Ruptured Hand Tendons

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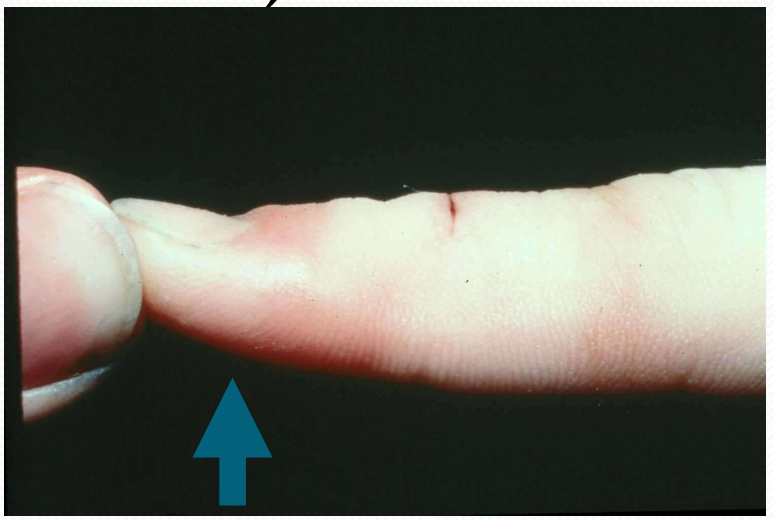
Work Related Injuries Workshop
May1 & 2 2017

Ruptured hand tendons

- Mallet finger
  - Rupture terminal tendon
- Rugger Jersey injury
  - Flexor profundus rupture
- Flexor tendon laceration

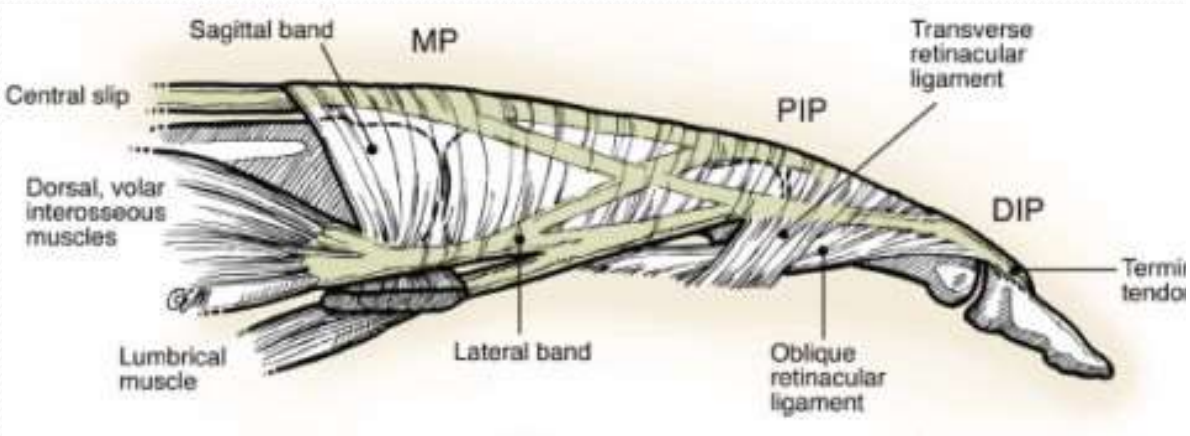
Mallet Finger

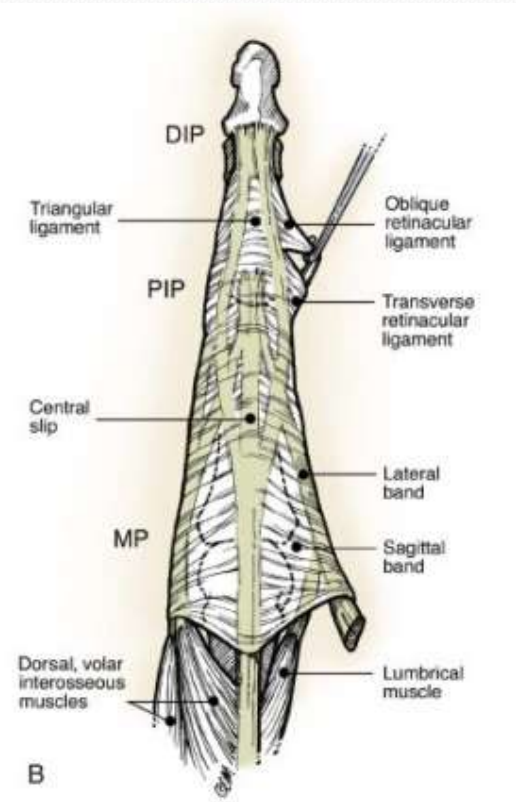
- Loss of active extension of DIP joint



Passive extension full

Anatomy Extensor





Mallet Finger

- Skin injury
  - Closed or open
- PIP joint -OK

Mallet Finger

Treatment

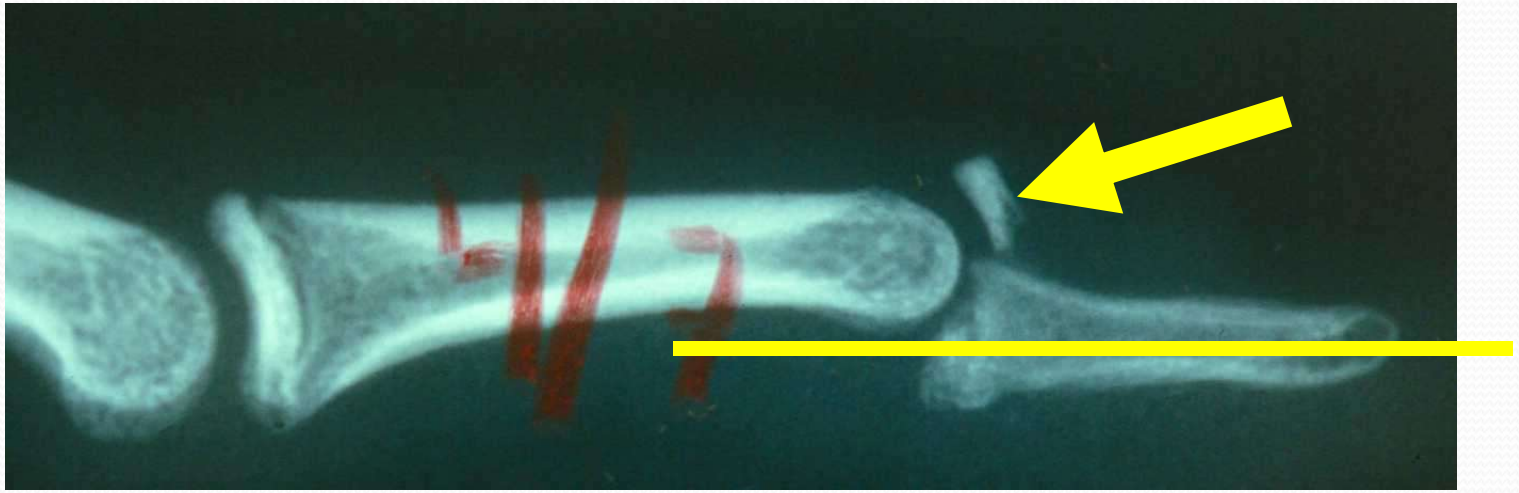
- Full time extension splinting of DIP only → 6(fx) to 8 wk

PIP Free

Mallet Finger

Surgery

- Fracture > 1/3 of joint



- Joint subluxation

Mallet Finger

Surgery

- Fracture > 1/3 of joint
- Joint subluxation
- Can't wear splint

Mallet Finger

- Pinning
  - Usually percutaneous and don't need to open
  - Buried (usually)
  - Out of skin
- Complications
  - Break pin
  - Infection

Mallet Finger

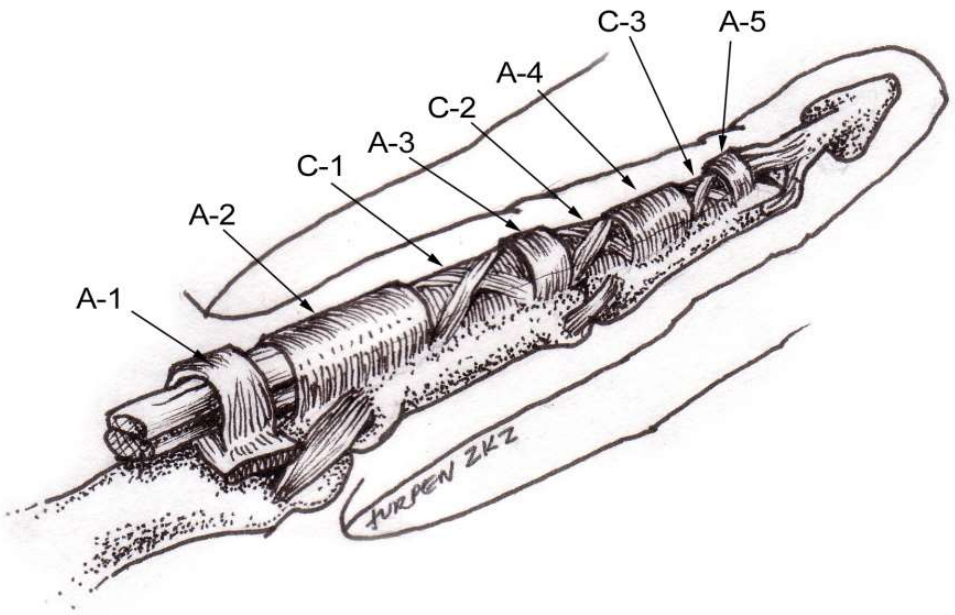
- Even if fracture displaced
  - DIP joint often remodels

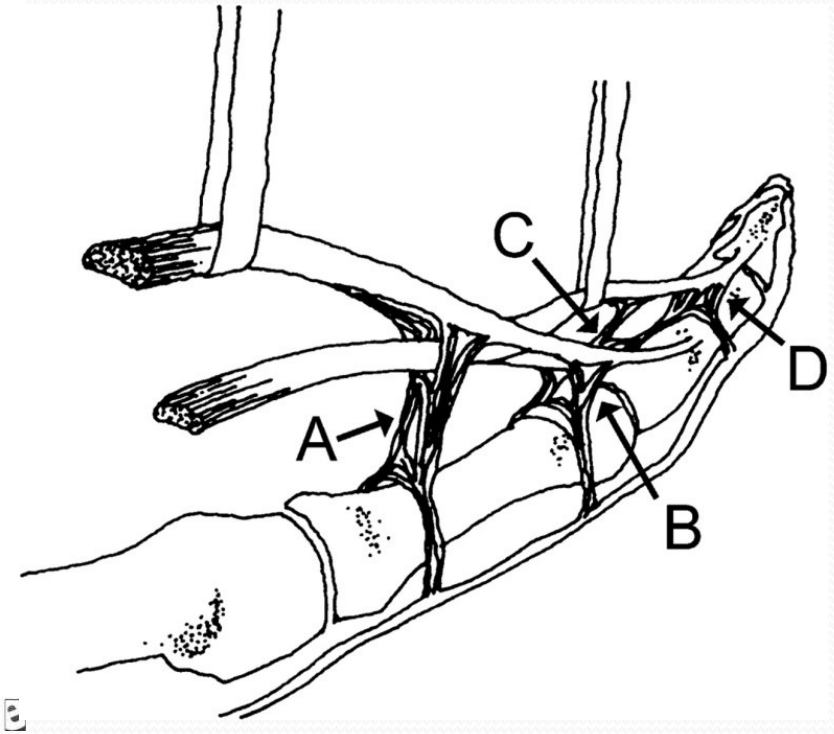
DIP Joint

Flexor Tendon Avulsion

- Rugger jersey (FDP avulsion)
- Ring finger most common

Flexor Anatomy





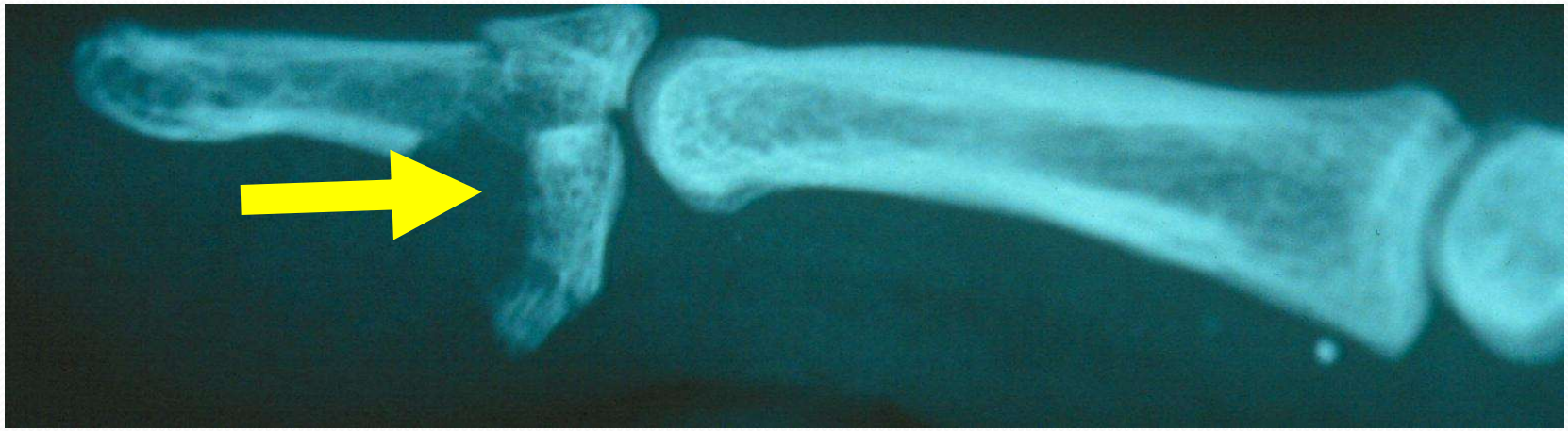
Flexor sheath

Flexor tendon

DIP Joint

Flexor Tendon Avulsion

- X-ray may show avulsion fracture



DIP Joint

Flexor Tendon Injury

- Treat usually surgical
- Non Operative treatment
  - **ONLY** if non displaced
  - Tendon attached to bone

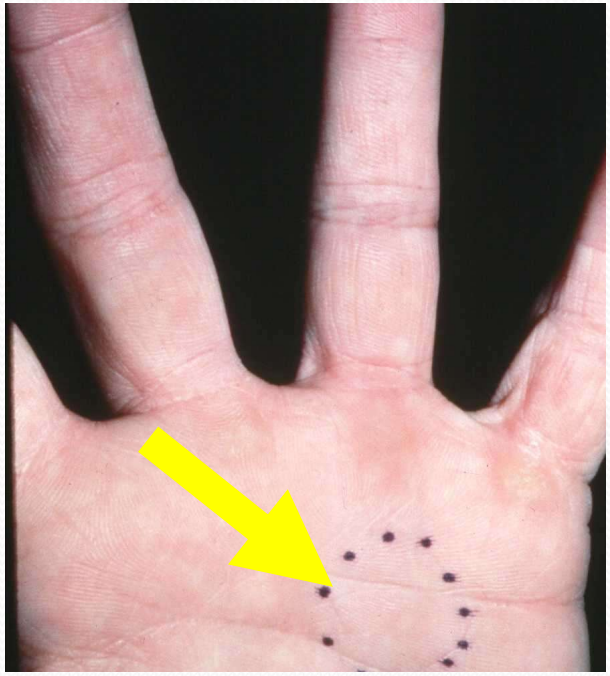
Splint

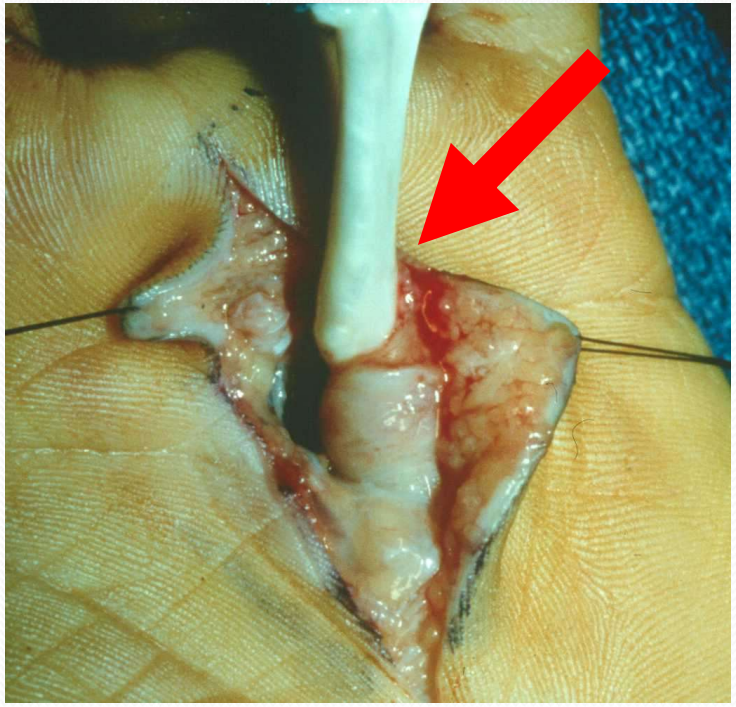
- Wrist in slight flexion
- MP flex
- IP joint extension

DIP Joint

Flexor Tendon Injury

- Surgery- soon- refer < 3 days





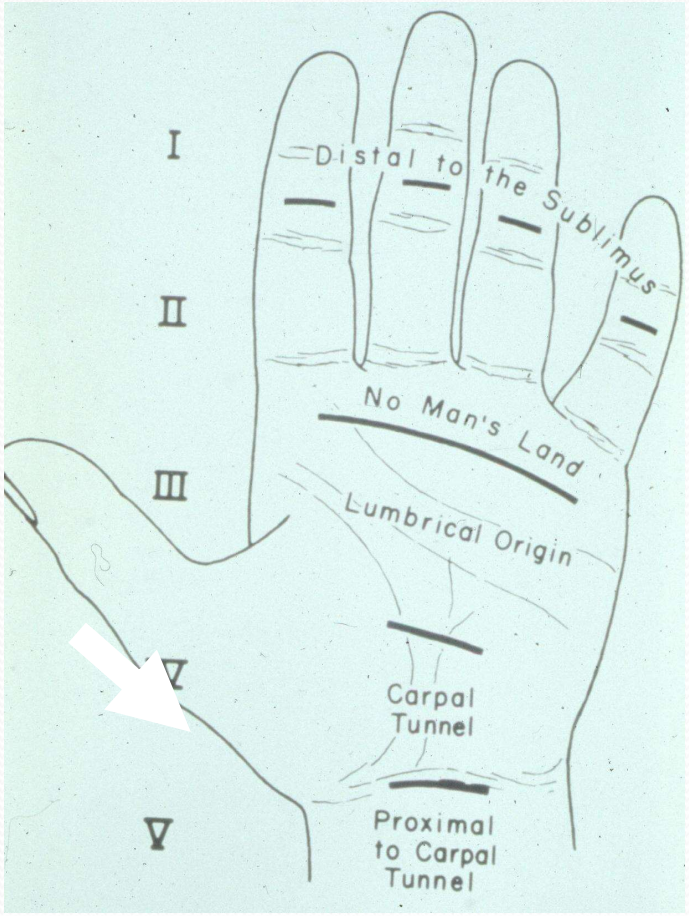
DIP Joint
Flexor Tendon Avulsion

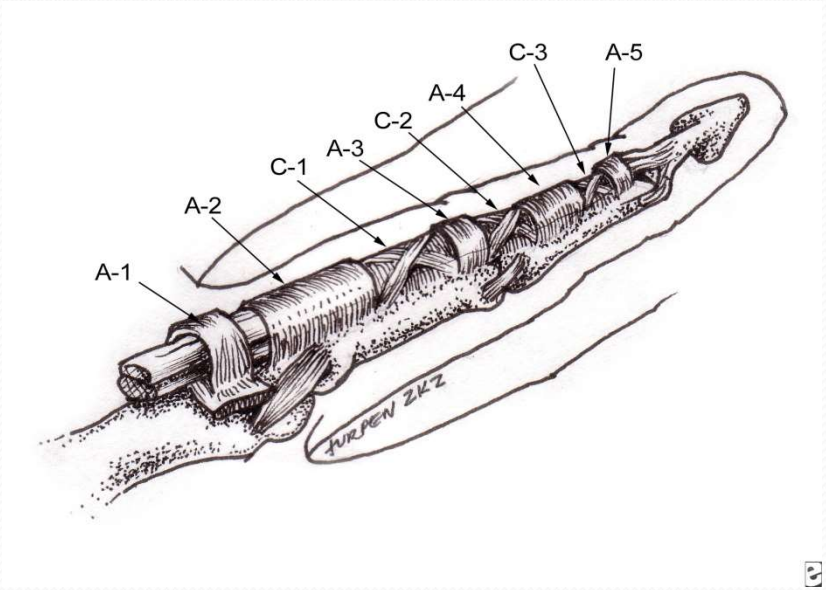
- Repair to bone

Flexor Tendon Laceration

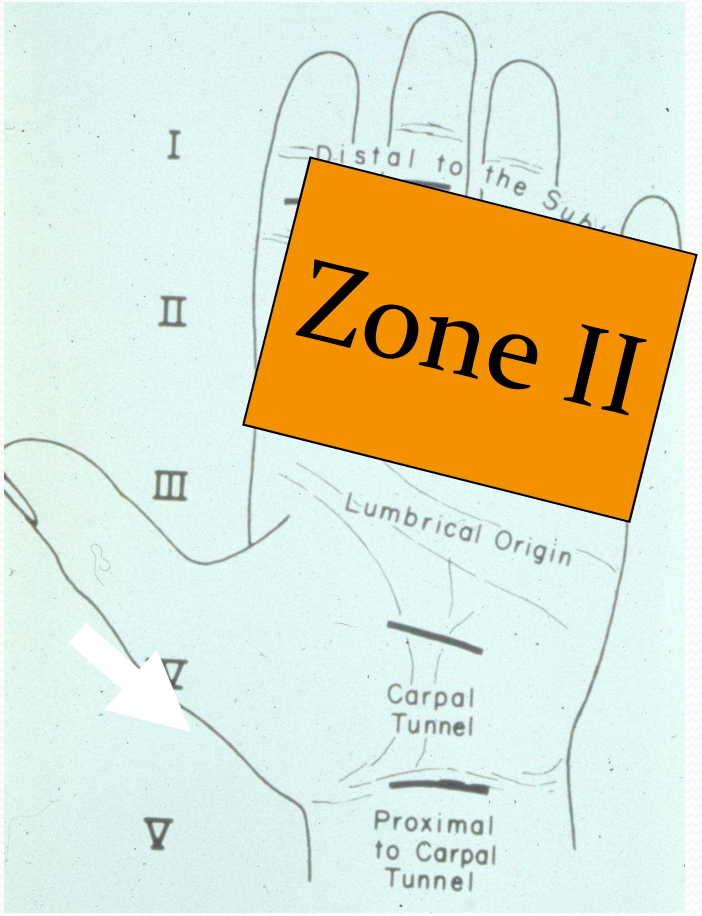
Altered Posture

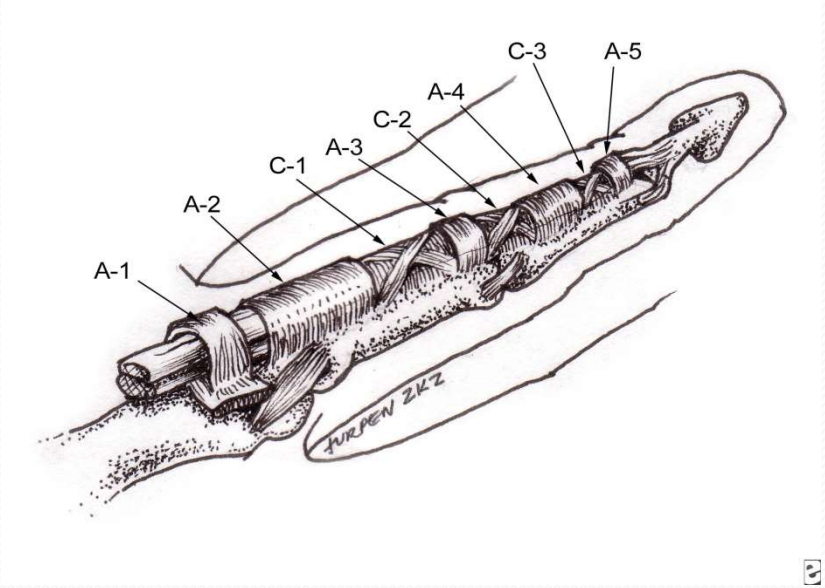
Flexor Tendon Laceration





Flexor Tendon Laceration





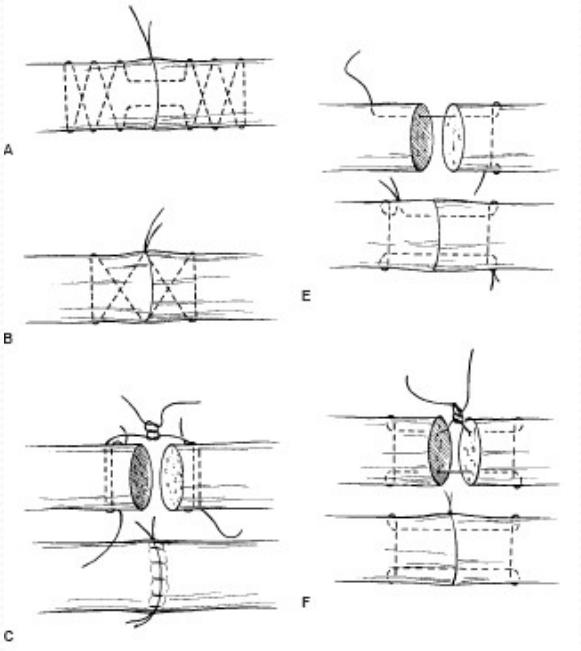
Flexor Tendon Laceration

- Early repair
- Repair strong enough for early active motion- light grasp
  - 4 strand repair

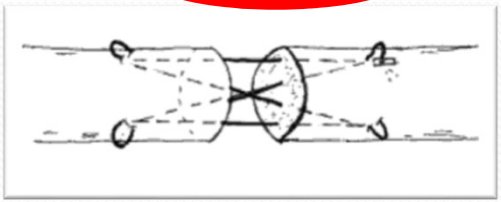
Core Suture

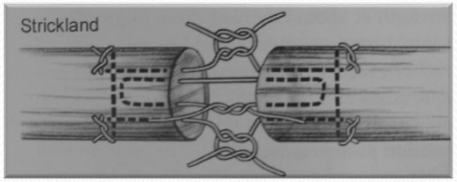
- Strength proportionate to number of crossing strands

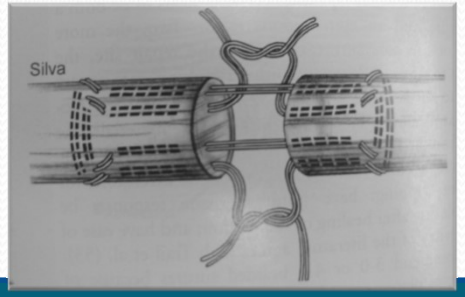
2 Strand



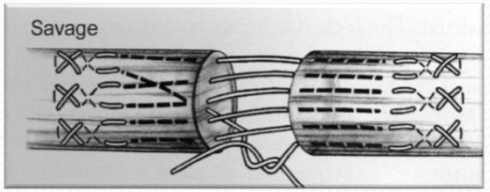
4 Strand





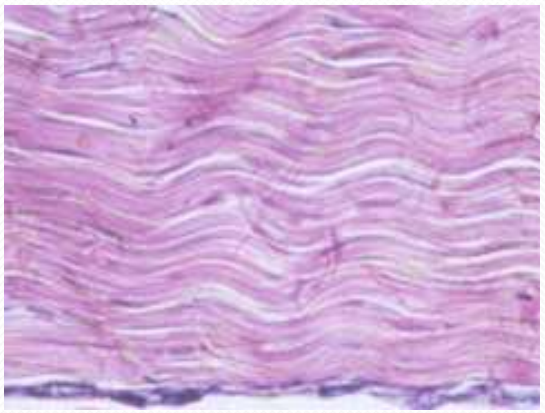


6 Strand



Phases of Tendon Healing

- **Inflammatory**
  - 3.5 days after repair
  - Strength = suture repair
- **Proliferative**
  - 5 days to 4 weeks after repair
  - **Weaker 7-21 days**
  - Increased fibroblasts and collagen synthesis
  - Increased strength
- **Remodeling**
  - 4 weeks to **6-9 months**
  - Longitudinal reorientation of collagen



Healing Strength

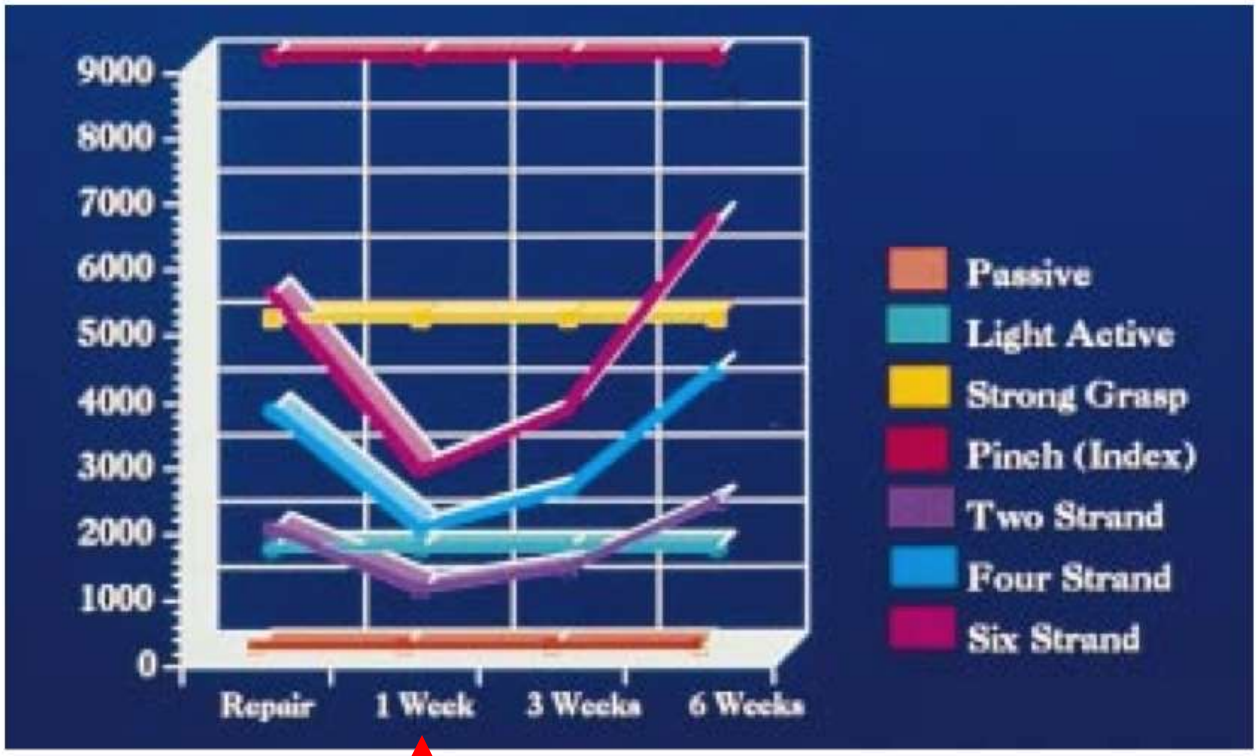


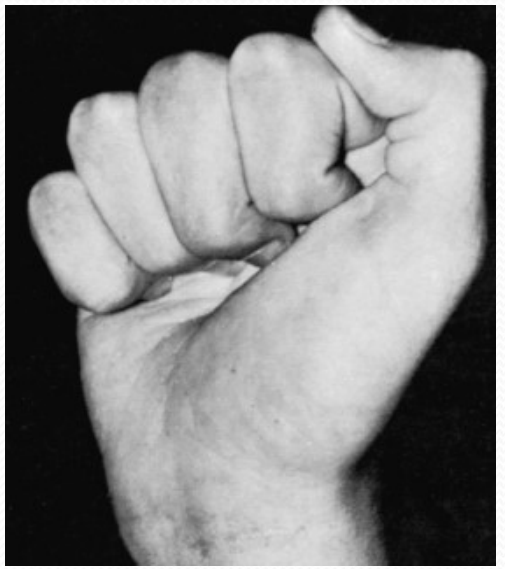
Fig. 8 Estimated strength [illegible]lure (measured in grams) for two-, four-, and six-strand flexor tendon repairs perform[illegible] without the use of epitendinous sutures.

Flexor Tendon Laceration

- Therapy very important
  - 3 months minimum

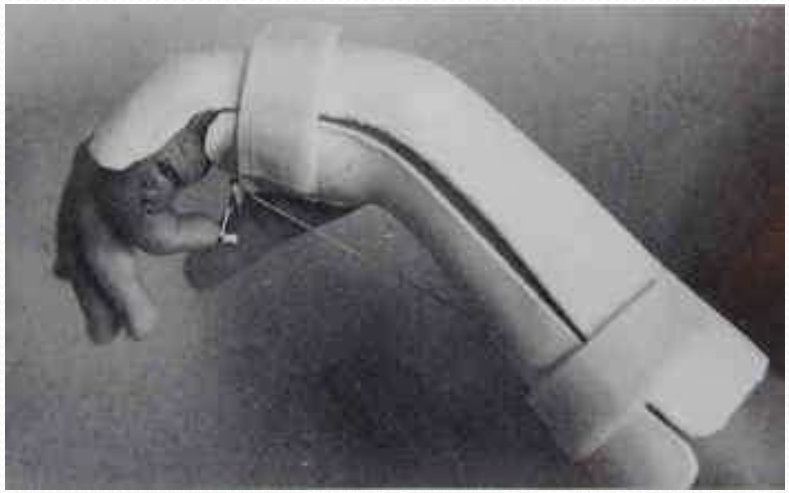
Rehabilitation

- Goals
  - Protect repair
  - Prevent adhesions
- Controlled motion stress
  - Increases tensile strength
  - Fewer adhesions
  - Improved excursion
- Many protocols

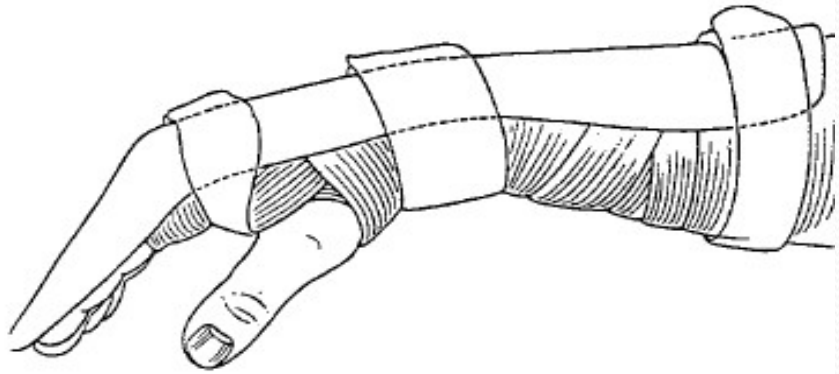


Rehabilitation
Passive Flexion

- Kleinert: passive flexion with rubber bands
  - PIP contractures



- Duran/Hauser: passive place and hold
  - Effectiveness of fully passive motion



Rehabilitation
Active Motion

- Active motion
- Becoming more common
- Increases strength
- Decreases adhesions
- Improves motion
- Reliable patient

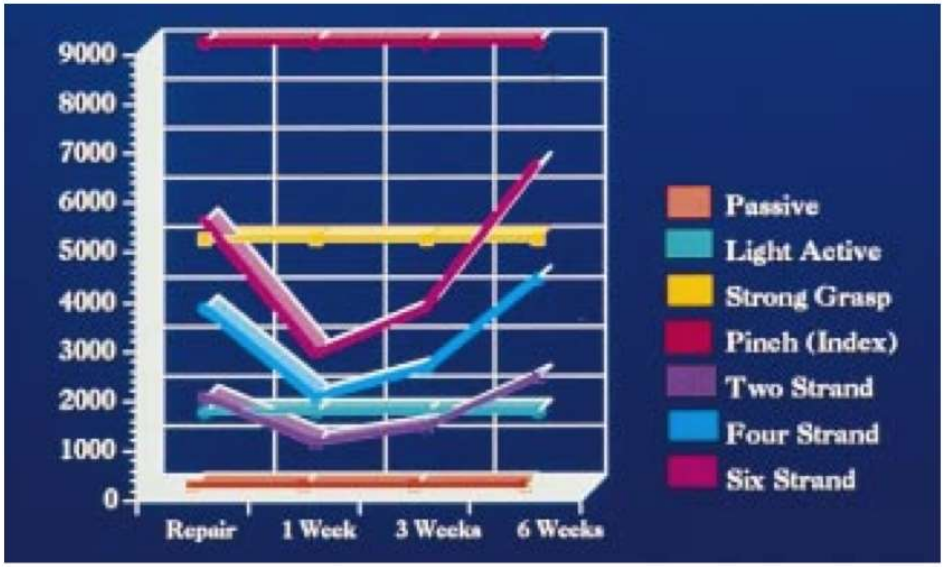


Fig. 8 Estimated strength to failure (measured in grams) for two-, four-, and six-strand flexor tendon repairs performed without the use of epitendinous sutures.

Rehabilitation

- Differential tendon gliding decreases adhesions
  - Palmar bar increases tendon excursion
  - Wrist motion also affects excursion

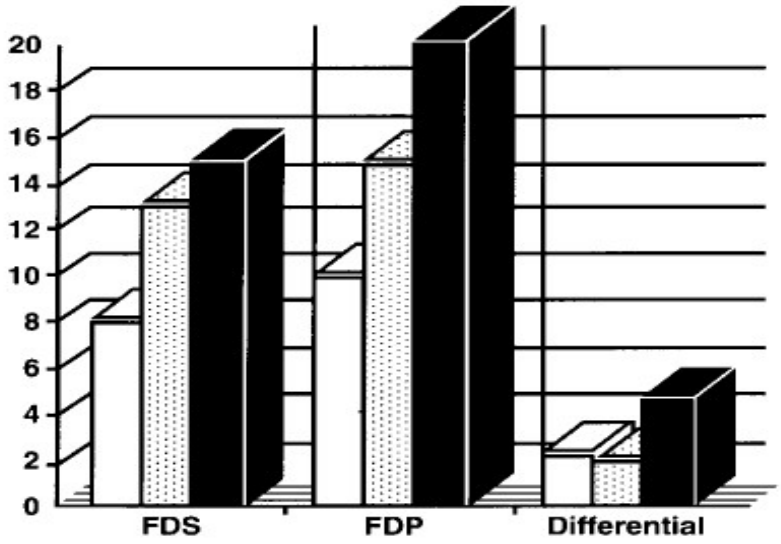


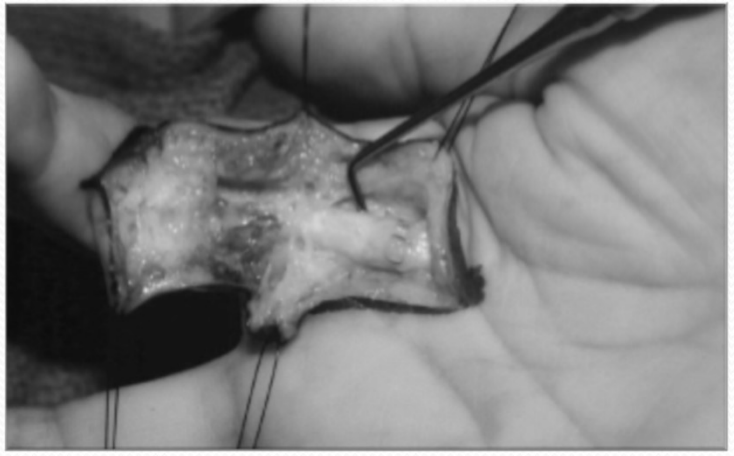
Figure 9. Estimated tendon excursion (measured in mm) with 3 types of mobilization splints: the Kleinert splint (no palmar bar, □), the Brooke Army splint (with a palmar bar pulley, ▨), and the Mayo Clinic synergistic dynamic tenodesis splint, which permits wrist extension (■). (Data from Cooney et al.[245])

Flexor Tendon Complications

- Tendon rupture
- Need tenolysis
- Often not normal

Tenolysis

- "Freeing up" tendon
- Technically demanding
- Immediate post-op motion
- Timing of intervention
  - No earlier than 3 months
  - Usually > 6 months
- Sheath rupture
- Tendon rupture



Questions

Thank you!