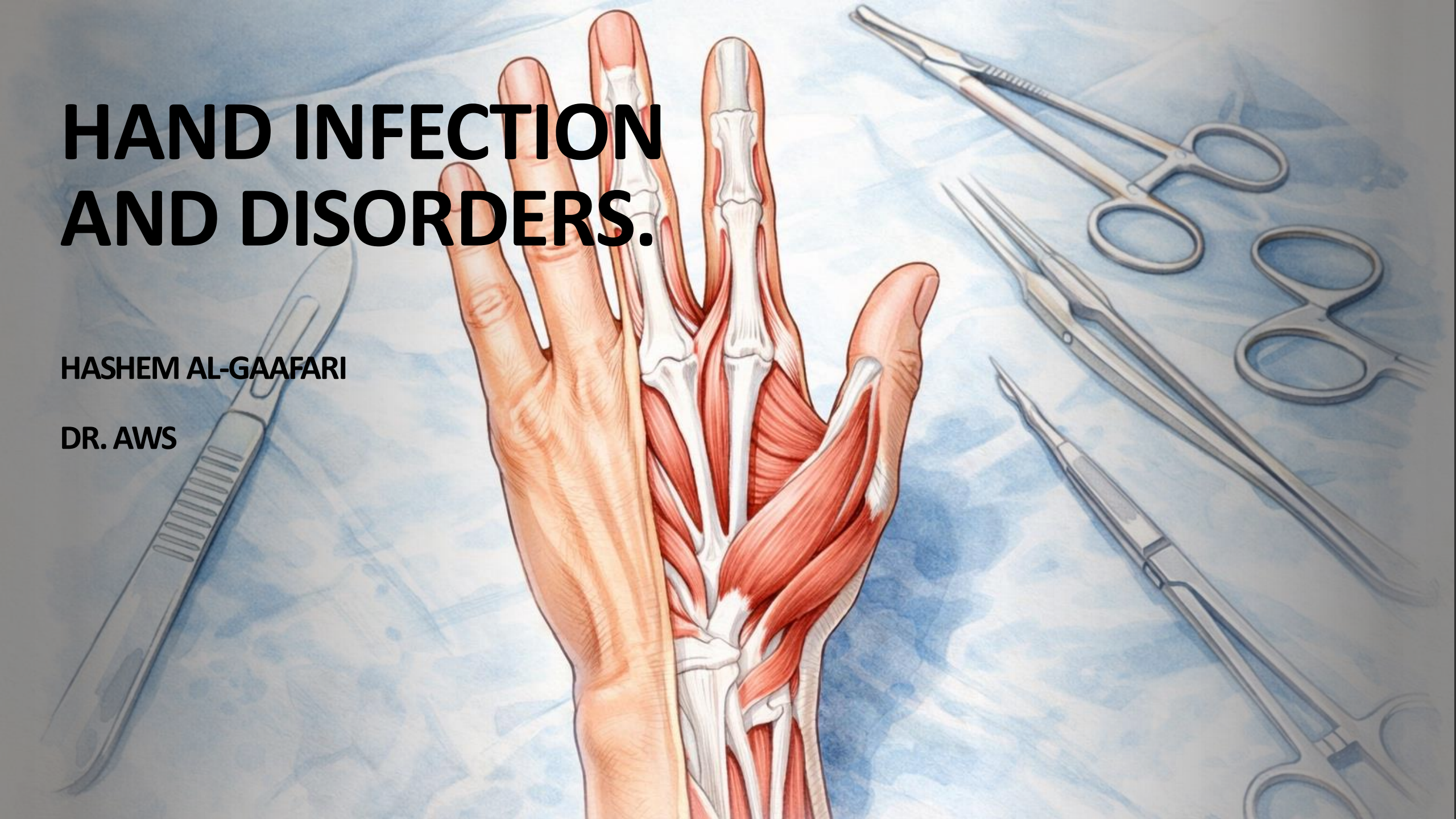
HAND INFECTION AND DISORDERS.

HASHEM AL-GAAFARI

DR. AWS



Learning Objectives.

By the end of this lecture you will be able to:

- Determine and classify different types of hand infections.
- Determine different types of common hand conditions.
- State the diagnosis for each condition.
- Outline management for each condition.

Hand infection…

I. Hand infections usually occur in well-defined compartments (nail fold, pulp space, tendon sheaths, deep fascial spaces, joints).
II. Most commonly follow trauma (even minor puncture injuries).
III. Higher risk in diabetic and **immunocompromised patients.**
IV. Most common causative organisms: Staphylococcus (commonly) ± Streptococcus. As well as other gram +ve bacteria.
V. Untreated infection can spread to other compartments with possible hematogenous/lymphatic spread.
VI. Typical signs: red, swollen, hot, painful area.

Paronychia (Nail-Fold Infection)

Infection under the nail fold; **the most common hand infection.**
More common in women.

Types

Acute paronychia (hours–days): usually bacterial

Chronic paronychia (>6 weeks): usually irritant dermatitis with secondary colonization (often Candida)

Risk Factors:

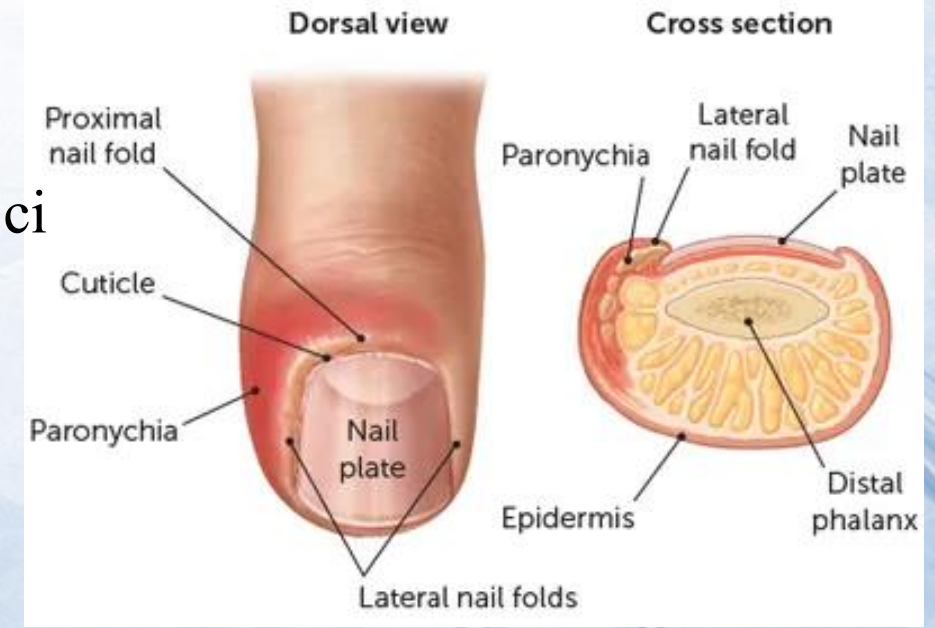
Hangnails, Nail biting/ sucking, Manicures

Penetrating trauma

Most common pathogens: Staphylococcus aureus, Streptococci

Diagnosis

Clinical: localized nail-fold erythema, swelling, tenderness, ± visible/palpable abscess (fluctuance).



Management

If NO abscess:

• Warm soaks (10–15 min, 3–4×/day)

• Analgesia

• Oral antibiotics, amoxicillin clavulanic acid.

If abscess present:

Incision & drainage (I&D) is the main treatment as well as antibiotics. Inadequate drainage can lead to chronic paronychia.

Complications

• Felon (pulp abscess)

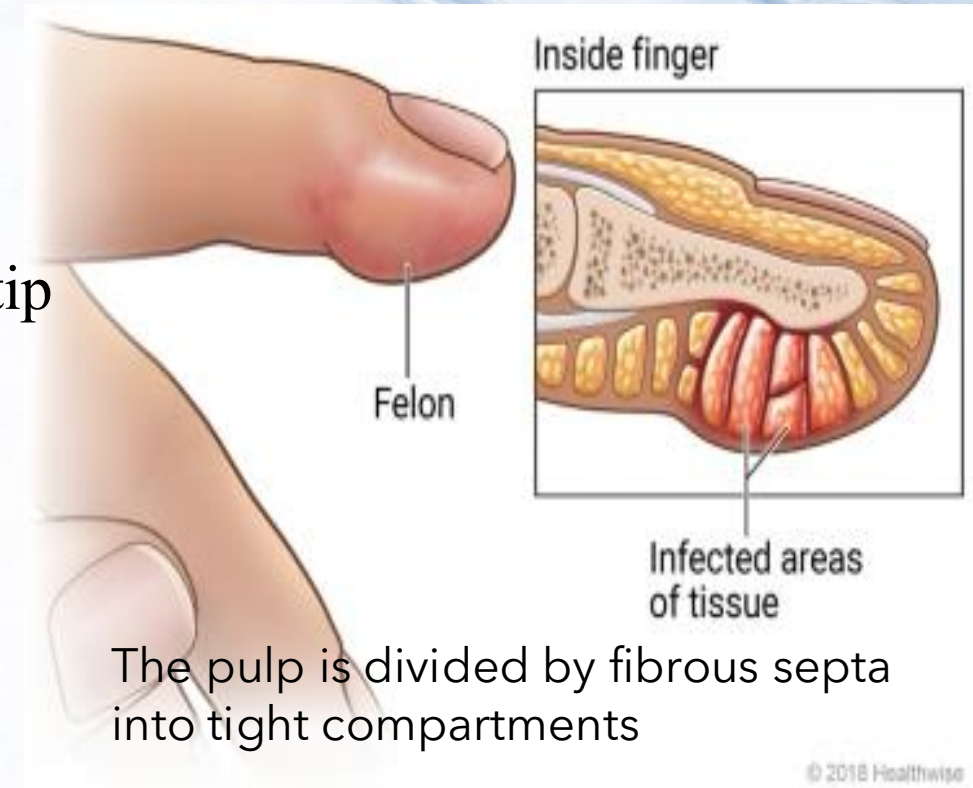
• Flexor tenosynovitis (rare extension)

• Osteomyelitis (rare)

• Nail deformity if recurrent/untreated

Felon (Pulp Space Infection)

It is closed-space **infection of the pulp space** of the fingertip which leads to formation of subcutaneous abscess formation. 15-20% hand infections.



Etiology

- Usually after penetrating trauma (splinters, needles).
- Can complicate untreated paronychia.
- The most common pathogen is Staphylococcus aureus (including MRSA).

Clinical Features

- Severe **throbbing** pain.
- Tense swelling of pulp " **Tense pulp".**
- Warmth/erythema.
- Pain localized to pulp (not just nail fold).

Diagnosis

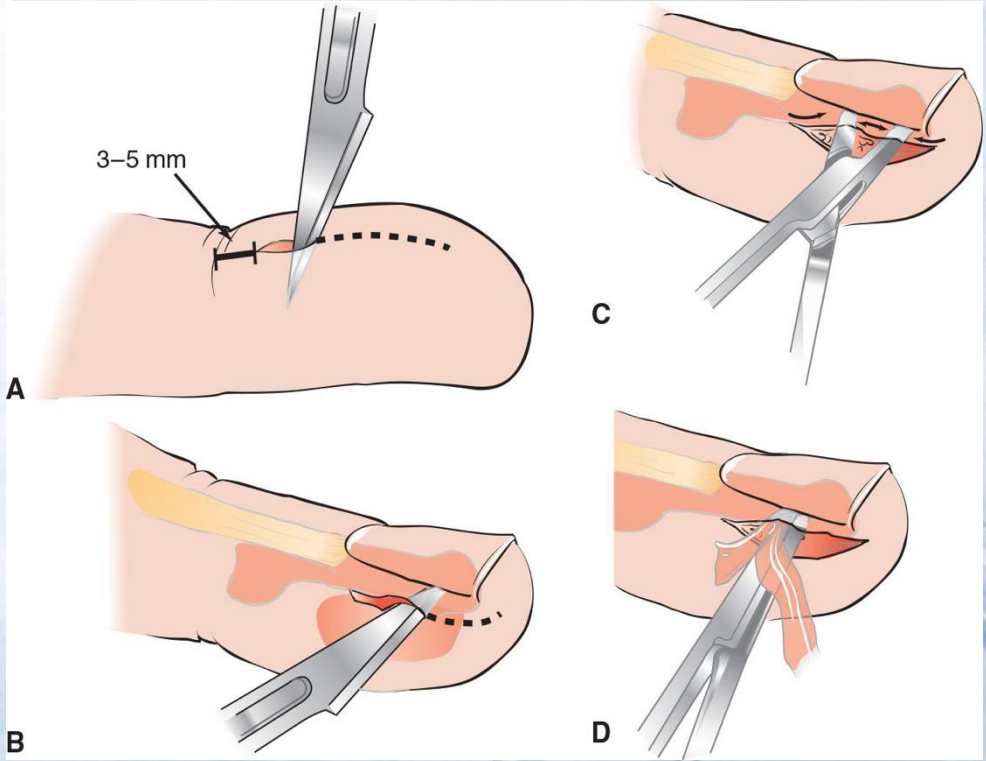
- Mainly clinical
- Consider X-ray if puncture/foreign body suspected or to exclude osteomyelitis.
- Ultrasound → confirm abscess

Complications.

- **Osteomyelitis** and
- **finger pad necrosis** if untreated.
- Septic arthritis (rare)
- Permanent fingertip damage.

Management

- If early and no abscess, Warm soaks + elevation, Empiric oral antibiotics
- Antibiotics + drainage when abscess/tense pulp is present.
- Immobilize/elevate (general hand infection principles)



Herpetic Whitlow (HSV Infection

HSV infection of the finger (usually distal phalanx), causing **painful vesicular lesions** on the fingertip /periungual area.

Etiology

- HSV-1 (more common; oral source)
- HSV-2 (genital source)
- Health care worker. Most common.

Key clinical picture

- Severe **pain/burning** ± tingling (may precede rash).
- Erythema + swelling.
- **Grouped clear vesicles** (may coalesce; fluid can becor cloudy later).

Diagnosis:

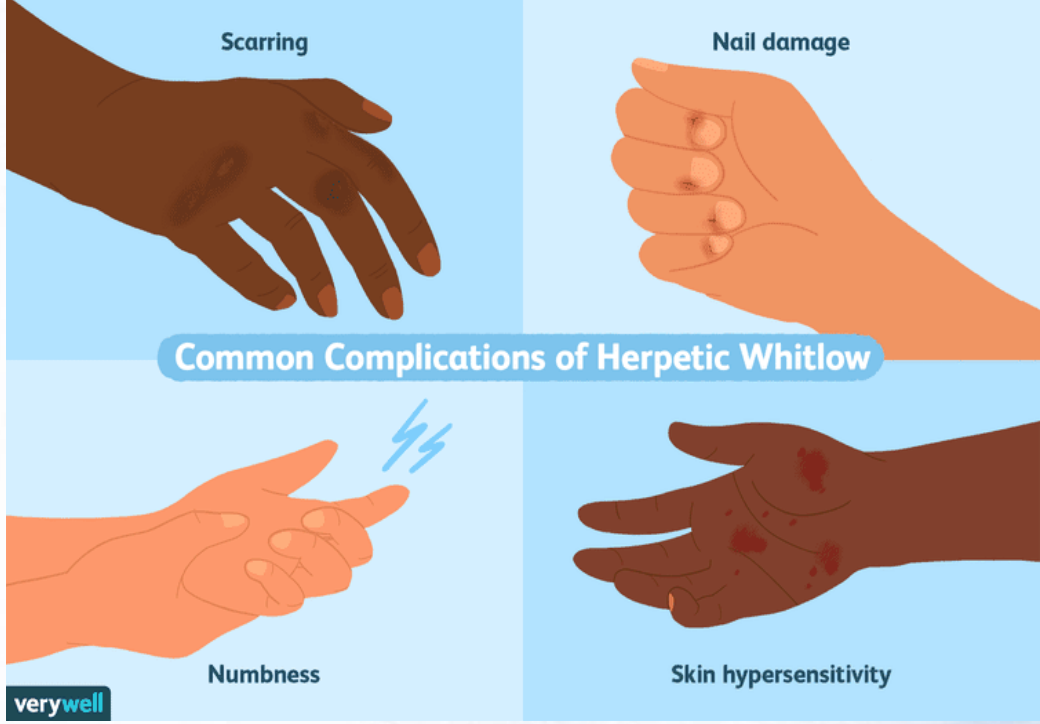
- Mainly clinical diagnosed.

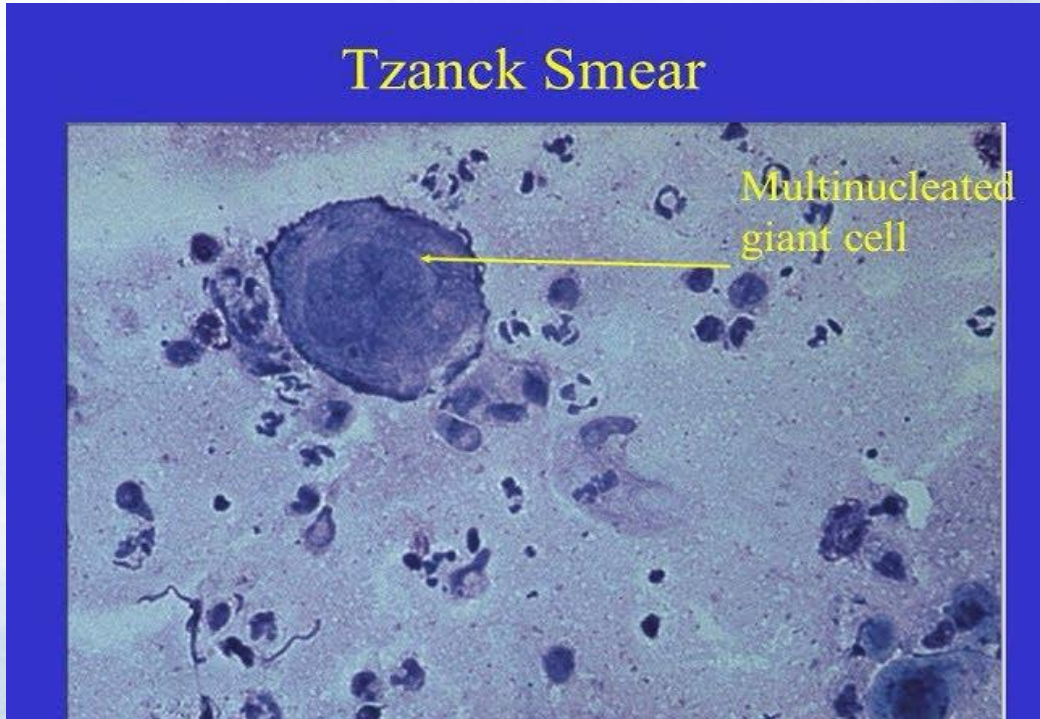
If uncertain:

- HSV PCR from vesicle fluid (best)
- Viral culture (slower)
- Tzanck smear (older/less specific)

Management

- Self limiting, subside writhin 10 days.
- Supportive care (analgesia, keep covered/clean.
- Consider antivirals early (severe, early presentation" within 48h", immunocompromised, recurrent)
- DO NOT incise or drain, can lead to bacterial infection.





Suppurative Tenosynovitis (Pyogenic Flexor Tenosynovitis).

Inflammation of a tendon and its sheath.. It is a hand **top emergency**.

The bacteria enters inside the sheath, inside the sheath there is tendon, the pus has proteolytic enzymes which will digest the collagen in the tendon.

Closed tendon sheath + infection → ↑ pressure → impaired blood supply to tendon →tendon necrosis, adhesions, stiffness, spread to deep spaces.

Typical cause and predisposing factors.

- Often after minor puncture/trauma (sometimes no clear injury).
- Bite
- IV drug use
- Diabetes / immunocompromise.

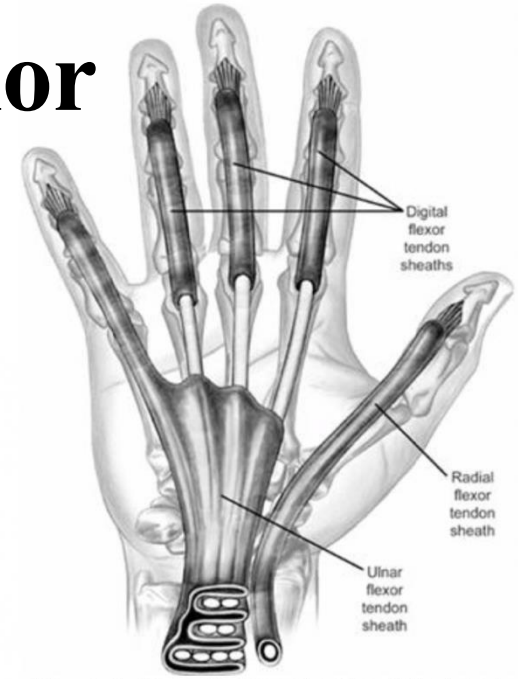


Figure 1. Flexor tendon sheaths of the hand.
https://www.orthobullets.com/hand/6105/pyogenic-flexor-tenosynovitis

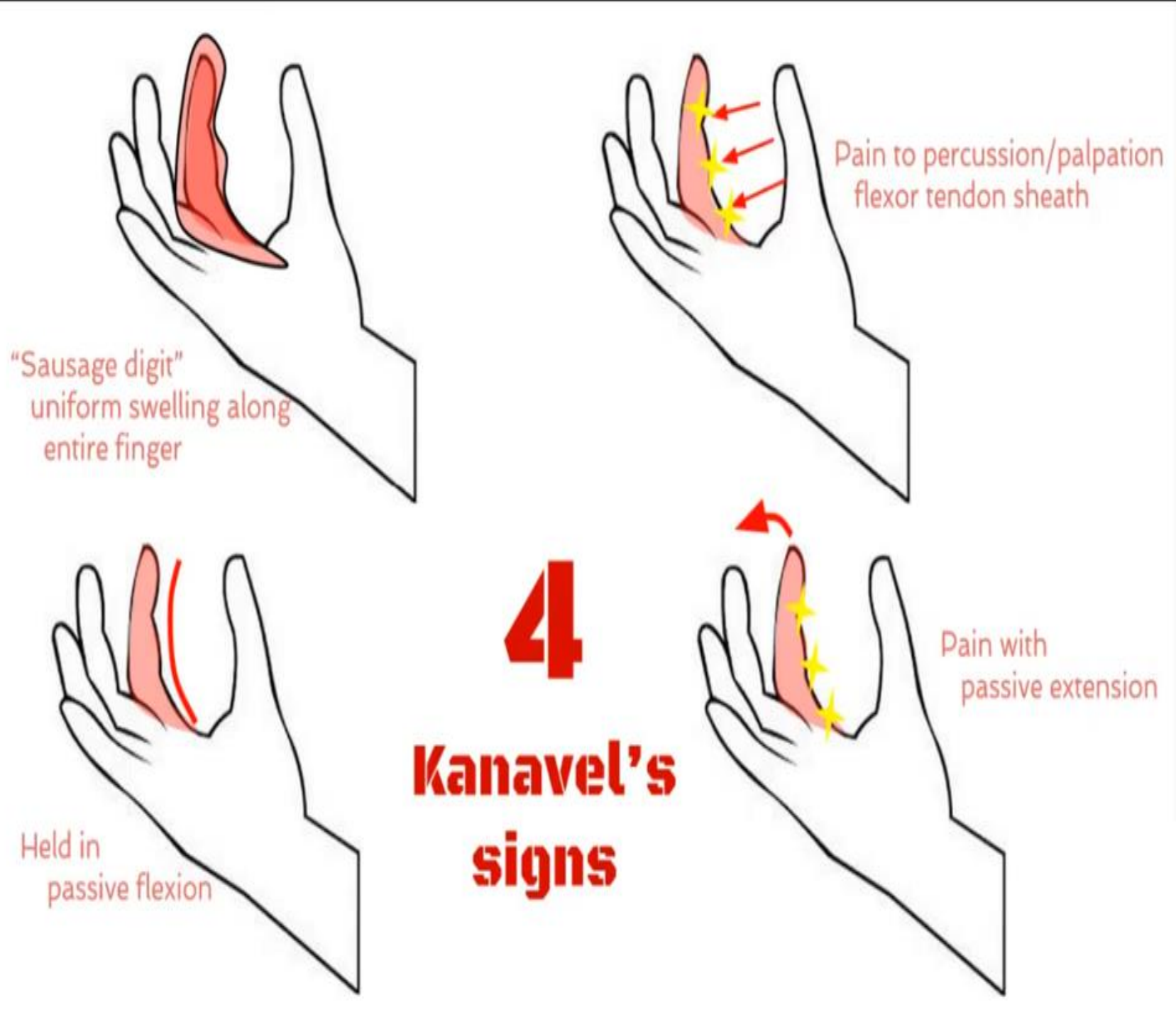
Figure 2. Typical presentation of PFT in the index finger.
https://www.orthobullets.com/hand/6105/pyogenic-flexor-tenosynovitis.

Diagnosis

Is clinically diagnosed.

Classic: **Kanavel signs (4)**

1. Fusiform swelling of the digit **(“sausage digit”)**
2. Finger held in slight flexion at rest.
3. Tenderness along the flexor sheath (volar side, from distal palm to fingertip).
4. Pain with passive extension (often the earliest/most sensitive).
5. Adjuncts (helpful, not to delay care) : labs, x-ray, MRI, culture.



Management.

- Immobilize + elevate the hand (splint in position of function)
- Analgesia.
- IV antibiotics.
- Urgent surgical drainage/irrigation if no improvement.

Complications if delayed

- Tendon ischemia/necrosis → rupture
- Adhesions → permanent stiffness/limited ROM
- Spread to:

Deep spaces of hand (thenar/midpalmar)

Radial/ulnar bursae → horseshoe abscess

- Osteomyelitis
- Sepsis (rare but possible).

Prognosis

Best outcomes with early recognition + rapid treatment.

Deep Fascial Space Infections

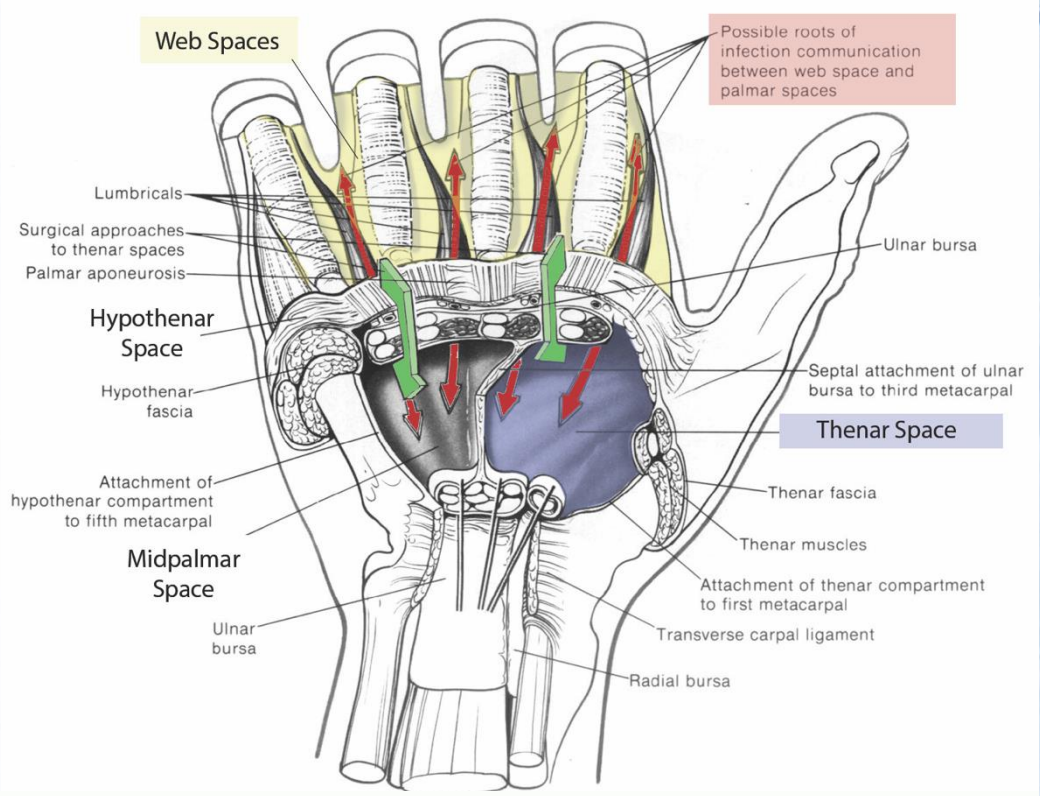
Suppurative infections that spread along fascial planes into anatomically defined "potential spaces." They can progress rapidly, cause neurovascular compromise, and may evolve into necrotizing fasciitis or sepsis. It is a hand emergency.

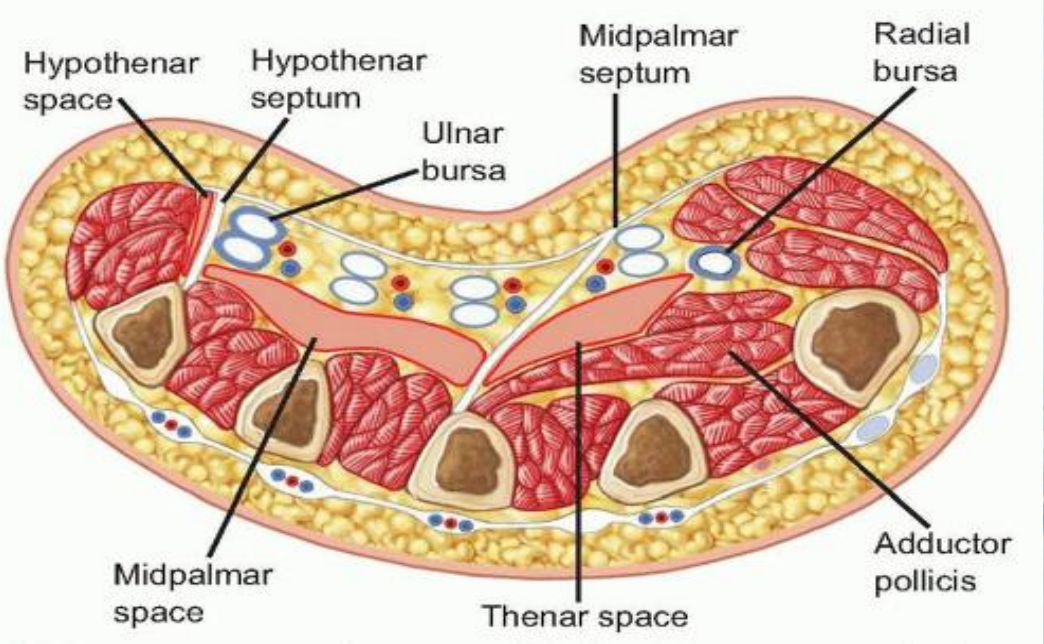
Etiology / entry points

- Puncture wounds (splinters, needles), bites.
- Spread from felon, paronychia, septic arthritis, osteomyelitis.

Risk factors:

diabetes, immunosuppression, delayed presentation.



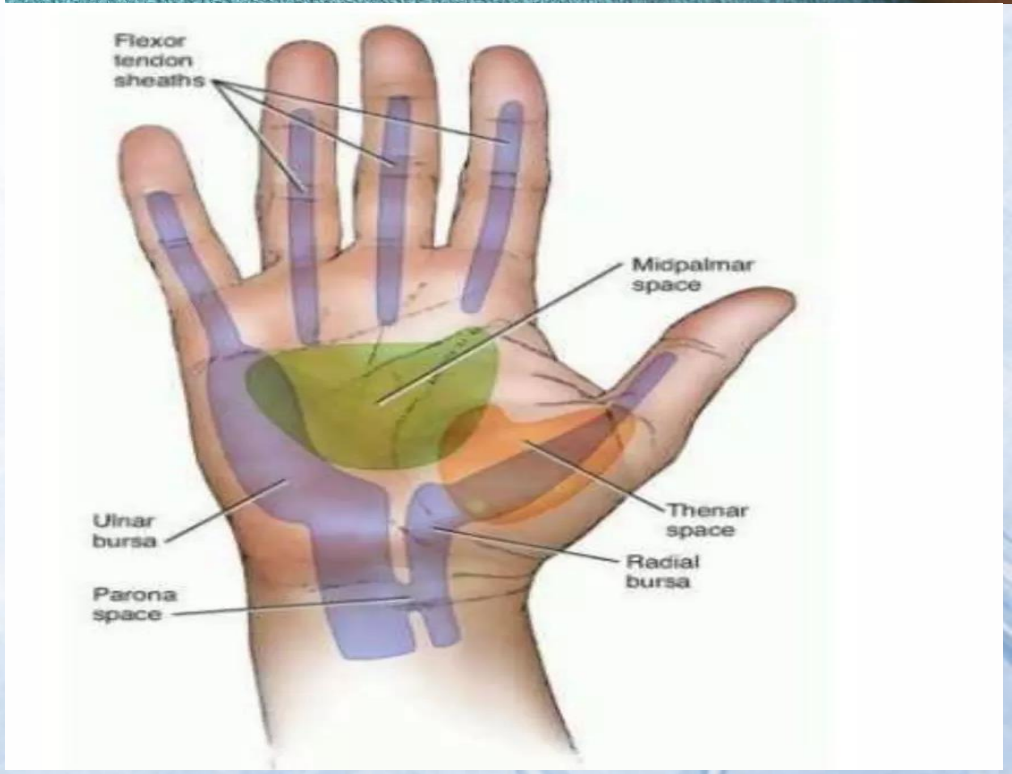


Clinical presentation.

- Deep, worsening pain sometimes without swelling; early skin may look mild. Palmar aponeurosis?
- Loss of function (↓ grip, ↓ ROM) is common
- Pain with finger/hand motion; may hold hand "protected"

High-yield patterns

- Thenar space: pain/swelling at thumb/palm.
- Midpalmar space: central palm swelling; pain with finger flexion/extension.
- Web space abscess: "**collar-button**" swelling between fingers (dorsal + palmar).
- Parona's space: distal volar forearm swelling + pain; often from flexor sheath spread.



Workup

Exam: swelling distribution + neurovascular status, ROM, tenderness along deep spaces

Labs: CBC, CRP; blood cultures if febrile/toxic

Imaging:

- US: superficial fluid/abscess.
- MRI: best for deep spaces/tenosynovitis/osteomyelitis
- CT w/ contrast: abscess mapping if MRI not feasible.
- X-ray: foreign body, gas.

Treatment:

1) antibiotics.

2) splitage. If we do splitage, stiffness will occur so the patient should start moving his had from the first day.

3) drainage.

- **Complications** include (Necrotizing fasciitis, sepsis,Compartment syndrome, Septic arthritis / osteomyelitis)

Septic Arthritis

Infection of any MCP or finger joint.

Contamination usually occurs via the Hematogenous, iatrogenic, or penetrating trauma.

High-risk.

Damaged joints or prosthetic joints.

Clinical features (classic)

- Acute onset **triad**: fever + joint pain + restricted ROM.
- Joint may be swollen, red, warm.
- Practical "hand" clue: pain with any movement, often patient avoids motion completely.

Workup.

- Urgent joint aspiration → culture (± WBC count/crystals).
- Start empiric IV antibiotics
- Labs: CBC/CRP support severity & follow response

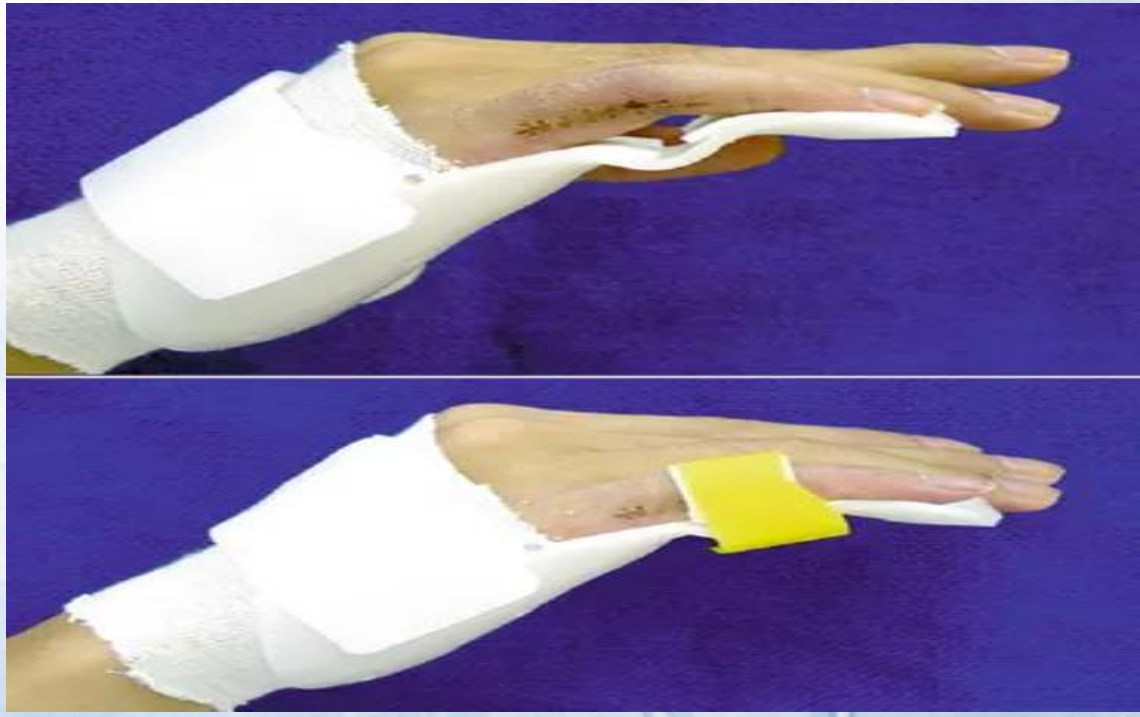
Imaging (useful, not diagnostic)

- X-ray: baseline, foreign body, late bony changes.
- Ultrasound: effusion guidance for aspiration.
- MRI: suspected osteomyelitis/deep extension.

Treatment.

1. Antibiotics
2. Splintage
3. Drainage

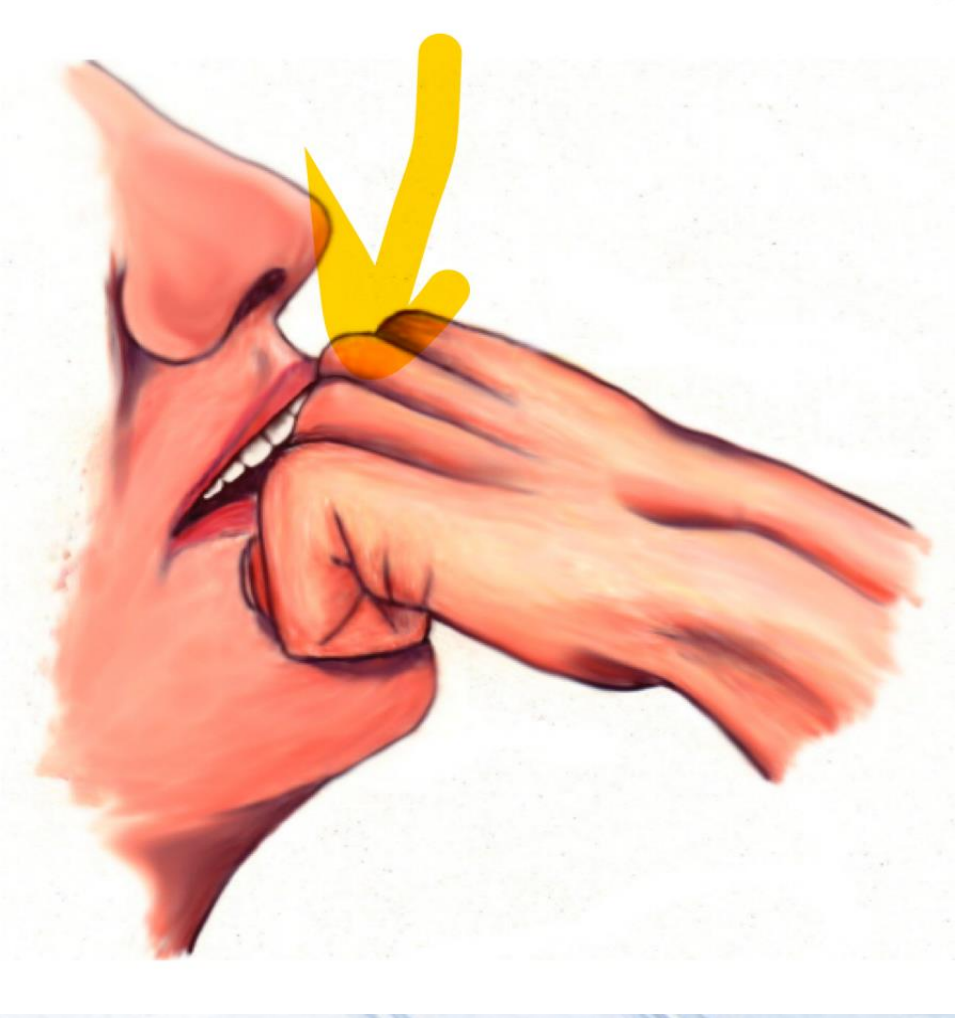
Complications if delayed: Joint destruction, osteomyelitis, sepsis.



Bites, Fist injury.

Hand laceration caused by human or animal bite.

Bite wounds can inoculate bacteria into tendon sheath / deep spaces / joints → rapid functional loss.



Classic scenario: "Fight bite"

- ❑ Clenched fist strikes teeth → small wound over MCP.
- ❑ High risk of septic arthritis / extensor tendon infection (even if skin wound looks small).

Key points

Human bites are more infectious (polymicrobial oral flora).

Assess:

Pain with MCP movement

Swelling, pus, erythema

Limited ROM / fever (deep infection)

Investigations .

- X-ray: foreign body (tooth), fracture, deep extension.
- Culture if infected/pus present.

Treatment

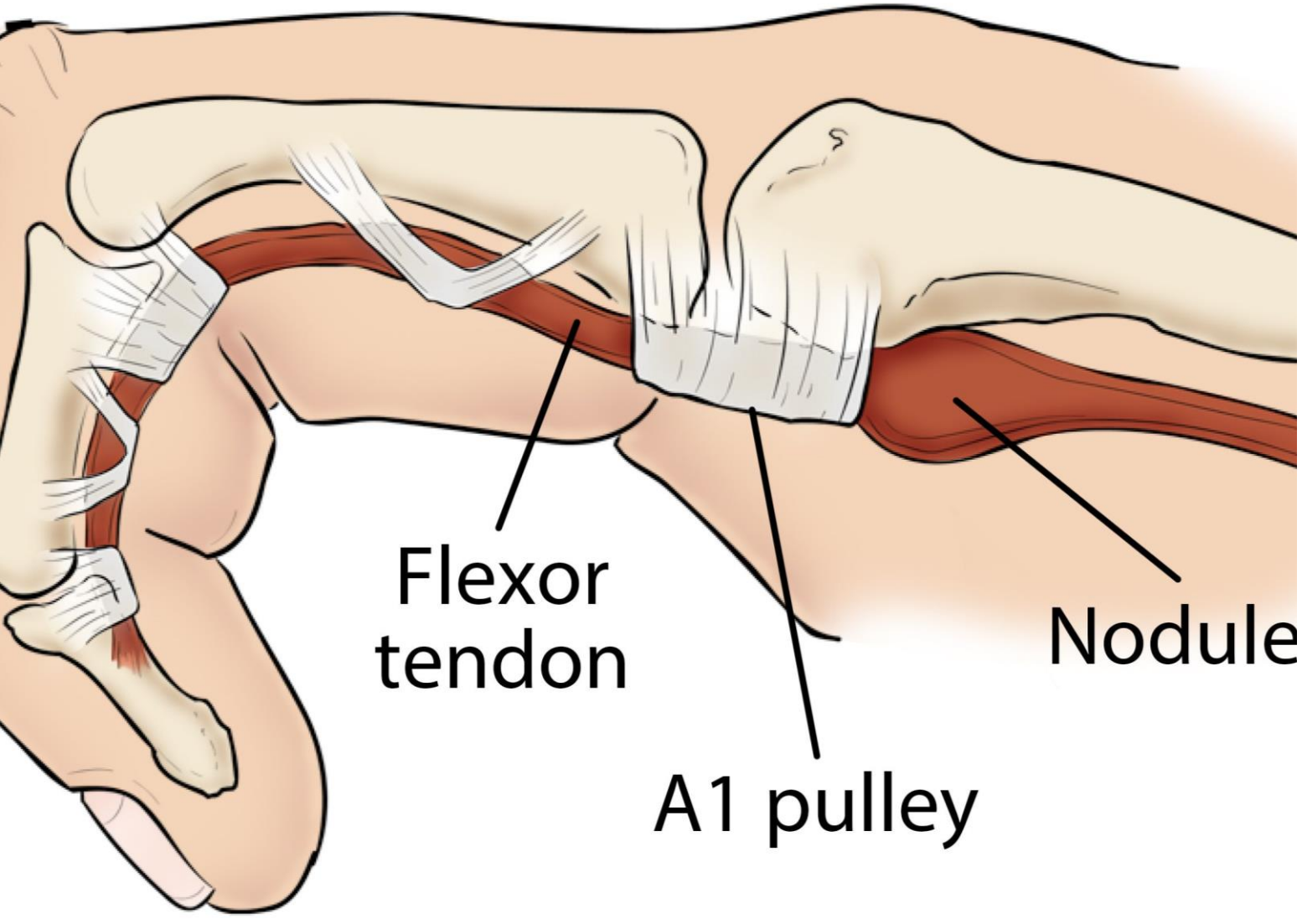
• Debridement + antibiotics + elevation/splintage.

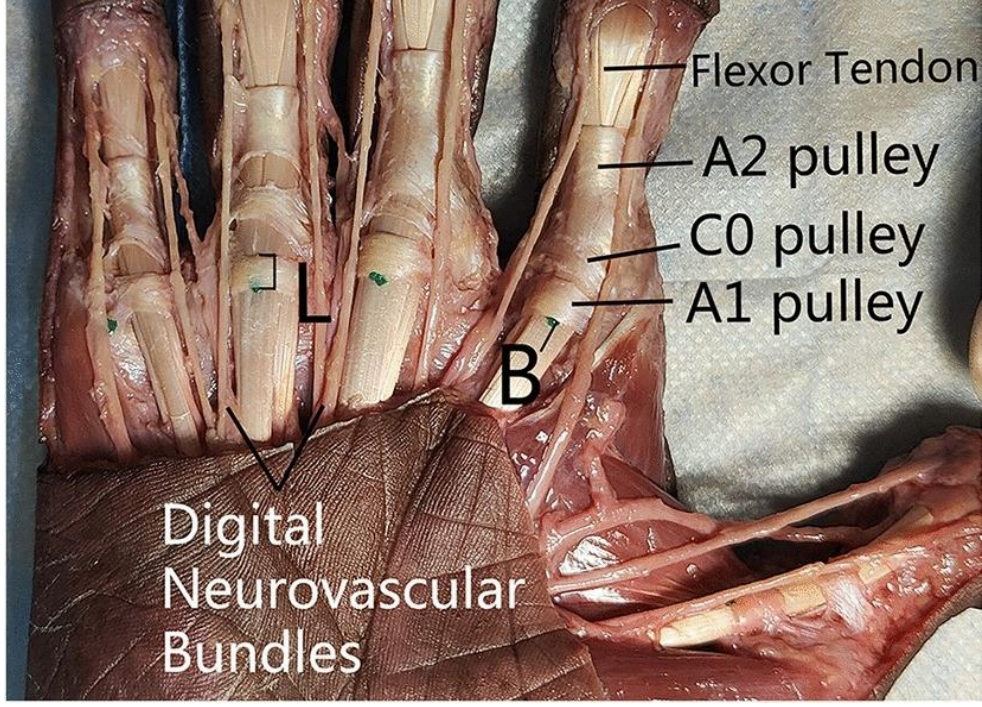
Tetanus prophylaxis as indicated; rabies assessment for animal bites.

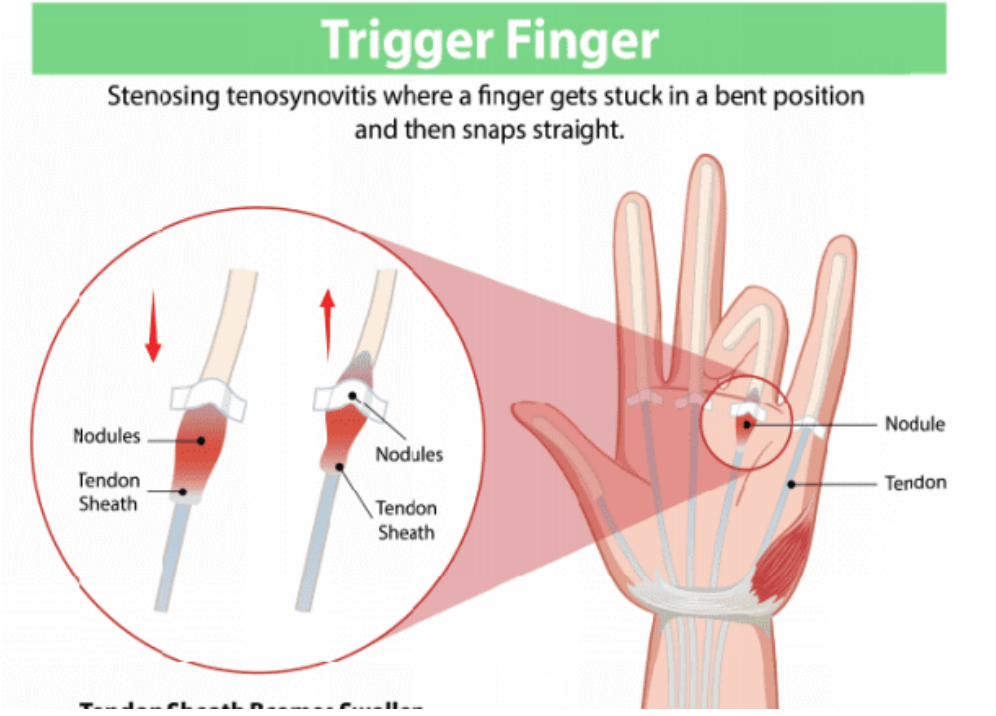
Common hand conditions

- Trigger finger .
- Osteoarthritis .
- Dupuytren’s contracture.
- Carpal tunnel syndrome.

- Zaid Abu Gazahla


Flexor tendon
A1 pulley
Nodule


Flexor Tendon
A2 pulley
C0 pulley
A1 pulley
L
B
Digital Neurovascular Bundles


Trigger Finger
Stenosing tenosynovitis where a finger gets stuck in a bent position and then snaps straight.
Nodules
Tendon Sheath
Nodules
Tendon Sheath
Nodule
Tendon

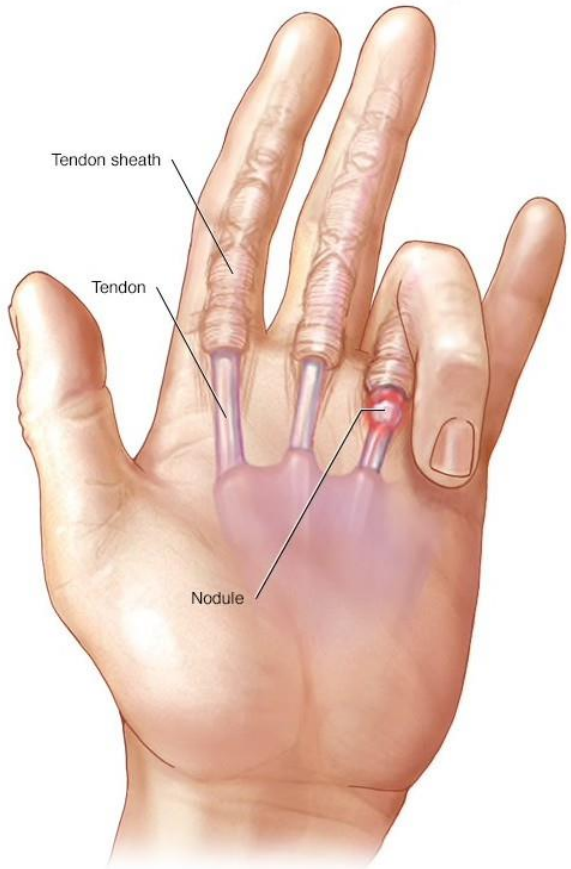
Trigger finger

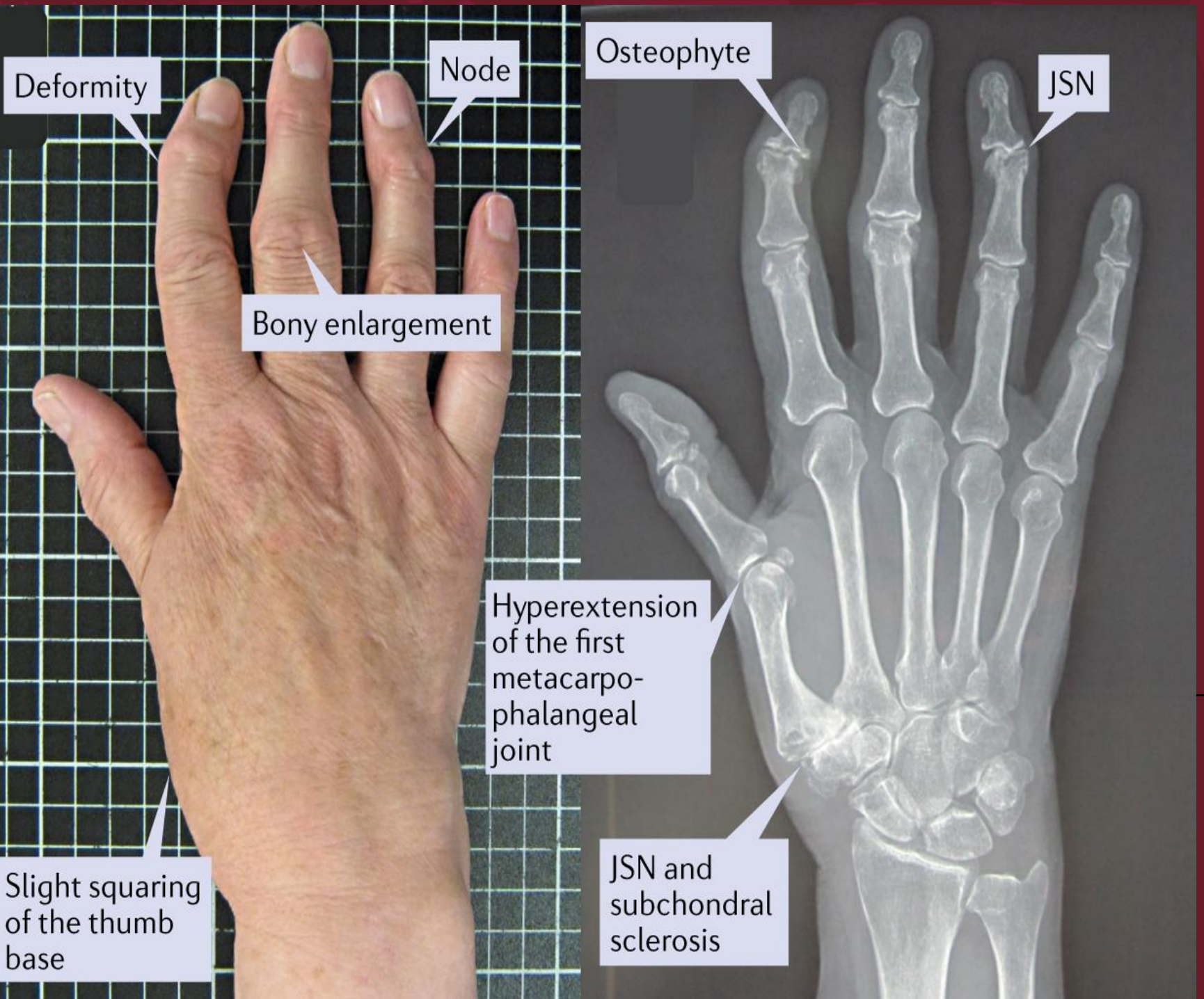
- painful **locking** of a finger in flexed position it's released suddenly with a snap/**pop** on extension.
- Local swelling from inflammation or scarring of the tendon sheath (tenosynovium) around the flexor tendons
- Mostly affects **thumbs** and **ring** fingers.
- **Treatment**:

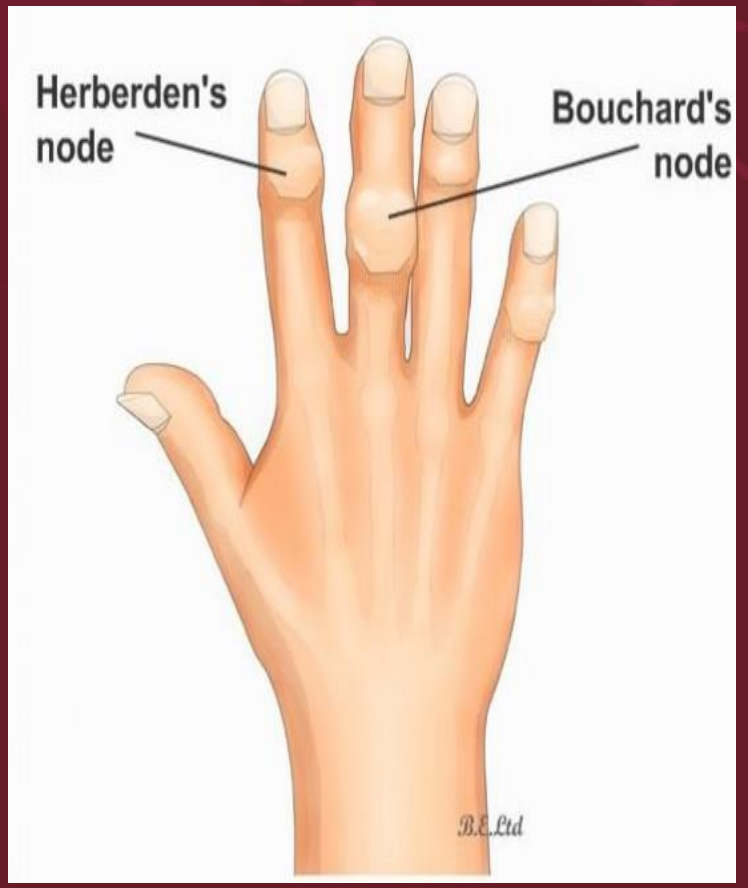
1) injection of corticosteroid at the mouth of the tendon sheath.

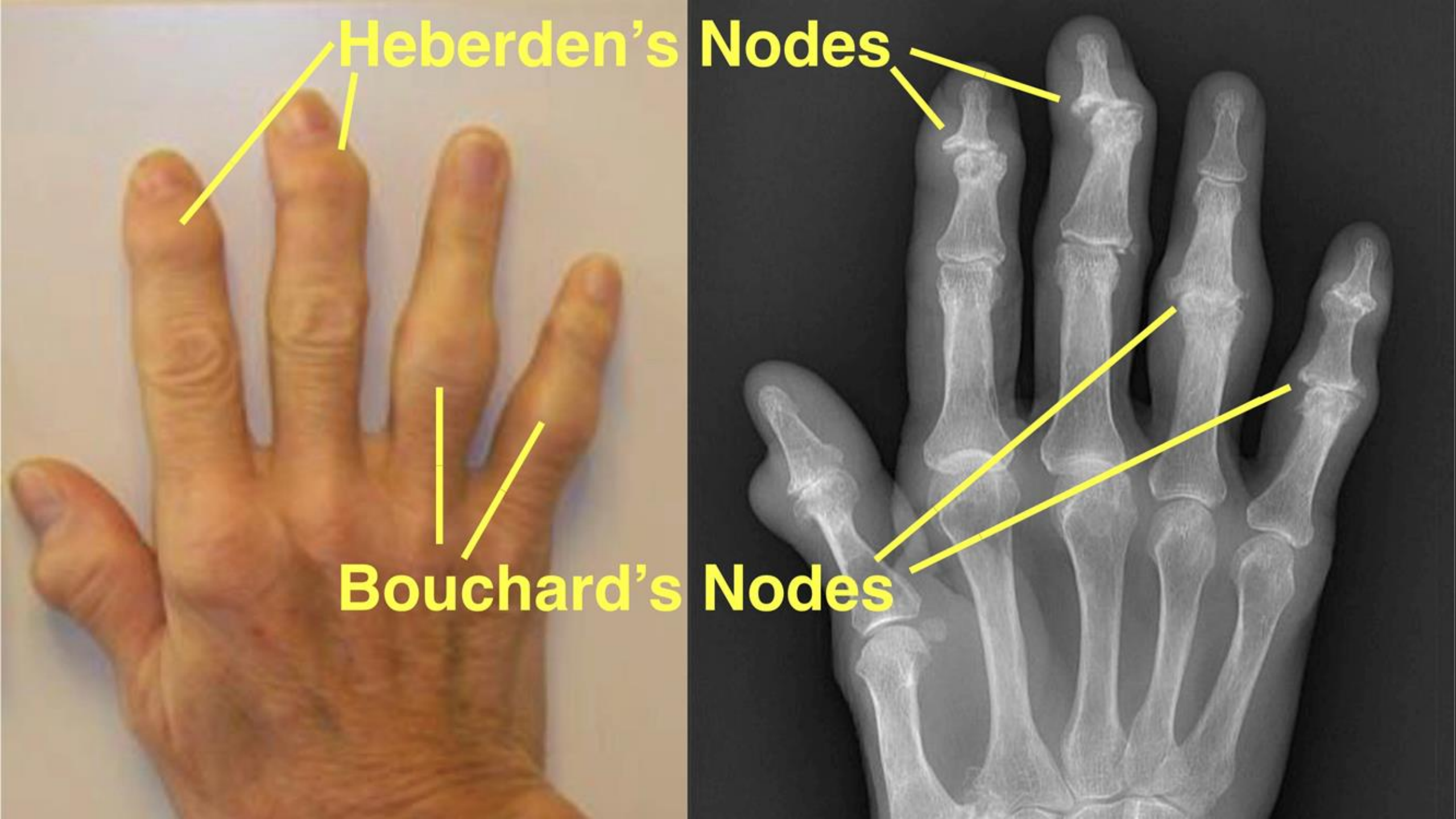
(recurrence after 6 months is >30%).

2) surgery (refractory cases).




Deformity
Node
Bony enlargement
Slight squaring of the thumb base
Osteophyte
JSN
Hyperextension of the first metacarpo-phalangeal joint
JSN and subchondral sclerosis

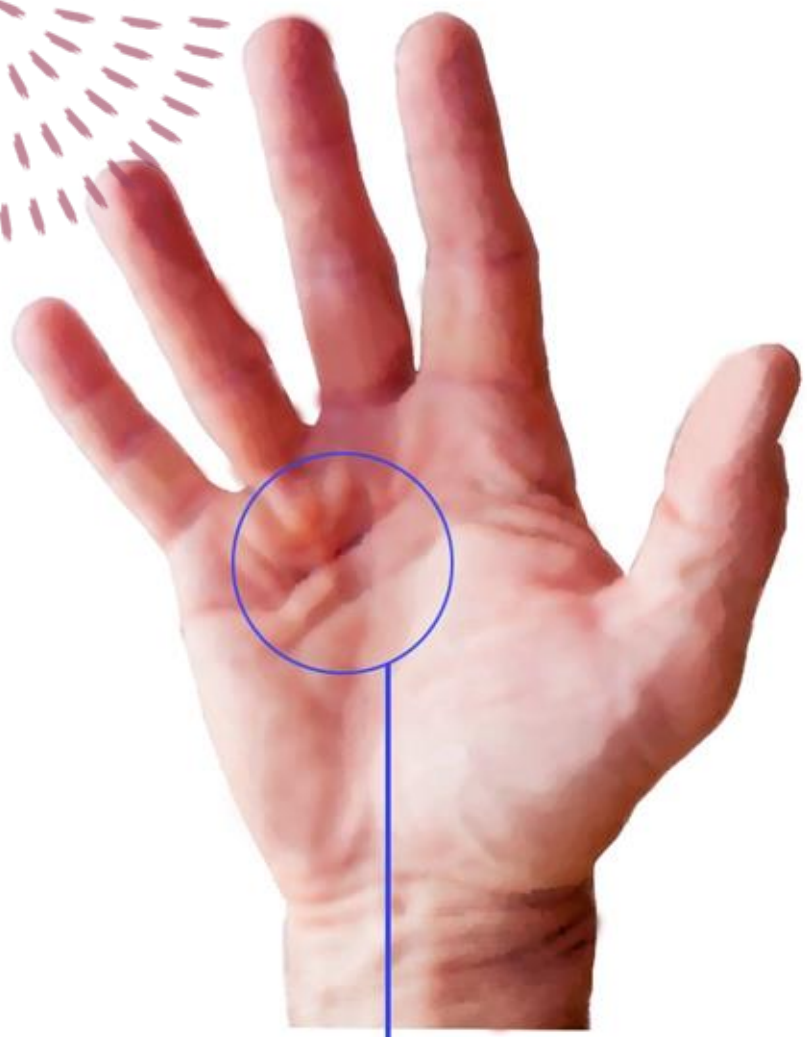

Herberden's node
Bouchard's node
B.E.Ltd


Heberden's Nodes
Bouchard's Nodes

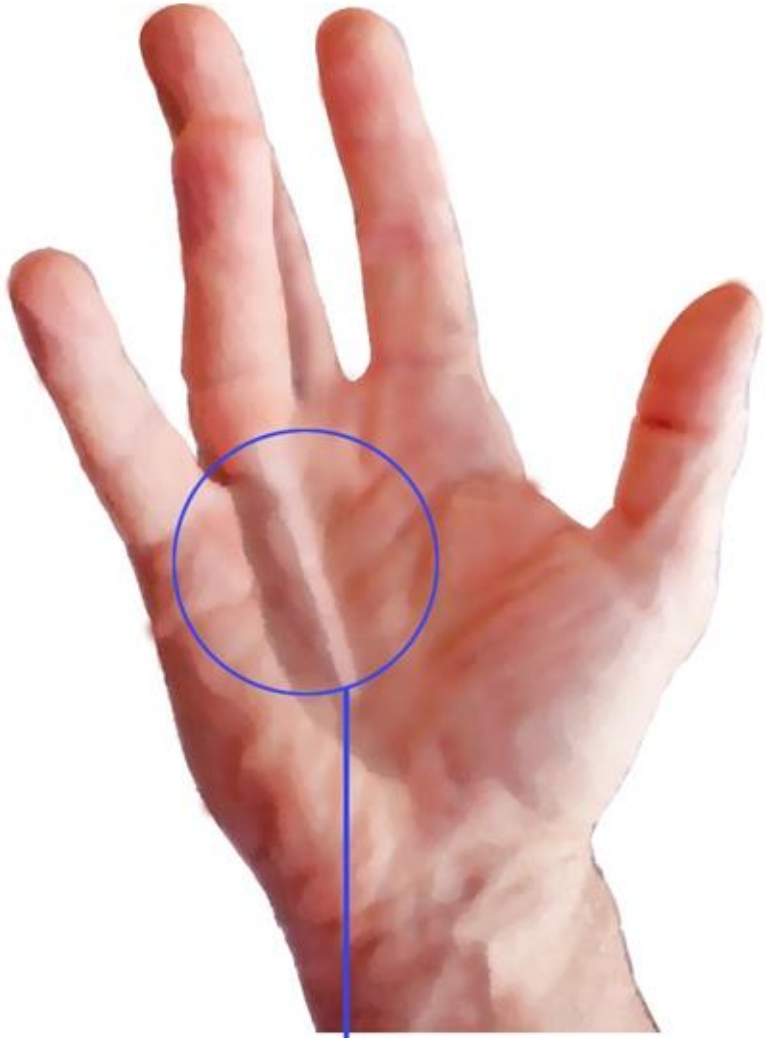
Osteoarthritis

- noninflammatory degeneration of the joint complex (articular cartilage, subchondral bone, and synovium) that occurs with old age or from overuse.
- One of the most common joint joint disorders.
- Treatment is usually Symptomatic treatment (cortisone injections in severe pain)

Distal interphalangeal joints	Proximal interphalangeal joints.
Most common in postmenopausal women	Less common
Swollen painful distal joints , spreads to all fingers of both hands	Swollen painful joints , associated with osteoarthritis elsewhere in the body
Bony thickening (Heberden's nodes)	Bony thickening (Bouchard's nodes)



Nodules and Pitting
May Appear in the Hand



Cord Forms
in the Palm

Fingers Bend
Toward the Palm

Dupuytren’s contracture

- Dupuytren's contracture is a common fibroproliferative disorder
- affecting the palmar fascia mainly of the 4th, and 5th fingers
- The cause is still unknown , but it’s is genetic.
- Males>females.
- **Features:**
- Skin puckering near the proximal flexor crease is the earliest sign.
- Flexion contracture of affected finger/s.
- **Treatment:**
  - Conservative therapy.

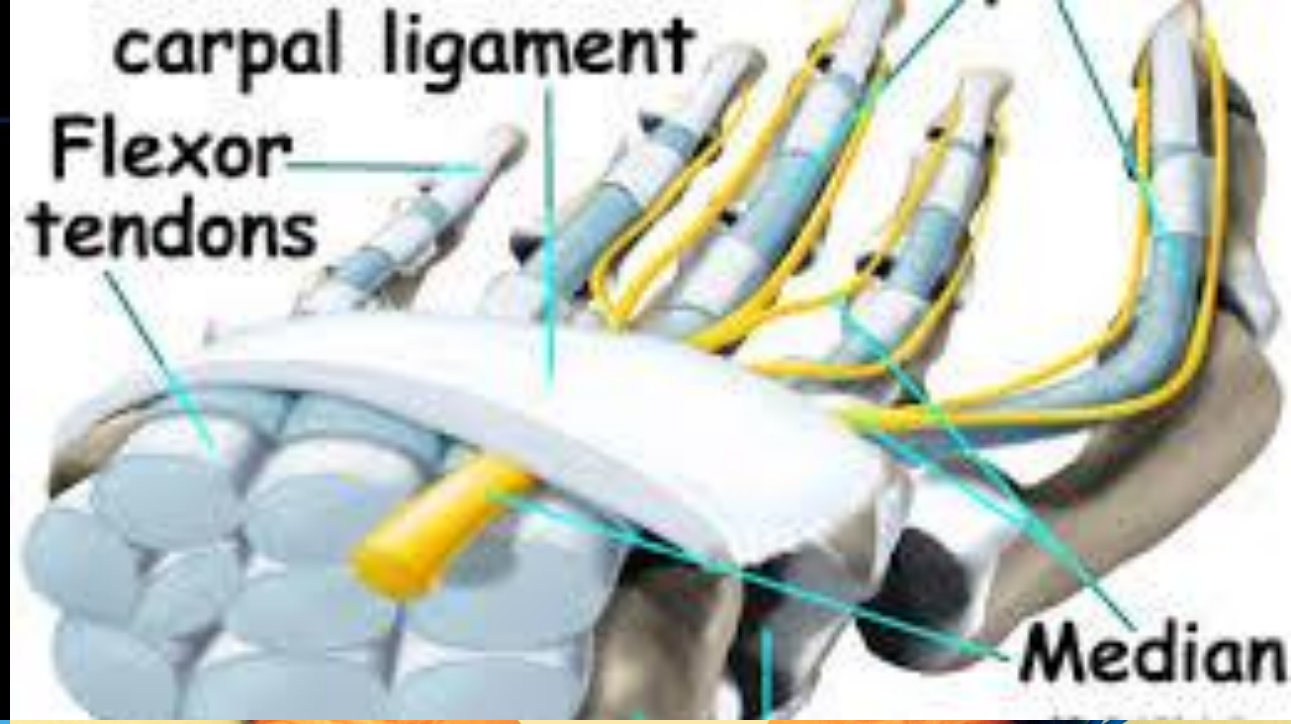
  2)Corticosteroids injections.

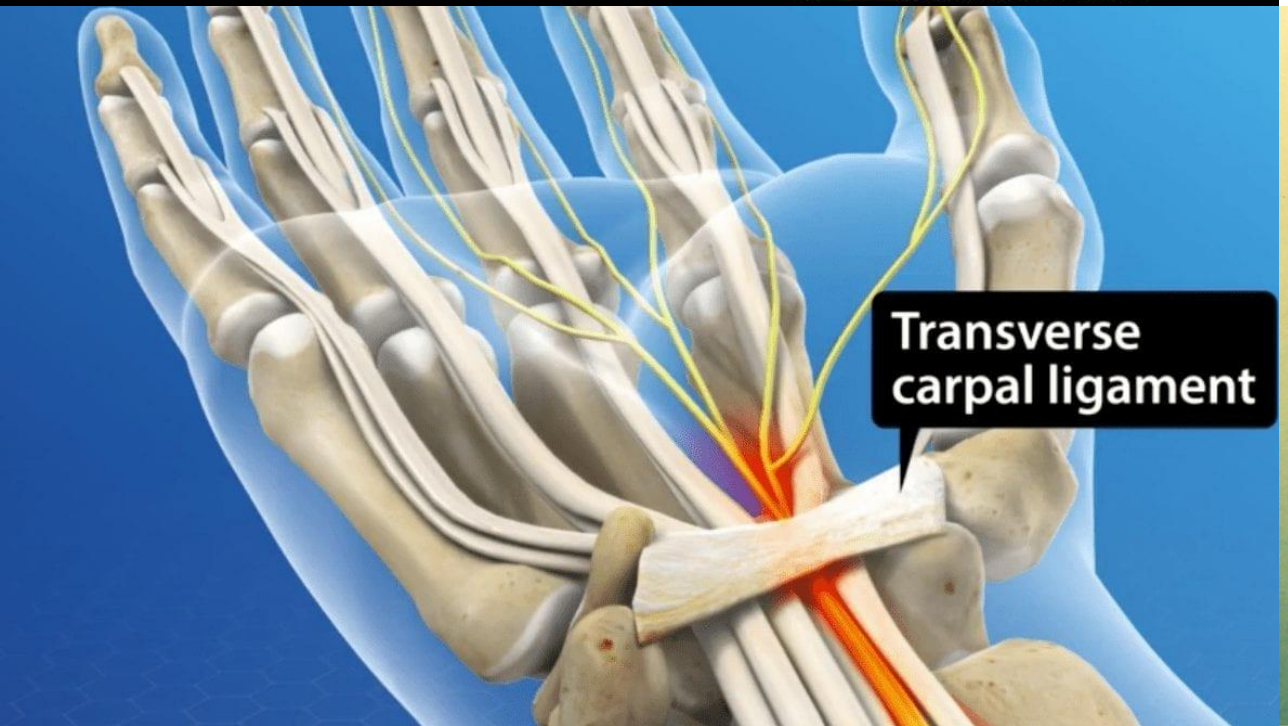
  3)Surgery:
    - Indicated in patients with functional disability due contractures. (Fasciotomy, Fasciectomy).

Carpal Tunnel

- Transverse carpal ligament (flexor retinaculum)
- Tendons:
  - Flexor digitorum superficialis m.
  - Flexor digitorum profundus m.
  - Flexor pollicis longus m.
- Tendon sheaths
- Median n.

BlueLink © B. Kathleen Alsup & Glenn M. Fox





Carpal tunnel syndrome

Carpal tunnel syndrome is a peripheral neuropathy caused by compression of the **median nerve** by the **transverse carpal ligament**.

carpal tunnel is a narrow fibrous structure at the level of the palmar aspect of the wrist. It contains flexor tendons and the median nerve.

More Common in:

previous distal radius fracture,

Manual workers (vibrating tools). ,Pregnancy, Diabetes.

- **Clinical features:**

1) Sensory symptoms on the palmar surface of the thumb, index, and middle finger; and radial half of the ring finger (paresthesia, numbness)

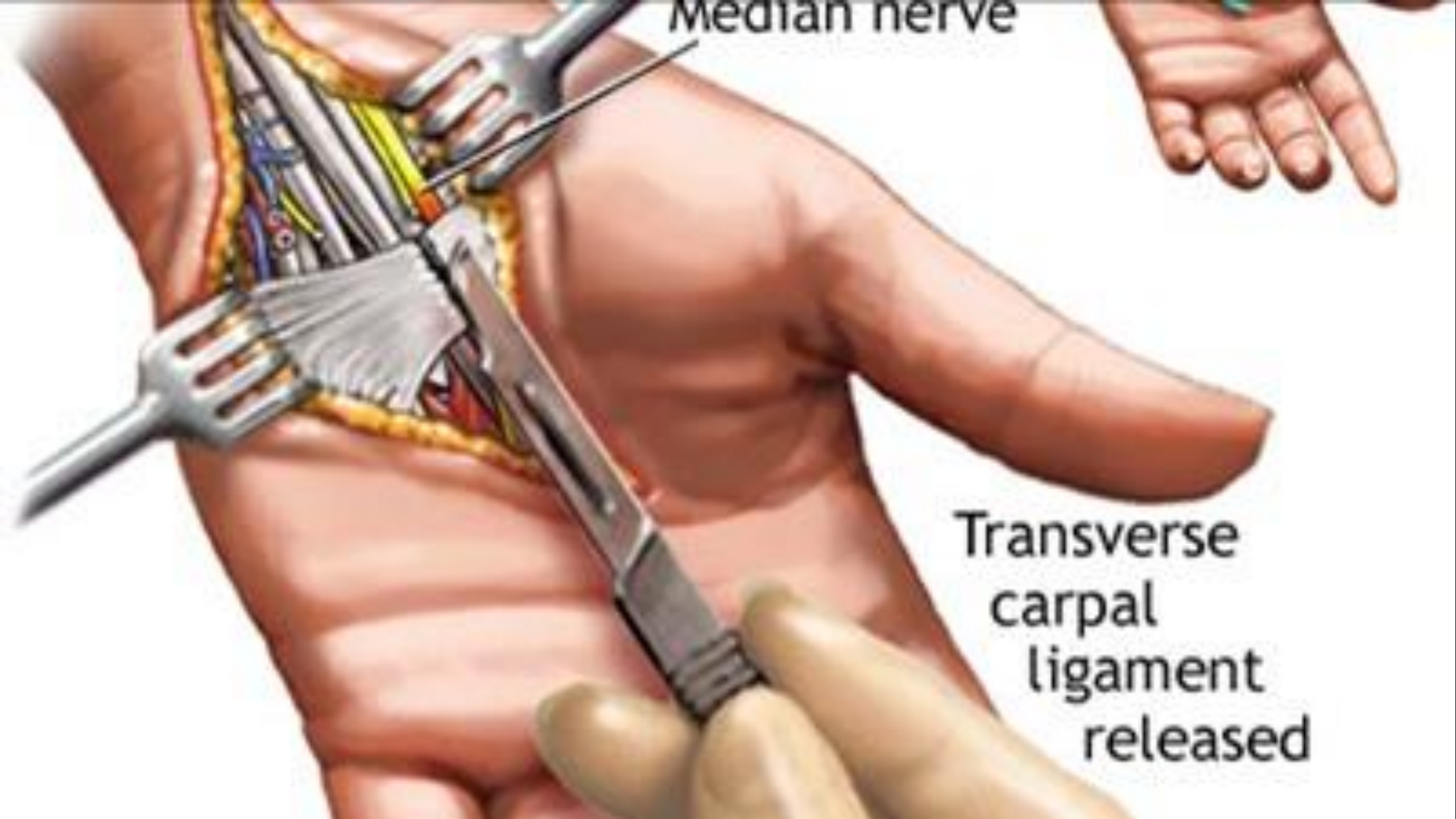
2) Weakened grip.

3) Thenar atrophy.

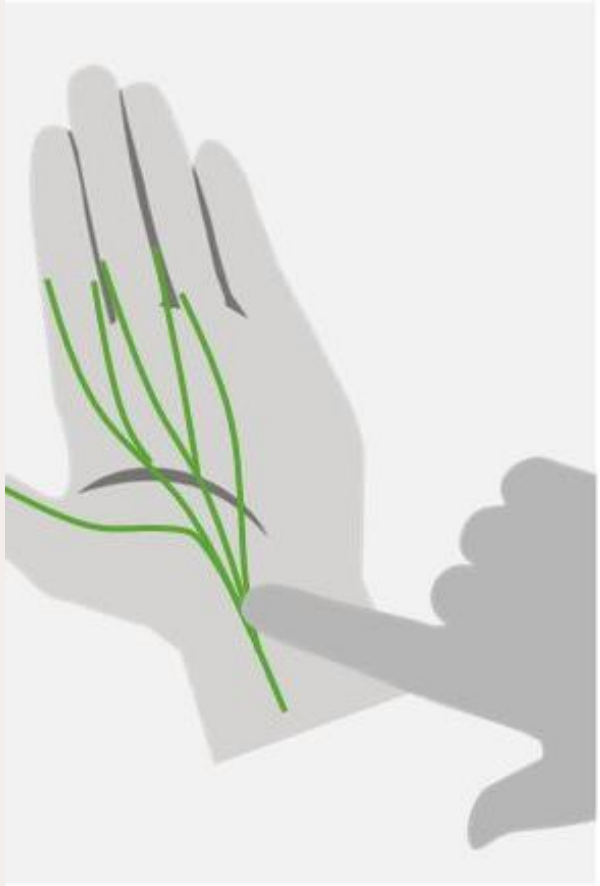
- **Treatment :**

1) conservative treatment: immobilization with splints, steroid injections, NSAID.

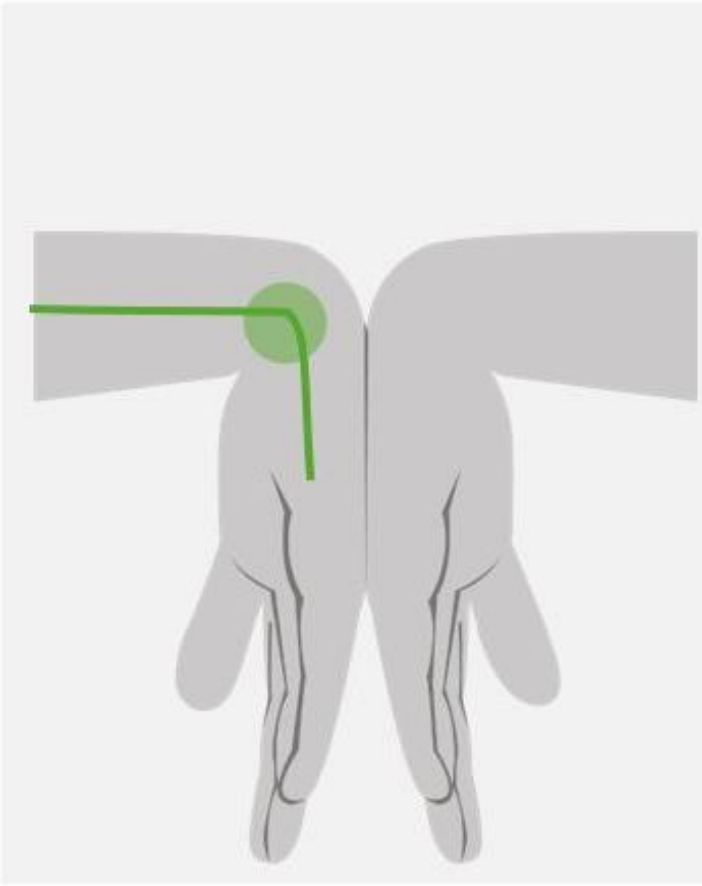
2) surgical release of the transverse carpal ligament.


Median nerve
Transverse carpal ligament released

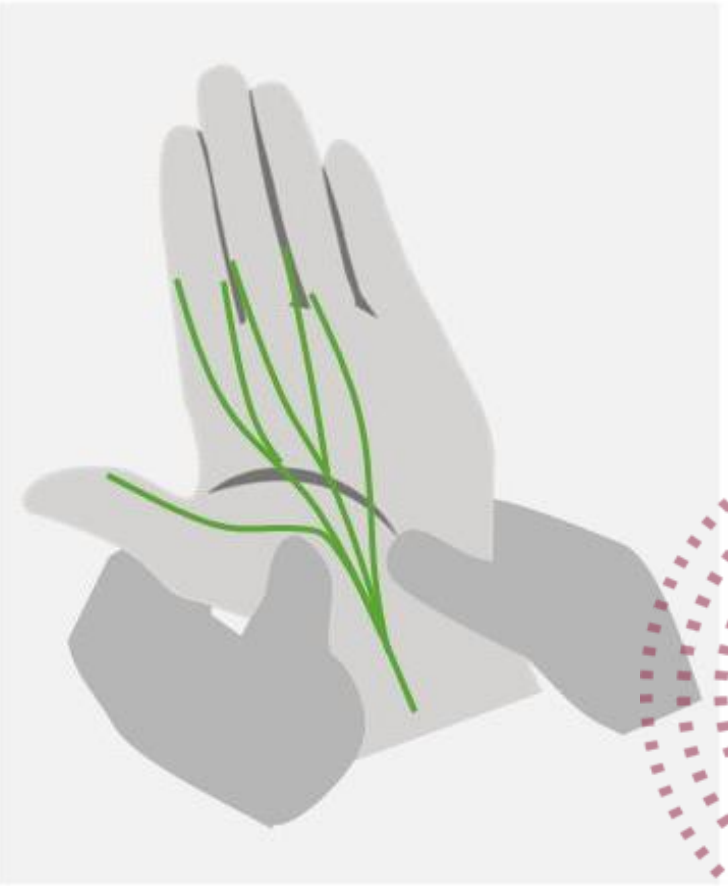
Tinel sign



Phalen sign

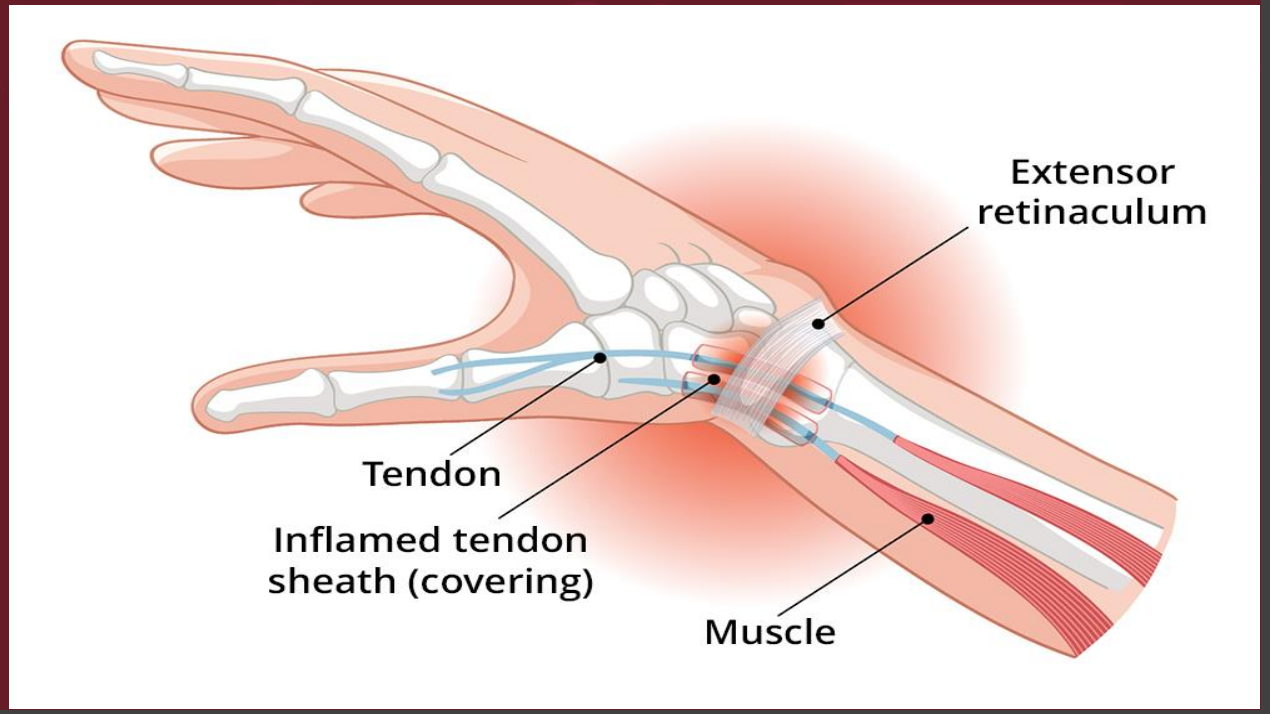


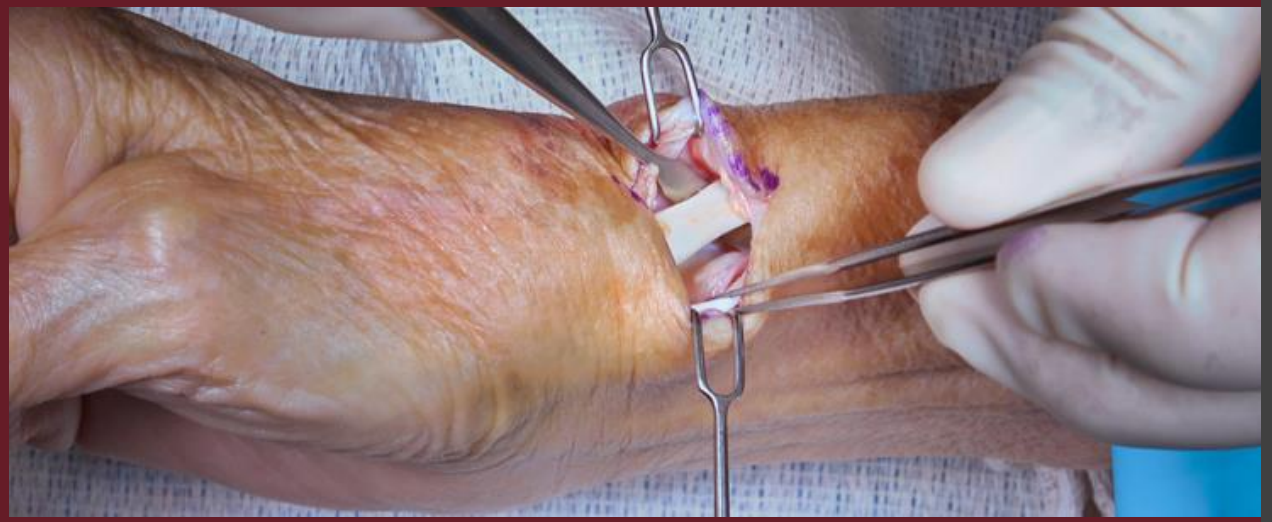
Compression test

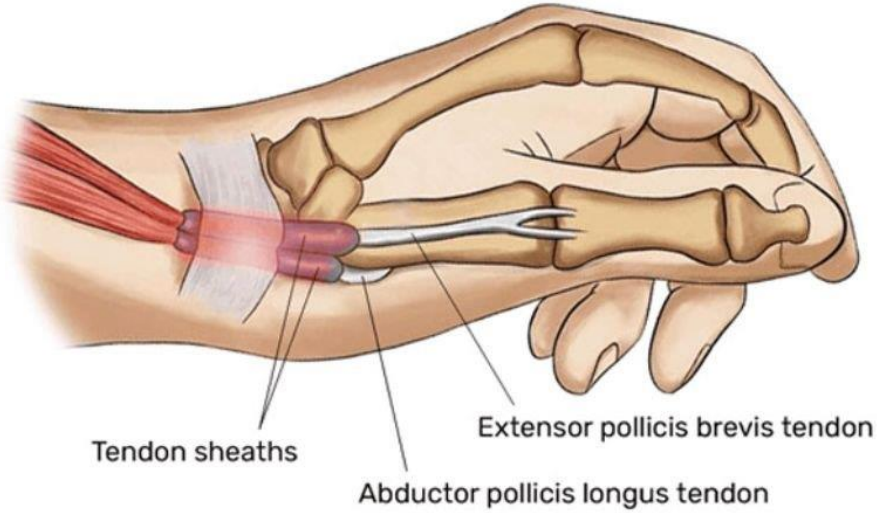


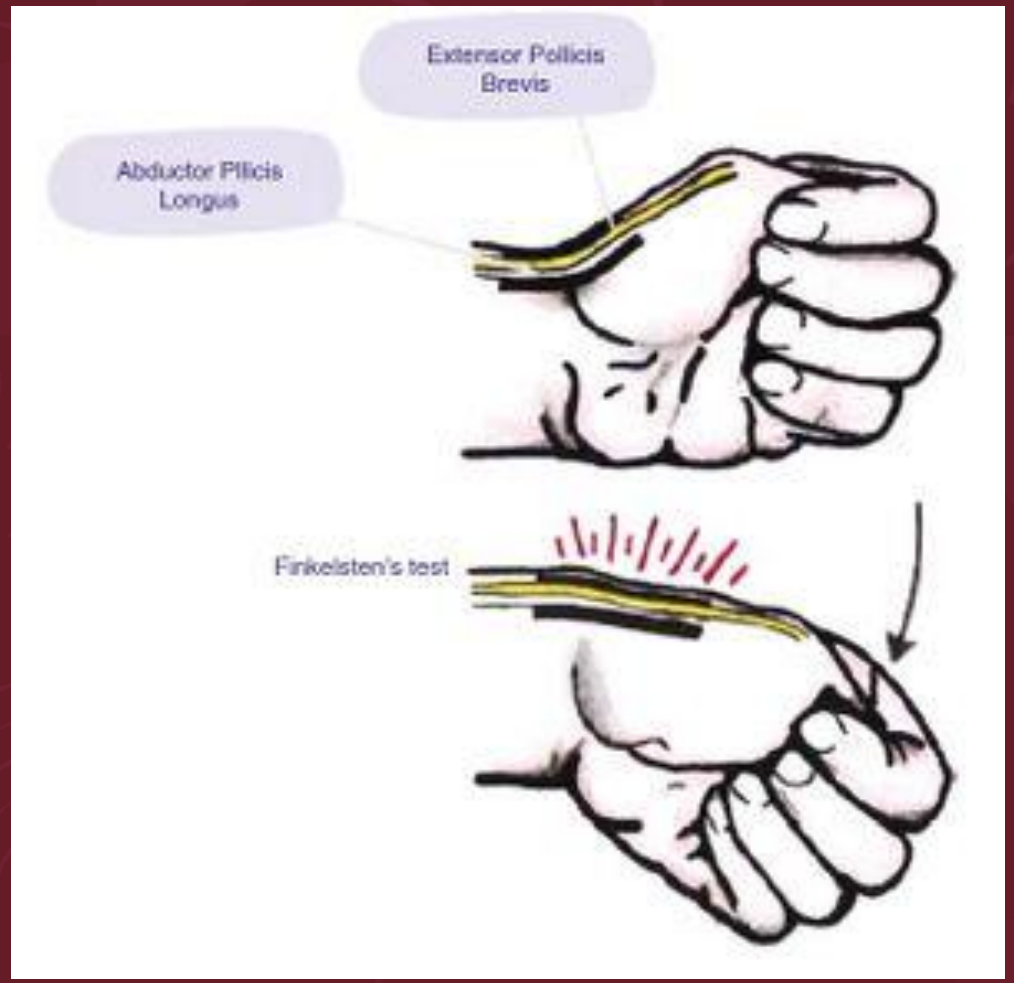
BRISBANE PHYSIOTHERAPY
& REHABILITATION

WHAT IS DE QUERVAIN'S TENOSYNOVITIS?









Tenosinovitis of first extensor compartment

- This compartment includes: extensor pollicis brevis and Abductor pollicis longus, which moves the thumbs.
- Mainly affects young ladies after delivery
- Tx: local steroid injection, NSAIDs.

De Quervain's release surgery\First extensor compartment decompression

- P/E: I do ulnar deviation of thumb (I ask the pt to put his thumb in the middle of palm and close his fingers on it)