Hand and Wrist Disorders

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Hand & Wrist Disorders

- Pediatric Hand
- Hand & Wrist Trauma
- Degenerative Conditions
- Neuropathies

Pediatric Hand

- **Congenital forearm**

Radial Club Hand

Ulnar Club Hand

Congenital Radial Head Dislocation

Madelung's Deformity

- **Congenital Hand**

Syndactyly

Clinodactyly

Camptodactyly

Polydactyly

Macrodactyly

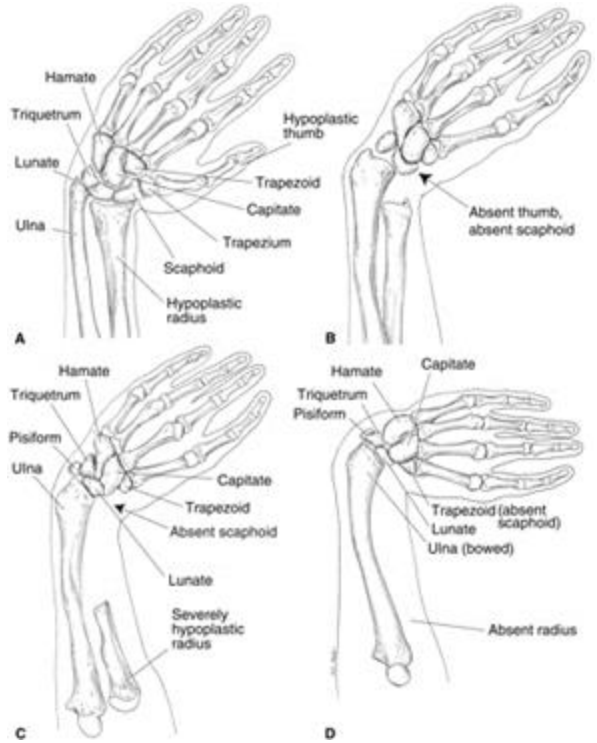
Congenital trigger thumb

Radial Clubhand (radial deficiency)

- Radial Clubhand is a rare birth defect characterized by a deformity of hand, with perpendicular relationship between forearm and wrist, and an absent thumb.

- Diagnosis is made on physical exam.

- Treatment may be observation or surgical reconstruction when the child is around 6 months of age



Ulnar Club Hand

- Ulnar club hand is a congenital upper extremity deformity characterized by a deficiency of the ulna and/or ulnar-sided carpal structures.

- Diagnosis is made clinically.

- Treatment can be nonoperative or operative depending on hand position, thumb function, elbow stability and presence of syndactyly.

Congenital radial head dislocation

- Incidence

Rare (< 1 per 100,000)

- Anatomic location

Posterior dislocation (~70%) more common than anterior (15%) and lateral dislocation (15%)

Bilateral in the majority of cases

- Symptoms

patients often asymptomatic

limited elbow ROM

Madelung’s Deformity

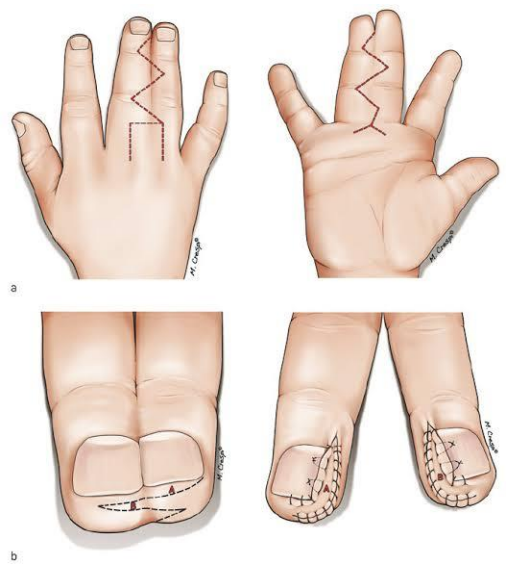
- Madelung's Deformity is a congenital dyschondrosis of the distal radial physis that leads to partial deficiency of growth of the distal radial physis.
- Diagnosis is made radiographically
- Treatment is observation in patients who are asymptomatic.
- Operative management is indicated for patients with wrist pain, decreased range of motion, and/or functional limitations

Syndactyly

- Syndactyly is the most common congenital malformation of the limbs and is characterized by abnormal connections of digits of the hand.

- Diagnosis is made clinically.

- Treatment is usually digit release performed at ~ 1 year of age.



Clinodactyly

- Clinodactyly is a congenital condition of the hand, often associated with Down's syndrome, that is characterized by the abnormal curvature of a digit in the radioulnar plane.

- Diagnosis is made clinically.

- Treatment is usually observation in the majority of cases.

Camptodactyly

- Camptodactyly is a rare congenital condition of the hand that is characterized by a digital flexion deformity that usually occurs in the PIP joint of the small finger.
- Diagnosis is made clinically.
- Treatment is usually observation with passive stretching in the majority of cases.
- Surgical management is indicated in cases of progressive deformity leading to functional impairment.

Polydactyly

- Polydactyly of Hand is a congenital malformation of the hand that presents with an extra digit in the hand.

- Diagnosis is made clinically.

- Treatment is usually a form of surgical reconstruction depending on the level of duplication and the specific digit involved.

Macrodactyly

- Macrodactyly is nonhereditary congenital digit enlargement.
- 90% are unilateral
- 70% involves more than one digit
- index involved most frequently

Hand & Wrist Trauma

- Carpal Trauma

Scaphoid Fracture

Lunate dislocation (Perilunate Dislocation)

- Finger Trauma

Metacarpal fracture

Phalanx fracture

Seymour fracture

- Tendon Injuries

Jersey Finger

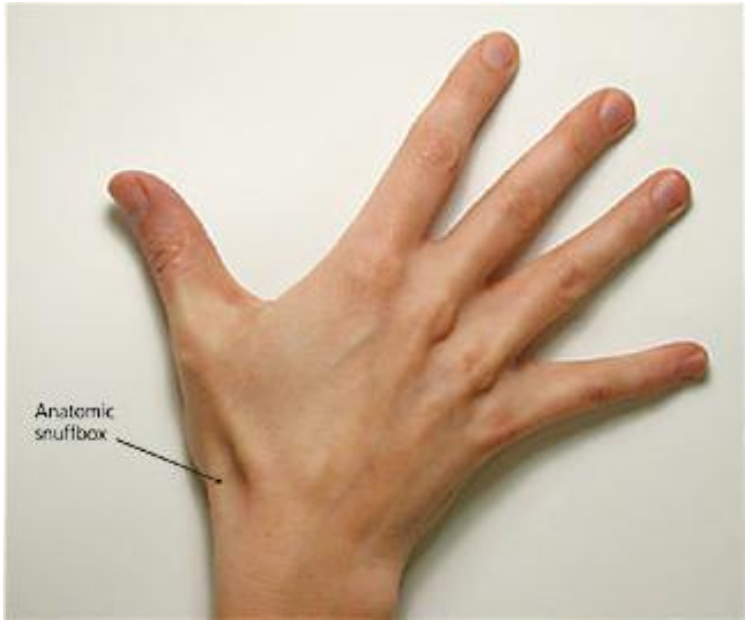
Mallet Finger

- Infections

Paronychia

Scaphoid Fracture

- Most common carpal bone fracture
- Often occurring after a fall onto an outstretched hand
- Anatomic snuff box tenderness dorsally
- Diagnosis can generally be made by dedicated radiographs but CT or MRI may be needed for confirmation.



Scaphoid Fracture

Treatment

• a prolonged period of cast immobilization

•percutaneous surgical fixation,

•open reduction and internal fixation.

Complications

•Scaphoid Nonunion

•Osteonecrosis

Lunate dislocation (Perilunate Dislocation)

- Lunate/perilunate dislocations are high energy injuries to the wrist associated with neurological injury and poor functional outcomes.

- Diagnosis requires careful evaluation of plain radiographs.

- Treatment requires urgent closed versus open reduction and stabilization.

Metacarpal Fracture

- Metacarpal Fractures are the most common hand injury

- **Bennett fracture** is a fracture of the base of the thumb resulting from forced abduction of the first metacarpal.

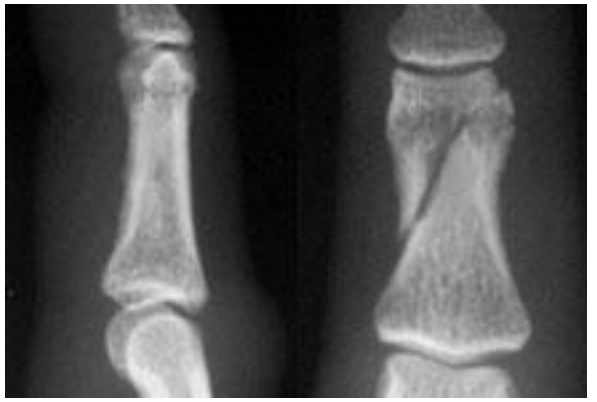
- **Boxer's fracture** is a break in the neck of the 5th metacarpal bone in the hand

Phalanx Fracture

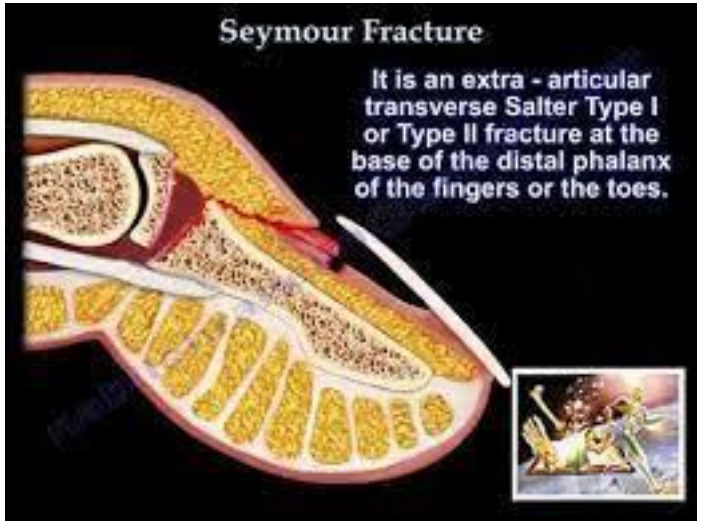
- Phalanx Fractures are common hand injuries that involve the proximal, middle or distal phalanx.

- Diagnosis can be confirmed with orthogonal radiographs of the involve digit.

- Treatment involves immobilization or surgical fixation depending on location, severity and alignment of injury.



Seymour Fracture

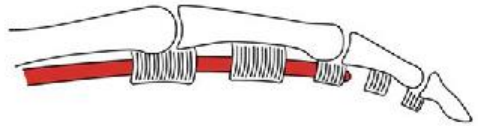
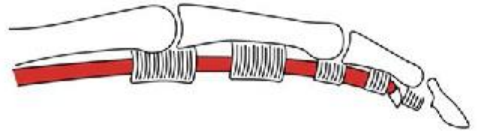
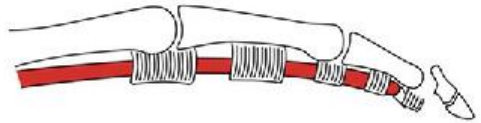


- Seymour Fractures are displaced distal phalangeal physeal fractures with an associated nailbed injury.

Jersey Finger

- Jersey Finger is a traumatic flexor tendon injury caused by an avulsion injury of the FDP from the insertion at the base of the distal phalanx.

- finger lies inslight extension relative to other fingers in resting position

TYPE		FEATURES
I		FDP in palm Vincula system disrupted
II		FDP at level of A3 Vincula longus profundus intact
III		FDP at level of A4 Both vincula intact Large avulsion fracture
IV		FDP in palm Large avulsion fracture Detached from FDP
V		FDP at A4 Large avulsion fracture Con-comitant distal phalanx fracture

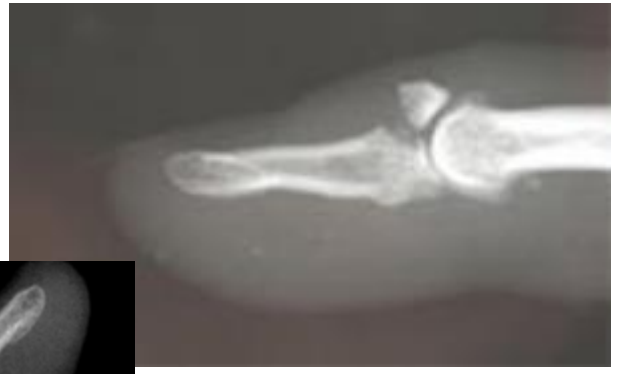
Mallet Finger

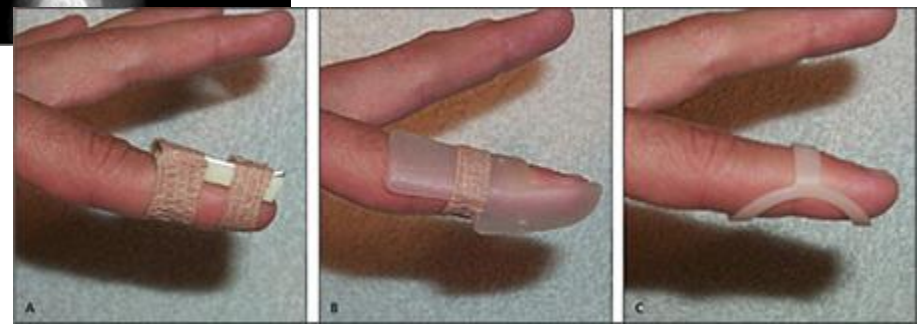
- Mallet Finger is a finger deformity caused by disruption of the terminal extensor tendon distal to DIP joint

- Diagnosis is made clinically with a presence of a distal phalanx that rests at ~45° of flexion with lack of active DIP extension.

- Treatment is usually extension splinting of DIP joint for 6-8 weeks.

- Surgical management is indicated for volar subluxation of the distal phalanx, chronic injuries, or with the presence of significant arthritis.





Paronychia

- Paronychias are soft tissue infections of the proximal or lateral nail fold.
- Diagnosis involves careful clinical examination assessing for erythema and fluctuance around the nail with discoloration/hypertrophic changes of the nail.
- Treatment involves warm soaks and oral antibiotics and if fluctuance is present, debridement and partial/complete nail removal is warranted.

Flexor/Extensor Tendon Conditions

- Dupuytren Disease
- De Quervain's Tenosynovitis
- Trigger Finger

Dupuytren's Disease

Dupuytren's Disease is a benign proliferative disorder characterized by decreased hand function caused by hand contractures and painful fascial nodules.

Diagnosis can be made by physical examination which shows painful nodules in the palm with associated digital contracture.

Dupuytren's Disease

Hueston's tabletop test

- ask patient to place palm flat on table
- look for MCP or PIP contracture

- Treatment ranges from nonoperative passive stretching to injections, needle aponeurotomy, and operative open fasciectomy if the disease progresses or affects a patient's daily living.

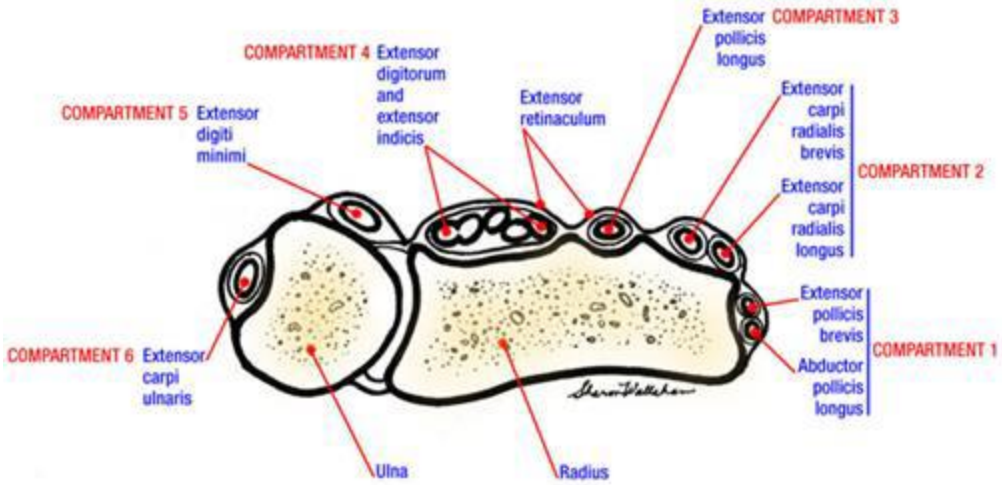
De Quervain’s Tenosynovitis

- De Quervain’s Tenosynovitis is a stenosing tenosynovial inflammation of the 1st dorsal compartment.

- Compartment 1. (De Quervain'sTenosynovitis)

APL

EPB



De Quervain's Tenosynovitis

- Symptmos

Radial sided wrist pain

•Physical exam

Tenderness over 1st dorsal compartment at level of radial styloid

•Finkelstein maneuver

On grasping the patient's thumb and quickly abducting the hand ulnar ward, the pain over the styloid tip is painful

De Quervain's Tenosynovitis

Treatment

- Nonoperative

rest, NSAIDS, thumb spica splint, steroid injection

- Operative

surgical release of 1st dorsal compartment

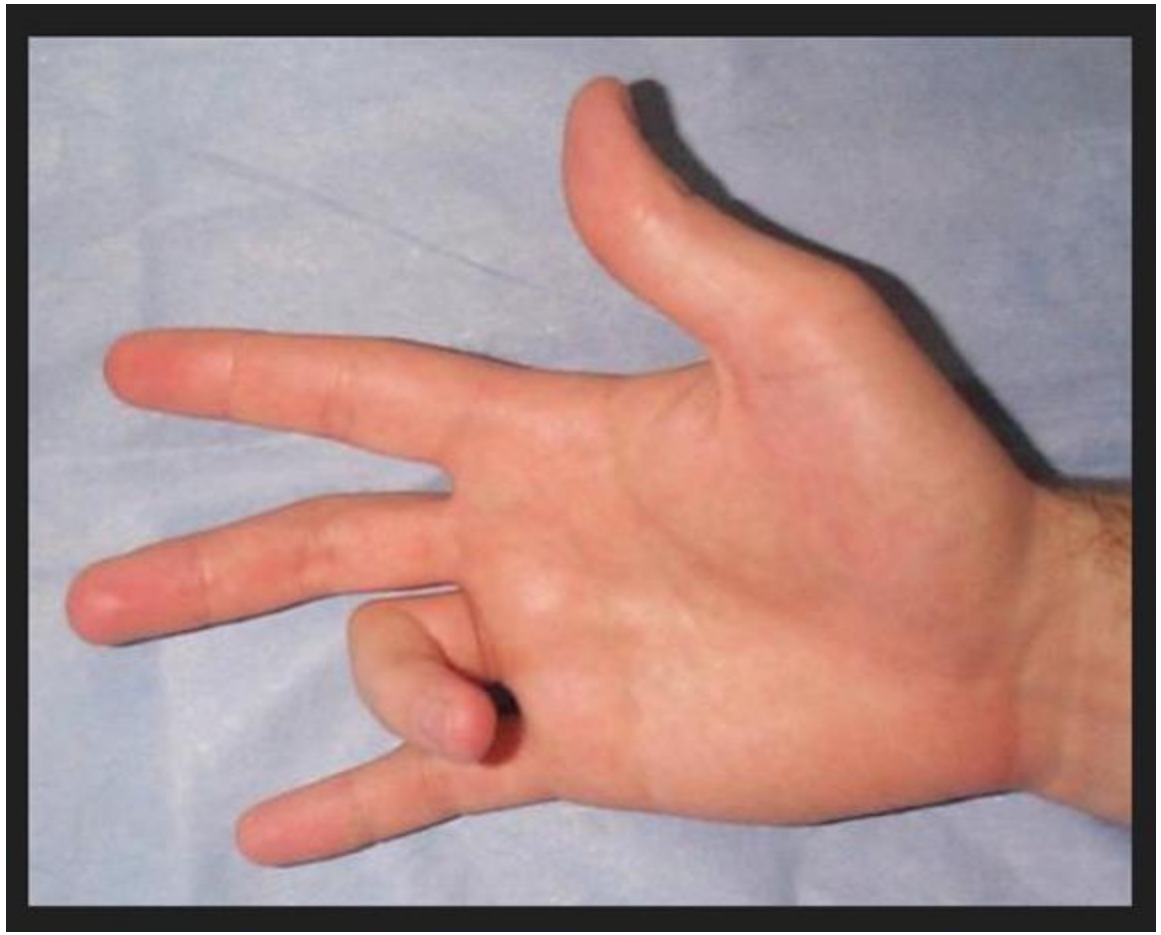
usually consider after 6 months of failed nonoperative management

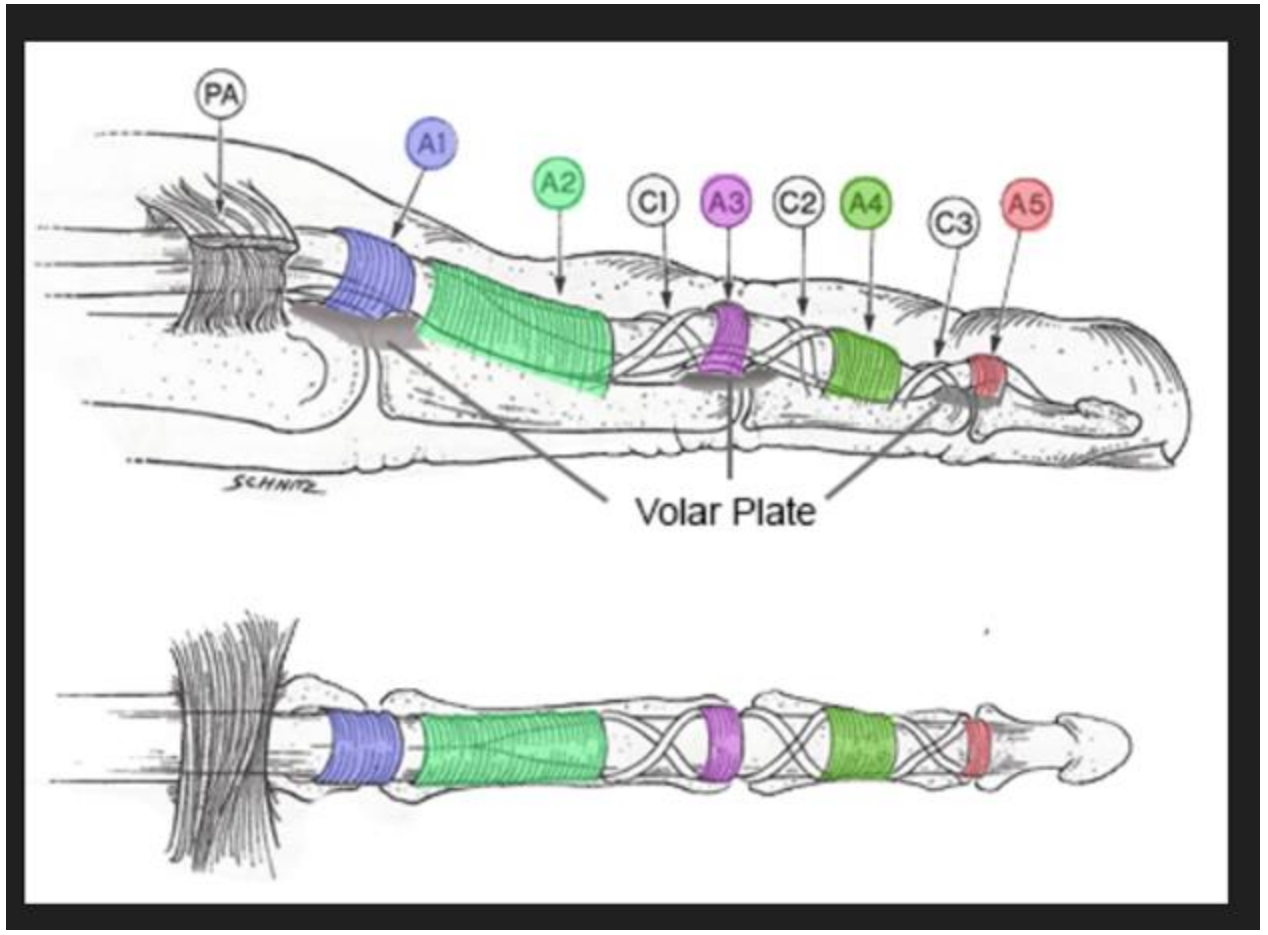
Trigger Finger

- Trigger Finger (trigger thumb when involving the thumb) is the inhibition of smooth tendon gliding due to mechanical impingement at the level of the A1 pulley that causes progressive pain, clicking, catching, and locking of the digit.
- more common in diabetics
- more common in females older than 50
- ring and long fingers are most commonly involved in adults
- caused by stenosing tenosynovitis at the A1 pulley
  - fibrocartilaginous metaplasia of tendon and/or pulley
  - proliferation of chondrocytes
  - increased type III collagen

Trigger Finger

- Associated conditions
  - orthopaedic conditions
    - rheumatoid arthritis
    - calcific tendinitis
    - septic tenosynovitis
    - carpal tunnel syndrome
      - >60% of patients with trigger digits have clinical or electrodiagnostic evidence of carpal tunnel syndrome
    - congenital trigger thumb
  - medical conditions and comorbidities
    - diabetes
      - bilateral hand and multiple digit involvement is more common
    - amyloidosis
    - hypothyroidism
    - sarcoidosis
    - gout
    - pseudogout





- Diagnosis is made by physical examination with presence of active triggering and tenderness at the A1 pulley.
- Treatment consists of splinting, anti-inflammatory medications, steroid injections, and surgical release.

Neuropathies

- **Median Neuropathies**

Carpal Tunnel Syndrome

Pronator Syndrome

AIN Compressive Neuropathy

- **Ulnar Neuropathies**

Cubital tunnel Syndrome

Ulnar Tunnel Syndrome

- **Radial Neuropathies**

PIN CompressionSydnrome

Radial Tunnel Syndrome

Wartenberg Syndrome

Carpal Tunnel Syndrome

- Carpal Tunnel Syndrome is a compressive neuropathy of the median nerve at the level of the wrist.

- **Risk factors**

Female sex

obesity

pregnancy

hypothyroidism

Rheumatoid arthritis

Repetitive motion activities

Carpal Tunnel Syndrome

- **Symptoms**

Numbness and tingling in radial 3-1/2 digits

Clumsiness

Pain and paresthesias that awaken patient at night

Carpal Tunnel Syndrome

Physical exam

- thenar atrophy
- carpal tunnel compression test(Durkan's test)

is the most sensitive test to diagnose carpal tunnels syndrome

performed by pressing thumbs over the carpal tunnel and holding pressure for 30 seconds.

onset of pain or paresthesia in the median nerve distribution within 30 seconds is a positive result.

- Phalen test

wrist volar flexion against gravity for ~60 sec produces symptoms

less sensitive than Durkan compression test

- Tinel's test

provocative tests performed by tapping the median nerve over the volar carpal tunnel

Carpal Tunnel Syndrome

- Radiographs

not necessary for diagnosis

- Diagnostic criteria

numbness and tingling in the median nerve distribution

nocturnal numbness

weakness and/or atrophy of the thenar musculature

positive Tinel sign

positive Phalen test

loss of two-point discrimination

- Electromyography (EMG)

test the electrical activity of individual muscle fibers and motor units

- diagnosis can be made purely based on history and physical examination and can be confirmed with EMG

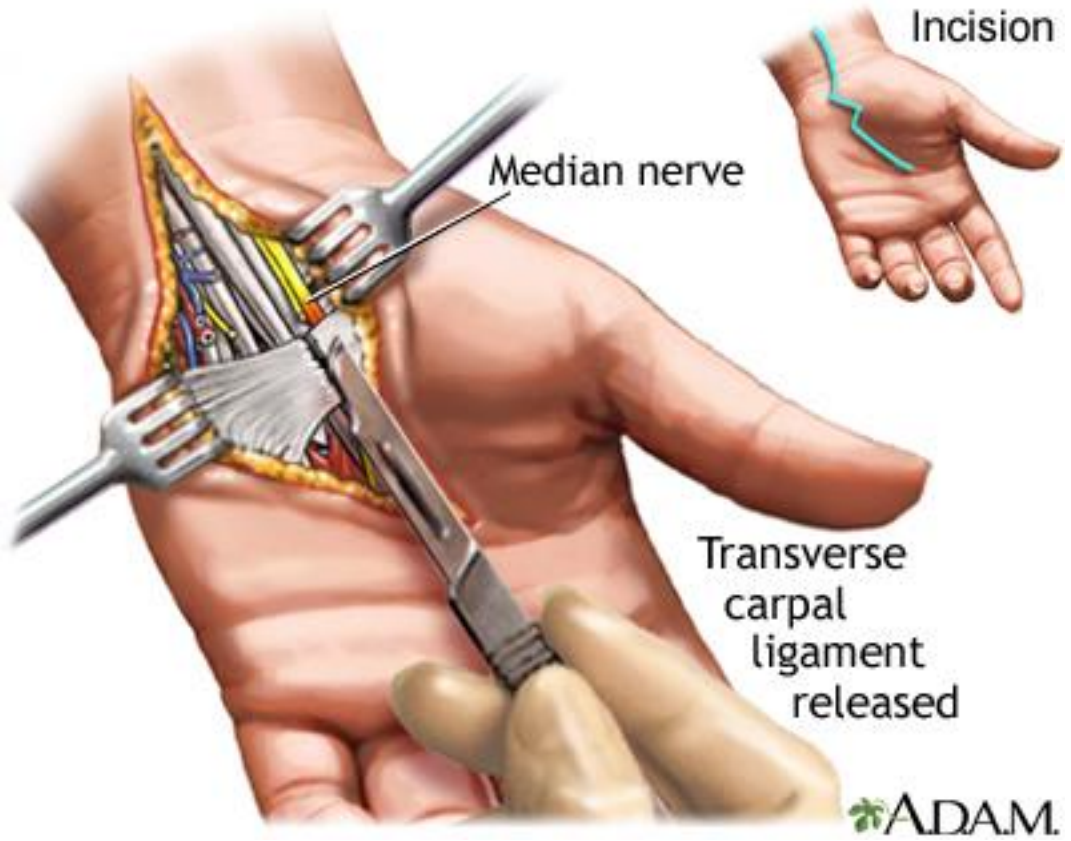
Carpal Tunnel Syndrome

- Nonoperative Treatment

NSAIDS, night splints, activity modifications,steroid injections

- Operative Treatment

carpal tunnel release



Pronator Syndrome

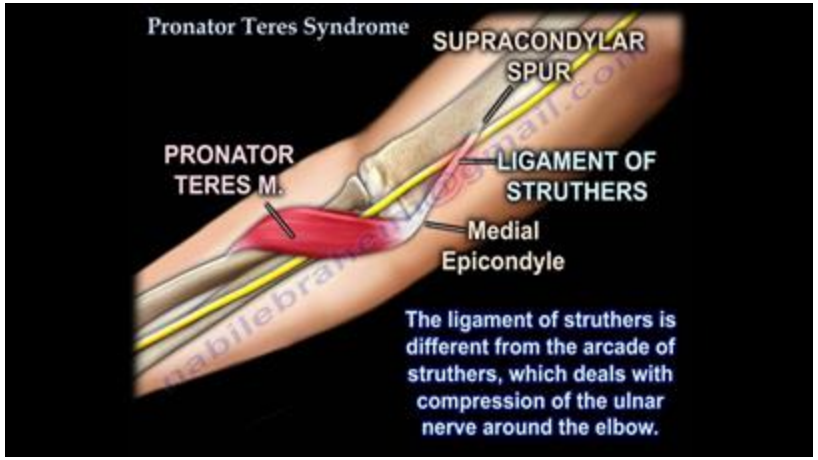
Pronator Syndrome is a compressive neuropathy of the median nerve at the level of the elbow.

Diagnosis

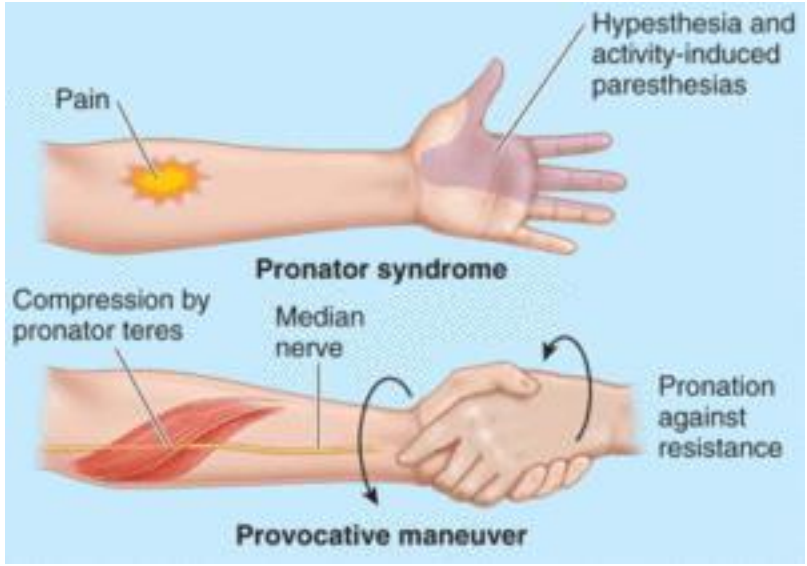
is made clinically with pain at the proximal volar forearm,

sensory changes over the palmar cutaneous branch,

and positive Tinel's over the proximal volar forearm.

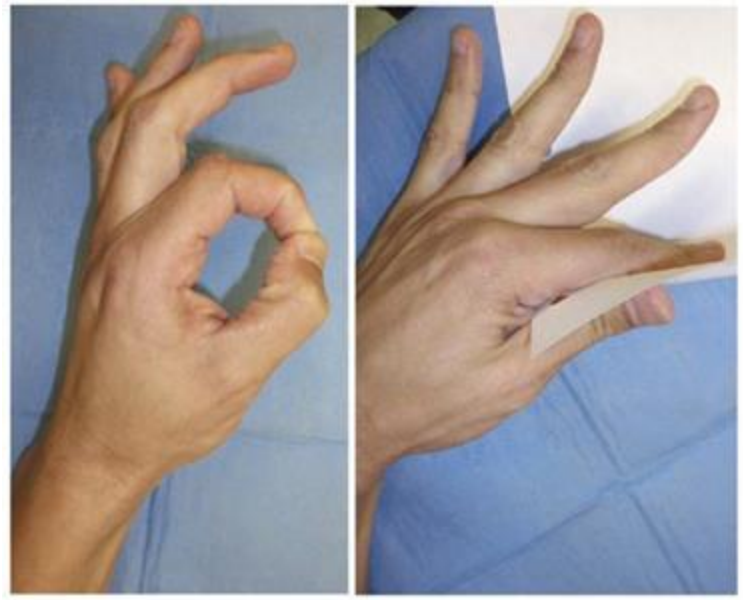


Pronator Syndrome



- Treatment involves a prolonged nonoperative course, and rarely, surgical decompression.

AIN Compressive Neuropathy



Anterior interosseous nerve

- Compression of the AIN is a forearm compressive neuropathy that results in motor deficits of the AIN .

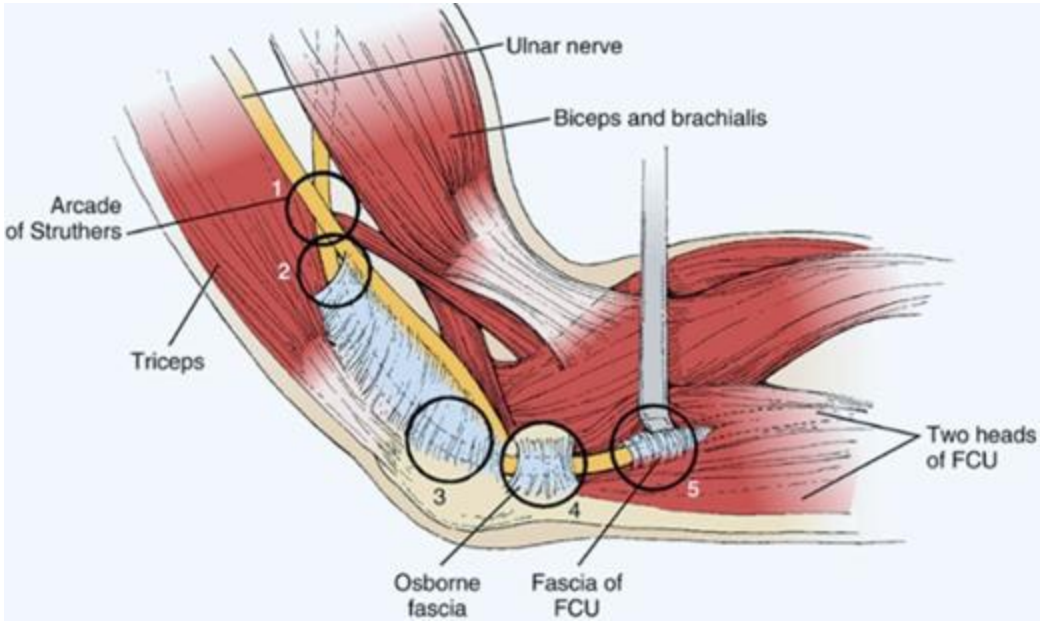
- Diagnosis can be made with a careful neurological exam (weakness of thumb, index and middle finger flexion) within ability to make OK sign and **normal median nerve sensory exam**.

- Treatment involves a prolonged nonoperative course, and rarely, surgical decompression.

Cubital Tunnel Syndrome

- Cubital Tunnel Syndrome is a compressive neuropathy of the ulnar nerve caused by anatomic compression in the medial elbow.

Sites of entrapment



Cubital Tunnel Syndrome

Symptoms

- paresthesias of small finger, ulnar half of ring finger, and ulnar dorsal hand

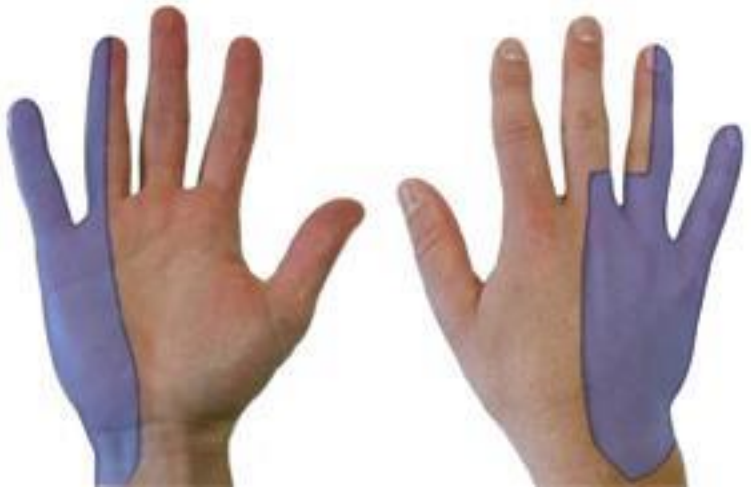
exacerbating activities include

cell phone use (excessive flexion)

occupational or athletic activities requiring repetitive elbow flexion and valgus stress

- night symptoms

caused by sleeping with arm in flexion



Cubital Tunnel Syndrome

Physical exam

- inspection and palpation

interosseous and first web space atrophy

ring and small finger clawing

observe ulnar nerve subluxation over the medial epicondyle as the elbow moves through a flexion-extension arc

- sensory

decreased sensation in ulnar 1-1/2 digits

Cubital Tunnel Syndrome

- Physical exam
- motor

loss of the ulnar nerve results in paralysis of intrinsic muscles (adductor pollicis, deep head FPB, interossei, and lumbricals 3 and 4) which leads to

- weakened grasp

from loss of MP joint flexion power

- weak pinch

from loss of thumb adduction (as much as 70% of pinch strength is lost)

- Froment sign

compensatory thumb IP flexion by FPL (AIN) during key pinch

compensates for the loss of metacarpal adduction by adductor pollicis (ulna n.)

adductor pollicis muscle normally acts as a MCP flexor, first metacarpal adductor, and IP extensor

- Wartenberg sign

persistent small finger abduction and extension during attempted adduction secondary to weak 3rd palmar interosseous and small finger lumbrical

Froment's Sign

Wartenberg's Sign

Cubital Tunnel Syndrome

Nonoperative treatment

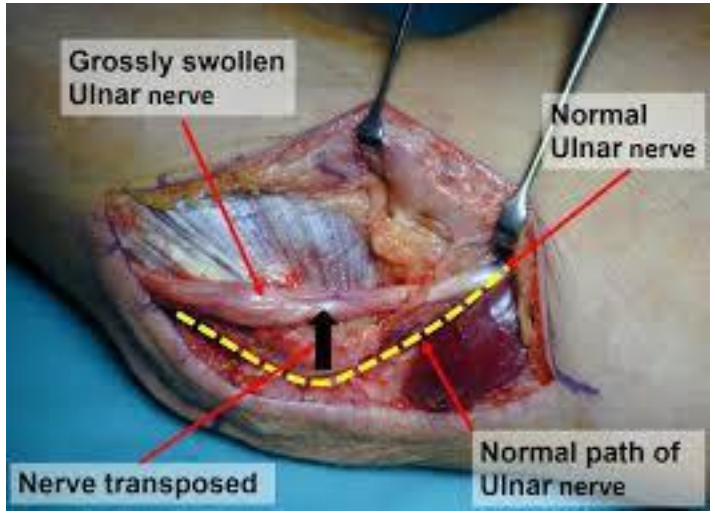
- **NSAIDs, activity modification, and nighttime elbow extension splinting**

indications

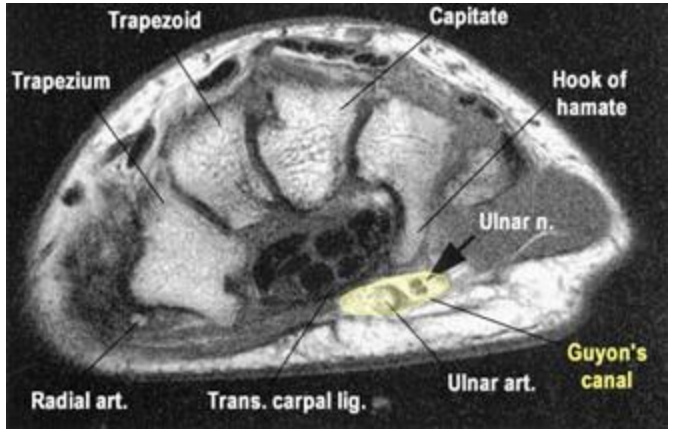
- first line of treatment with mild symptoms
- outcomes
- management is effective in ~50% of cases

Operative treatment

- when nonoperative management fails



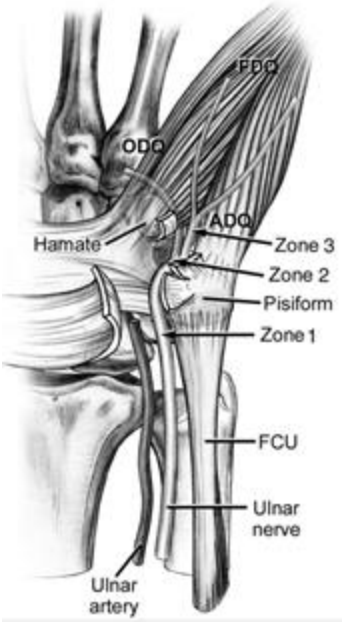
Ulnar Tunnel Syndrome



- Ulnar Tunnel Syndrome is a compressive neuropathy of the ulnar nerve at the level of the wrist (Guyon's canal), most commonly due to a ganglion cyst.

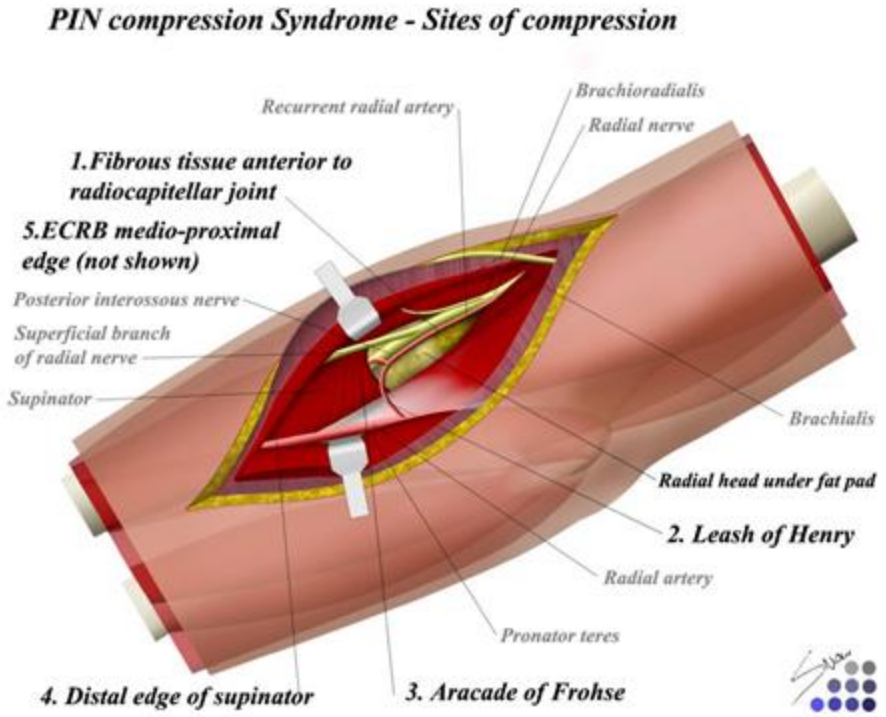
- Diagnosis can be made clinically with paresthesias of the small and ring finger with intrinsic weakness with a Tinel's sign over Guyon's canal.

- Treatment involves a course of conservative management with splinting, and surgical decompression in the presence of a compressive lesion (i.e ganglion) or continued symptoms.



PIN Compression Sydnrome

- PIN compression syndrome is a compressive neuropathy of the PIN which affects the nerve supply of the forearm extensor compartment.
- •Diagnosis is made clinically with weakness of thumb and wrist extensors **without sensory deficits**



Radial Tunnel Syndrome

- Radial Tunnel Syndrome is a compressive neuropathy of the posterior interosseous nerve(PIN) at the level of proximal forearm (radial tunnel).
- •Diagnosisis made clinically with pain only (maximal tenderness 3-5 cm distal to lateral epicondyle) **without any motor or sensory dysfunction.**