

Common Hand & Wrist Injuries



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Disclosure

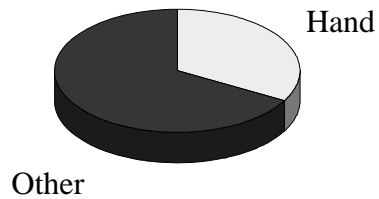
- Company Name:
 - Ascension Ortho- Consultant

Common Disorders of the Hand

■ General Classification

- Fractures
- Dislocations
- Infections
- Lacerations
- Neuropathies
- Vascular disorders
- Tendonopathies
- Tumors

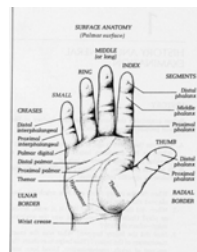
Injuries



•Common Disorders of the Hand

• Review of Anatomy

- Surface
- Bones and Joints
- Ligaments
- Muscles and Tendons
- Nerves
- Vessels



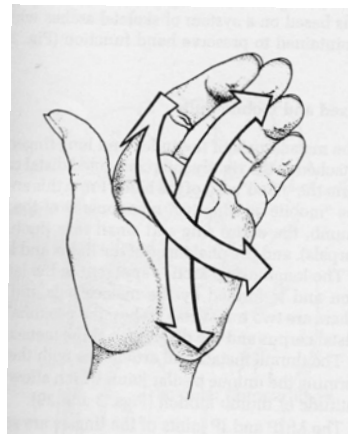
Common Disorders of the Hand

- Evaluation
 - History
 - Details of complaint
 - PMHx
 - PSHx
 - Social Hx
 - Rx



Common Disorders of the Hand

- Physical Examination
 - General
 - Focused
 - Upper extremity
 - Begins at the neck
 - Focused examination of the Hand and Wrist
 - Related distant physical finding
 - Systemic
 - Other musculoskeletal anomalies



Common Disorders of the Hand

- Examination
 - Inspection
 - Palpation
 - Range of motion
 - Active
 - Passive
 - Provocative maneuvers



Common Disorders of the Hand

- Sensory Exam
 - Light touch
 - Sharp/dull discrimination
 - Threshold
 - Vibration
 - Semmes-Weinstein
 - 2 point discrimination
 - Static
 - Moving

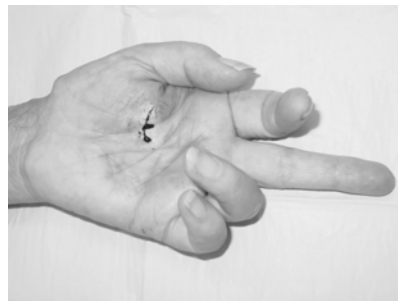


Lacerations:



Common Disorders of the Hand

- Lacerations
 - Evaluation
 - History
 - Clean or contaminated
 - Td status
 - Mechanism
 - Penetrating injury?
 - Bite?
 - Beware dorsal MCP injuries



Common Disorders of the Hand

- Lacerations
 - X-rays
 - Orthogonal views
 - Fractures
 - Dislocation
 - Foreign material
 - Soft tissue
 - Air
 - Joint
 - Soft Tissue



Common Disorders of the Hand

- Lacerations
 - Examination
 - Wound evaluation
 - Recognized extent of injury
 - Retained foreign material
 - Neurovascular status
 - Before anesthesia
 - ROM
 - Passive/active
 - Motor
 - Ability
 - Resting posture
 - Tenodesis
 - Pain?



Common Disorders of the Hand

- Lacerations
 - Recognize flexor and extensor lacerations
 - Repair appropriately
 - Recognize joint penetration
 - Recognize nerve injuries



Common Disorders of the Hand

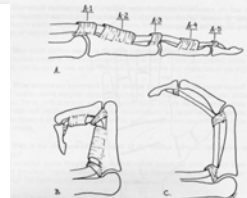
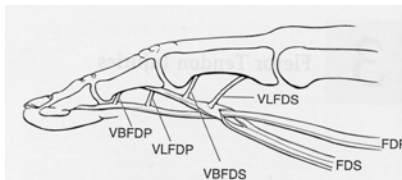
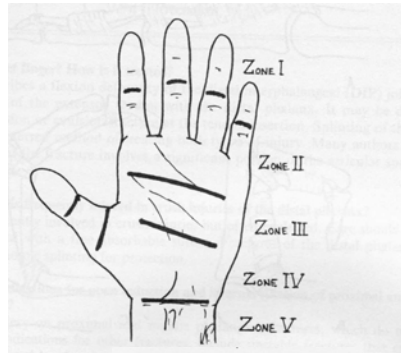
- Lacerations
 - Flexor injuries
 - Pain with resisted flexion may herald injury
 - Generally require OR for exploration and repair
 - Beware Zone 2 injuries
 - >50% repaired
 - <50% trim
 - Rehabilitation protocols



Common Disorders of the Hand

- Flexor Zones

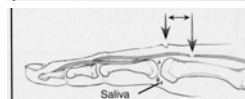
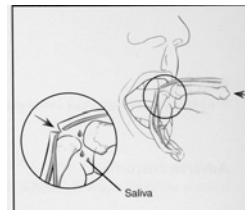
- 5 Zones
- Correlate with underlying anatomy
- Zone 2: “No man’s land”



Common Disorders of the Hand

- Lacerations

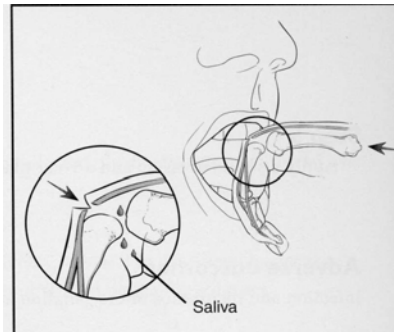
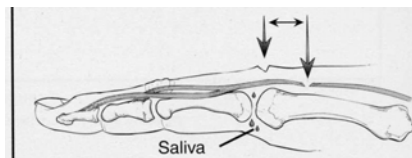
- Extensor lacerations
 - Consider position of hand at time of injury
 - Presume “fight bite”
 - Pain may indicate injury
 - Junctura tendinae may allow partial/weak extension and create false sense of security in MCP level injuries



Common Disorders of the Hand

■ Lacerations

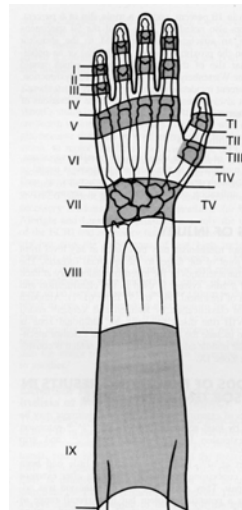
- Extensor lacerations
 - Often under-appreciated
 - Be aware of anatomy
 - >50% repair
 - May be done in ER at times



Common Disorders of the Hand

■ Extensor Zones

- 8 Zones
- Correlate with underlying anatomy
- Odd numbers over joints



Common Disorders of the Hand

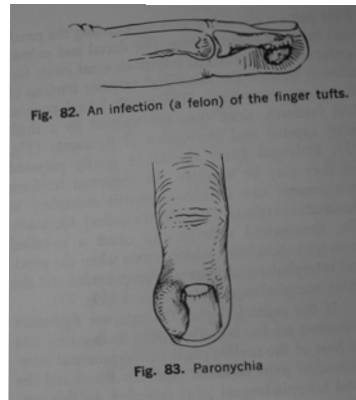
- Laceration
 - Wound closure
 - Adequate I and D
 - Loose closure
 - Consider drain for contaminated or deep wounds
 - Abx for contaminated wounds
 - <24 hours
 - Beware bites
 - Wound check



Infections:

Common Disorders of the Hand

- Infections
 - Paronychia
 - Felon
 - Herpetic whitlow
 - Septic Tenosynovitis
 - Deep space infections
 - Thenar space
 - Mid-palmar space
 - "Horseshoe abscess"
 - "Collar button abscess"



Common Disorders of the Hand

- Infections
 - Group A Strep most common
 - Special considerations
 - Exposure to marine environment
 - Fishermen
 - Mycobacterium marinum
 - I and D
 - Rifampin, ethambutol, TCL
 - Gardening
 - Rose thorn
 - Sporotrichum schenckii
 - KISS (Super saturated potassium iodine)



Common Disorders of the Hand

■ Infections

■ Bites

- History
- Xrays
- Cat and Dog
 - *Paturella multocida*
 - Rx: Augmentin
- Human
 - *Eikenella corrodens*
 - Rx: PCN, Augmentin

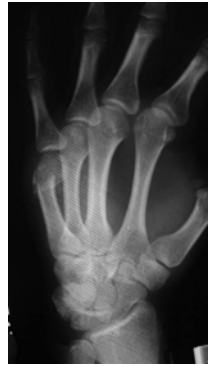


Common Fractures:



Common Disorders of the Hand

- Common fractures
 - Phalanx
 - Shaft, Condyles
 - Metacarpals
 - Head, Neck, Shaft, CMC
 - Carpus
 - Distal Radius



Common Disorders of the Hand

- Fractures
 - Evaluation
 - Open v. closed
 - Displaced v. undisplaced
 - Stable v. Unstable
 - Associated injuries



Common Disorders of the Hand

- X Ray interpretation
 - Patient information
 - Skeletal maturity
 - Orthogonal views
 - Anatomic location
 - Soft tissue assessment
 - Bones imaged
 - Fracture or dislocation
 - Location of injury



Common Disorders of the Hand

- X-ray interpretation
 - Identify bone
 - Fracture pattern
 - Angulation
 - Displacement
 - Articular involvement
 - Articular Congruity
 - Direction



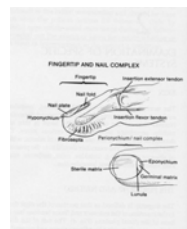
Common Disorders of the Hand

- Tuft fracture
 - Often associated with nail bed injury
 - Address nail injury
 - Displaced
 - Reduce
 - Splint
 - Open injuries more forgiving than elsewhere



Common Disorders of the Hand

- Distal phalanx fracture
 - Address nail injury
 - Alignment to improve contour and nail injury
 - Splint or pinning
 - Assess FDP and Extensor insertion



Common Disorders of the Hand

- Nail bed injury

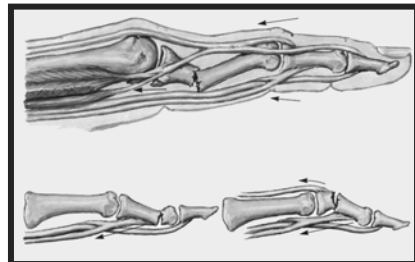
- With or without bone injury
- Evacuate hematoma
- If >50% consider nail removal and nail bed repair
 - 6.0 monocryl
 - Return nail or stent to nail fold
- Stabilize



Common Disorders of the Hand

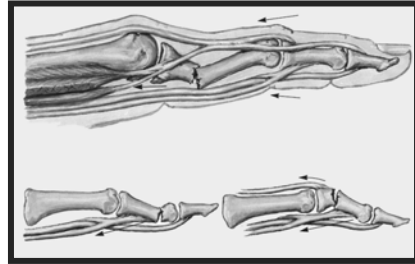
- Phalangeal fractures

- Deformity is predictable with knowledge of anatomy
- May be unstable
- Be aware of intrarticular fractures



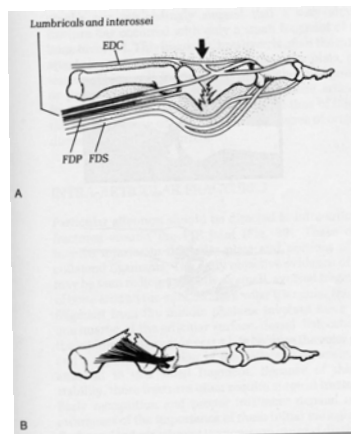
Common Disorders of the Hand

- Proximal phalanx fracture
 - Dorsal pull of extrinsic extensor mechanism combined with volar pull of intrinsics
 - Volar angulation
 - Potentially unstable



Common Disorders of the Hand

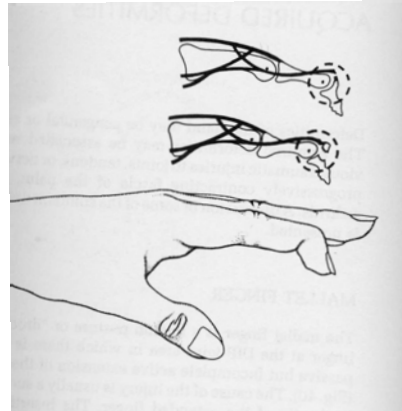
- Metacarpal shaft fracture
 - Intrinsic muscle pull
 - Dorsal angulation



Common Disorders of the Hand

■ “Mallet finger”

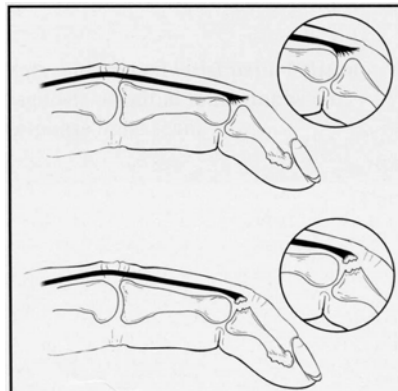
- Disruption of insertion of extensor terminal tendon
- History of resisted for forceful extension
- Swelling, pain, inability to extend DIP
- Bone or pure ligamentous



Common Disorders of the Hand

■ “Mallet finger”

- Closed v. Open
- +/- Bone
- Joint reduced vs. dislocated

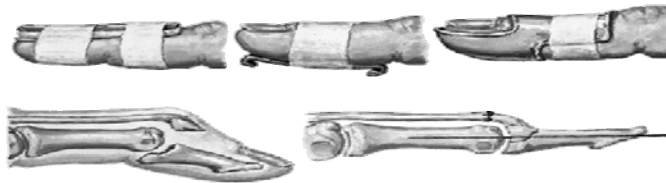


Common Disorders of the Hand

■ “Mallet finger”

■ Tendinous

- Closed
 - 6 - 8 weeks of full time extension splinting
 - 6 weeks of night splinting
 - 6 weeks of protection and return to splinting
- Acute
 - 6 - 8 weeks of full time extension splinting
 - 6 weeks of night splinting
 - 6 weeks of protection and return to splinting
- Chronic
 - 8-12 weeks initial splinting
 - Increased chance of tx failure



Common Disorders of the Hand

■ “Mallet finger”

■ Bony

- Assess size and displacement of fragment
- Assess joint congruity



Common Disorders of the Hand

■ Bony “Mallet finger”

Treatment

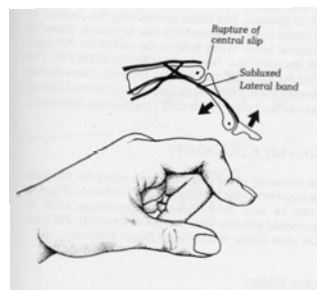
- Non-displaced, congruent
Extension splint
- >40% Joint surface, subluxed
Closed pinning v. open reduction and pinning



Recognition and Treatment of Hand and Wrist Injuries

■ Central Slip Injury

- Rupture or avulsion of insertion of the extensor insertion at the middle phalanx
- Resisted, forced hyperextension
- Inability to extend PIP in isolation



Recognition and Treatment of Hand and Wrist Injuries

■ Central Slip Injury

■ Treatment

■ Acute

- PIP extension splint x6 weeks/until competent central slip
- DIP motion

■ Chronic

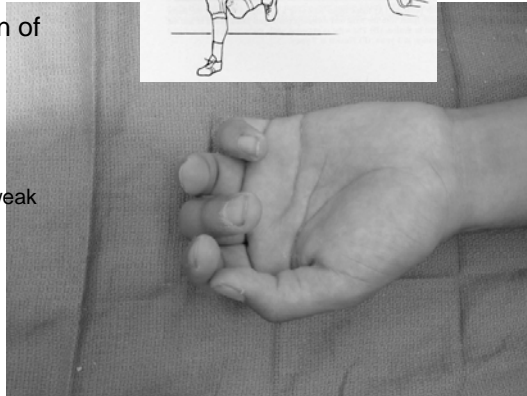
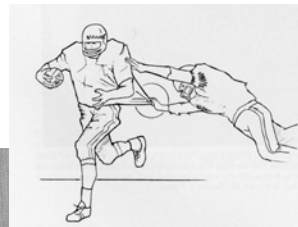
- Attempt closed tx
- May require reconstruction if progressive swan neck deformity from over-pull of terminal tendon



Common Disorders of the Hand

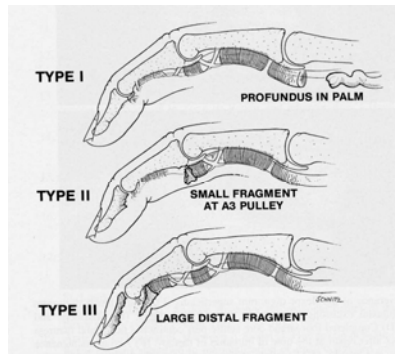
■ FDP Avulsion

- “Rugger Jersey” finger
- History of forcible/resisted flexion of FDP
- More often ring finger
 - Proposed reason
 - Exposed location
 - Watershed area/weak area of tendon
- Inability to flex DIP
- Often present late



Common Disorders of the Hand

- FDP Avulsion
 - Leddy Classification
 - Governed by level of tendon retraction and associated bone fragment
 - Determines treatment interval



Recognition and Treatment of Hand and Wrist Injuries

- Fractures and Dislocations
 - Open Fractures
 - Orthopedic Emergency
 - Require expeditious cleansing and debridement
 - Do not close wound
 - Td, and Broad spectrum Abx
 - Early referral



Recognition and Treatment of Hand and Wrist Injuries

- Intra-articular Fractures
 - Early Referral
 - Attention to articular congruity
 - More likely to require fixation



Recognition and Treatment of Hand and Wrist Injuries

- Finger Fractures
 - Diaphyseal
 - Metaphyseal
 - Intra-articular
 - Avulsion Type
 - Unstable, Incongruent patterns

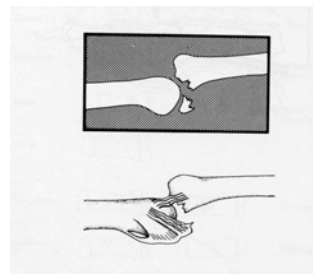
Recognition and Treatment of Hand and Wrist Injuries

- Phalangeal condyle
- PIP fracture/dislocation
 - Treatment
 - Stable
 - Buddy tape
 - Short period of immobilization followed by buddy taping and ROM
 - Unstable
 - Small fragment, stable zone
 - Large fragment, persistent instability Potentially unstable
 - Treat closed with caution
 - May require operative stabilization



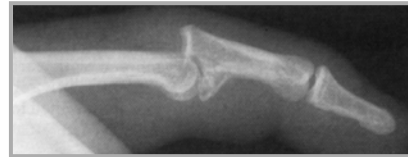
Common Disorders of the Hand

- Proximal interphalangeal fracture/dislocation
 - Pain and swelling at PIP
 - History of “jamming” injury common
 - May present delayed
 - Patients often self reduce



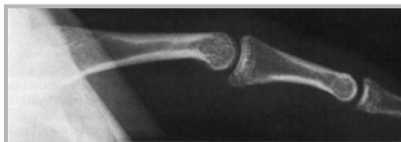
Common Disorders of the Hand

- PIP fracture/dislocation
 - Commonly dorsal dislocation
 - Assess for volar fragment and subluxation
 - Potentially disabling
 - May displace late if volar fragment >25%
 - Look for Dorsal Subluxation
 - If volar (palmar) subluxation - referral



Common Disorders of the Hand

- PIP fracture/dislocation
 - Treatment
 - Stable
 - Buddy tape
 - Short period of immobilization followed by buddy taping and ROM



Common Disorders of the Hand

■ PIP fracture/dislocation

■ Treatment

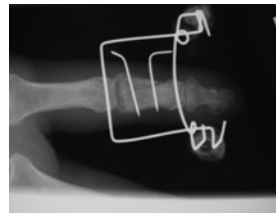
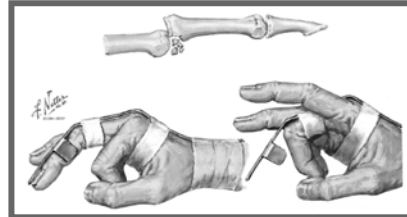
■ Unstable

– Small fragment, stable zone

- Dorsal extension block splint in stable zone with close follow up

– Large fragment, persistent instability

- ORIF



Recognition and Treatment of Hand and Wrist Injuries

■ Avulsion Type

- Small, marginal avulsions

- Usually proximal, middle phalanx or MC

- Attachments of Collateral ligament and/or volar plate



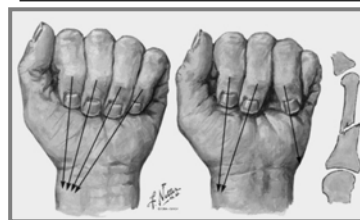
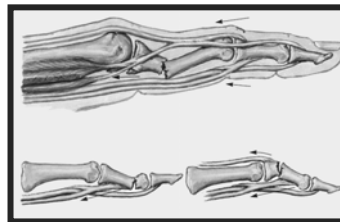
Recognition and Treatment of Hand and Wrist Injuries

- Marginal avulsion fractures
 - If joint is stable and congruent
 - Buddy tape, early ROM, splinting



Recognition and Treatment of Hand and Wrist Injuries

- Metacarpal and Phalangeal Fractures
 - Assessment
 - Predictable patterns of deformity
 - Rotational and angular alignment assessment critical
 - Look for overlap, deviation, change in plane of nail beds



Normal Malrotated

Recognition and Treatment of Hand and Wrist Injuries

■ Metacarpal Neck fractures

- History of axial load or blow to MCP
- 5th MC neck most common
 - “Boxer’s Fracture”
 - Forgiving Fx (accept up to 50 deg. Angulation)
- Pain, swelling
- Assess
 - Displacement
 - Stability
 - Angulation
 - Rotation



Common Disorders of the Hand

■ Metacarpal neck fracture

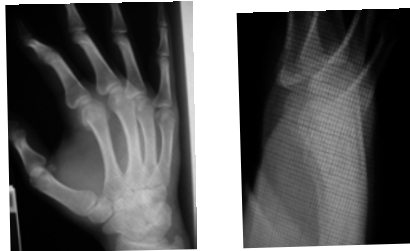
- Treatment
 - Closed reduction
 - Ulnar gutter splint or gauntlet cast with outriggers 4 to 6 weeks if acceptable
 - Some favor early ROM for stable fractures



Common Disorders of the Hand

■ Metacarpal neck fractures

- Acceptable alignment
 - Extra-articular
 - Index to small angulation
 - 10, 20,30,40 degrees
 - Mobility of 5th CMC allows for more angulation
 - < 10 degrees rotation
 - No cross-over or impingement
 - Assess nail bed alignment, alignment of digits with flexion



Common Disorders of the Hand

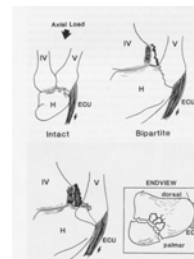
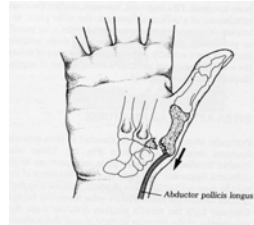
■ Metacarpal diaphyseal fractures

- Closed v. open treatment
- Most *isolated* MC treated closed
- Reduction parameters
 - Avoid rotation
 - <4-5 mm shortening
 - Angulation Index to small
 - 10,10,20,20
 - Less angulation tolerated proximally



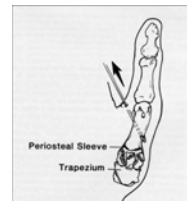
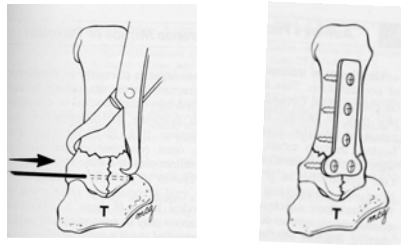
Common Disorders of the Hand

- CMC fracture/dislocation
 - 1st: Bennett's fracture, Rolando's fx
 - 5th: "Baby Bennett's"
 - Unopposed force of APL, ECU



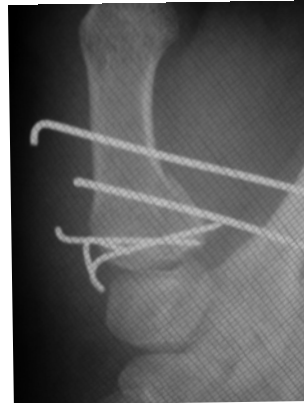
Common Disorders of the Hand

- Bennett's Fracture
 - Non-displaced
 - Unusual
 - Thumb spica cast
 - Close follow-up
 - Displaced
 - Closed v. Open reduction and internal fixation
 - Many different variations of operative treatment



Common Disorders of the Hand

- Rolando's Fracture
 - Comminuted, intra-articular fracture of base of 1st MC
 - May be mistaken for Bennett's fracture
 - Unstable
 - Prone to displacement, articular incongruity, early arthritis
 - Operative treatment



Common Disorders of the Hand

- Scaphoid Fractures
 - Most commonly fractured carpal bone
 - Vascular supply at risk with fracture
 - May be missed as presentation with "normal x-rays"

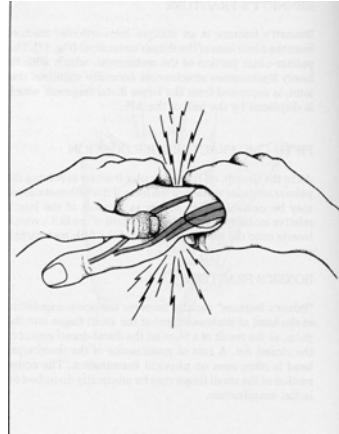


Common Disorders of the Hand

■ Scaphoid fracture

■ Presentation

- Fall on outstretched hand
- Snuff box tenderness
- Scaphoid tubercle tenderness
- May present late as “sprained wrist”

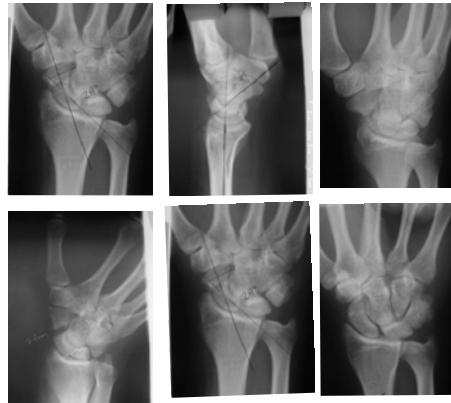


Common Disorders of the Hand

■ Scaphoid fracture

■ X-ray

- 5 or 6 view “scaphoid” or “navicular” series
 - PA, lateral, oblique
 - Ulnar deviation, radial deviation, clenched fist PA
- May be missed on initial films

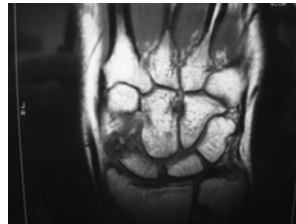


Common Disorders of the Hand

- Scaphoid fracture

- Special studies

- Bone scan
 - MRI
 - CT
 - Tomograms



Common Disorders of the Hand

- Scaphoid fractures

- Diagnosis

- High index of suspicion
 - If in doubt
 - Additional views
 - Immobilize and repeat x-rays in 7-10 days
 - Bone scan or MRI

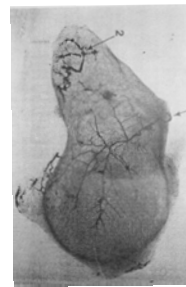
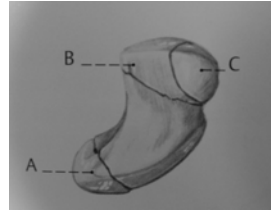


Common Disorders of the Hand

■ Scaphoid fractures

■ Types

- Distal pole
 - Most likely to heal
- Middle 1/3
- Proximal pole
 - Concerning
 - May warrant acute surgical treatment even if non-displaced



Common Disorders of the Hand

■ Scaphoid fractures

■ Treatment

- Non-displaced
 - thumb spica cast, IP free x 6 weeks
 - Short arm, thumb spica cast until united
 - Average time to healing - 12 weeks



Common Disorders of the Hand

■ Scaphoid fractures

■ Treatment

■ Displaced

- > 1mm displacement
- Flexion
- Rotation
- Surgical



Common Disorders of the Hand

■ Scaphoid fractures

■ Non-union

- Fibrous union
- Non-union
- Avascular non-union



Common Disorders of the Hand

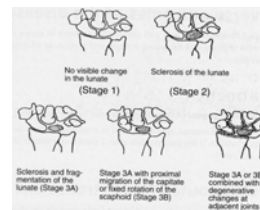
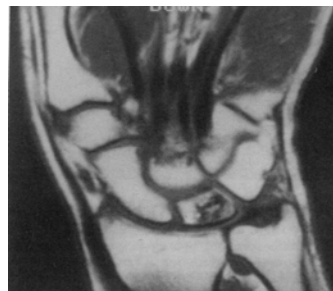
■ Scaphoid Fractures

- Non-union
 - Treatment
 - ORIF
 - Bone grafting
 - Iliac crest
 - Distal radius
 - Vascularized graft
 - Fixation
 - None
 - Pins
 - Screws

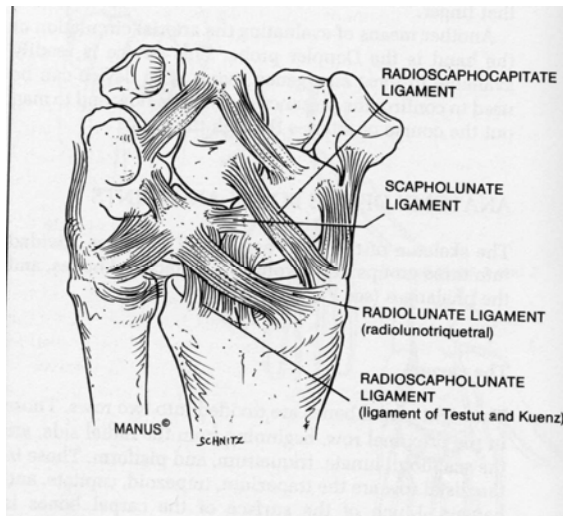


Recognition and Treatment of Hand and Wrist Injuries

- Kienbock's disease
 - Avascular necrosis of the lunate
 - 4 stages
 - No x-ray changes to global collapse and arthrosis
 - May present as pain
 - Often missed in early stages
 - Diagnoses early with MRI
 - Treatment:
 - ?Immobilization early
 - Multiple surgical options depending upon stage



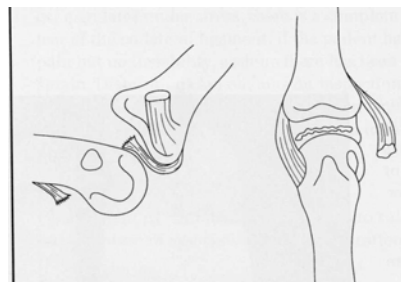
Ligament Injuries:



Common Disorders of the Hand

■ Metacarpal phalangeal joint dislocation

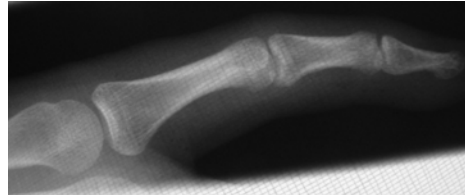
- Usually secondary to forceful hyperextension
- MCP volar plate disruption



Common Disorders of the Hand

■ MCP dislocation

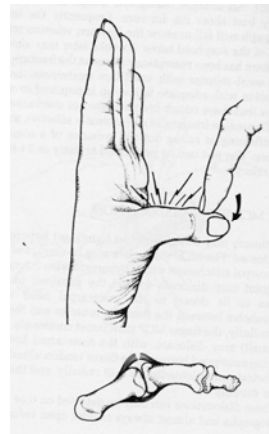
- Must have true lateral x-ray view
- Closed reduction usually possible
- Likely requires open reduction if button-holed
- Dorsal approach



Common Disorders of the Hand

■ Ulnar Collateral Ligament Disruption

- Most common is UCL of thumb
 - "Gamekeeper's thumb"
 - "Skier's thumb"
- Finger Collaterals
 - Usually treated closed
 - Buddy tape, ROM



Recognition and Treatment of Hand and Wrist Injuries

■ UCL Thumb

■ “Gamekeeper’s Thumb”

■ Diagnosis

- History of acuter radial deviation of thumb
- Tenderness over UCL
- Assess for fullness
 - Stener’s lesion
 - Retracted UCL ligament with interposed aponeurosis
 - Poor prognosis for closed treatment

Common Disorders of the Hand

■ UCL Thumb

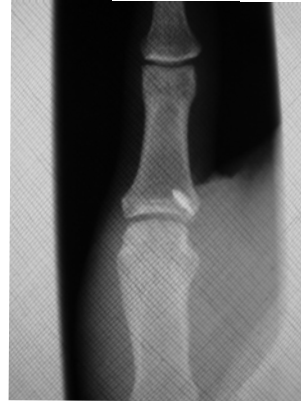
■ Stress evaluation of Thumb MCP

- Clinical evaluation
 - End point
 - Asymmetry
 - Extension and 20 -30 degrees flexion
 - Anesthetic
- Radiographs
 - >30 degrees deviation
 - >15 degrees deviation compared to uninjured side

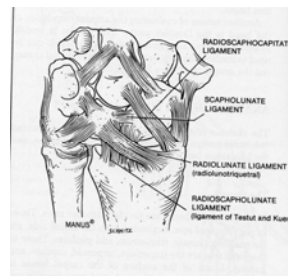
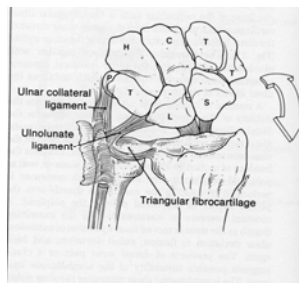


Common Disorders of the Hand

- UCL Thumb - “Gamekeeper’s thumb”
 - Stable UCL
 - Thumb spica cast or splint
 - Unstable UCL
 - Consider surgical repair



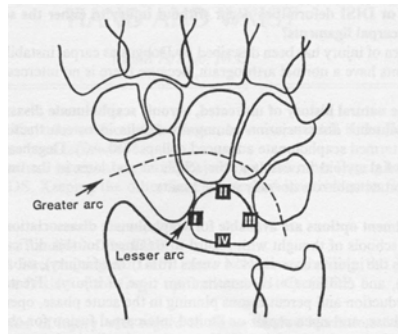
Common Disorders of the Hand



- Ligaments of the Wrist
 - Radiocarpal
 - Ulnocarpal
 - Interosseous

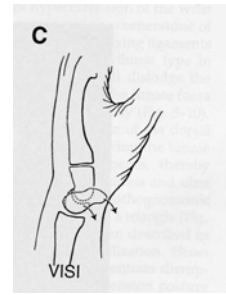
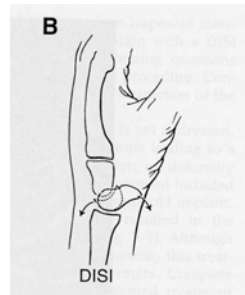
Common Disorders of the Hand

- Mayfield Classification of wrist ligament injuries
 - Progressive injury pattern
 - Greater and lesser arc injuries
 - Associated fractures
 - Radial styloid
 - Scaphoid
 - Ulnar styloid



Common Disorders of the Hand

- Carpal Instability - Dissociative (CID)
 - Disruptions of SL or LT connection
 - DISI
 - Dorsal Intercalated Instability
 - VISI
 - Volar Intercalated Segmental Instability



Common Disorders of the Hand



Common Disorders of the Hand

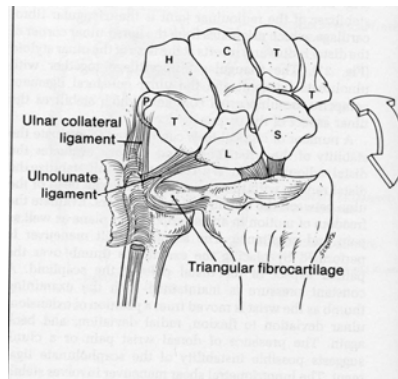
■ Perilunate/Lunate Dislocation

- Result of progressive disruption about the lunate
- Not infrequently missed
- Must assess median nerve
- Reduction and surgical treatment indicated
 - May require surgical reduction, especially if delayed presentation



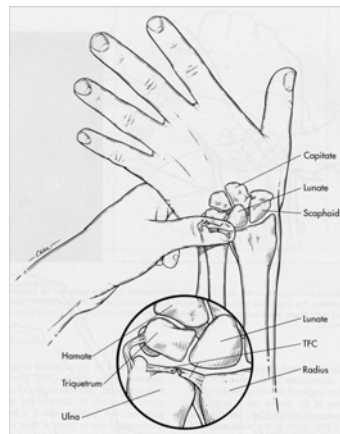
Common Disorders of the Hand

- Triangular Fibrocartilage
 - Major stabilizer of the distal radioulnar joint (DRUJ)
 - Traumatic/acute or Degenerative



Common Disorders of the Hand

- TFCC
 - Presentation
 - Ulnar sided wrist pain
 - Insidious onset
 - Acute onset
 - May have history of abrupt, rotational injury e.g. striking ground with golf club



Common Disorders of the Hand

■ TFCC

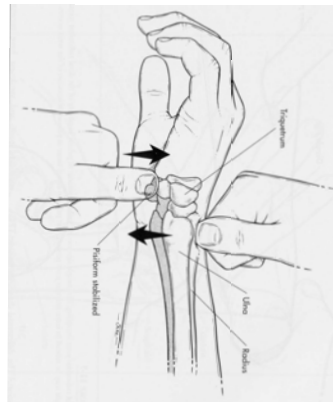
- Degenerative
 - Progressive pain
 - Tenderness over ulnocarpal joint
 - Positive ulnar impaction test
 - Ulnar positive variance



Common Disorders of the Hand

■ TFCC injury

- Acute
 - Traumatic injury
 - May be associated with distal radius fracture
 - Higher association with ulnar styloid avulsion on x-ray
 - Tenderness at ulnar snuff box, distal ulna
 - Instability or pain with distal ulnar stress



Common Disorders of the Hand

■ TFCC injury

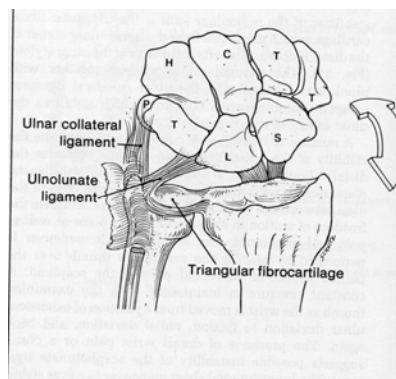
- Differential diagnosis
 - Hook of hamate fracture
 - LT ligament injury
 - Pisotriquetral injury or DJD
 - Ulnar styloid injury or non-union
 - ECU tendonitis or subluxation
 - FCU tendonopathy
 - DRUJ injury or DJD
 - Ganglion cyst



Common Disorders of the Hand

■ TFCC evaluation

- X-ray
 - Assess ulnar variance
 - May be normal
- MRI
 - Increased signal
 - May be normal
- Arthrogram
 - TFCC leak
 - Also seen in asymptomatic wrists
 - May be normal
- Arthroscopy
 - Gold Standard



Common Disorders of the Hand

- TFCC injury
 - Treatment
 - Immobilization
 - Eliminate Pro/Sup
 - Long arm splint or cast
 - Injection
 - Arthroscopy
 - Repair
 - Peripheral
 - Debridement
 - Central
 - Ulnar shortening

Common Disorders of the Hand

- Carpal Ligament Disruption - Acute
 - History of injury
 - Tenderness
 - Pain and instability on exam
 - Often missed



Normal SL
Gap



Widened
SL Gap

Common Disorders of the Hand

■ Carpal Ligament Disruption - Acute

■ X-Ray evaluation

- SL, LT gap and alignment
 - 3mm or greater (Terry Thomas sign)
 - suspicious
 - >5mm
 - confirmatory
 - >1mm larger than contralateral side
- SL angle
 - Normal: 30 to 60 degrees



Normal SL Angle



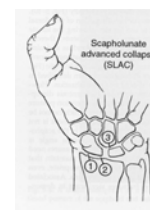
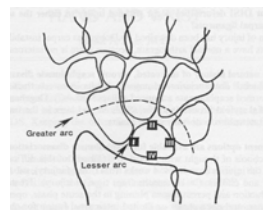
Increased SL Angle

Common Disorders of the Hand

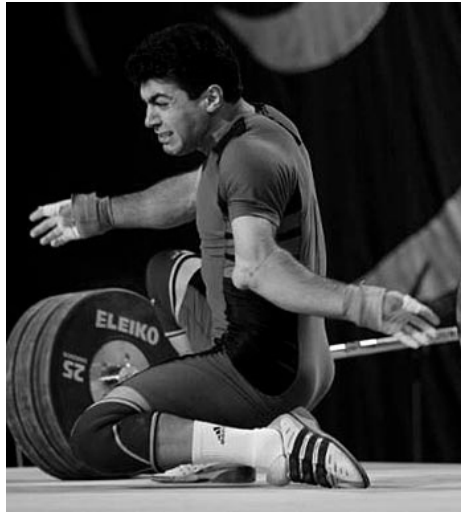
■ Carpal Instability - Acute

■ Treatment

- Dynamic
 - Immobilize
 - Static
 - Surgical reconstruction
 - Treatment of chronic injuries not as favorable
 - Untreated injuries go on to progressive arthritis
- SLAC: ScaphoLunate Advanced Collapse

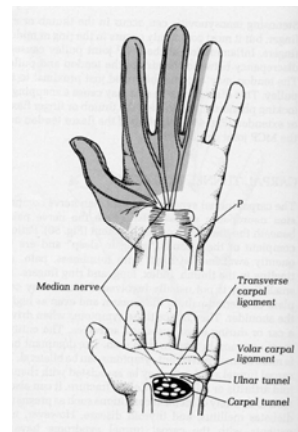


Thank You



Common Disorders of the Hand

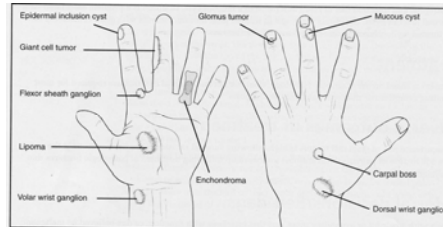
- Compression Neuropathies
 - Carpal Tunnel Syndrome
 - Cubital Tunnel Syndrome
 - Pronator Syndrome
 - Ulnar Tunnel Syndrome
 - Radial Tunnel Syndrome
 - DRSN Neuritis



Common Disorders of the Hand

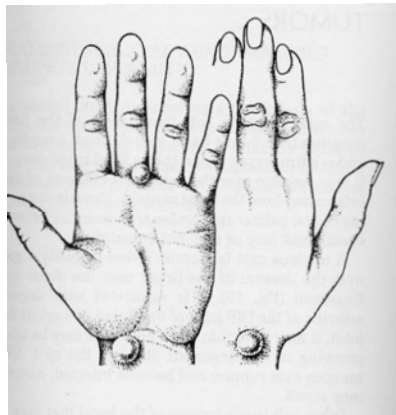
■ Benign Tumors and Masses

- >95% Benign
- Most common
 - Cysts
 - Ganglion
 - Retinacular
 - Mucinous
 - Soft tissue
 - Giant Cell Tumors
 - Hemangiomas
 - Bone
 - Carpal Boss
 - Osteophytes



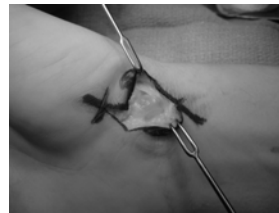
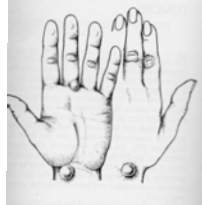
Common Disorders of the Hand

- Ganglion Cysts
 - Synovial cyst
 - 60-70% of soft tissue tumors of the hand
 - Predominantly dorsal wrist (70%)
 - Most often arise from SL ligament
 - Volar (20%)
 - Commonly arise from STT or RC joint
 - Also seen at volar MCP
 - Retinacular cyst
 - Arising from flexor sheath



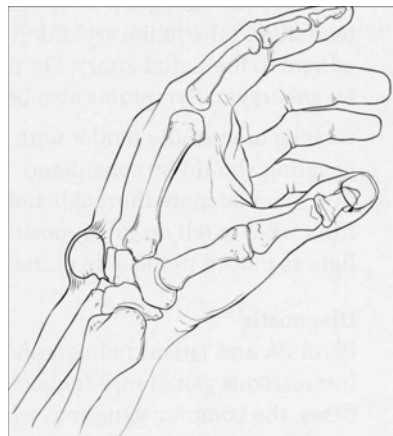
Common Disorders of the Hand

- Ganglion Cysts
 - Gelatinous substance filled cyst
 - High concentration of hyaluronic acid



Common Disorders of the Hand

- Ganglion Cysts
 - Treatment
 - Observation
 - Aspiration
 - Higher recurrence rates (20%)
 - Steroids ineffective
 - Excision
 - With stalk and portion of capsule
 - Recurrence rates as low as 10%



Common Disorders of the Hand

- **Carpal Boss**
 - Osteoarthritic spur occurring at the base of the 2nd and/or 3rd CMC
 - Often confused with ganglion cyst
 - Firm, non-mobile, occasionally tender mass seen on slightly supinated, oblique x-ray
 - May be excised if symptomatic

