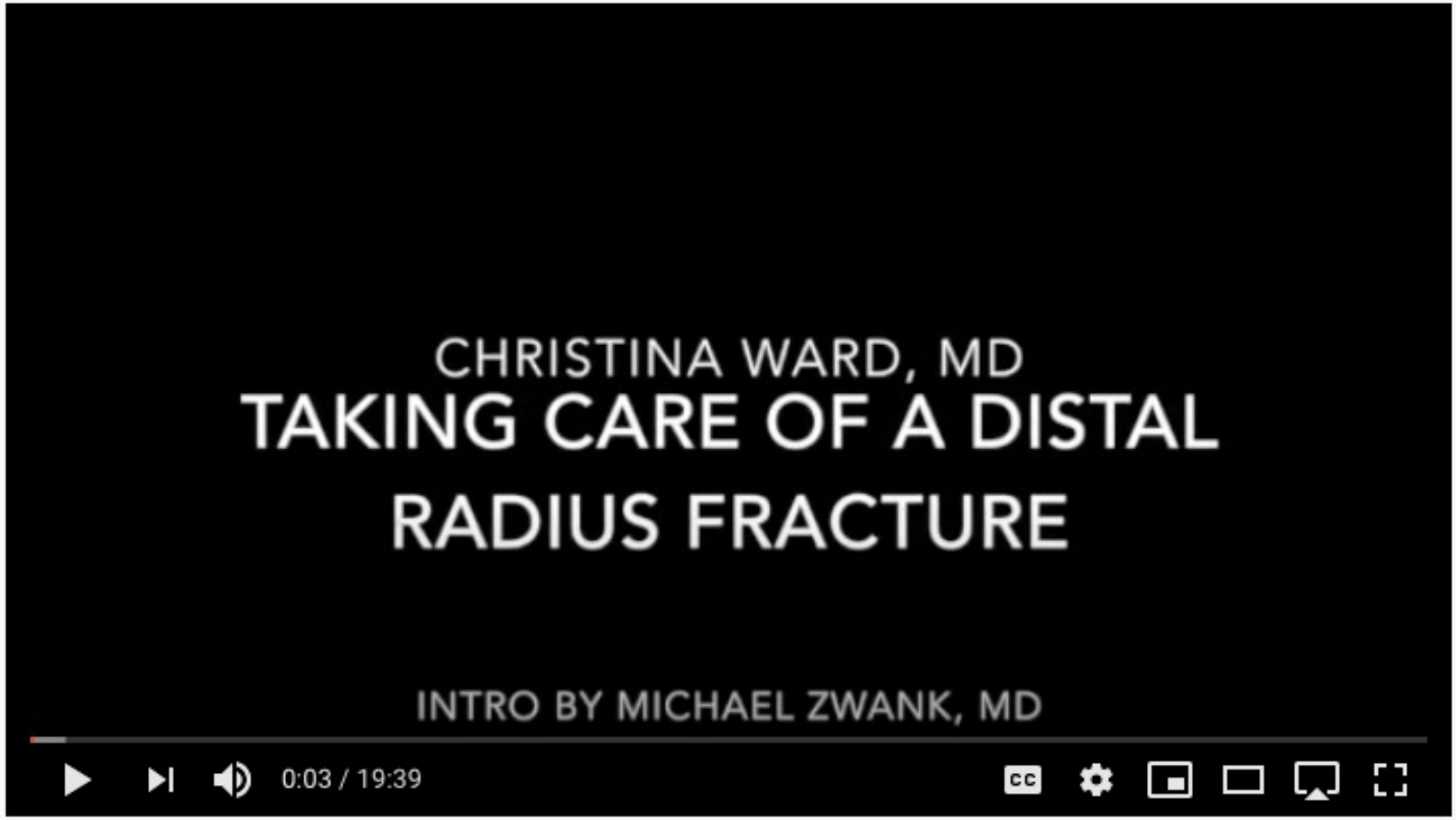
- Hematoma block
- Hang in finger traps with 5-10 lbs of weight
- Flexion while pushing distal fragment in distal and volar direction
- Beware elderly patient skin!



**Youtube: Zwank distal radius**

YouTube

zwank distal radius




Distal Radius Reduction

38,755 views • Jun 24, 2017

223 13 SHARE SAVE

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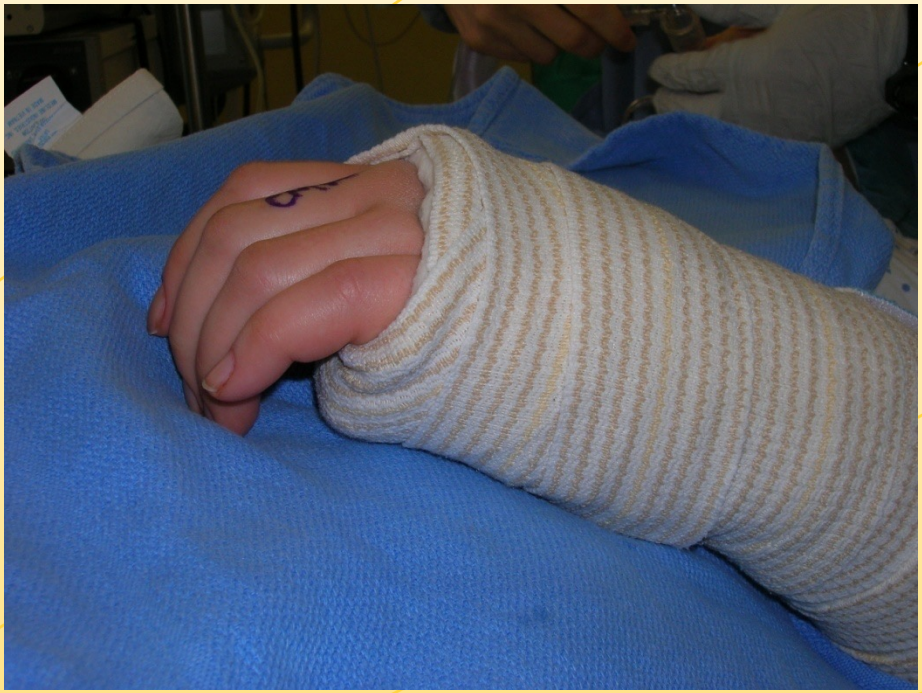
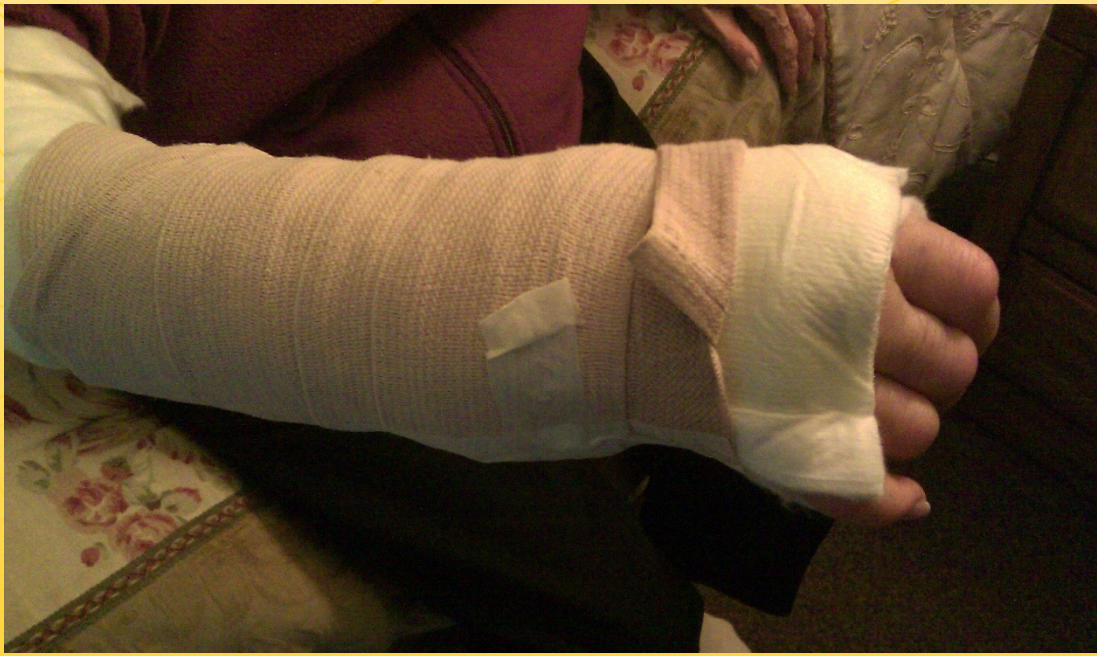
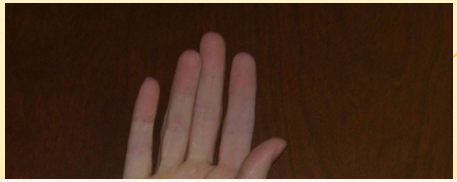
Sugar tong splint

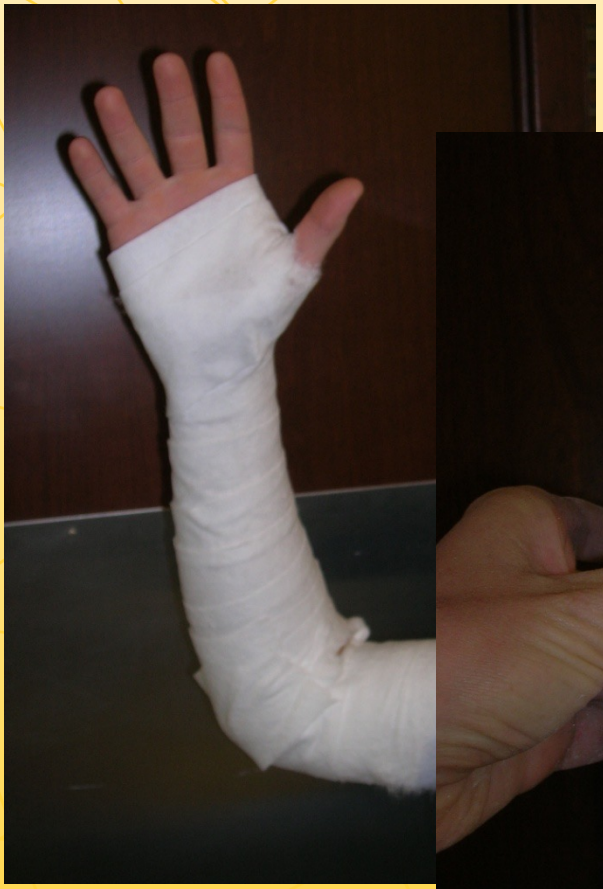
Avoid placing any splint material distal to distal palmar crease

Avoid extreme po









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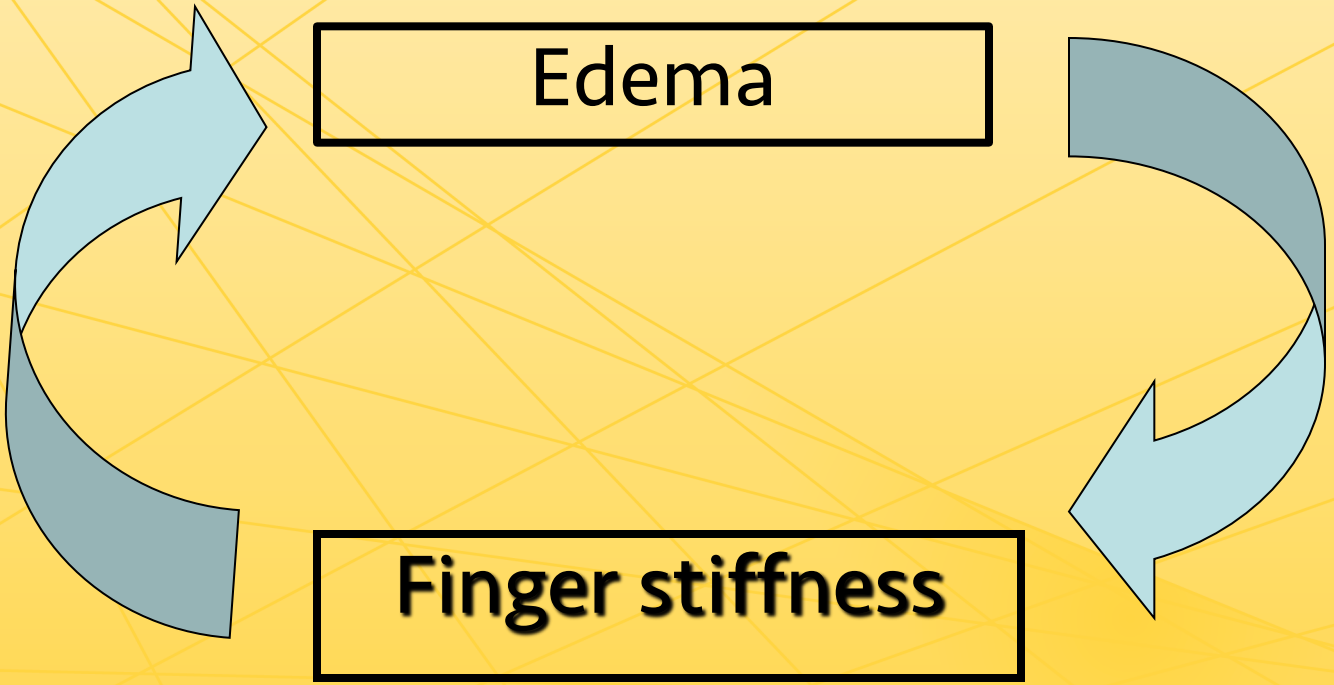
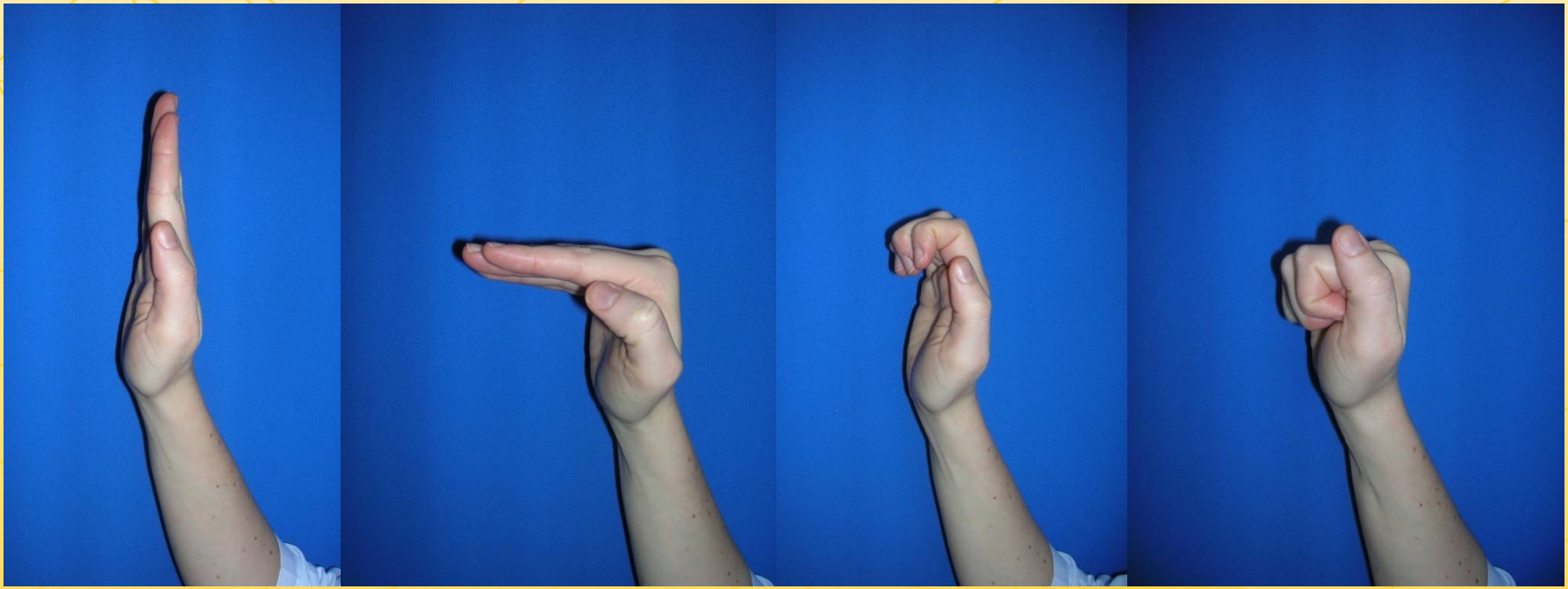
# Initiating digital motion



# Simple finger motion exercises



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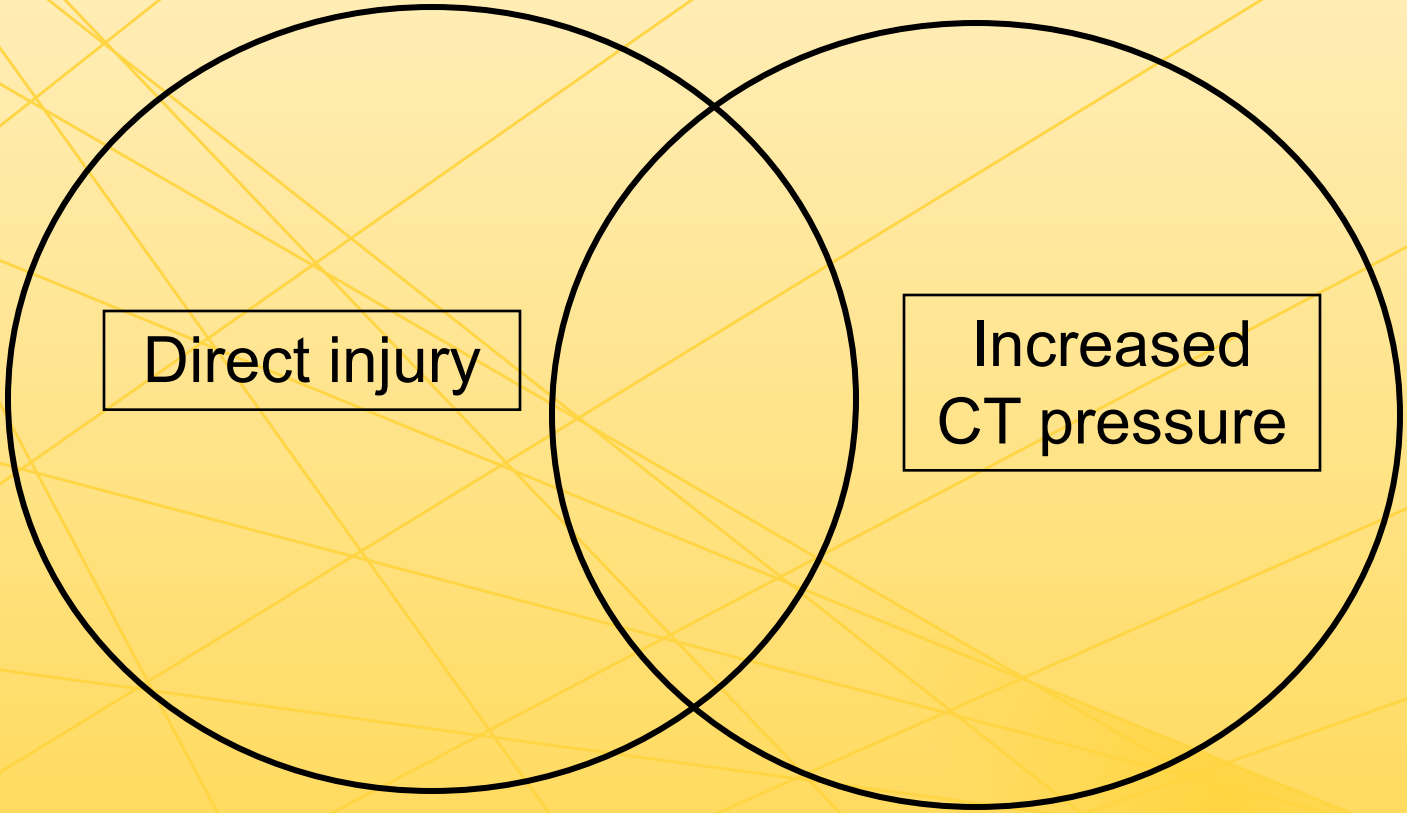
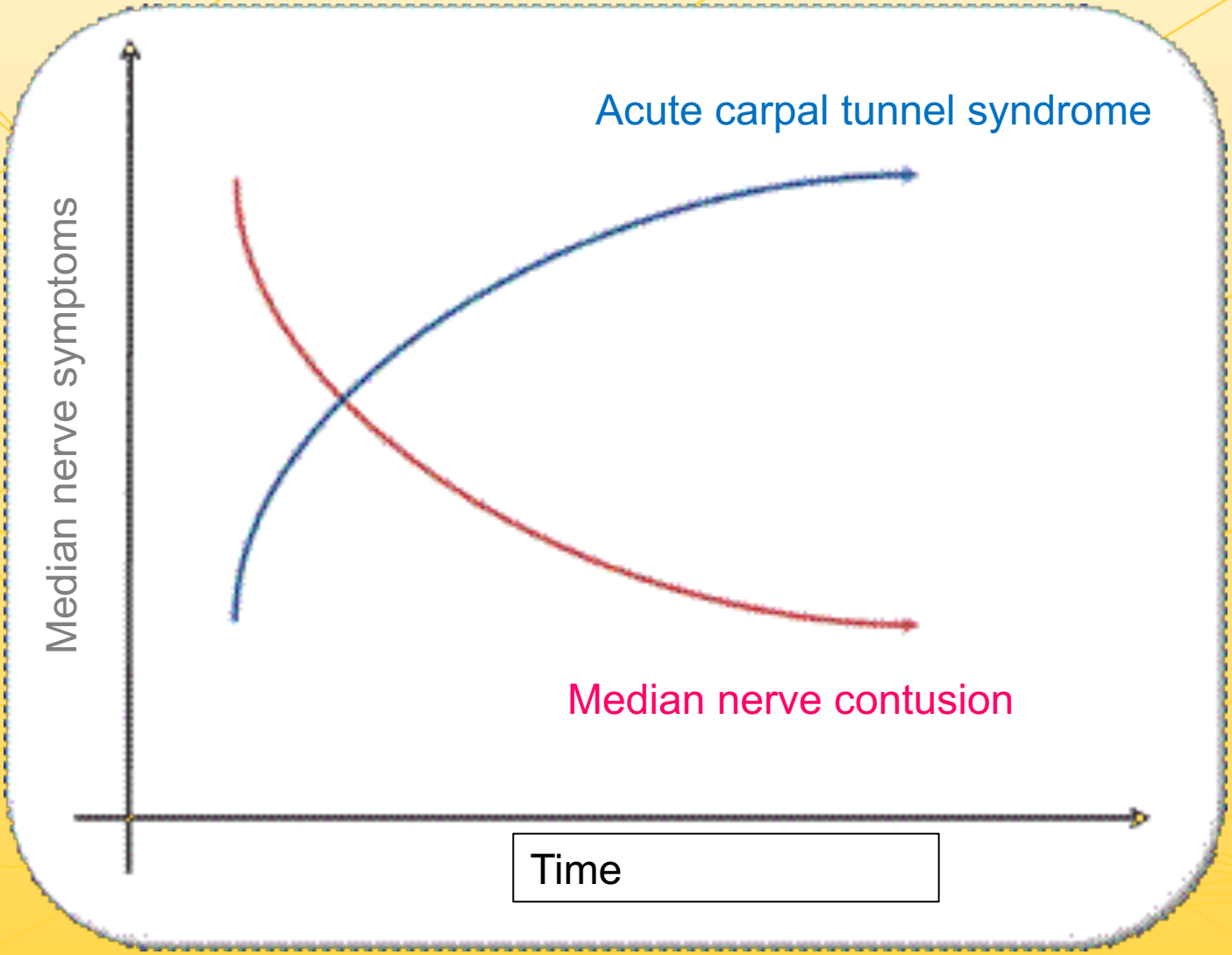
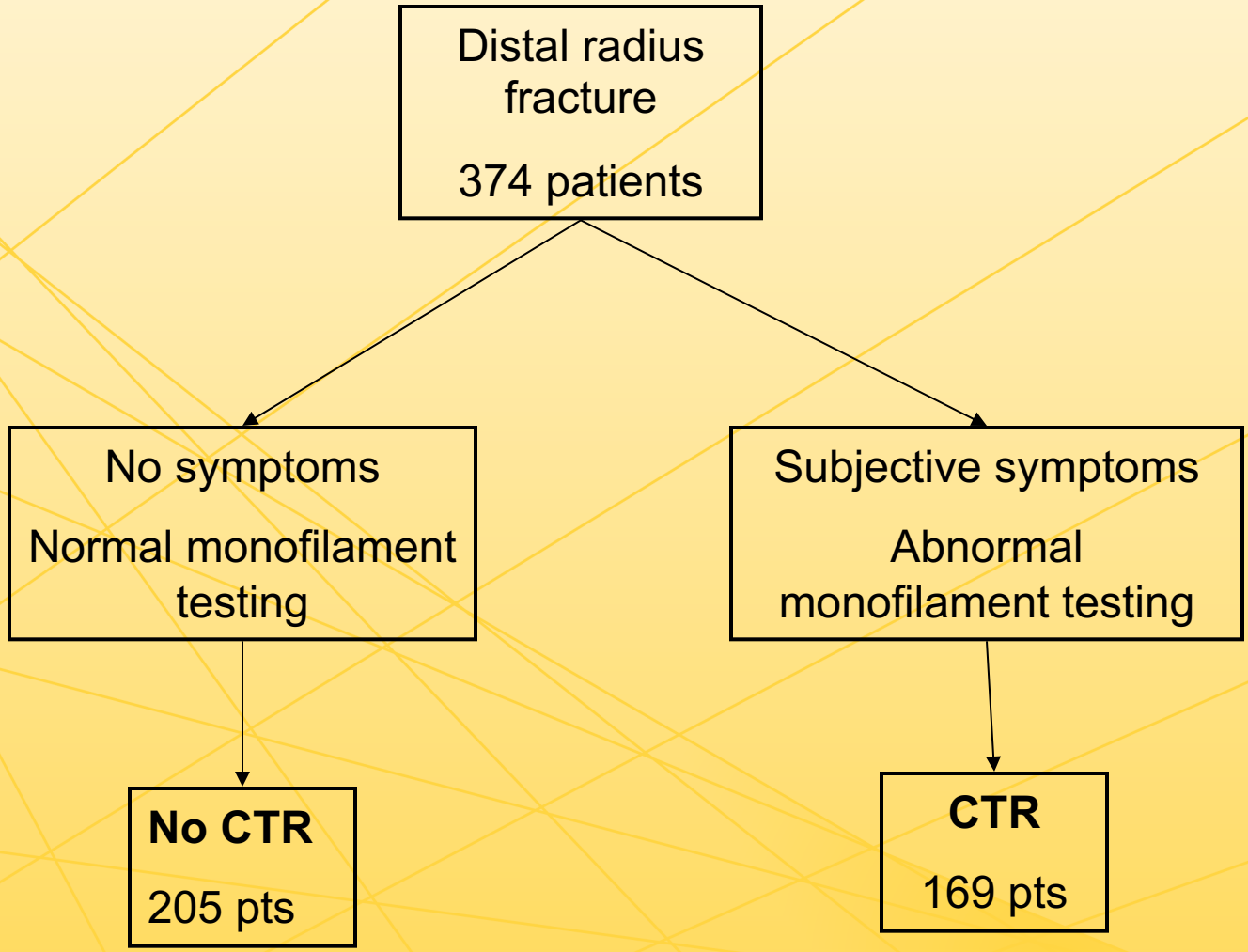
# Median Nerve Dysfunction




"We are unable to recommend for or against performing nerve decompression when nerve dysfunction persists after reduction."

-AAOS Clinical Practice Guideline

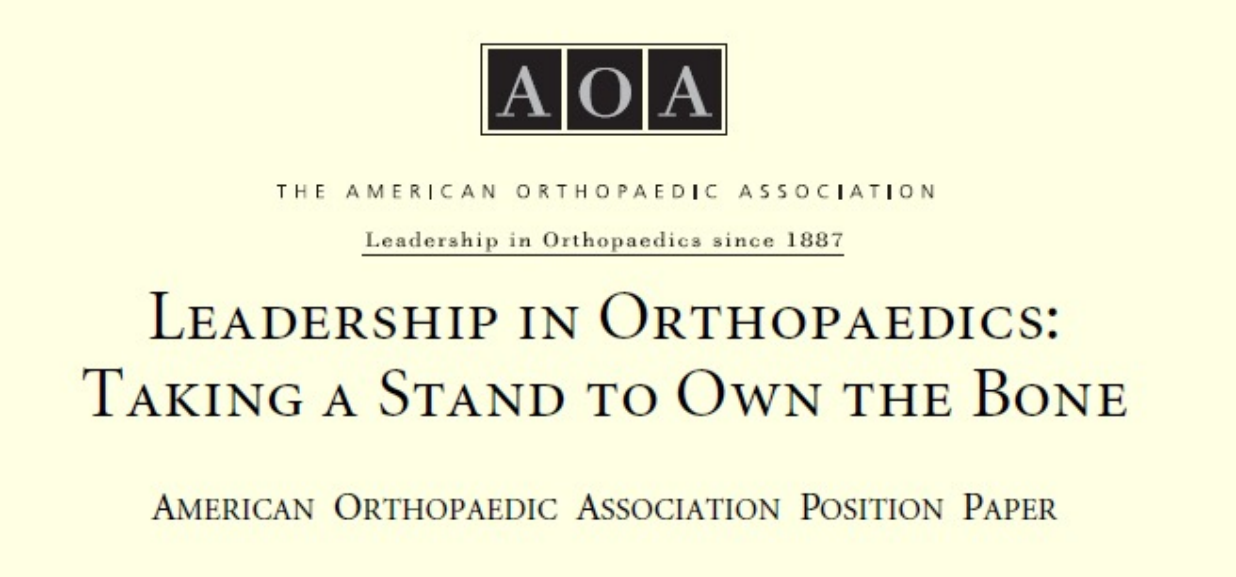

Acute carpal tunnel syndrome
Median nerve symptoms
Median nerve contusion
Time




No patients with CTS or CRPS during follow-up

- Henry and Stutz, Hand Surgery 2007

# Osteoporosis Evaluation




In 2004 State of Health Care Quality study
only 11.6% of women over 65 who had a fragility fracture
were treated for osteoporosis in the year following the fracture

In 2012, 14.3% of Medicare patients received osteoporosis treatment
within 6 months of a fragility fracture

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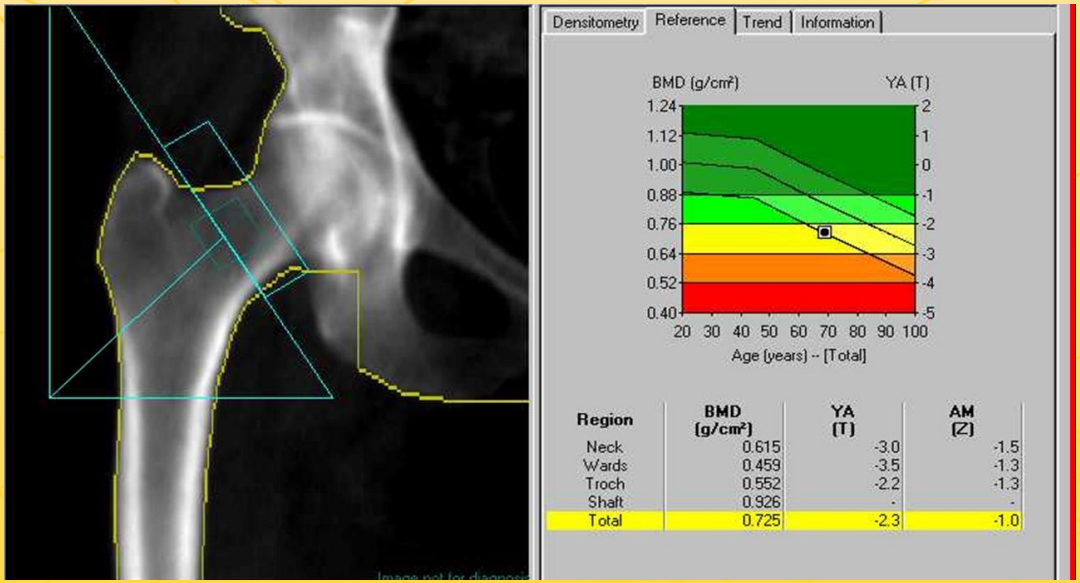
# Osteoporosis Evaluation

Who should be screened for osteoporosis?

1. Age over 50
2. Low energy fracture mechanism

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# THANK YOU!

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