# MANAGEMENT OF COMMON HAND CONDITIONS

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# A LITTLE ABOUT ME…

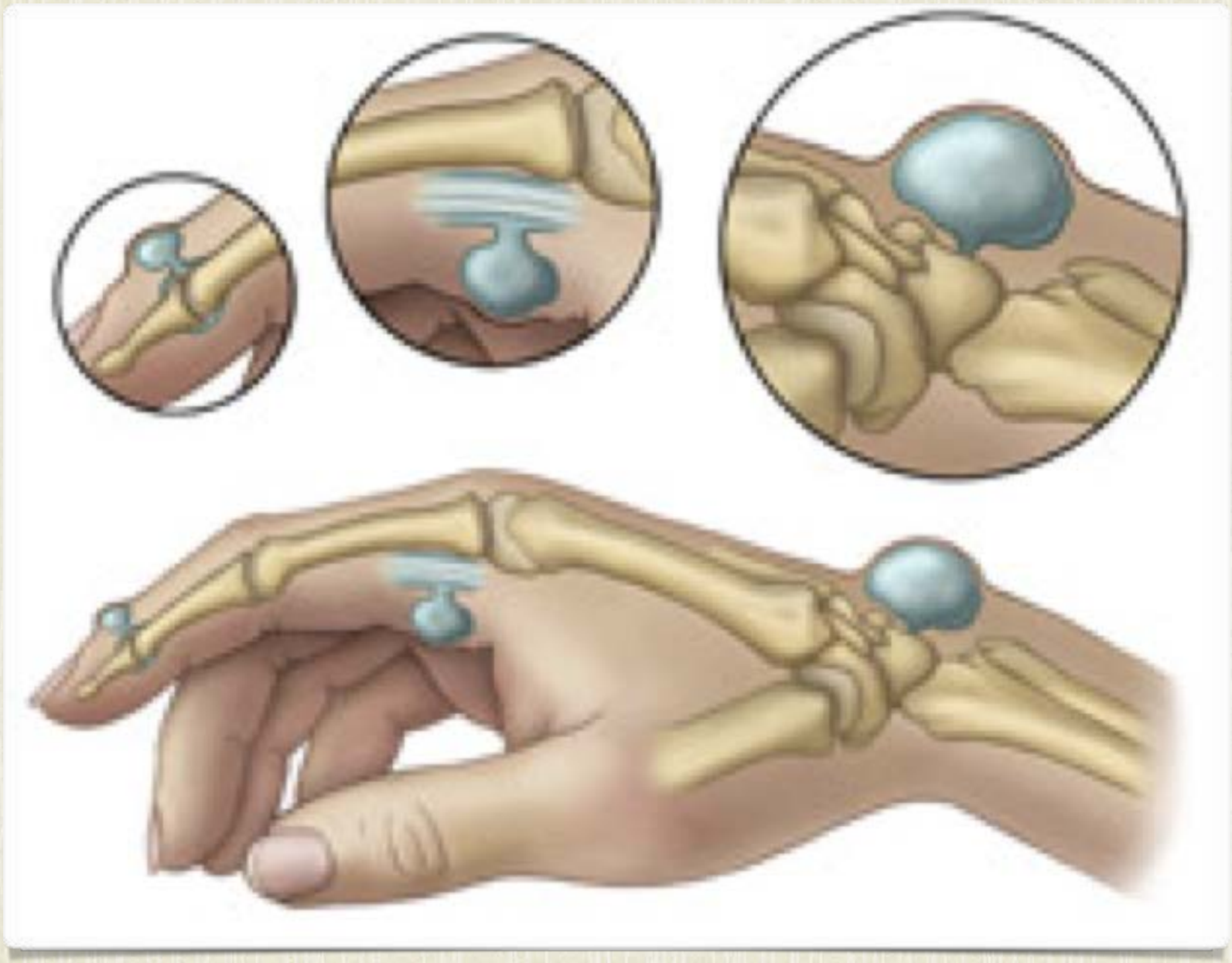

- Fort Saskatchewan Alberta
- Undergrad/Medical School: U of A
- Residency: UBC
- Fellowship: Melbourne (Orthopedic Hand/Wrist)
- Minni fellowship: Spain, India
- Husband Fabian: Thailand -> Germany -> Canada
- Interests: Hiking, Snowboarding, Art, Scuba Diving, Classic cars

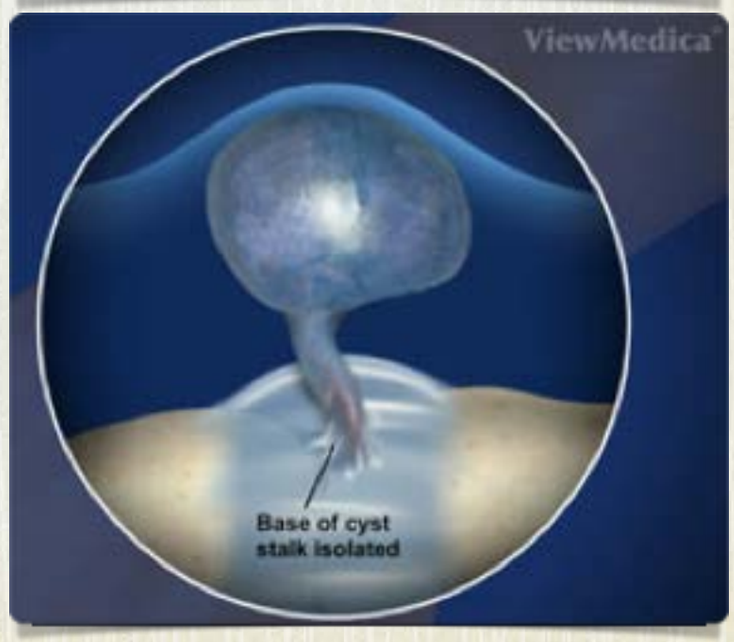
# MISSIONS

- Tanzania (Education)
- Ecuador (Ortho)
- Guatamala (Plastics)
- Ethiopia (Plastics)

# GOAL!

- No disclosures, no biases
- Objectives
- All plastic surgery except breast reconstruction
- Happy to discuss anything (breast reduction, burns, skin cancers, wrist…etc.)






# GANGLION CYSTS

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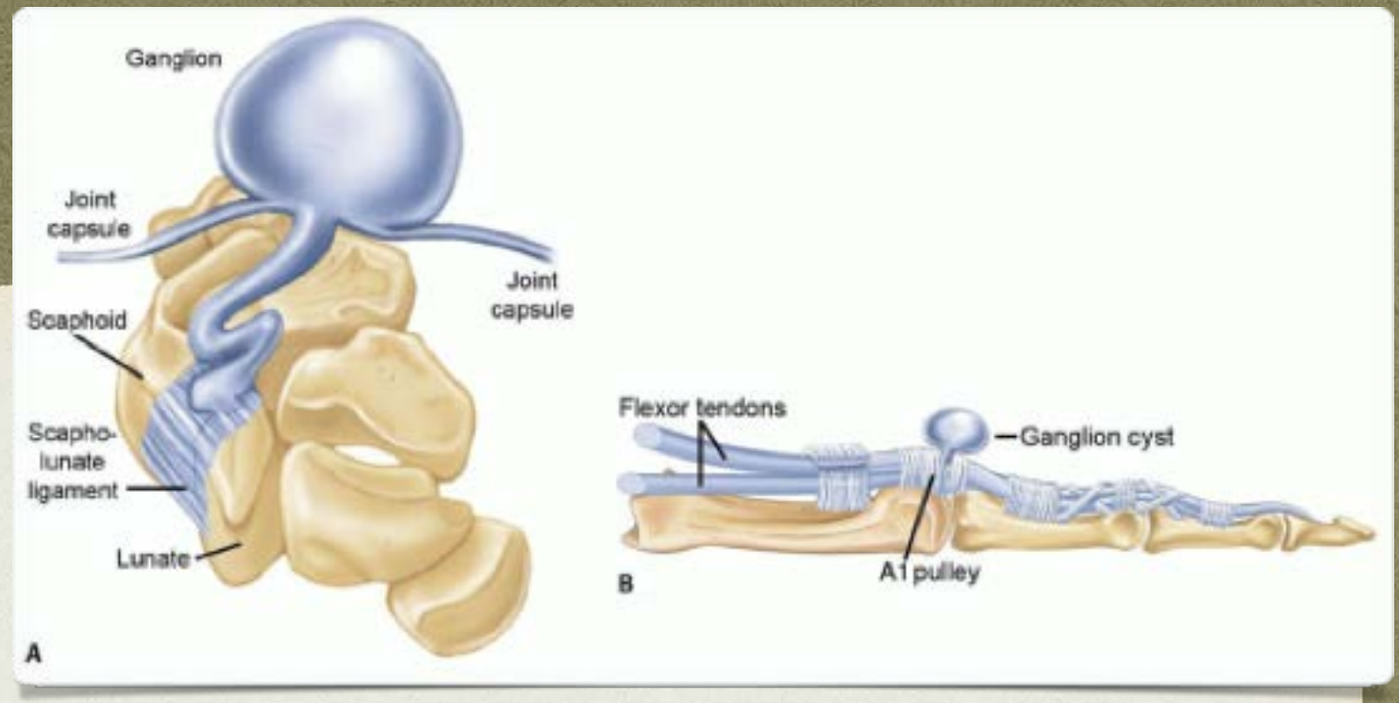
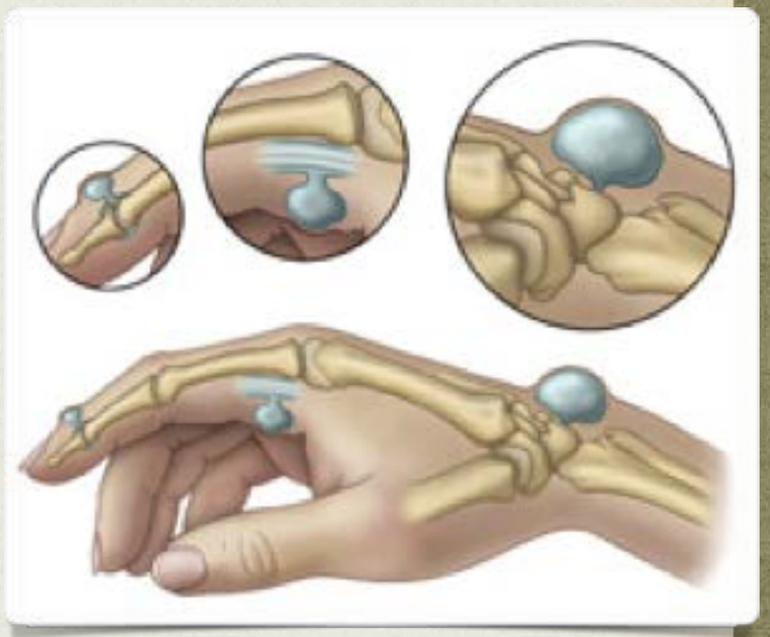
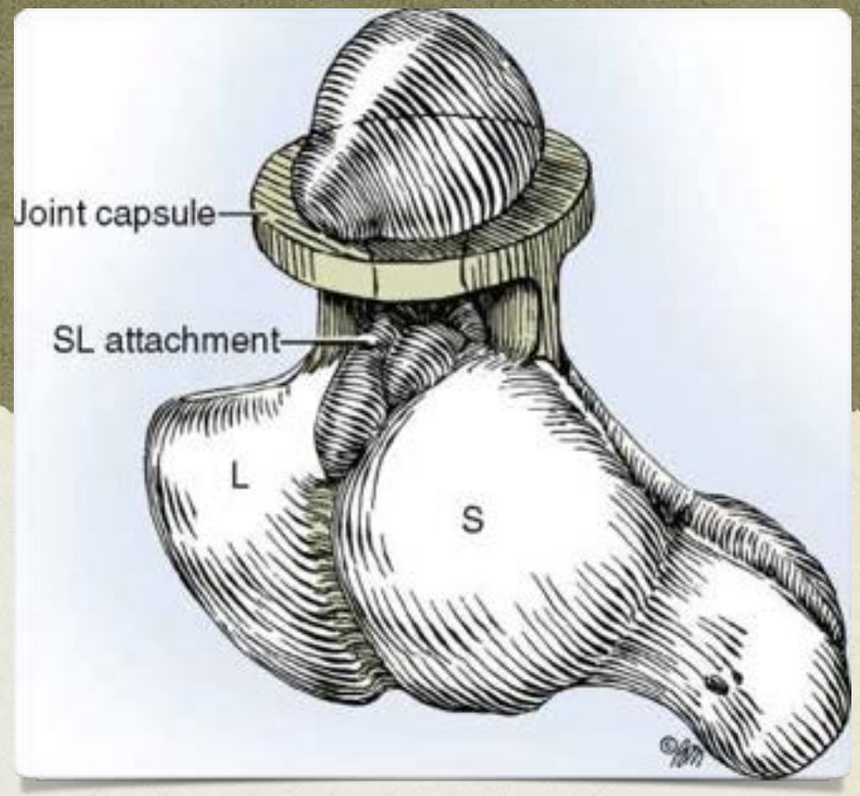



- Most frequent benign hand mass (33-69%)
- 2-3x more common in F, 20-40
- Etiology:
  - Degeneration of fibrous connective tissue in joint capsules or tendon sheaths
  - 10% of cases present after a specific trauma
  - repeated minor trauma may be a factor
- Diagnosis:
  - can be painless or painful, can wax/wane in size
  - mobile or fixed, **transilluminate**
  - **Radiographs: needed to rule out underlying pathology (e.g. ligament injury, arthritis)**



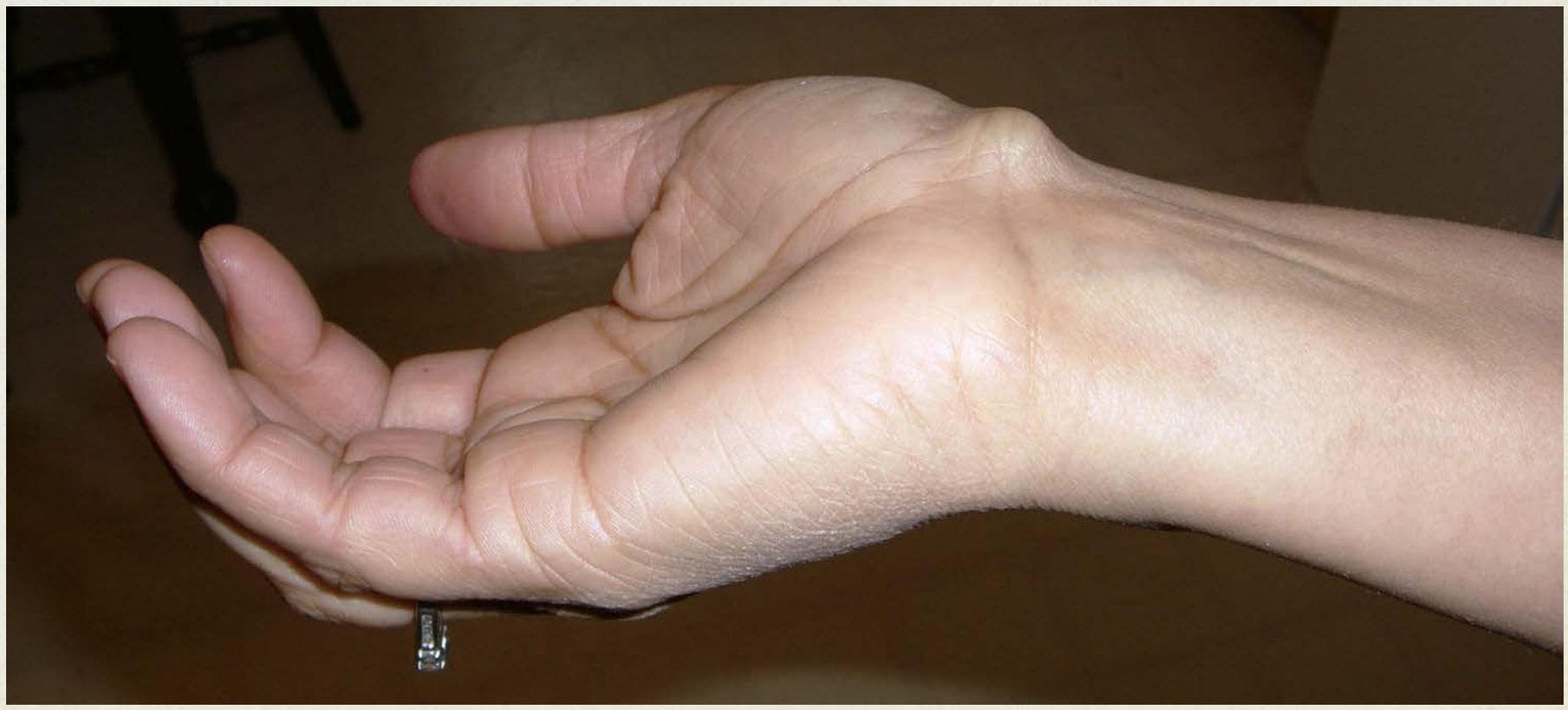
# TYPES




- **Dorsal Carpal Ganglions**: 70%
  - overlies SL ligament

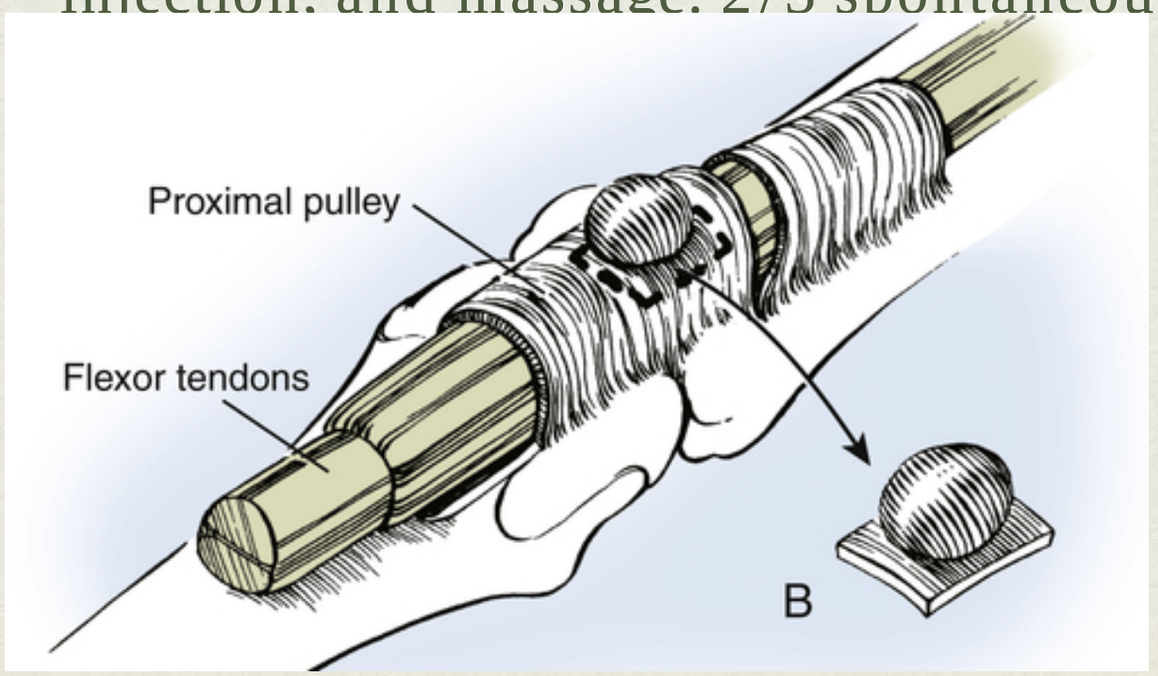
# TYPES

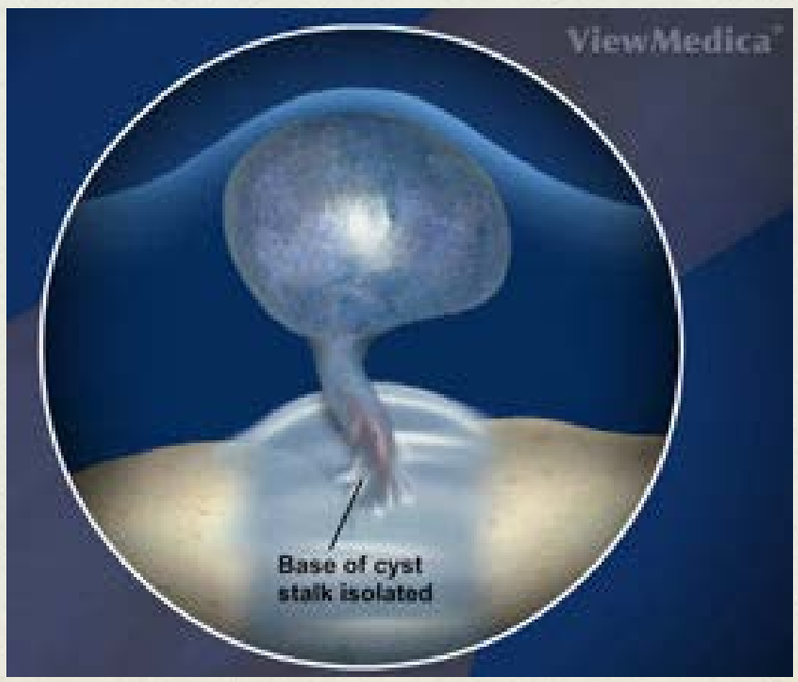
- **Volar Carpal Ganlion:** 15-25%
  - most frequent site in children <10yo
  - originate from FCR tendon sheath, radiocarpal or STT joints
  - lay adjacent to radial artery



# TYPES

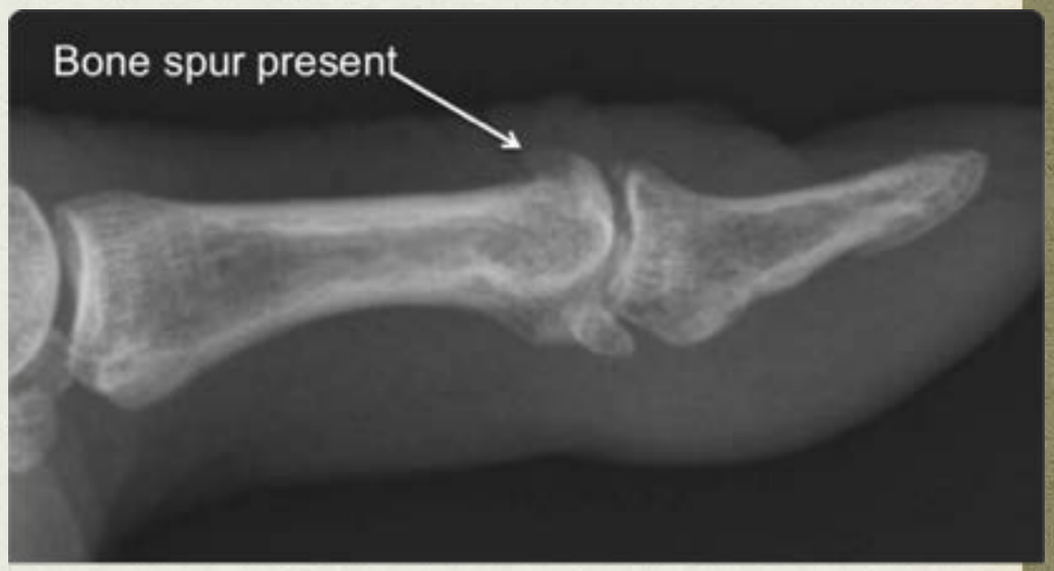
- **Flexor Tendon Sheath Ganglion**
  - Often at A1 pulley (or btw A1 and A2), base of digit
  - 3-8mm diameter
  - attached to tendon sheath and does not move with tendon
  - result of direct damage to fibrous sheath
  - possibly delay or obviate need for surgery by using needle aspiration, steroid injection, and massage. 2/3 spontaneously resolve.



# TYPES

- **Mucous Cysts:**
  - dorsal aspect DP, associated with extensor tendon, joint or joint capsule
  - can cause longitudinal nail grooving
  - usually associated with DIPJ degeneration
  - skin is thin and may rupture
  - must remove underlying osteophyte with cyst.



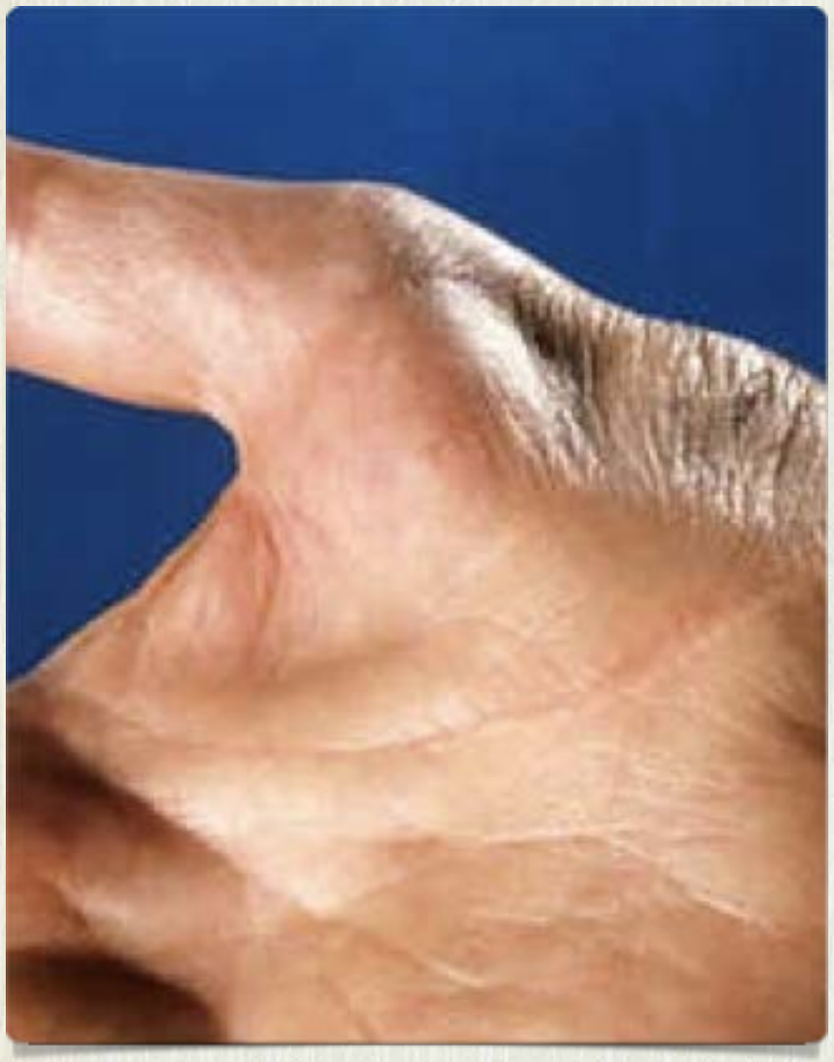


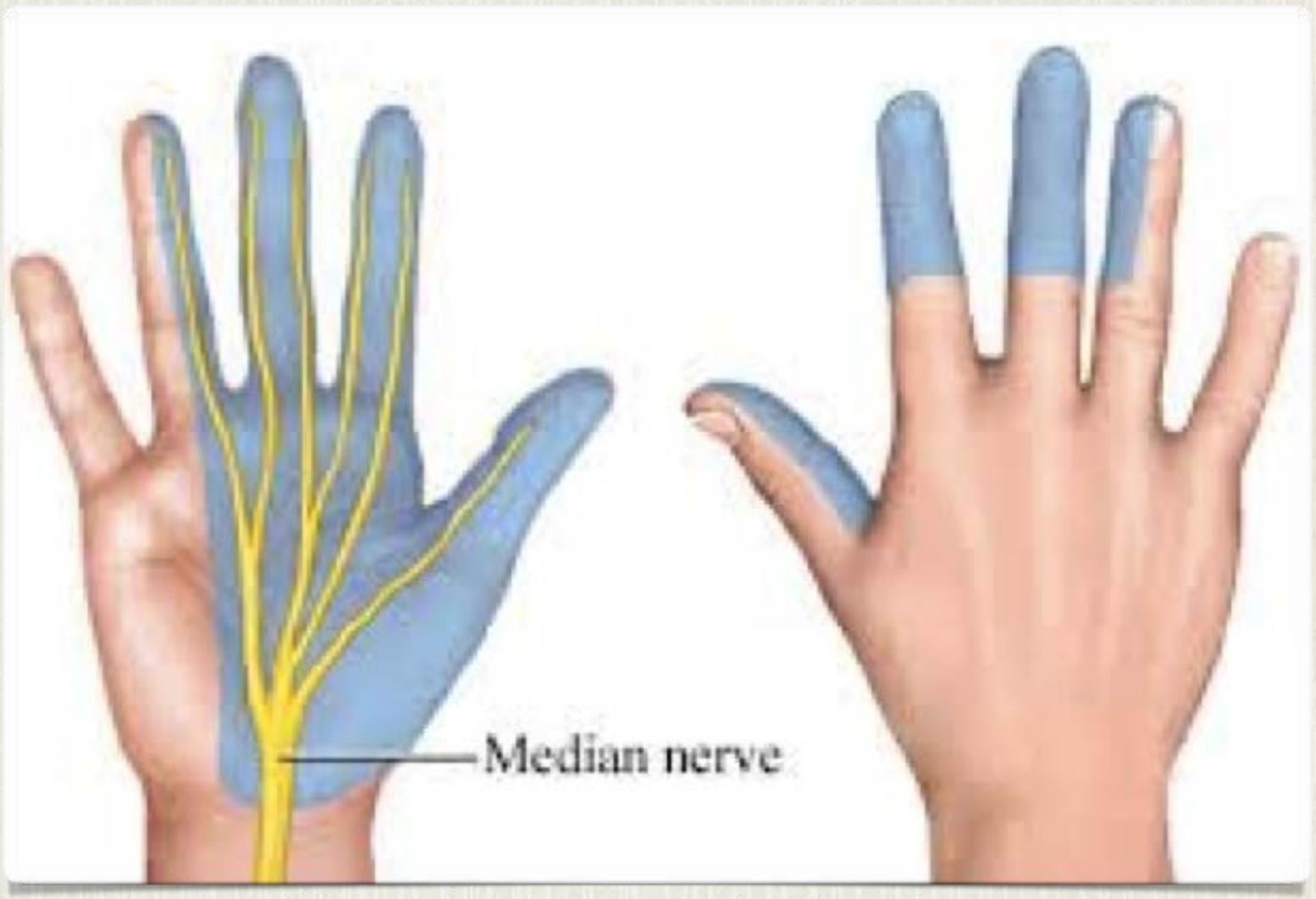
# TYPES

- **Carpal boss:**
  - painful mass at base of metacarpal
  - benign bony prominence, may be associate with OA
  - ganglia present 30% of the time.
  - Can irritate tendons

# TREATMENT

- Children: many respond spontaneously
- Adult: 38-58% regression (may take years)
- Options:
  - Aspiration
  - Injection of enzymes, sclerosing agents, cortisone
  - Surgery indicated for pain, deformity, or limitation of function.
- Recurrence rate: 1-50% (mean 24%)

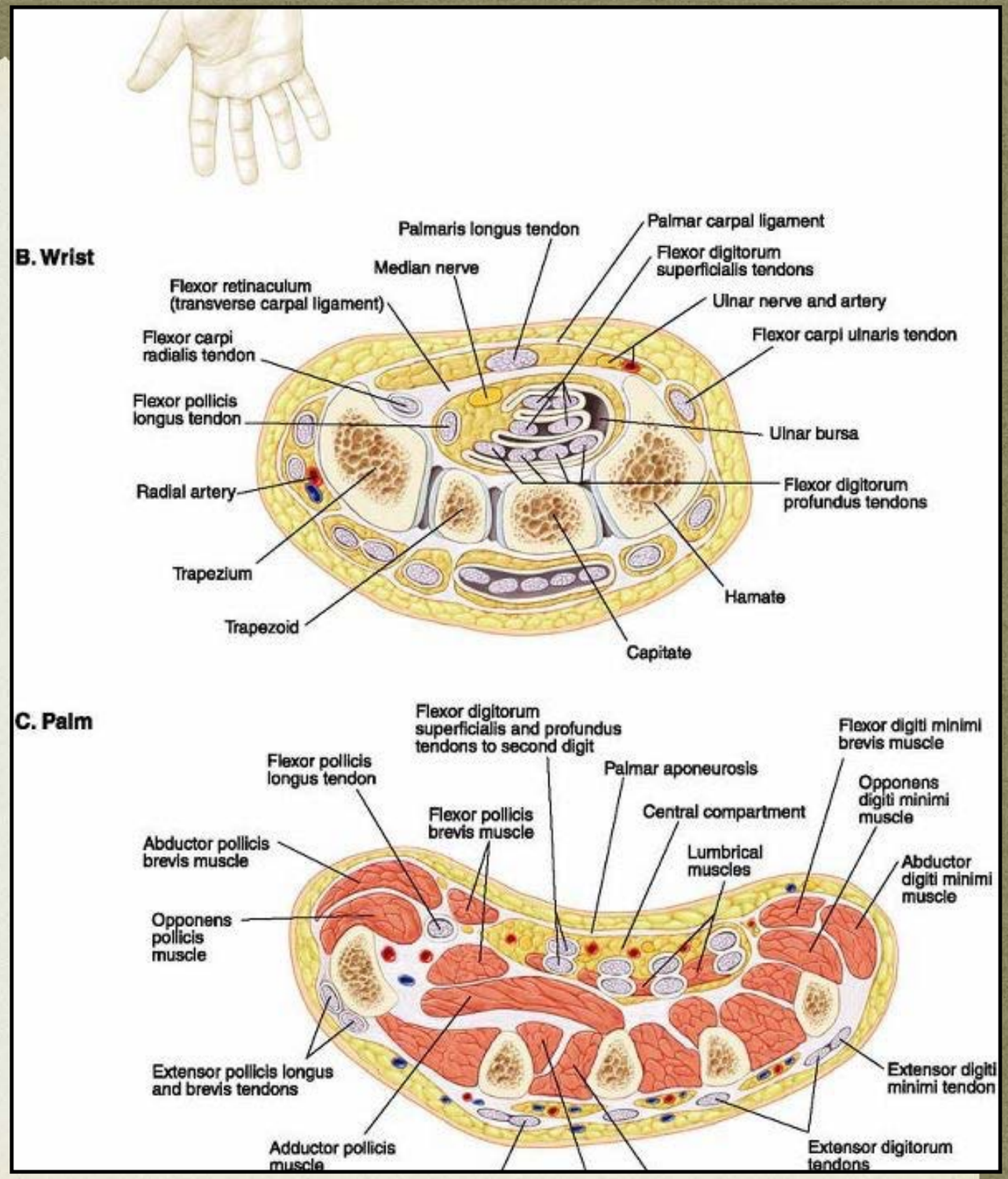





# CARPAL TUNNEL

# CARPAL TUNNEL ANATOMY

- Floor: **BONE** (Carpal bones and Metacarpals)
- Ulnar: **BONE** (Hook of Hamate, Triquetrum, Pisiform)
- Radial: **BONE** (Scaphoid, Trapezium, Fascial Septum)
- Roof: **Transverse Carpal Ligament**
- Contents: 9 tendons (FPL, 4FDS, 4FDP) and Median **Nerve**
- If swelling: only squishable object = NERVE
- 5cm proximal to wrist: **Palmer cutaneous branch** (gives sensation to thenar eminance) Differentiate between CTS or something more proximal



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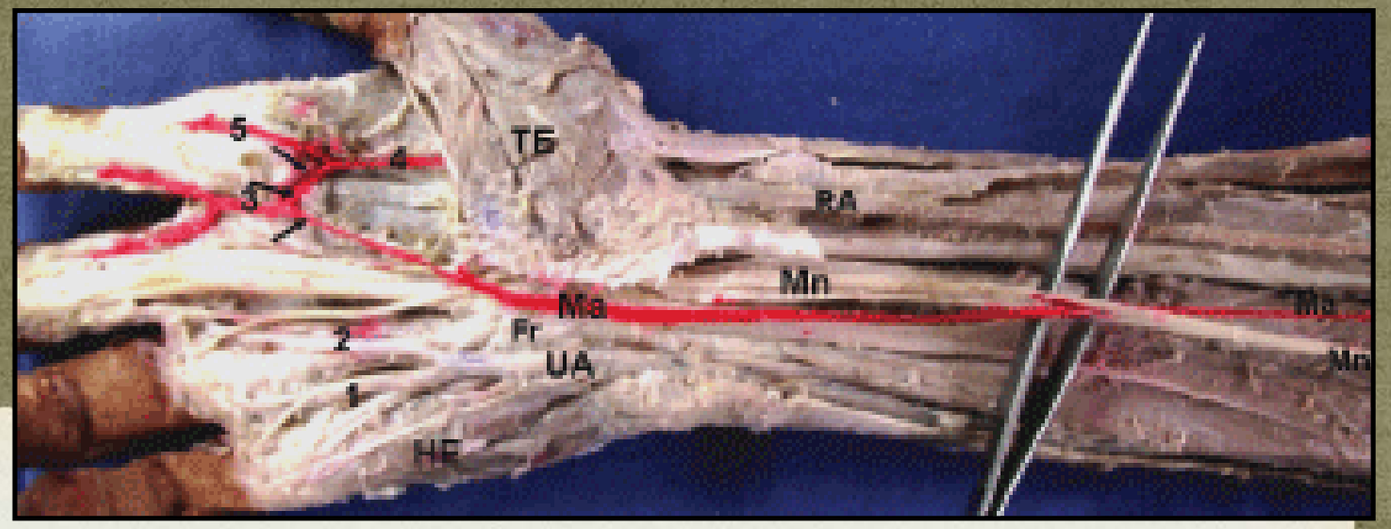
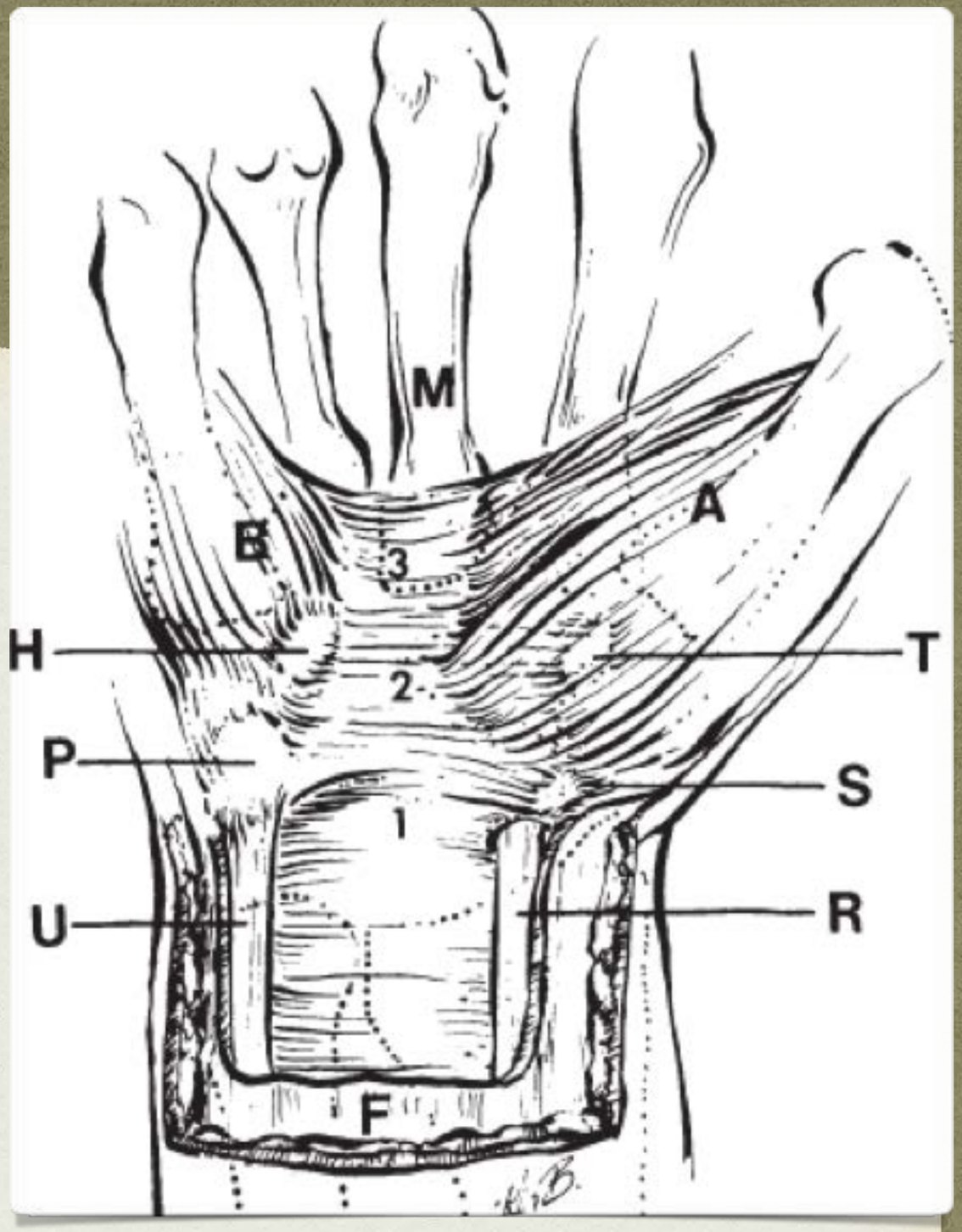



- Most common compression neuropathy in the upper extremity (incidence 5%)
- Age (40-60 yo) and sex (female > male) (F 70%)
- Etiology: Mechanical compression caused by idiopathic synovitis of flexor tendons in carpal tunnel -> demyelination -> axonal loss
- Associated with other medical conditions:
  - Diabetes, hypothyroidism, RA, CRF, alcoholism, pregnancy, menopause, gout, myxedema, acromegaly, Hurler's, mucopolysacharridoses, multiple myeloma, amyloidosis, and hemophilia
  - Previous local trauma to wrist
  - Repetitive strain injury
  - Local tumours such as ganglion (most common) or lipoma, and vascular tumours
  - Anatomic anomalies like thrombosis of a persistent median artery, low-lying flexor muscle bellies (FDS most commonly) or accessory muscles (manus)/lumbricals traversing CT

# CARPAL TUNNEL

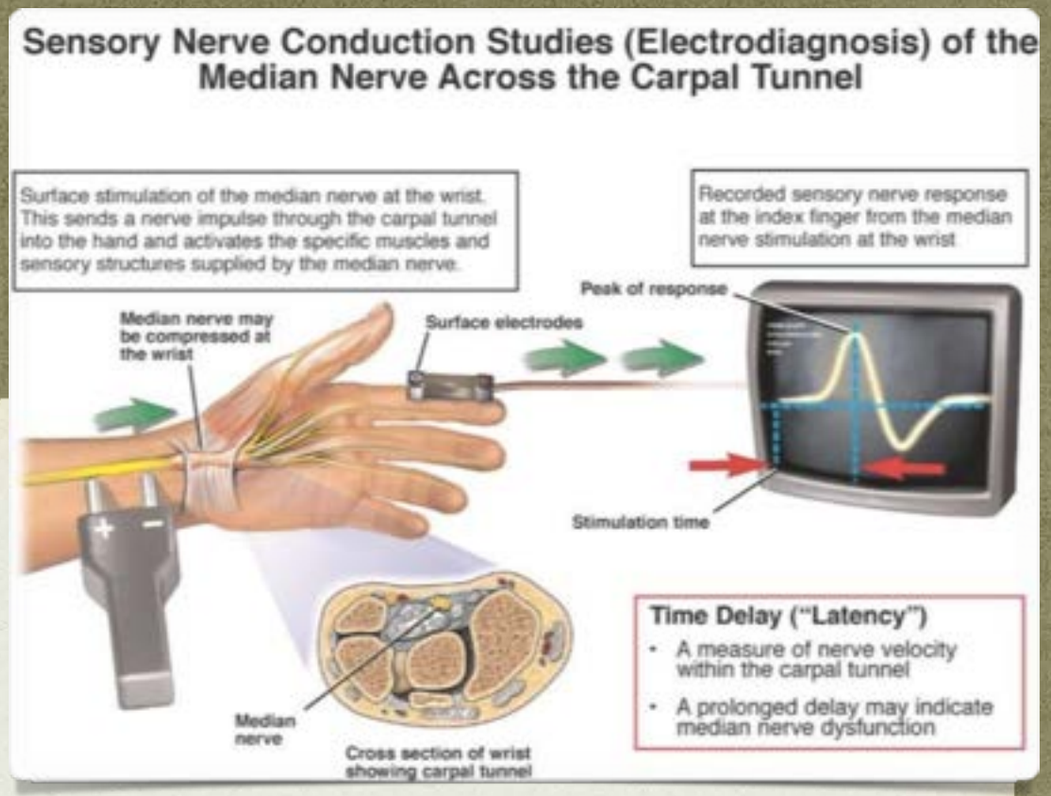
- Narrowest point?
  - 2 cm from leading edge
  - At hook of hamate
  - 1 cm distal to midline of distal carpal row



# CARPAL TUNNEL SYMPTOMS

- Pain worse at night (redistribution of swelling)
- Numbness (↓ light touch)
  - D1,2,3,half4 (or Whole Hand!)
  - (spared over thenars - palmar cutaneous branch)
- Weakness/Clumsiness, strong FPL
- Aggravation of symptoms while using hand (especially with grasping, typing)
- Tinel's sign positive at wrist
- Thenar muscle wasting (with axonal damage) and increased 2 PD (if more advanced)
- Provocative Tests
  - Durkin sign: pressure to CT causes local pain and symptom recurrence
  - Phalen's test / Reverse Phalen's test

# CARPAL TUNNEL DIAGNOSIS

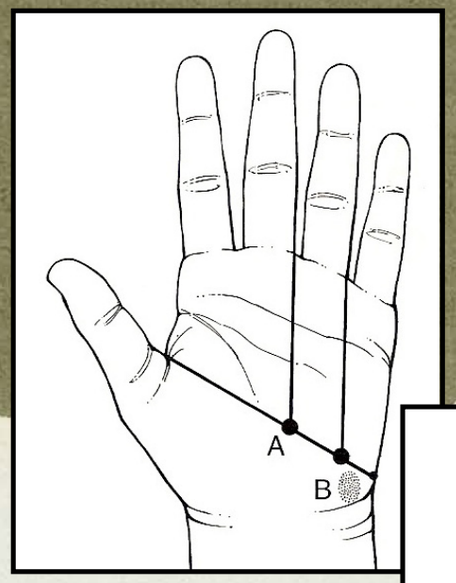


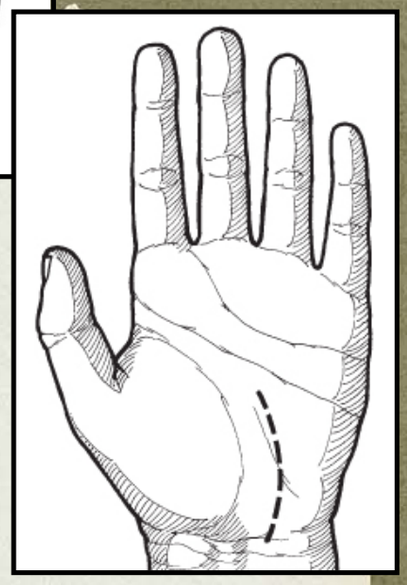

- PE
  - 85% specificity with all of the following:
    - Positive Phalen's test, Tinel's sign and objective sensory findings in median nerve distribution
- NCS:
  - motor latencies usually greater than 4.5msec
  - sensor latency > 10% compared to ulnar nerve across wrist
  - Fibrillation potentials in APB suggest deneravation

# CARPAL TUNNEL TREATMENT

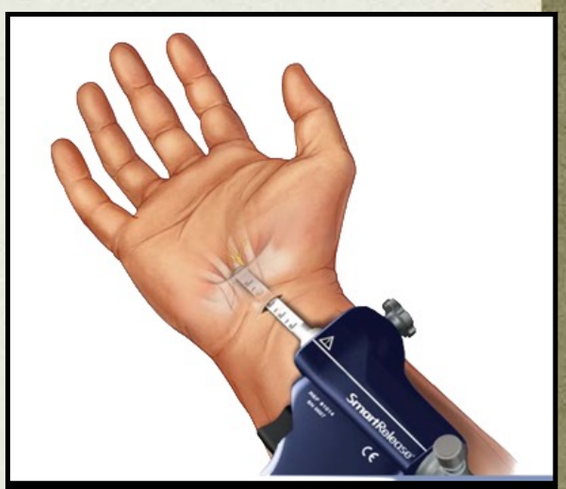
- Nonsurgical: (patients with mild symptoms respond more reliably)
  - Neutral wrist splint at **NIGHT**
- Activity modification, ergonomic workstation
- NSAID
- Steroid injection into CT (20% symptom free at 1yr if mild) -> **NEVER**
- Nerve gliding exercises (? questionable)
- Vitamin B6 (no proof)

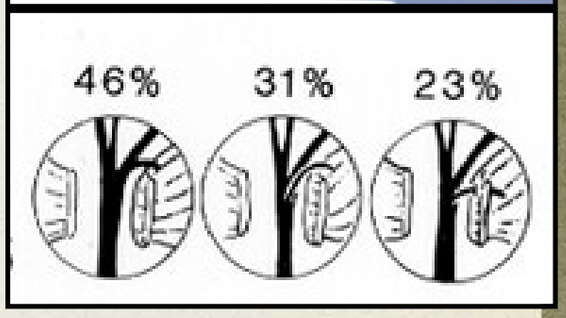
# CARPAL TUNNEL TREATMENT



- Surgical
  - Open release (+/- neurolysis/epineurotomy/flexor tenosynovectomy)
    - Advantages: critical structures/anatomic variance visible, complete release, concomitant guyon's canal decompression
    - Disadvantages: flexor tendon bowstringing (?), longer more tender scar, traction neuritis, 62% pilar pain
  - Endoscopic (1 or 2 portal)
    - Advantages: smaller, less tender scar, faster return to work (open CTS 5-6wks vs 4wks endoscopic)
    - Disadvantages: higher rate of neuropraxia, recurrent CTS (incomplete release, adhesions, flexor tenosynovitis), inability to view anatomic variants



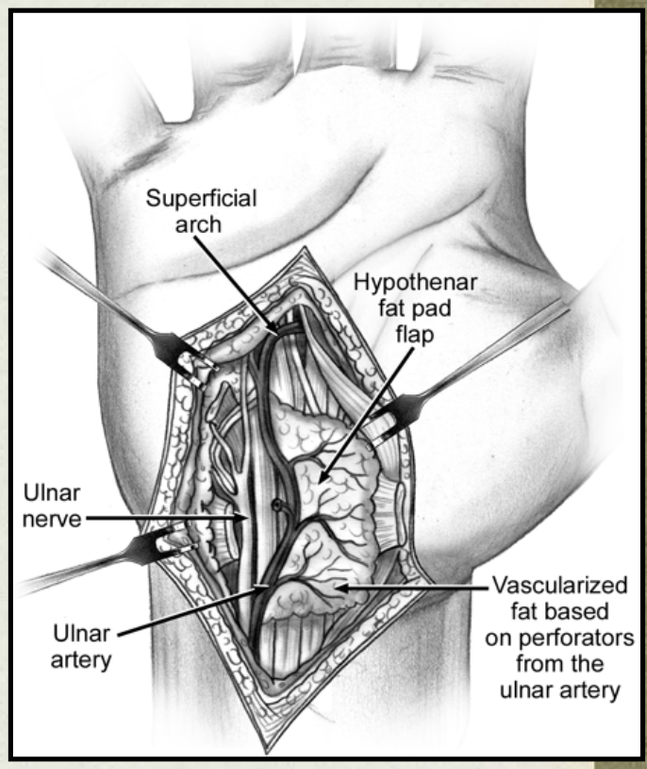


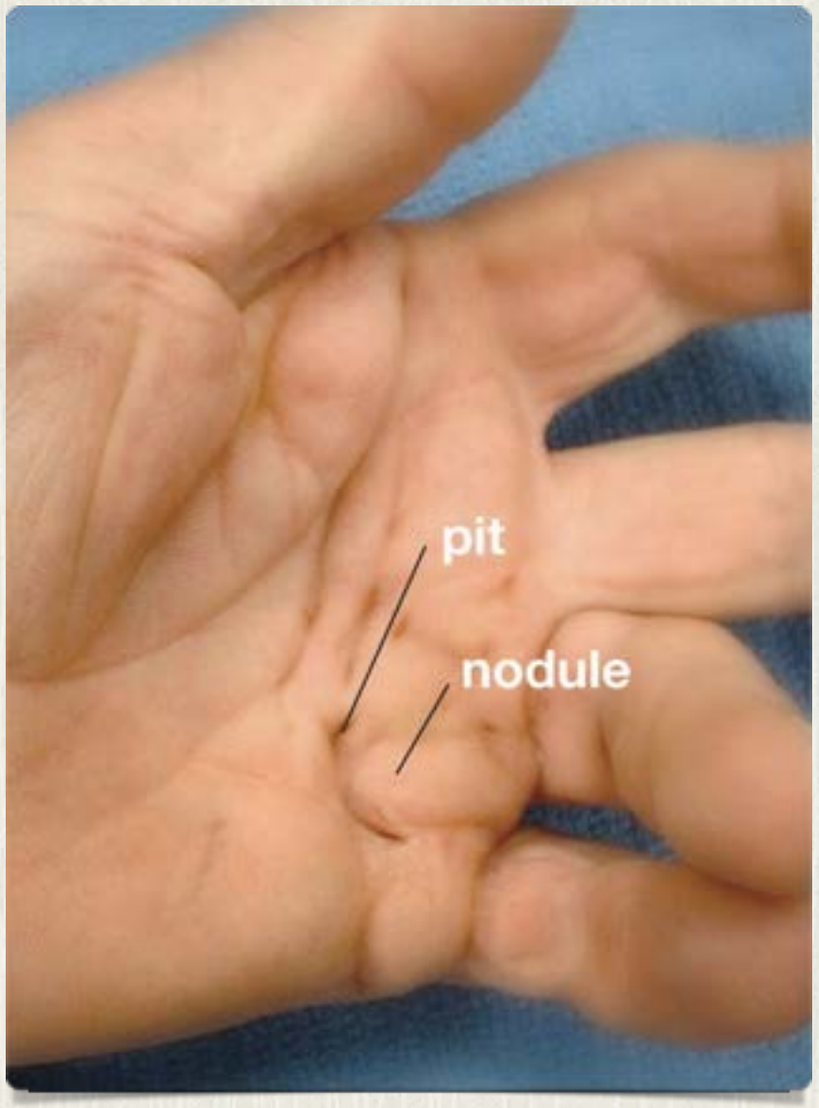
# CARPAL TUNNEL RESULTS

- NCS improved by 3mo, strength by 6mo, thenar atrophy may persist for 2yrs or longer

# RECURRENT CARPAL TUNNEL SYNDROME

- Differential includes:
  - Wrong diagnosis (proximal lesion, peripheral neuropathy, CRPS, malingering, PCB neuroma)
  - Persistent CTS (incomplete release)
  - Recurrent CTS (encased in scar or TCL reformed, devascularized nerve)
- Investigations include:
  - Further history and physical examination
  - NCS/EMG +/- C-spine XR's, ultrasound, Doppler, MRI
- Treatment:
- May involve: Re-exploration, +/- neurolysis (external +/- internal) +/- a vascularized flap (eg. PB, PQ, hypothenar fat)





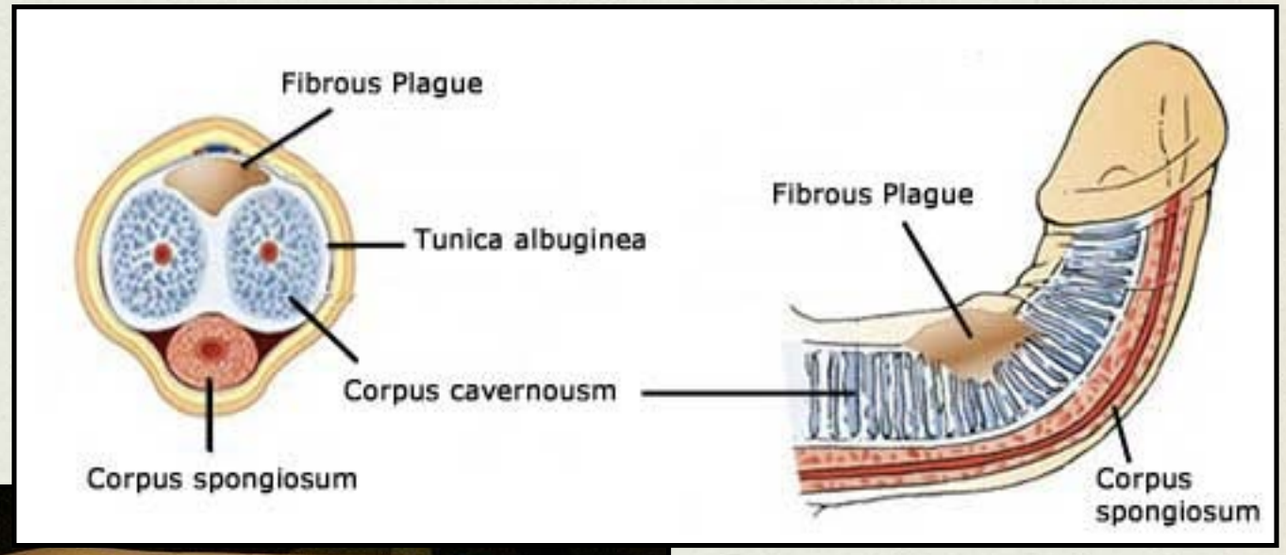

# DUPUYTRENS DISEASE

# DUPUYTREN'S

- Fibroproliferative disease of Palmer Fascia
  - Superficial to all tendons, nerves, vessels
  - Anchors palmer skin to bone
- Genetic disease:
  - Autosomal dominant, Caucasians of Northern European background
  - Prevalence: 0.6 to 31.6% (12%@55, 21%@65, 29%@75)
  - M:F = 5.9:1
  - Environmental factors: Increased association with diabetes, heavy drinking, over 15 years of occupational vibration exposure (1.5-3x more prevalent).
- No single gene or transcription factor identified.
- Possibly, because of localized ischemia:
  - Down regulation of genes that break down collagen.
  - Up regulation of genes that make collagen (esp. Type III)

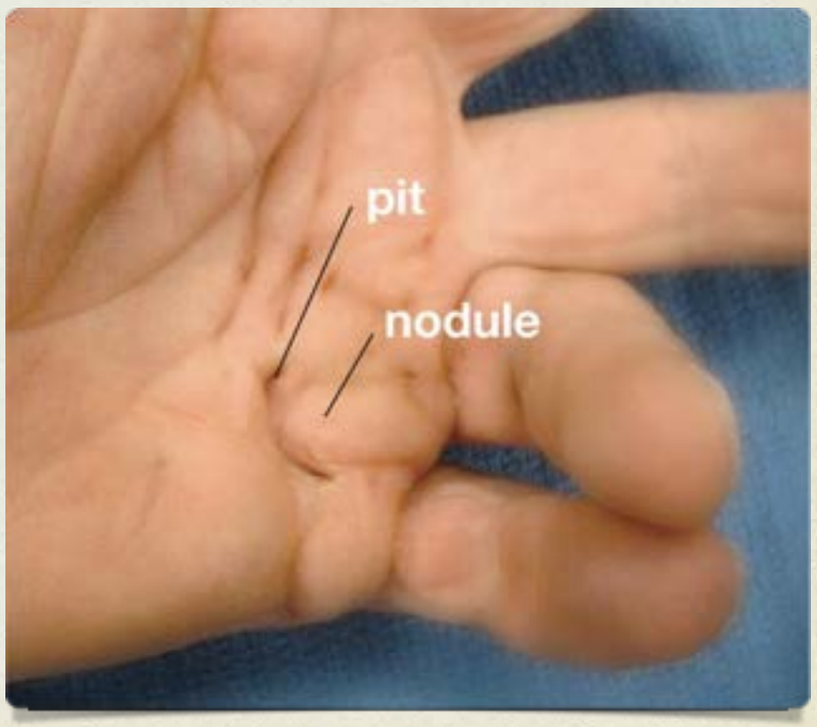
# AGGRESSIVE DUPUYTREN'S DIATHESIS

- Characterized by:
  - Bilateral disease
  - Positive family history
  - Male sex
  - Onset before age 50 years
  - Presence of ectopic locations such as knuckle pads, Ledderhose disease, or Peyronie disease

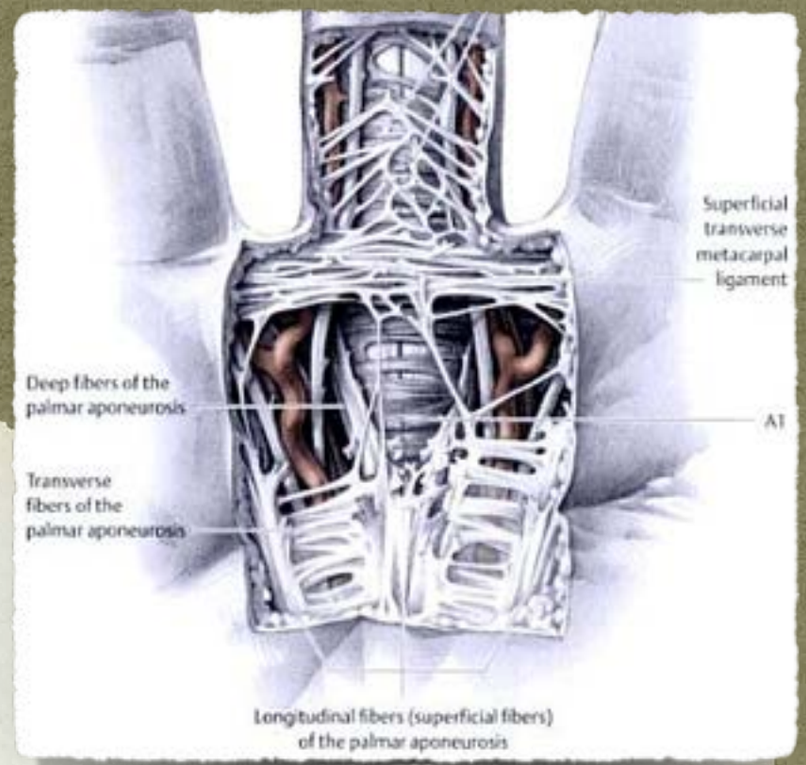


# DUPUYTREN'S PRESENTATION

- Nodules and Cordes
- Progress over time, **Speed Unknown**
- D4 most common, followed by D5
- **<u>When to refer (Indications for surgery):</u>**
  - 30 degrees MCPJ
  - 15 degrees PIPJ
  - Positive table top test

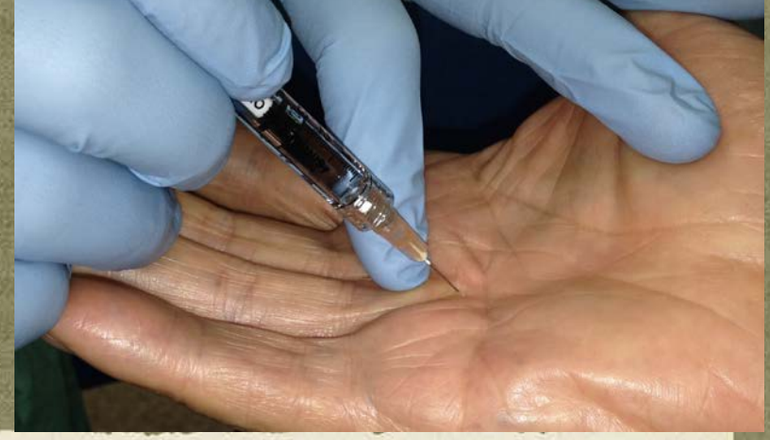


# DUPUYTREN'S TREATMENT




- Options:
  - Collagenase: Clostridial collagenase histolyticum injections
  - Percutaneous Needle Fasciotomy
  - Open fasciectomy
- All are temporizing, **not curative**
- Physio (splinting, stretching): Can improve ROM, doesn't make worse, may not help

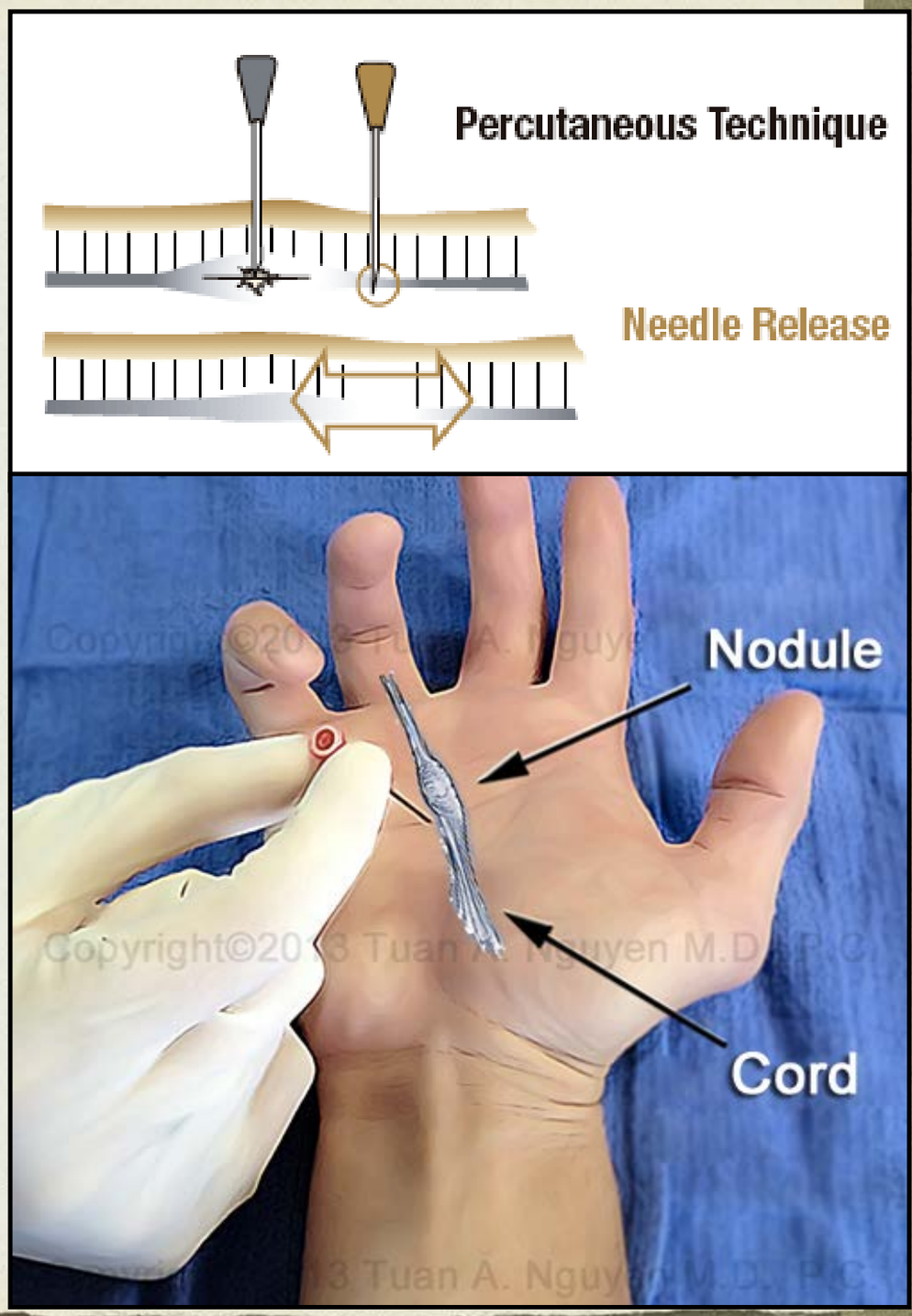
# COLLAGENASE: CLOSTRIDIAL COLLAGENASE HISTOLYTICUM INJECTIONS



- Mixture of two clostridial collagenases:
  - preferentially dissolves cord collagen and spares type IV collagen (a primary component of basement membranes and nerves)
- Advantages: less time, reduced follow-up appointments, faster recovery, can be performed in the office
- Procedure associate with pain, pruritus, lymphadenopathy, and skin tears.
- Initial injections, then manipulation with local anesthetic blocks at 2-7 days.
- **The incidence of complications was much lower with collagenase vs limited fasciotomy**
  - nerve injury (0 percent versus 3.8 percent)
  - neurapraxia (4.4 percent versus 9.4 percent)
  - CRPS (0.1 percent versus 4.5 percent)
  - infection (0 percent versus 4.5)
  - arterial injury (0 percent versus 5.5 percent).
- The complications were higher with collagenase:
  - tendon injury (0.3 percent versus 0.1 percent)
  - skin tears (16.2 percent versus 2.8 percent)
  - hematoma (77.7 percent versus 2.0 percent)
- Results: Compares very well to limited fasciotomy at the MCPJ and slightly worse at the PIPJ

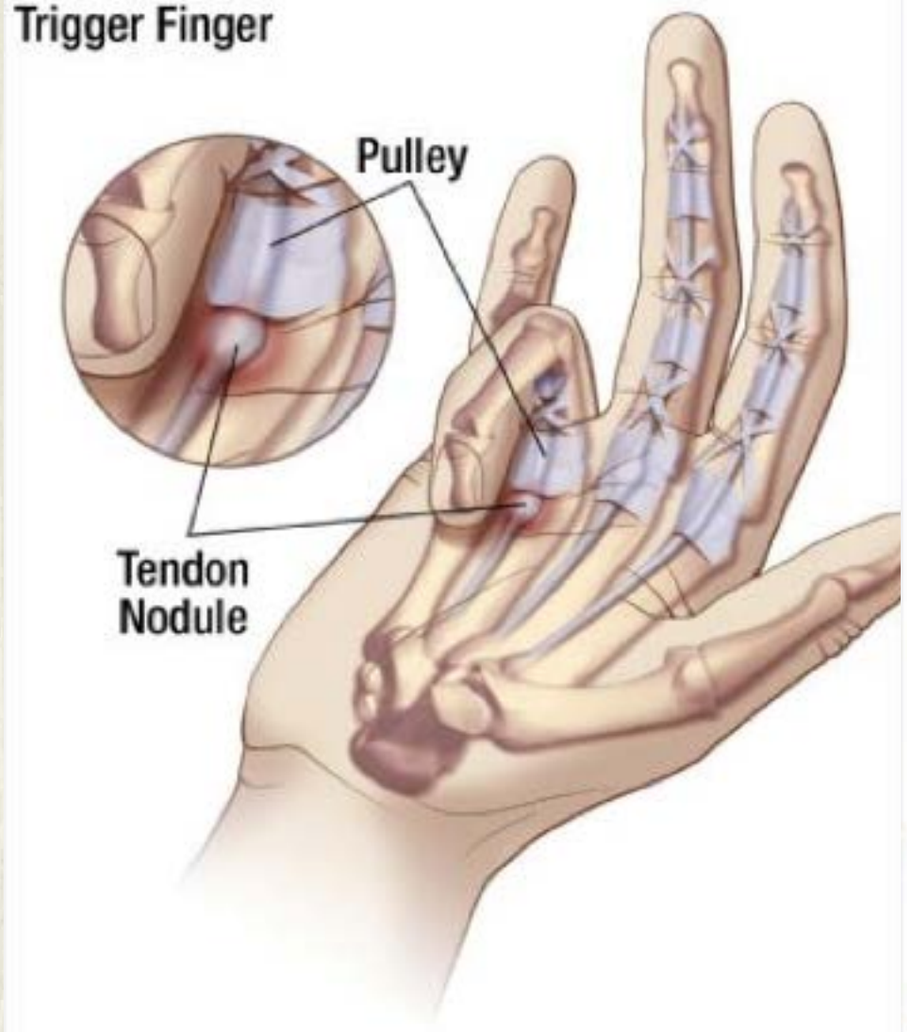
# PERCUTANEOUS NEEDLE FASCIOTOMY

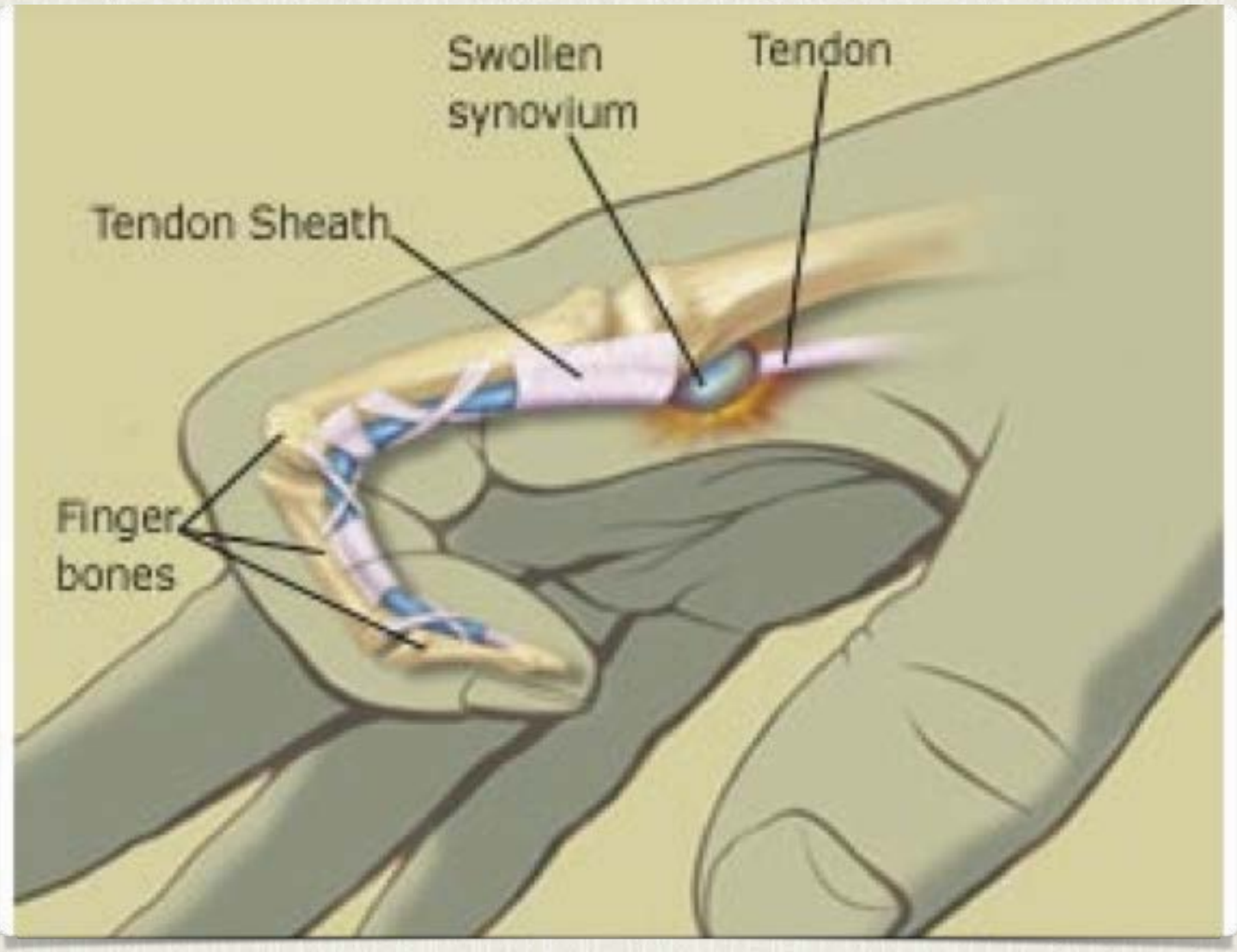
- Fragments the tissue (thickness/nodules remain present)
- Recurrence rate is approximately 85 percent at 5-year follow-up
- **Repeatable**
- Complications: 50% skin fissures, 6% paresthesias, 0.1% nerve damage.
- Higher risk of nerve injury, neurapraxia, complex regional pain syndrome, and arterial injury



# OPEN FASCIECTOMY

- Removes all diseased fascia
- Deficit covered by Z-plasty flaps or full-thickness skin graft
- 84 studied in 143 rays had a low recurrence rate of 8.4 percent at 5.8-year follow-up.
- Postoperative splinting and hand therapy is widely practiced. However, night splinting does not seem to have a benefit in clinical studies
- Complications:
  - Nerve injury 3.4%
  - Digital artery injury 2%
  - Infection 2.4%
  - Hematoma 2.1%
  - **Flare reaction 9.9%**
  - CRPS 5.5%
  - Wound healing complications 22.9%




# TRIGGER FINGER

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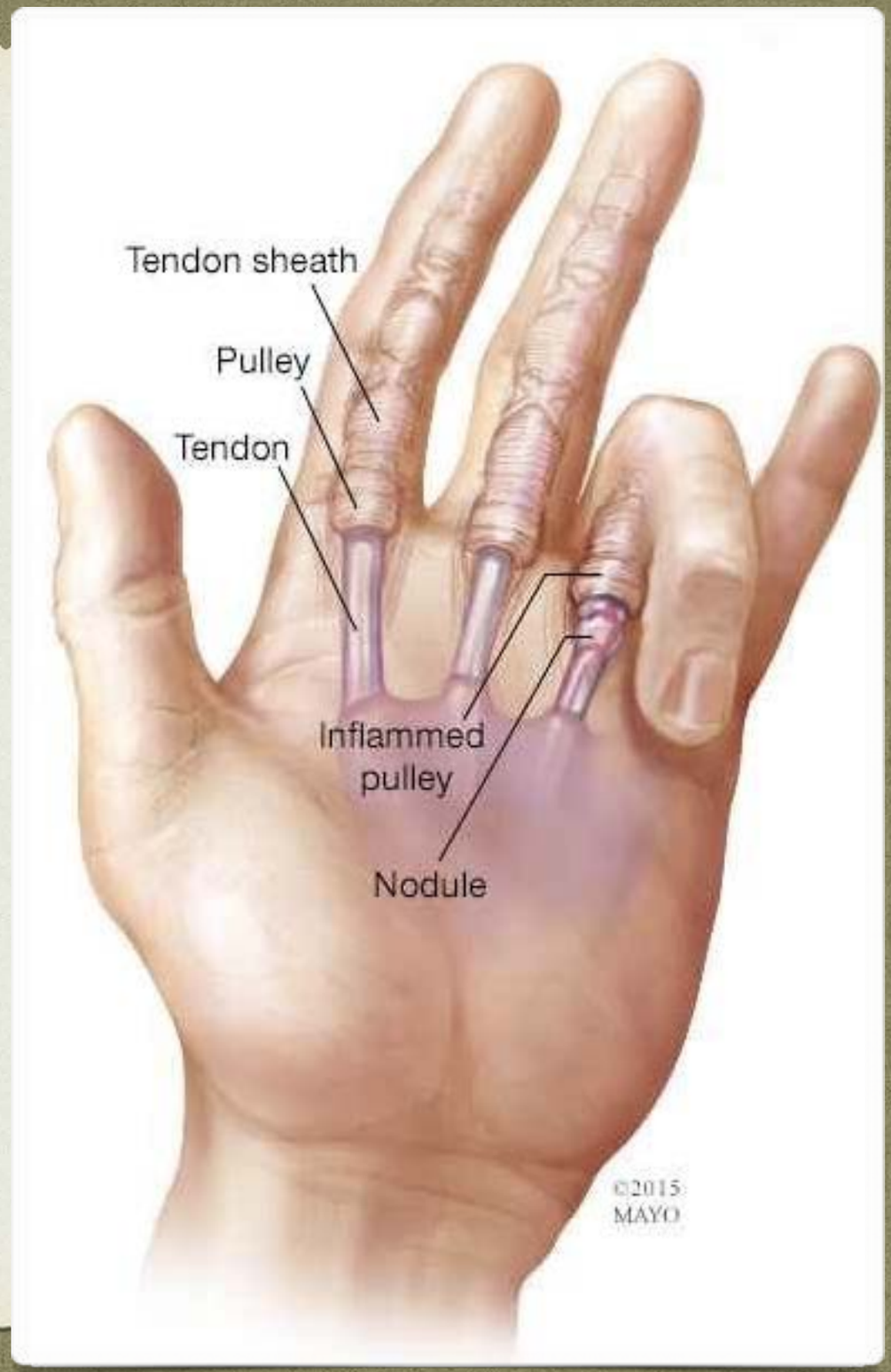
- Stenosing tenosynovitis caused by inflammation of the flexor tendon sheath
- Ring finger most common, but any finger can be
- **Pediatric trigger thumb often resolves by age 2**
- Mechanism
  - entrapment of the flexor tendons at the level of the A1 pulley
  - pathology: fibrocartilaginous metaplasia of tendon and pulley found in pathology
- Associated conditions
  - diabetes mellitus
  - rheumatoid arthritis
  - amyloidosis



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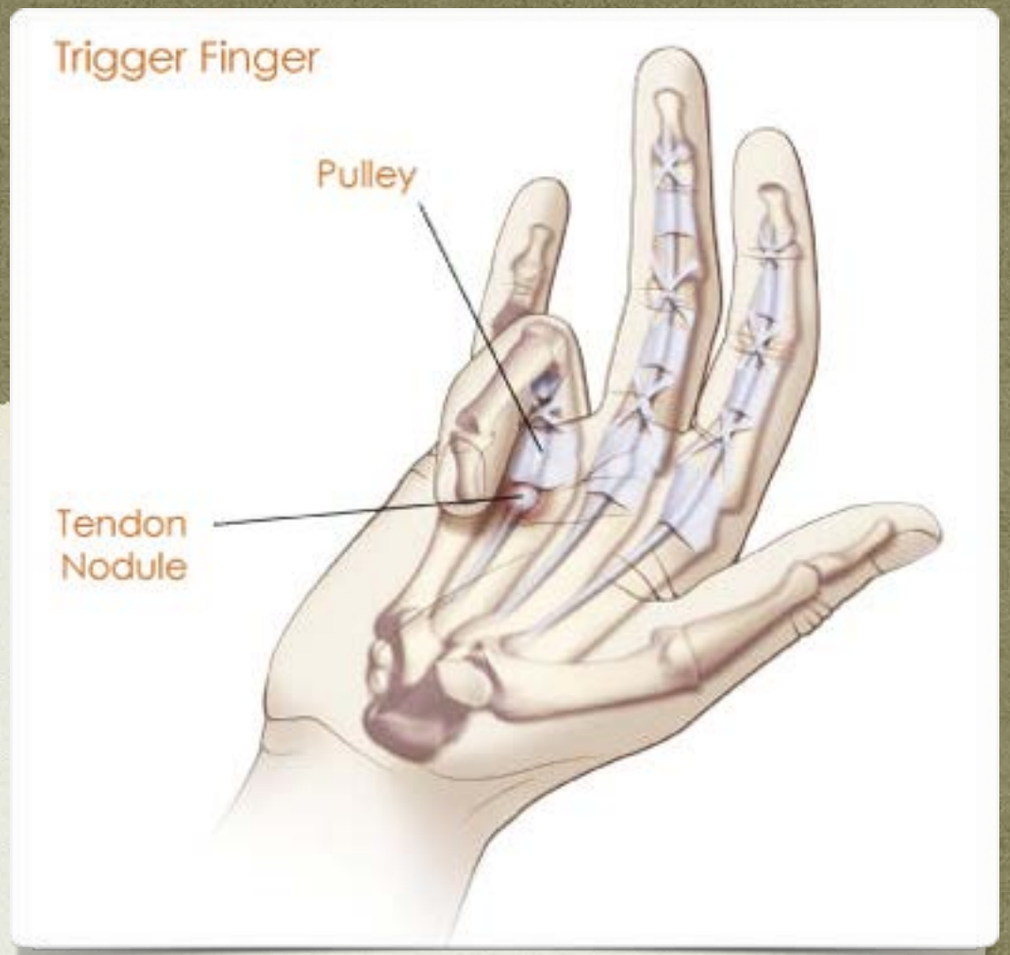
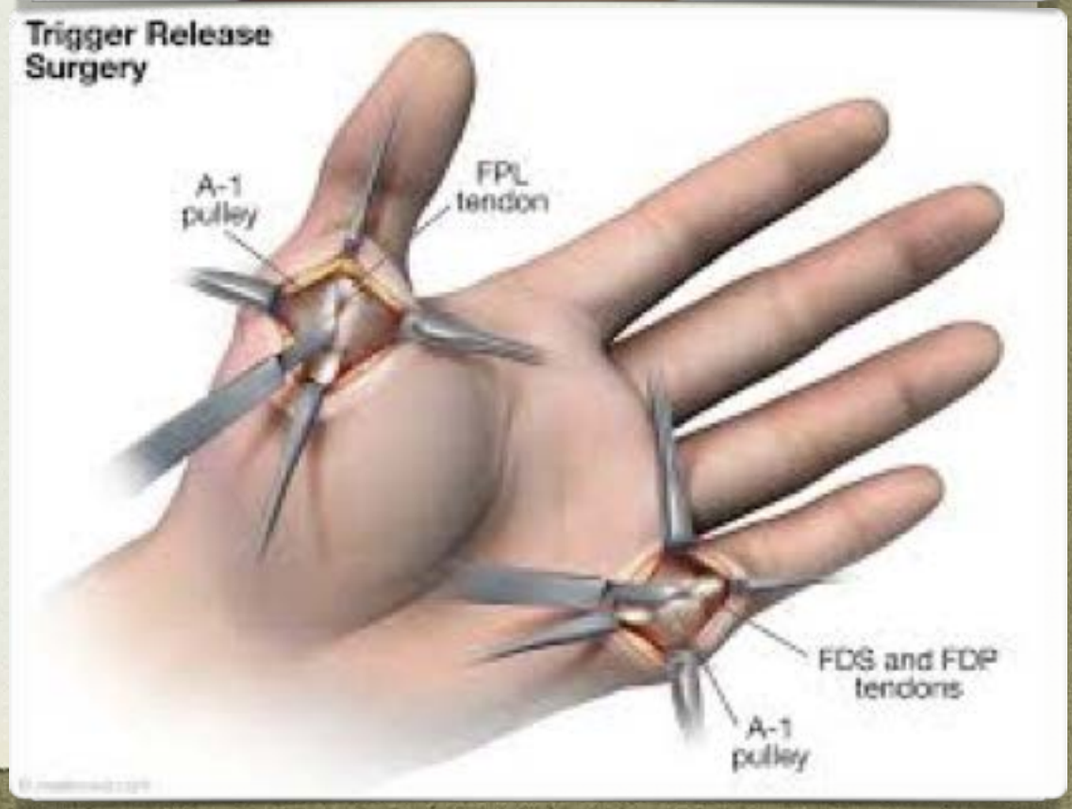



- Presentation:
  - Finger clicking
  - Pain at distal palm (A1 pulley) and/or PIPJ
  - Finger can become “locked” in flexion (rarely extension)
  - Palpable bump on tendon or in pulley area (ganglion)

# TRIGGER FINGER

- Treatment:
  - Nonoperative:
    - Night splinting, Activity modification, NSAIDs
    - Steroid Injection: best initial treatment
      - can give 1-3 injections (more risks tendon rupture)
      - diabetics do not respond as well
- Operative:
  - Surgical release of A1 pulley and debridement
  - Compliations: digital nerve/vessel injury, infection, stiffness, recurrence



# MALLET FINGER

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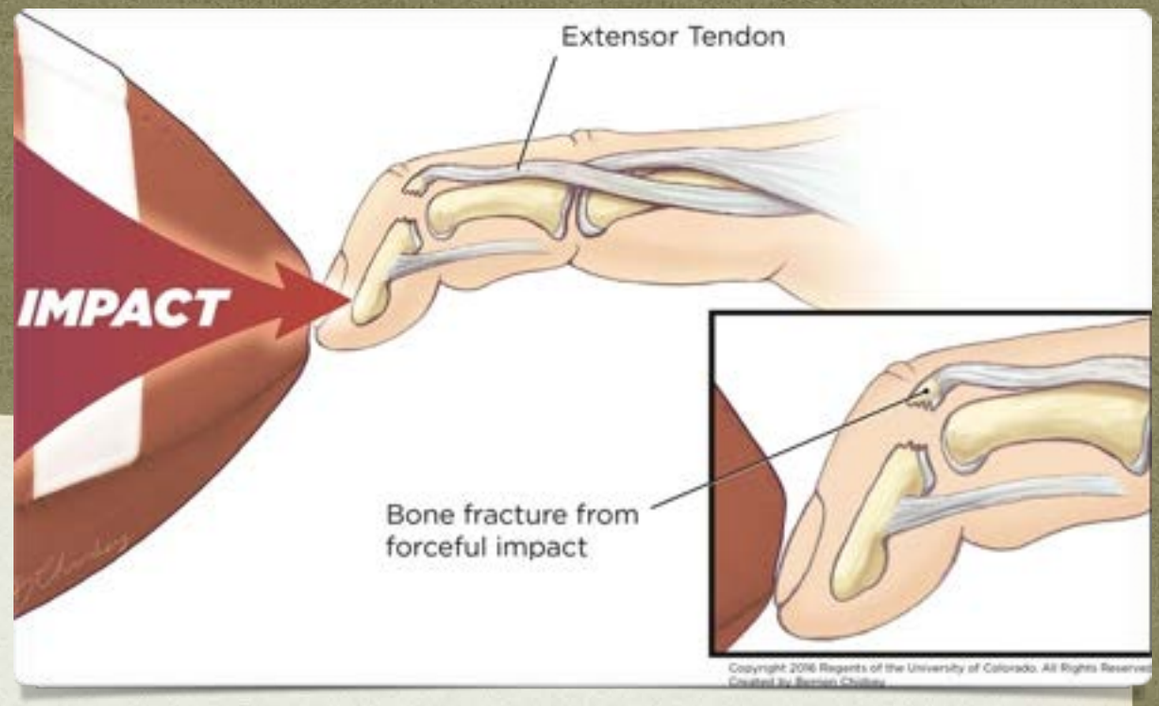
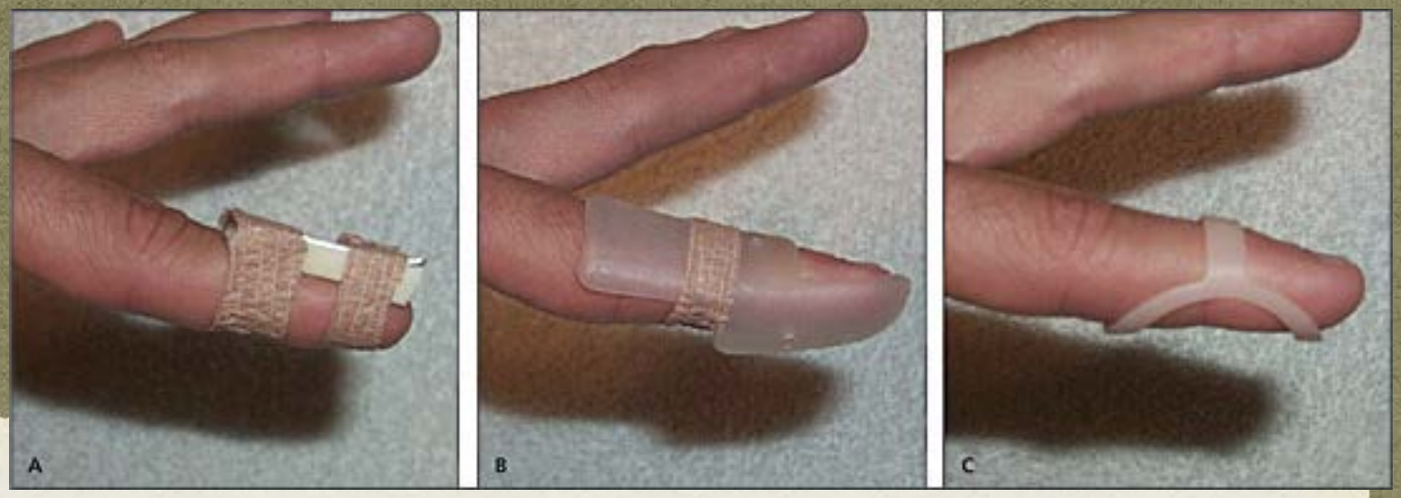



- Disruption of terminal extensor tendon causing flexion at DIPJ. Can be tendinous or bony.
- Caused by traumatic impaction: forced flexion while finger is actively extended (e.g. football), or laceration dorsal to DIPJ.
- Most frequently involves long, ring and small fingers
- Presentation: painful swollen DIPJ with ~45 degrees flexion and lack of active DIPJ extension.

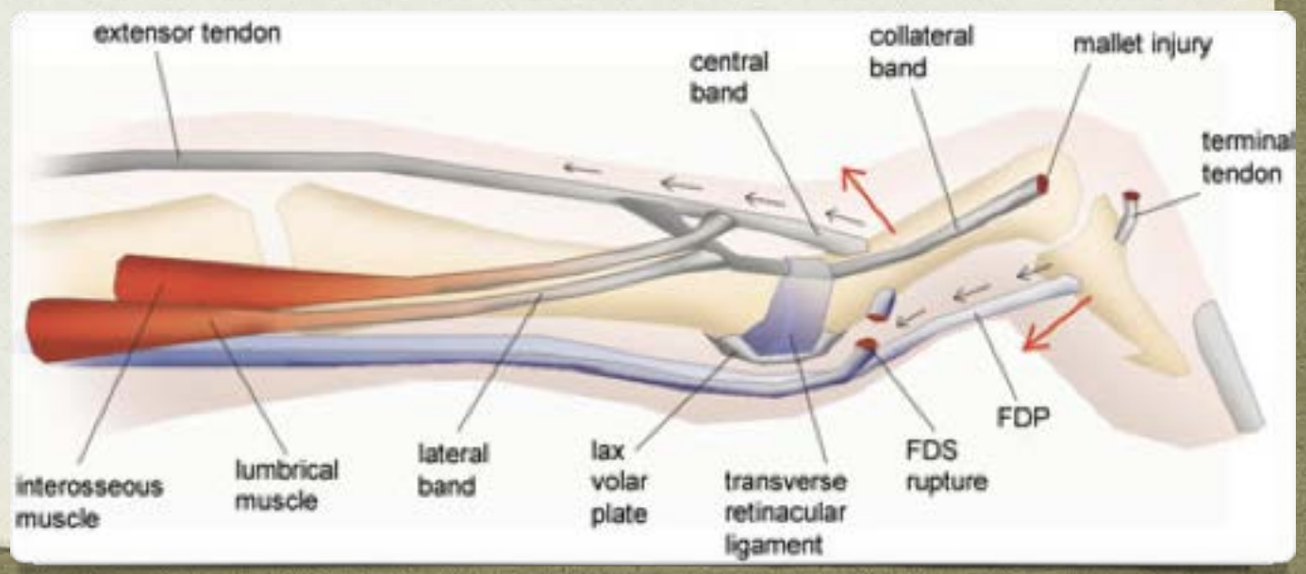
# MALLET FINGER CLASSIFICATION

- Type 1: closed injury with or without small avulsion fracture
- Type 2: Open injury (laceration)
- Type 3: Open injury with loss of soft tissue (abrasion)
- Type 4: Fracture
  - A: DP physeal injury (peds)
  - B: fragment involving 20-50% of articular surface
  - C: fragment involving >50% articular surface

# MALLET FINGER TREATMENT




- No bone involved, Small bone fragment witout joint subluxation
  - Immobilize DIPJ in slight hyperextension, allow PIPJ AROM for 6wks then wean splint.
  - Watch for maceration and skin wounds on dorsum of finger.
- Joint subluxed, not reduced with splint
  - ORIF (if >50% articular involvement or >2mm gap)
- Chronic/Delayed presentation
  - Treat as above
- Complications:
  - residual extensor lag <10 degrees common
  - Swan Neck Deformity



# OSTEOARTHRITIS

*When to treat*

# HAND/WRIST OA

- Most common: DIPJ, basal thumb, post traumatic wrist, PIPJ
- Often painless and become painful with acute trauma
- Only treat if painful and debilitation and surgery can cause pain/complications!
  - DIPJ -> fusion
  - PIPJ -> replacement
  - MCPJ -> replacement
  - CMC OA -> suspensionplasty
  - Wrist OA -> varies


# ENCHONDROMA

# ENCHONDROMA

- Most common bone tumor in the hand
- Benign tumor composed of hyaline cartilage
  - Chondroblasts and fragments of epiphyseal cartilage escape from the physis, displace into the metaphysis and proliferate there
- Located in medullary cavity

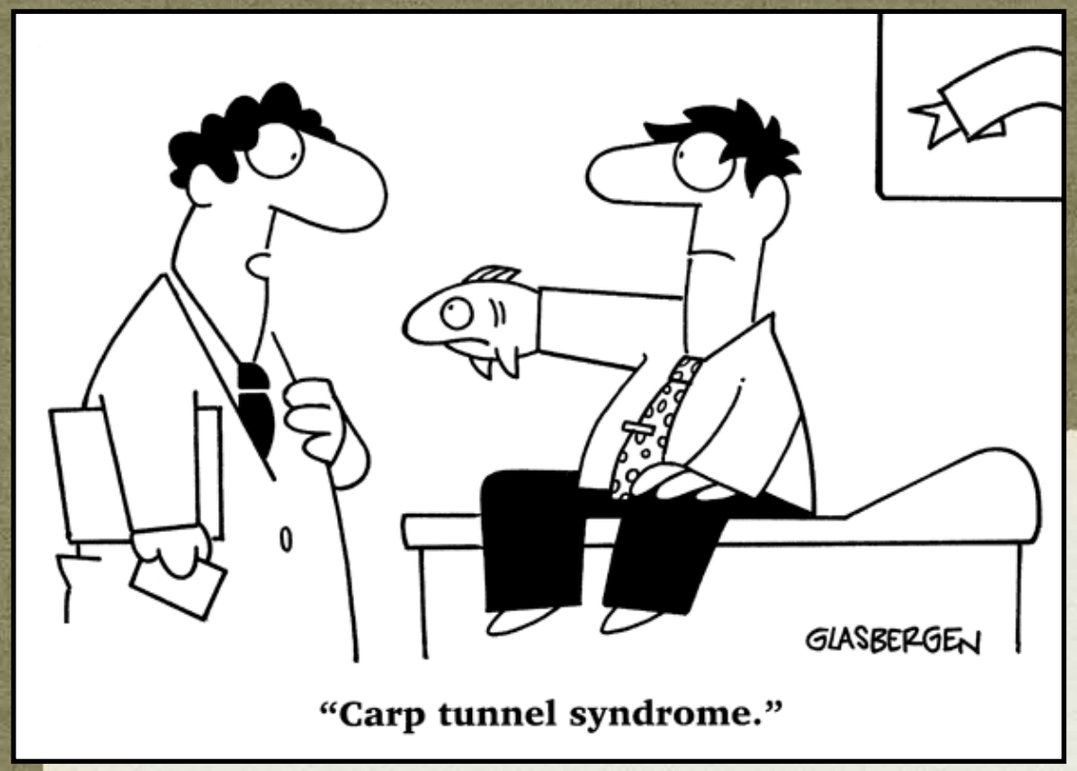
# ENCHONDROMA

- Presentation:
  - most asymptomatic, incidental finding on radiograph
  - pathologic fracture due to mild trauma
  - X-ray:
    - “pop-corn” stippling, arcs, whorls, rings
    - minimal endosteal erosion (<50% cortex width)
    - cortical expansion and thinning may be present

- Workup:
  - X-ray usually enough
- Differential:
  - Chondrosarcom: associated with pain, large size, scalloping >2/3 cortex, periosteal reaction, cortical breakthrough, rare in hands/feet

# ENCHONDROMA TREATMENT

- Observation for asymptomatic
  - Followup: serial radiographs at 6months and 12months to confirm stability
  - Long term followsup if multiple enchondromas (can have syndromic association)
- Operative:
  - Curettage and bone graft: if changing or at risk of fracture, suspicious
  - If fracture, let heal then do curettage and grafting.
- Risk of malignant transformation: 1%




"Carp tunnel syndrome."


"I use so much alcohol-based hand sanitizer, my hands had to join a 12-step program!"

# THANK YOU