

# Wrist and Hand injuries



# Anatomy



- Bones
- Joints
- Ligaments
- Muscles

# Bones

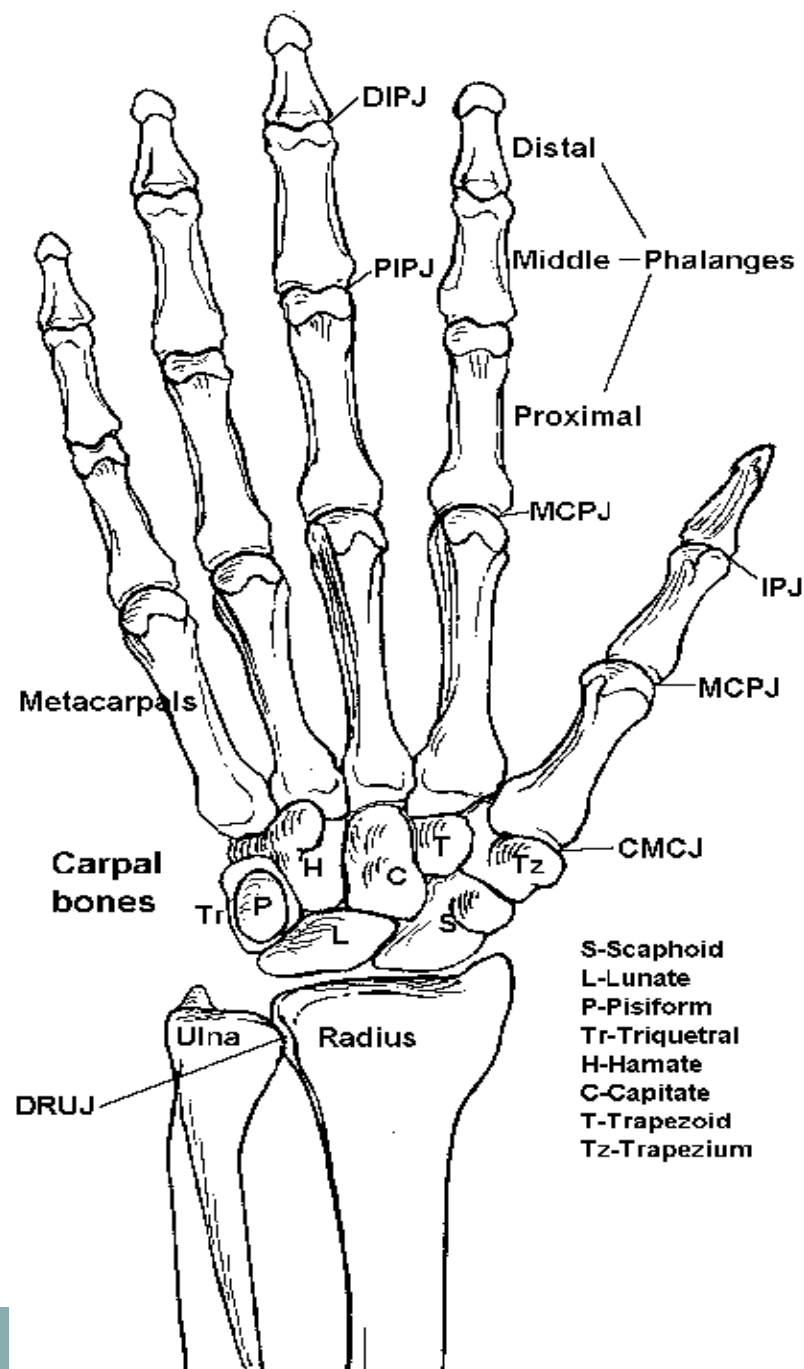


- Carpals
- Metacarpals
- Phalanges
- Radius
- Ulna

# Carpals



- 2 rows, lateral to medial
  - Distal
    - ✦ Trapezium, trapeziod, capitate, hamate
  - Proximal
    - ✦ Scaphoid (navicular) lunate, triquetral, pisiform



# Metacarpals

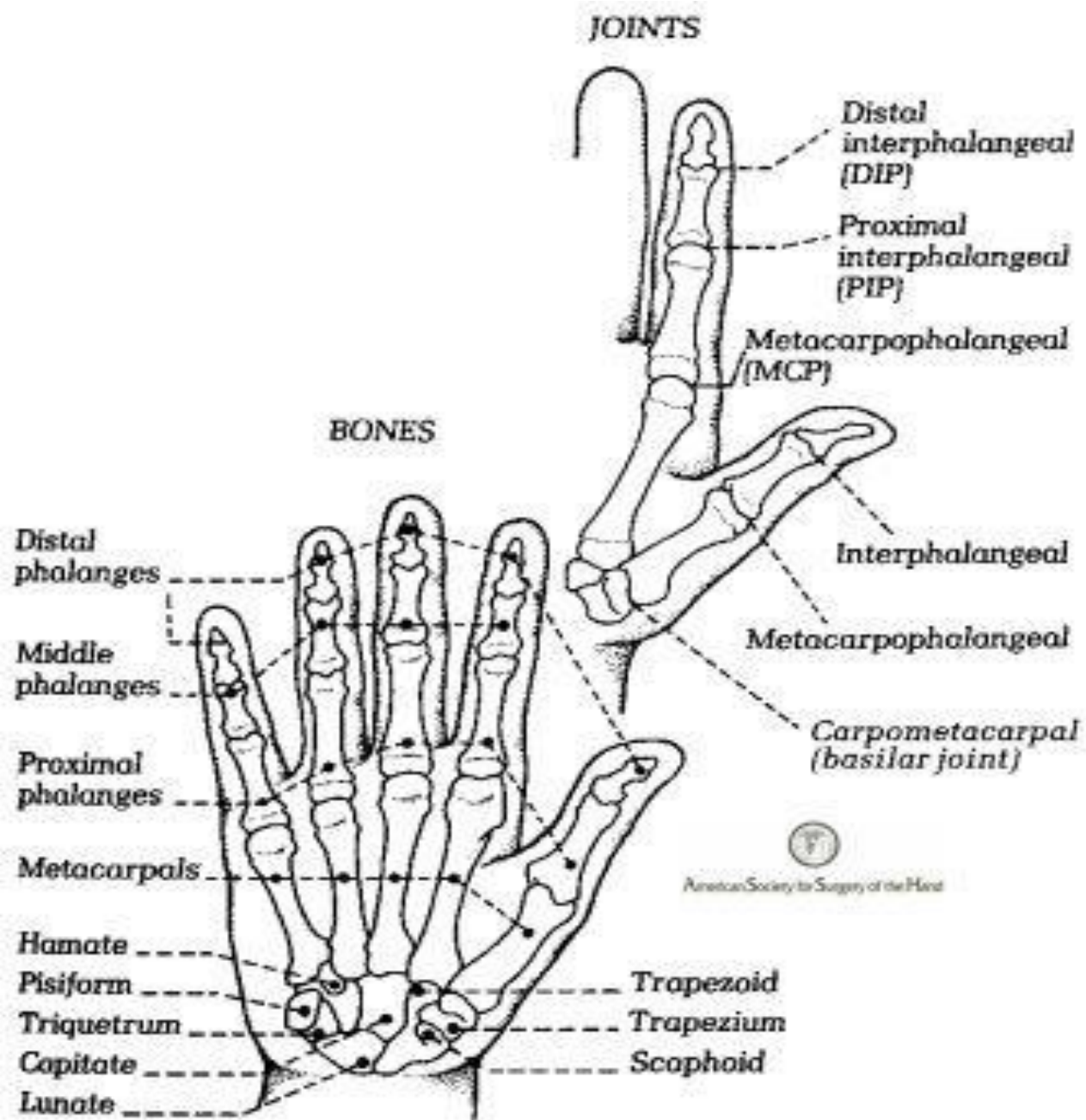


- 5 bones
- Numbered 1 through 5
- Thumb is #1
- Pinky is #5

# Phalanges



- 5 proximal
- 4 middle
- 5 distal





# Radius and Ulna



- Styloid process on each

# Joints

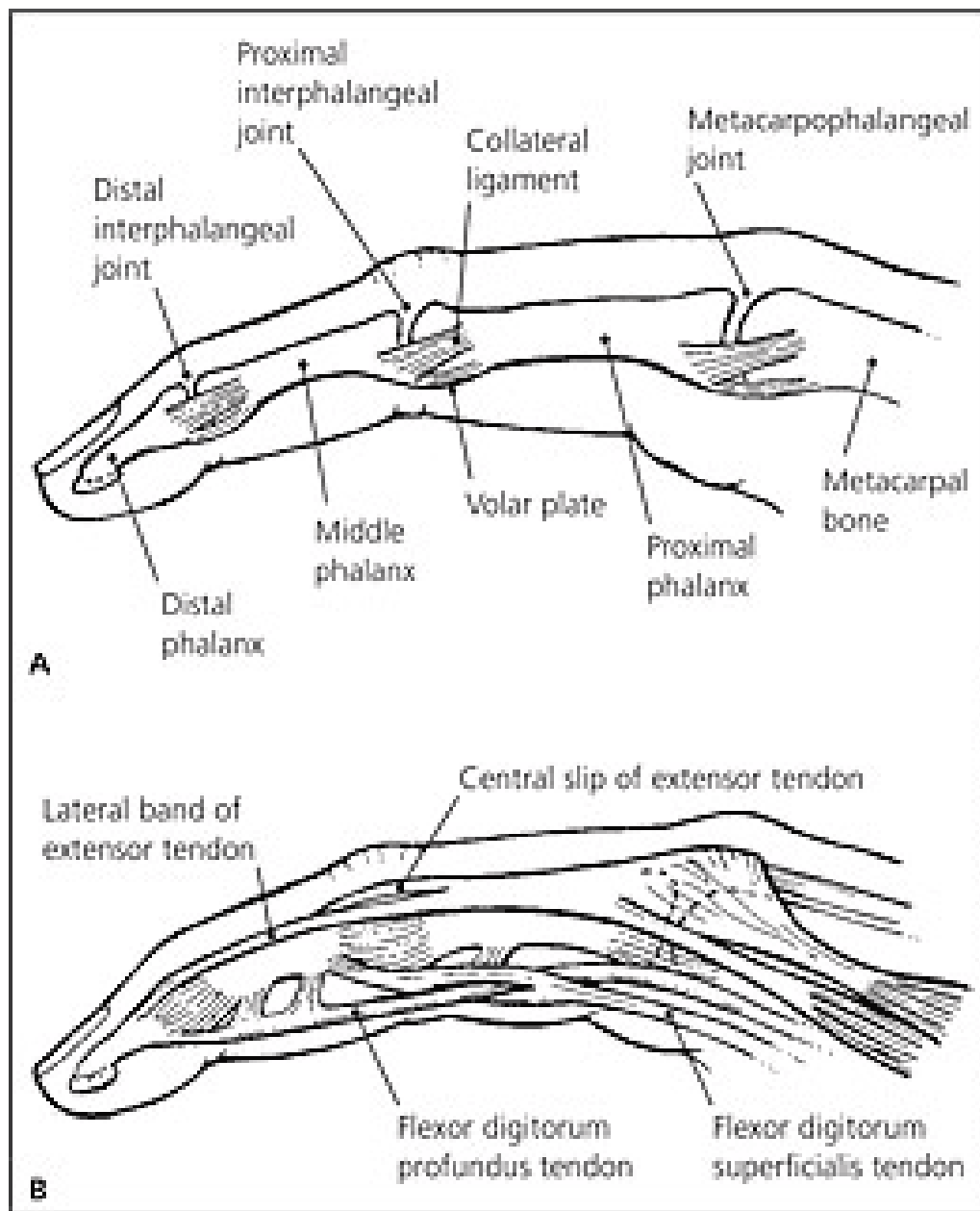


- Distal radioulnar
- Carpal
- Carpometacarpal
- Metacarpalphalangeal (MCP)
- Interphalangeal (PIP and DIP)

# Ligaments



- Ulnar collateral (ulna to carpals)
- Radial collateral (radius to carpals)
- Transverse carpal ligament (crosses volar aspect of carpals)
- Medial collateral and lateral collateral (at IP joints)
- Volar plate (thickened part of joint capsule)

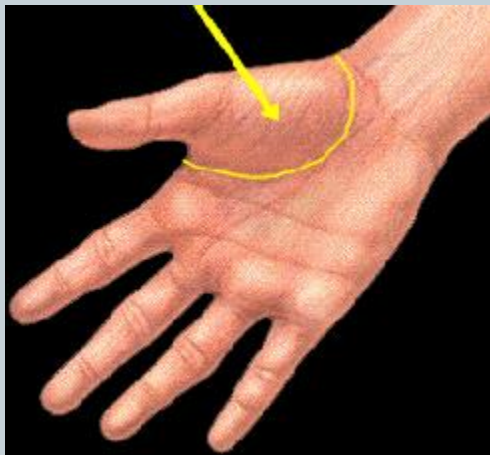


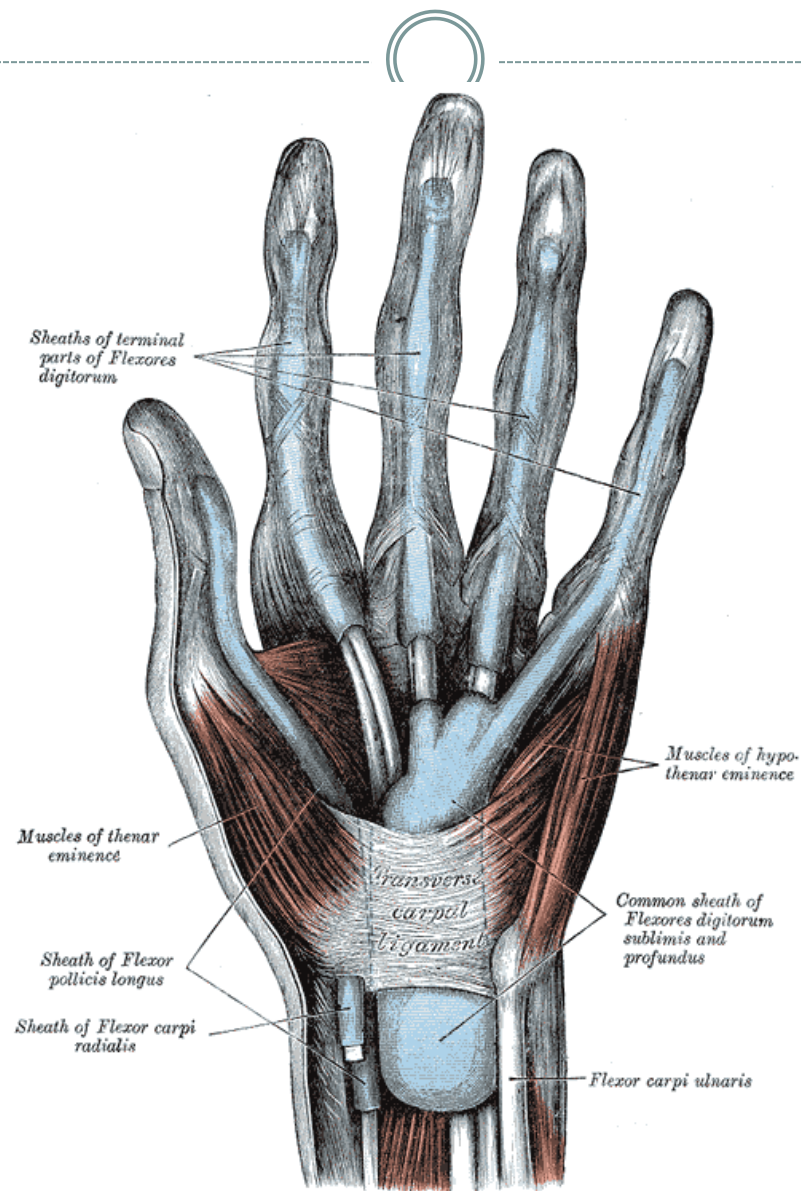
# Muscles



- **Intrinsic muscles**
  - Originate in the hand
  - Thenar and hypothenar eminence
    - ✦ Actions include abduction/adduction & opposition of thumb
- **Extrinsic muscles**
  - Originate outside the hand
    - ✦ Actions include flexion/extension of wrist, hand, fingers

# Thenar & hypothenar eminence









# Bones most often injured



- Radius
- Ulna
- Lunate (dislocation)
- Scaphoid (fracture in anatomical snuffbox)
- Metacarpals
- Phalanges

# Wrist Injuries



- Colle's Fracture
- Sprain
- Tendonitis
- Ganglion cyst

# Hand injuries



- Dislocation of lunate
- Scaphoid Fracture
- Hamate Fracture
- Metacarpal Fracture—Boxer's fracture

# Finger Injuries

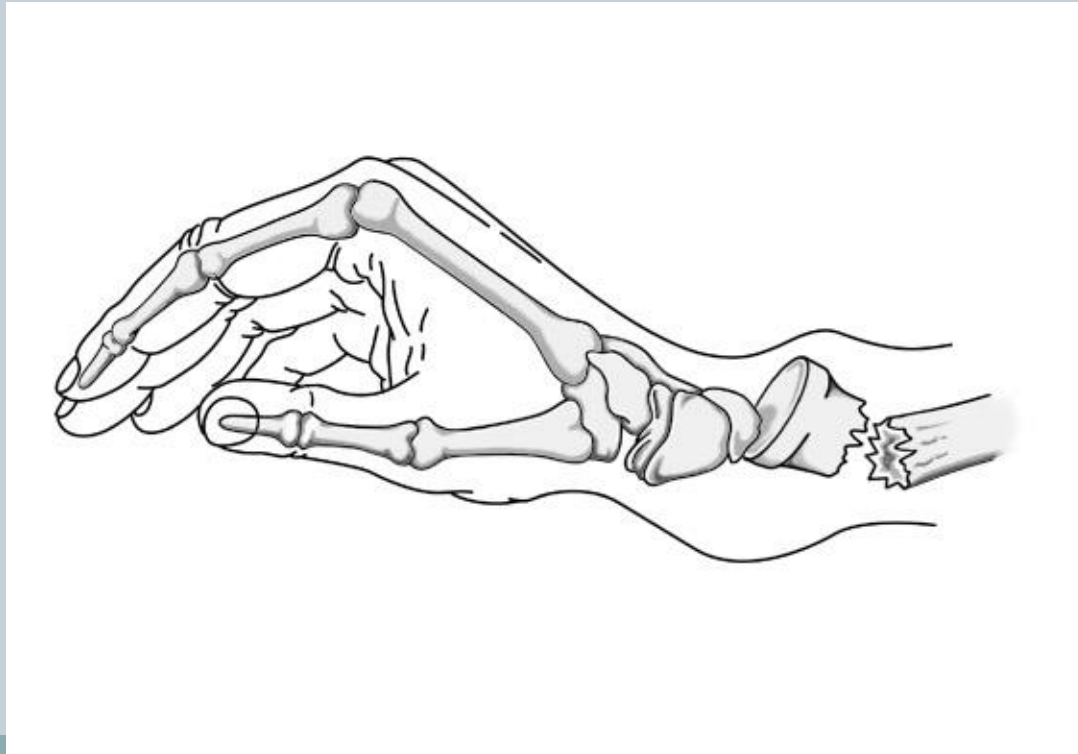


- Mallet Finger
- Jersey Finger
- Gamekeeper's Thumb
- Dislocation
- Fracture
- Sprain
- Subungual hematoma

# Colle's Fracture



Involves the distal end of radius  
Silver fork deformity

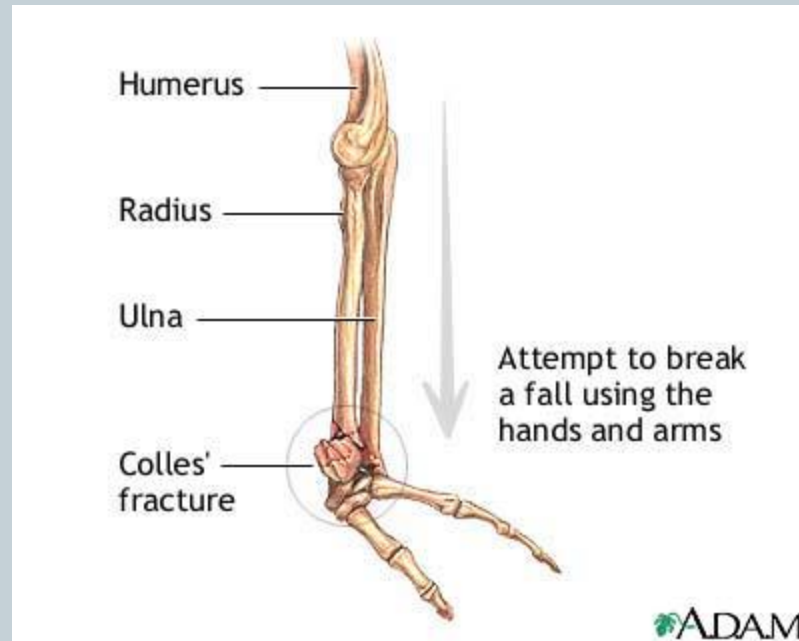




# Mechanism of Injury



- Fall on an outstretched hand
- Run into wall, etc, with wrist hyperextended



S/S



- Visible deformity—“silver fork”
- Swelling
- Pain



# Complications



- Tendons may be torn away from attachment site
- Median nerve damage

# Care



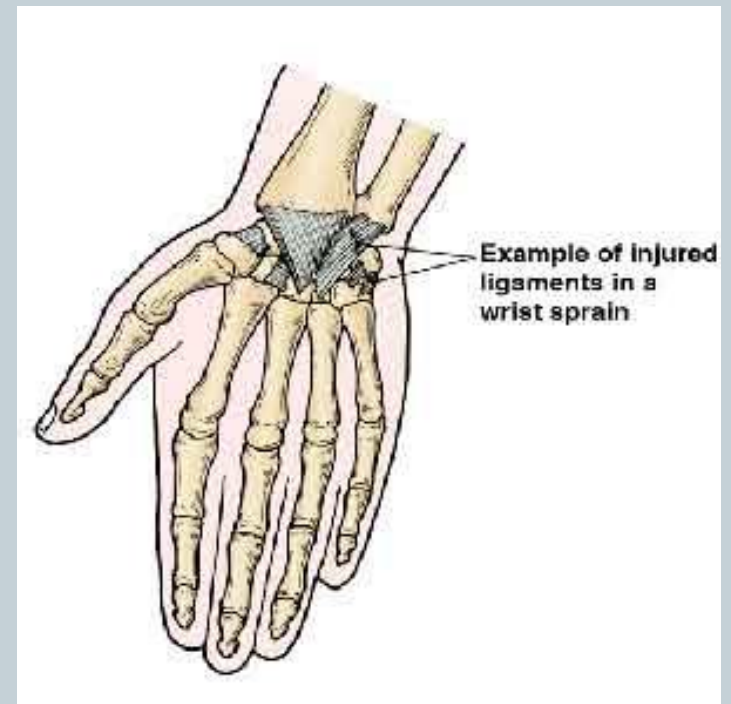
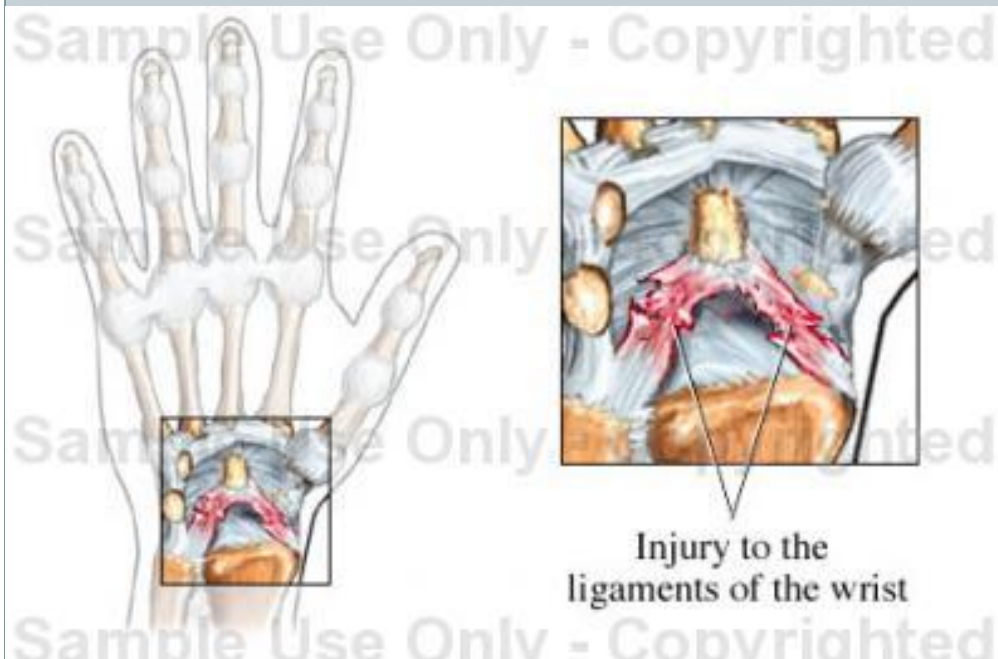
- Splint in position you find it until medical treatment available
- Ice
- 2 month recovery time

# Wrist Sprain



- **Mxn:**
  - Abnormal forced movement of the wrist
  - Falling on hyperextended or hyperflexed wrist
  - Violent torsion

# Wrist sprain





- **S/S:**
  - Pain
  - Point tenderness
  - Swelling
  - Difficulty moving wrist—limited ROM

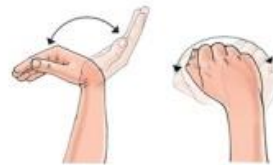


- **TX:**
  - RICE for mild/ moderate
  - Physician referral to rule out fx for severe
  - Splint if necessary
  - Exercises for strengthening and ROM
  - Tape for support
  - **PEARL** long term complication if acute SL or TFCC injuries undiagnosed

# Treatment for wrist injuries



## Wrist Sprain Rehabilitation Exercises



Wrist range of motion



Wrist stretch



Wrist extension stretch



Wrist flexion stretch



Forearm pronation and supination



Wrist flexion



Wrist extension



Grip strengthening

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# Wrist Tendonitis



- MXN: repetitive motion at wrist—usually in flexion/extension
  - Seen more often in athletes involved in sports with repetitive acceleration and deceleration
    - ✦ i.e. weight lifters, rowers

Also in factory workers





## Muscles and tendons of the hand



## Wrist Tendonitis



# Clinical picture



- Pain with active motion
- Pain with passive stretching
- tenderness over either flexor or extensor tendons
- Swelling

# treatment



- Ice
- Heat
- Analgesics
- Modify activity
- NSAIDS
- Splint
- Strengthening and ROM exercises

# Ganglion Cyst



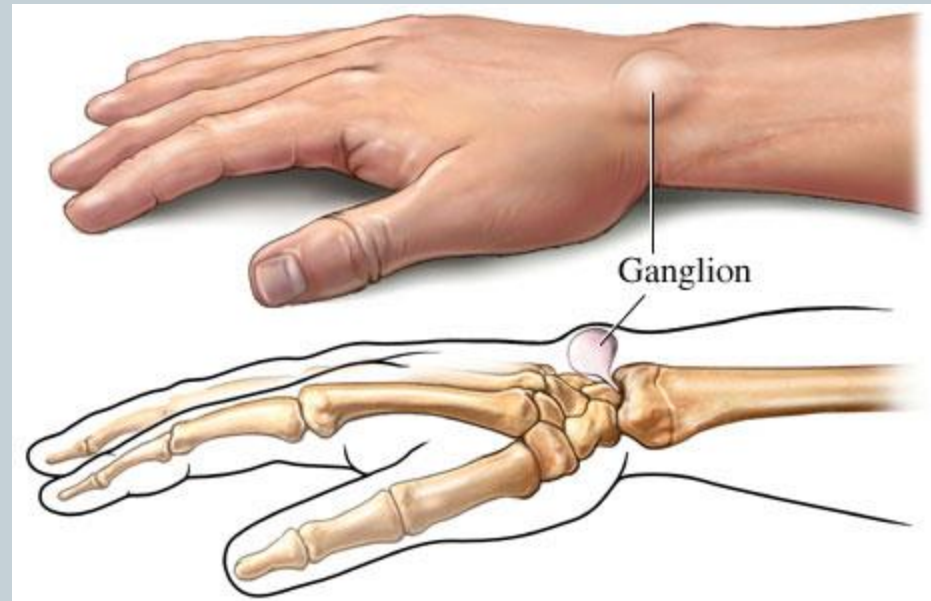
- herniation of joint capsule, synovial sheath of tendon or cystic structure
- MXN: Appears slowly after repeated forced hyperextension of wrist.
  - Contains clear mucous fluid
  - Appears most often on dorsum of hand

# Ganglion cyst



- S/S:
- pain on dorsum of hand that increases with wrist extension
- May feel soft and rubbery or hard
- May appear bigger with flexion of wrist

# Ganglion Cyst



# Ganglion cyst

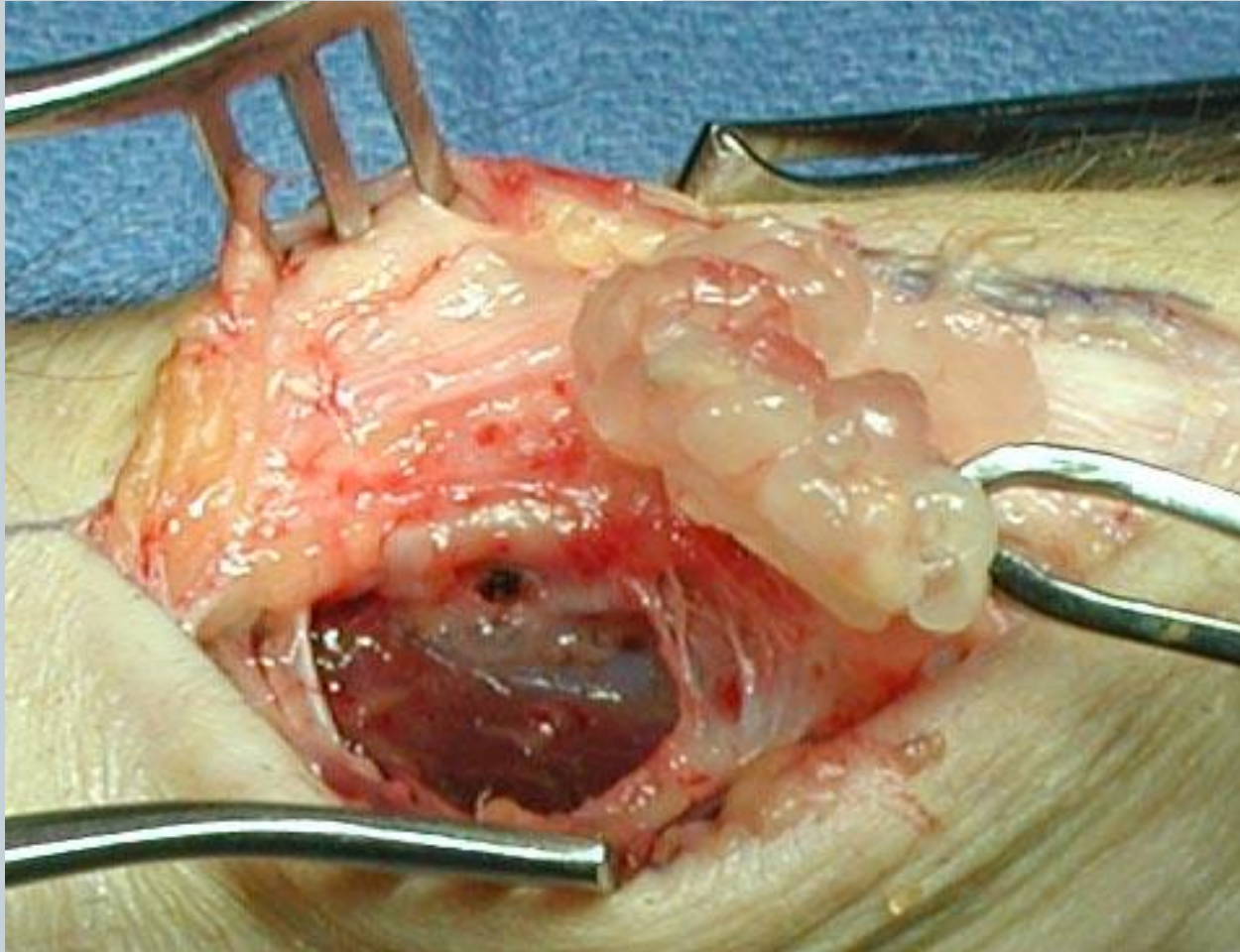


# Ganglion cyst





# Ganglion cyst



# treatment



- Break down swelling with digital pressure and padding
- Aspiration and chemical cauterization followed by pressure padding
- Will usually come back
- Surgical removal
- HIT IT WITH A BOOK

# Dislocation of Lunate

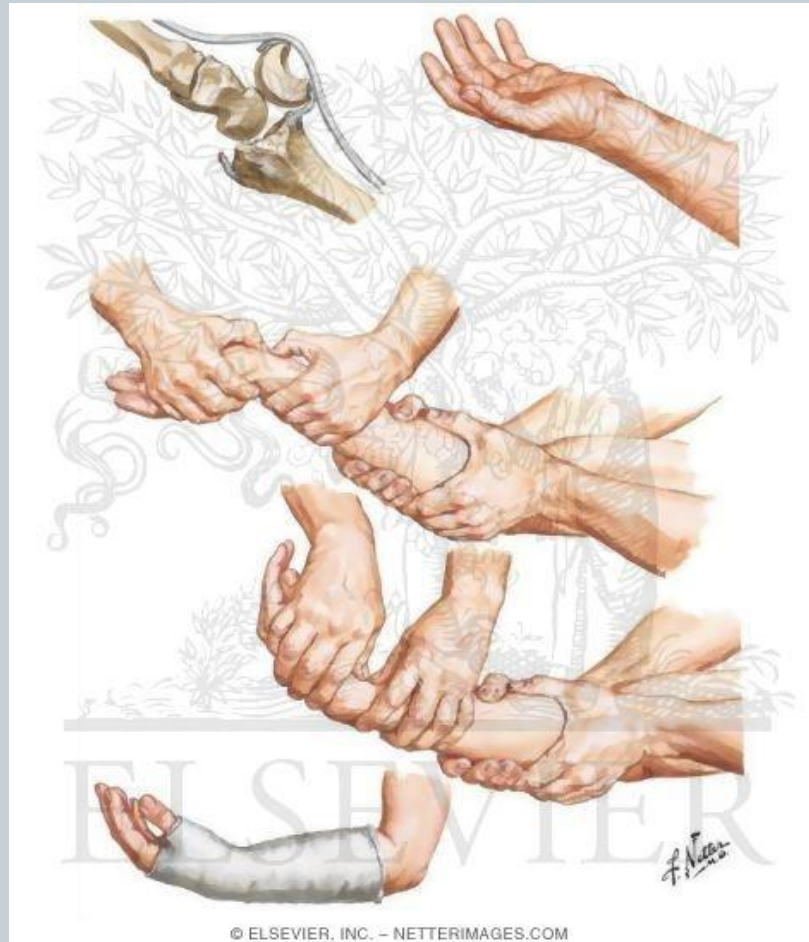


- MXN:
- Forced hyperextension of wrist

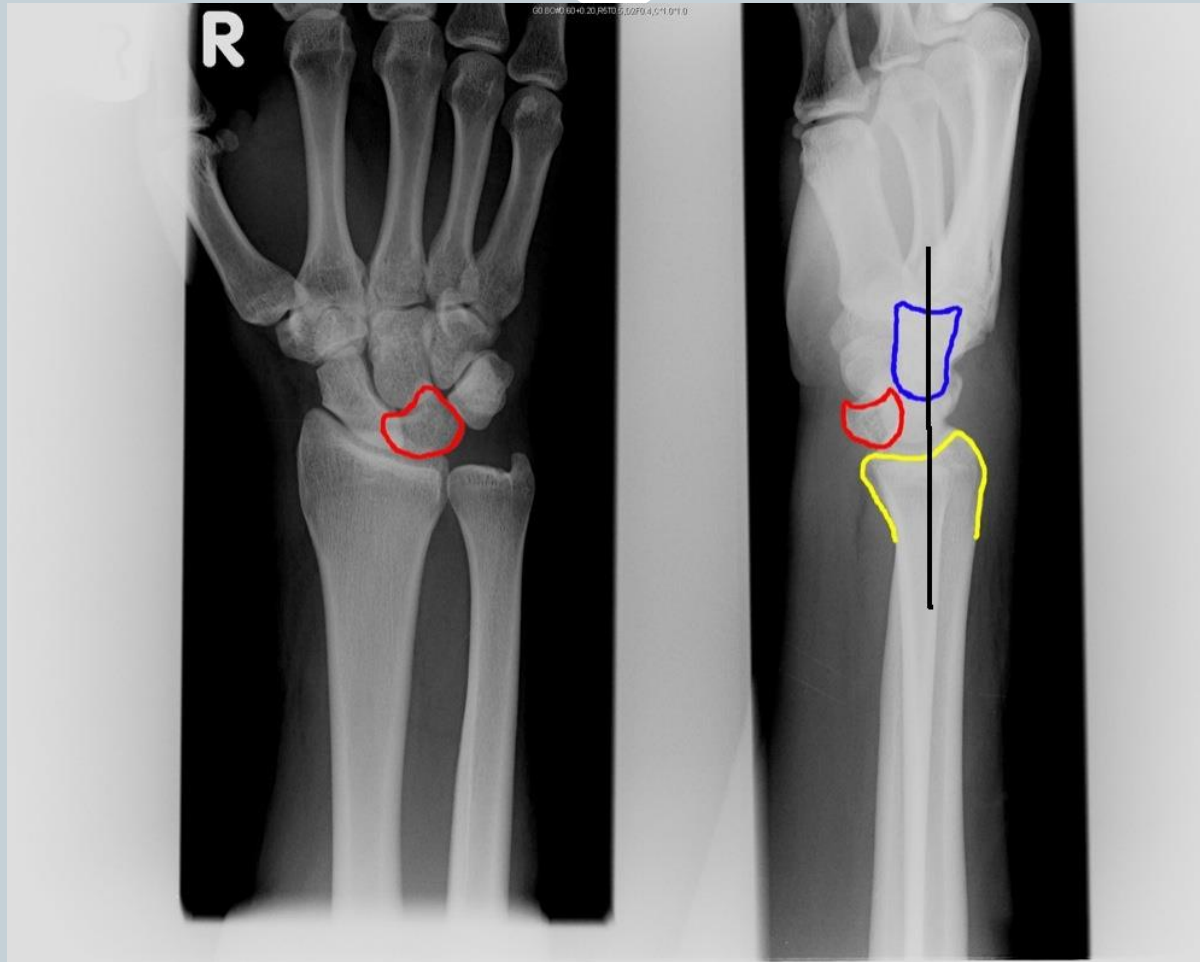


- S/S:
- Pain
- Swelling
- Difficulty moving wrist and fingers into flexion
- Numbness/paralysis of flexors due to pressure of lunate on median nerve
- deformity

# Lunate dislocation



# Lunate Dislocation



# treatment



- Splint
- Ice
- Physician referral for reduction
- 1-2 month recovery time

# Scaphoid Fracture



- MXN:
- Fall on hyperextended wrist
- Force on outstretched hand (hyperextended wrist) that compresses the bone between the radius and 2<sup>nd</sup> row of carpal bones



# Clinical picture



- Pain and POT over the anatomical snuffbox
- Swelling
- Possible discoloration
- Limited range of motion

# Scaphoid fracture



# Scaphoid fracture



# treatment



- Ice
- Splint
- Physician referral
- Initial immobilization for 6-10 weeks
- If not recognized as fracture, could have non-union then surgery is required

# Metacarpal (Boxer's) Fracture



- Most common of all metacarpal fractures
- Associated with martial arts/boxing
- MXN:
  - direct axial force caused by punching another person or object
  - Direct impact to hand

# Boxer's fracture





- S/S:
- POT over the metacarpal involved
- Palpable defect in the shaft of the 5th metacarpal (or other metacarpals)
- Swelling
- Discoloration
- Pain with movement

# Boxer's fracture





# Boxer's fracture



Fifth Metacarpal  
(Boxer's) Fracture

# Metacarpal fractures





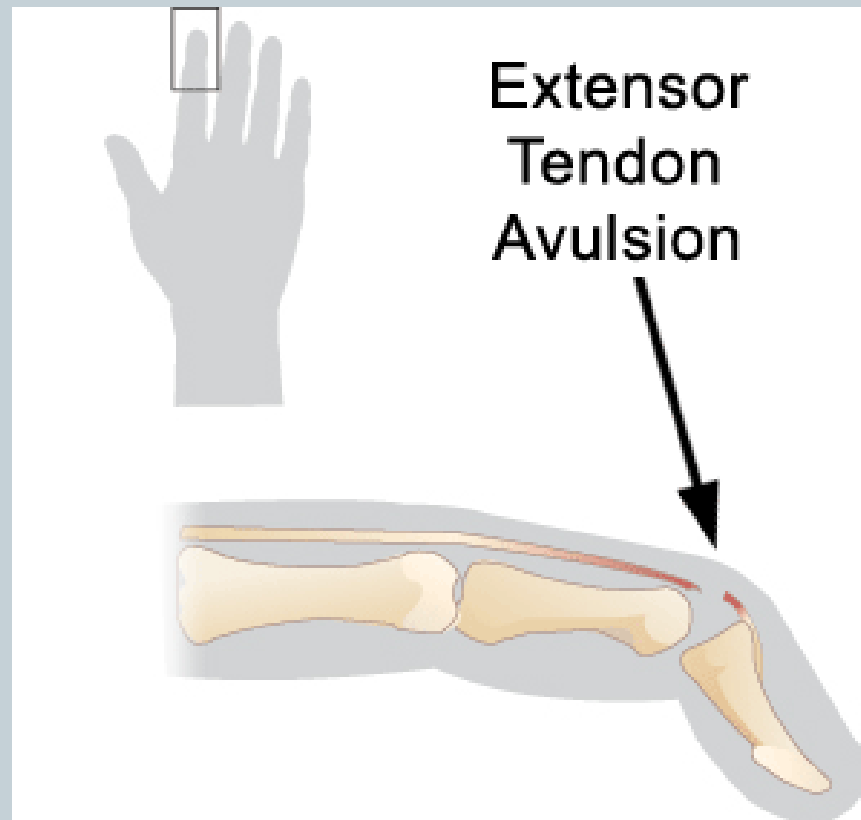
- TX:
- Ice
- Splint
- Physician referral for x-ray
- Reduction and casting (3-4 weeks)

# Mallet Finger



- MXN:
- Blow to tip of finger, jamming it and avulsing the extensor tendon from its insertion at the distal phalanx
- Can cause an avulsion fracture as well

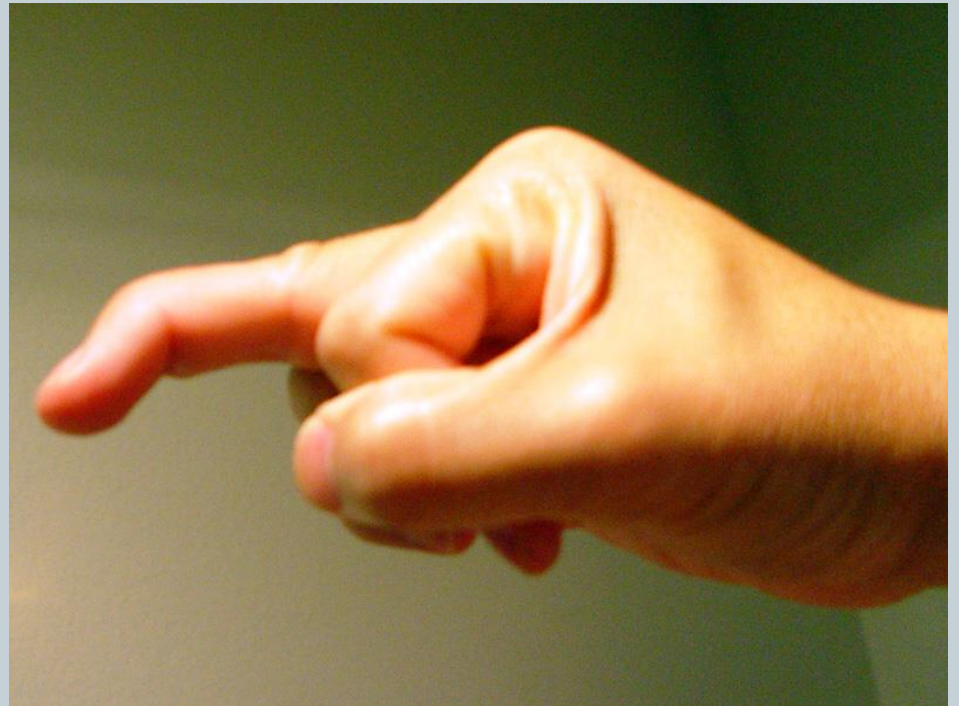
# Mallet finger





- S/S:
- Pain
- POT over dorsum of distal phalanx
- Deformity
- Unable to extend finger at DIP joint
- Avulsed bone may be palpable

# Mallet finger

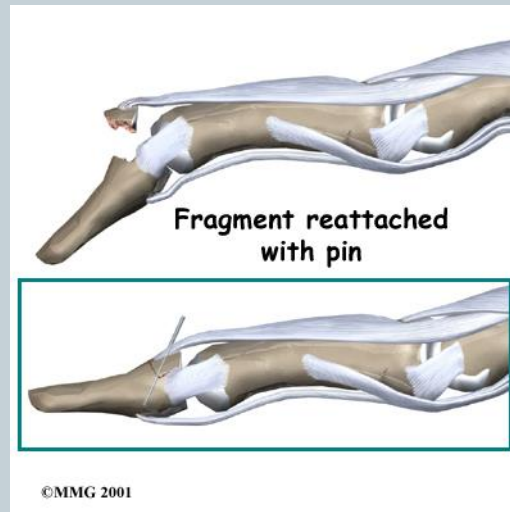




- TX:
- RICE
- Splint into extension 6-8 weeks
- Physician referral



# Mallet finger



# Mallet finger-stack splint



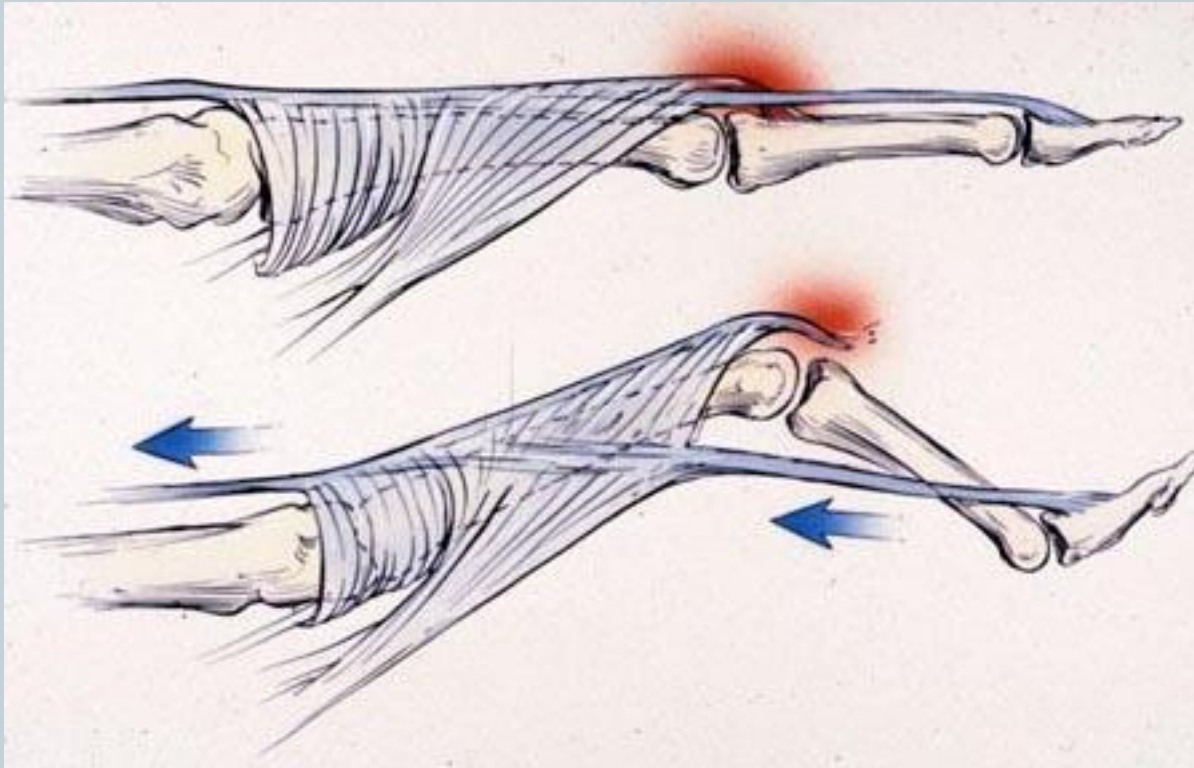
# Stack splint



# Boutonniere deformity



# Boutonniere deformity





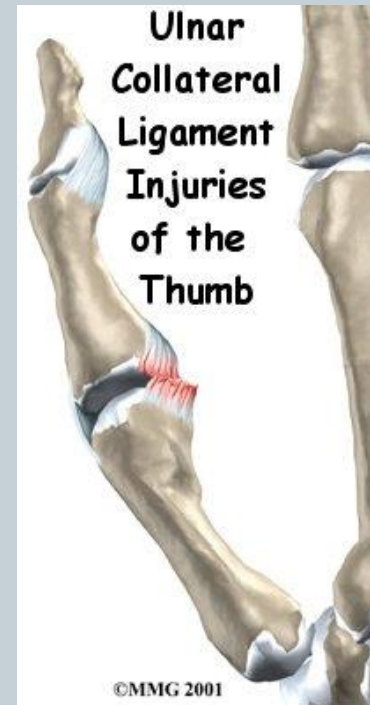
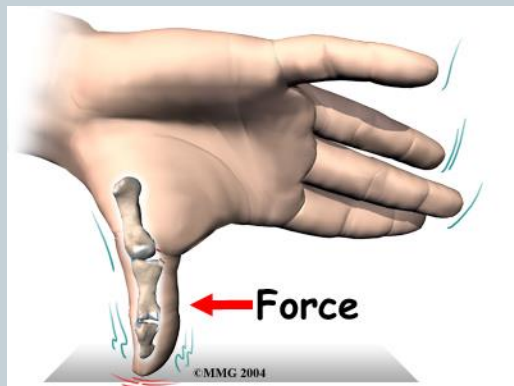
- TX:
- Ice
- Splint PIP joint into extension with flexion of DIP joint 5-8 weeks
- Physician referral

# Gamekeeper's Thumb



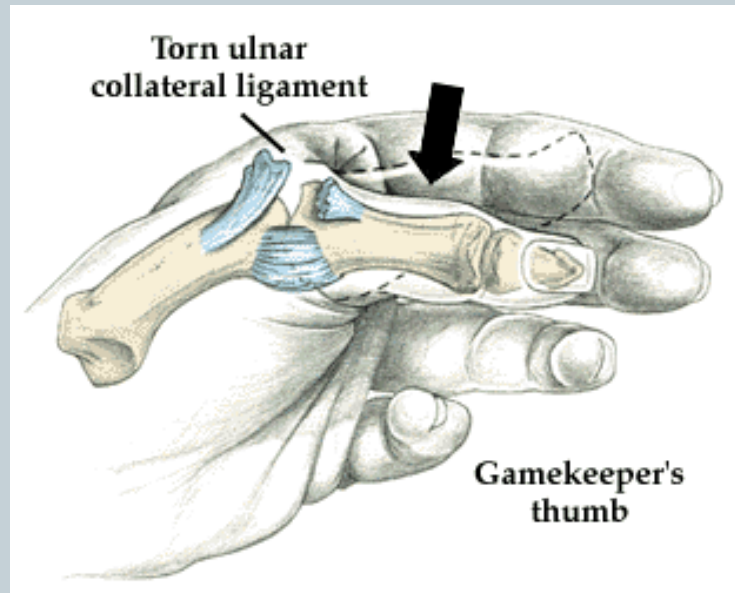
- MXN:
- Forced abduction and hyperextension of the proximal phalange of thumb
- Falling on the thumb
- Sprains UCL of 1<sup>st</sup> MP joint

# Gamekeepers thumb





# Gamekeepers thumb





- S/S:
- Pain
- POT over UCL of thumb
- Swelling
- Discoloration
- Instability of joint
- Unable to grip



- TX:
- Ice
- Splint
- Physician referral for x-ray to rule out avulsion fracture
- Possible surgery

# Interphalangeal Dislocation



- Can affect PIP or DIP joint
- Axial force to the tip of the finger
- Blow to tip of finger
- Falling directly on extended finger
  - May rupture tendon, avulse bone, pinch volar plate

# Dislocation



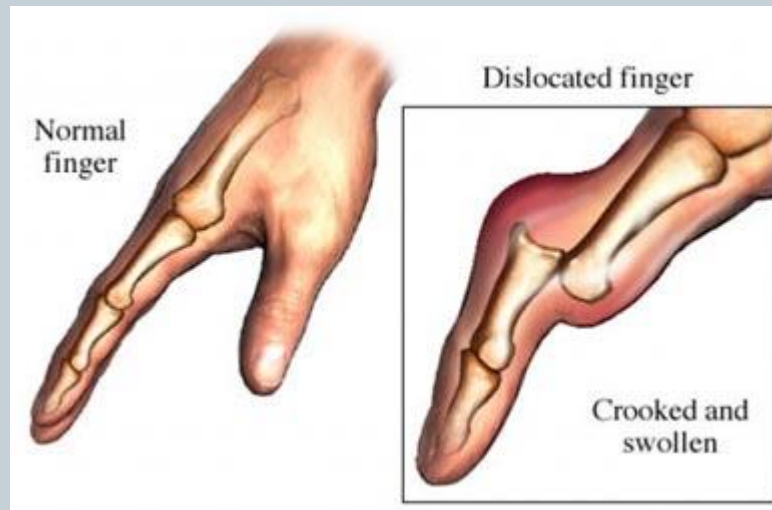
# Dislocation





- S/S:
- Pain
- Deformity
- Swelling
- discoloration

# Dislocation





# Dislocation





- TX:
- Physician referral for reduction & x-ray
- Splint (about 3 weeks) with intermittent motion
- Ice

# Finger fracture

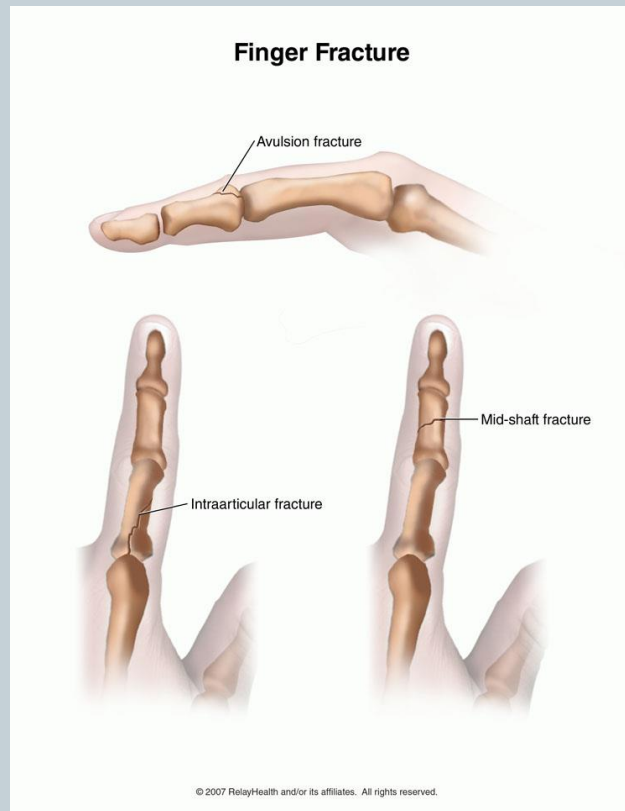


- MXN:
- Stepped on (direct force)
- Hit on the tip of finger
- Twisting/torsion

# Fracture



# Fracture





- S/S:
- Pain
- Possible deformity
- Swelling
- Discoloration
- Crepitus
- POT
- + compression/percussion test



- TX:
- Ice
- Splint
- Physician referral

# Finger Sprain



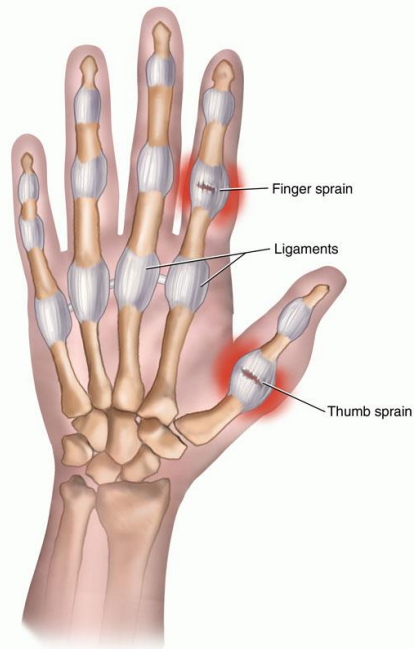
- MXN:
- Axial force to the tip of the finger, “jamming” it



# sprain



## Finger and Thumb Sprain



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- S/S:
- Pain
- POT over the collateral ligaments
- Swelling
- Discoloration
- Joint instability



- TX:
- Ice
- Splint
- Physician referral if necessary for x-rays

# Subungual Hematoma



- MXN: direct blow to the fingernail
- S/S: throbbing pain due to accumulation of blood under the nail
- TX: ice (water) to numb, release pressure under nail by drilling/burning a hole in the nail