Wrist & Hand Fracture Topics

• Bony structure and anatomy
• Bony injury and repair
• Fracture types
• Factors affecting healing and outcomes
• Methods of fracture fixation
• Common fractures

Bony Structure & Anatomy

Composition, Histology, Morphology, Anatomy, Classification

Histology

**Bone Composition**

Organic Components

30% Dry Weight
- Type I Collagen
- Noncollagenous Proteins
- Growth Factors and Cytokines

Inorganic Components

70% Dry Weight
- Calcium & Minerals
- Hydroxyapatite
- Water
Bone Cell Morphology

**Osteoblasts**: Bone forming cells,
Immature Osteocytes
Produce type I collagen
Line surface of bone

**Osteocytes**: Most numerous, Mature Osteocytes
Form latticework
Eventually become mineralized

**Osteoclasts**
Reabsorb bone
Produced from marrow cells

Bone Structure

**Cortical bone** – compact bone
• Concentrated in diaphysis of long bone
• Houses osteons (contain osteocytes)
• 80% of skeletal mass
• Slower to heal

**Cancellous bone** – trabecular/ spongy
• 20% skeletal mass
• Concentrated at epiphysis and metaphysis of long bones
• Higher metabolic turnover

Adult Bony Anatomy

**Epiphysis**: articular end of bone, which is coated with articular cartilage; has growth potential

**Diaphysis**: shaft of bone

**Metaphysis**: growing portion of the bone between the diaphysis and epiphysis

**Periosteum**: tough vascular covering of bone; thicker in children, thins with aging

Growing Bony Anatomy

**Epiphysis**

**Physis**: Growth Plate
• Between metaphysis and epiphysis
• Fuses approximately age 20 for males and 18 for females

**Metaphysis**

**Diaphysis**
• Periosteum
• Endosteum

Indirect (Secondary) Fracture Repair

Results with non-operative treatment of closed, well-aligned, relatively stable fractures.
Treated by immobilization with a cast or orthosis.

**3 Phases**
1. Inflammatory Phase: first week after injury
2. Reparative Phase: 2-3 weeks after injury
3. Remodeling Phase: 3 weeks- 18 months after injury

Bony Injury & Repair

Method of Injury, Fracture Repair
Healing Phases

Indirect Fracture Repair
1. Inflammatory Phase

- Accumulation of a hematoma
- between fracture ends
- under elevated periosteum
- Bone necrosis (osteocytes lose nutrition)
- Angiogenesis, restoration of blood supply
- Proliferation of fibroblasts and osteoblasts
- Invasion of leukocytes and macrophages

2. Fracture Reparative Phase

- Hematoma organizes – forms fibrin scaffold for repair cells
- External cartilaginous callus forms from periosteum and internal callus from endosteum
- New bone and osteoblasts bridge fracture site

*Crucial period of immobilization during callus formation until clinical stability 4-6 weeks after injury.*

3. Remodeling Phase

- Occurs over a prolonged period, 18-24 months
- Continuous bone resorption/bone formation
- Influenced by forces of stress
- Bone is remodeled as osteoclasts reabsorb callous

Direct Fracture Repair

Occurs with open (surgical) treatment of fractures using pins, screws, plates, external fixation.

- Bone forms across approximated ends of bone
- Gap healing can occur for small defects
- Inflammatory phase skipped; goes straight to reparative phase

Fracture Complications

- Malunion / nonunion
- Joint stiffness
- Tendon adhesion
- Post-traumatic arthritis
- Chronic Regional Pain Syndrome
- Open fractures: infection/including osteomyelitis
Fracture Types

Imaging & Classification

Imaging Techniques

- **X-ray**: standard/stress views, bone lesions
- **Fluoroscopy**: video of x-ray
- **Arthrogram**: dye injected into area – leakage shows tear
- **MRI**: soft tissue
- **CT**: complex fractures

Fracture Classification

- **Location in Bone**
  - Epiphysis
  - Diaphysis
  - Metaphysis

Salter-Harris Fracture Classification

**Pediatric fractures including physis**

- **Salter I**: through growth plate (physis)
- **Salter II**: through physis & part of metaphysis
- **Salter III**: through physis; longitudinal fracture through epiphysis
- **Salter IV**: longitudinal fracture
  - extends into metaphysis, physis, and epiphysis
  - alignment necessary to restore articular surfaces
  - physeal plate damage unknown
- **Salter V**: crush injury to germinal cells of epiphysis; premature closure of physeal plate

Salter Harris Fracture Classification

- **Mnemonics**
  - **SALTR**
    - **S**: slipped (type I)
    - **A**: above (type II)
    - **L**: lower (type III)
    - **T**: through or transverse or together (type IV)
    - **R**: ruined or rammed (type V)
  - **SMACK**
    - **S**: slipped (type I)
    - **M**: metaphyseal (type II)
    - **A**: articular-epiphyseal (type III)
    - **C**: complete-metaphysis and epiphysis (type IV)
    - **K**: kruished (type V)

Fracture Classification

- **Angle**
  - Transverse
  - Oblique
  - Spiral
  - Longitudinal

- **Complexity**
  - Simple (2 pieces)
  - Comminuted (multiple pieces)

- **Closed versus Open**
  - Degree of soft tissue damage
  - Open fractures carry risk of infection
Factors Affecting Healing & Outcomes

Patient Factors, Fracture Factors

Patient Factors Affecting Healing
- Patient’s age
- Patient’s mental status
- Complexity/Character of fracture – open/comminuted have a higher nonunion rate
- Systemic disease & metabolic factors – RA, Diabetes
- Bone disease – tumor, osteomyelitis
- Soft tissue complications – nerve, tendon, ligament injuries
- Steroid use – delays healing
- Nutritional factors, ETOH, tobacco use – delay healing

Fracture Factors Affecting Outcomes
- Restoration of anatomical alignment
- Ability to maintain reduction
- Reduce possibility of instability, malunion or shortening
- Associated soft tissue and nerve injury
- Appropriate therapy to restore motion and function

Methods of Fracture Fixation

Conservative Care (Closed Reduction), Open Reduction Internal Fixation, External Fixation

Closed Management
- Immobilization until cleared by Xray
- Cast
- Orthosis
- ROM to uninvolved joints
- Edema control
- Healing by indirect method

Open Management
- Alignment and reduction by pins, wires, screws, plates
- Allows relative stability for early motion
- Introduces risk of infection, wound care
Open Reduction and Internal Fixation (ORIF)

**Indications**
- Unstable fractures
- Fractures requiring early motion
- Fractures with high incidence of non-union
- Methods: screws, plates, k-wires, interosseous wires

External Fixation

External Fixation provides traction to prevent fracture shortening or angulation.

Fracture Management Therapy Principles

- Immobilization
- Edema control
- AROM of uninvolved joints and surrounding soft tissue ASAP
- Protection of healing fracture while applying controlled stress to improve motion and strength.

Therapists should have an understanding of:
- Appropriate timing
- Fracture stability/alignment
- Operative procedures performed
- Potential dysfunction at uninvolved joints

Common Fractures

Distal Radius Fractures, Carpal Fractures, Metacarpal Fractures, Phalanx Fractures

Distal Radius Fracture

**Causes**
- FOOSH
- MVA
- Crush injuries
- Low impact force in patients with osteoporosis

Distal Radius Alignment

- Radial Inclination = 21-25°
- Palmar Tilt = 11-12°
- Radial Height = 10-13mm
- All components are important for a stable & pain-free wrist capable of accepting forces
Normal Ulna

- Separated from proximal row by TFCC (see arrow)
- Radius rotates around fixed ulna
- Ulnar variance = length of ulna relative to radius
  1. Neutral
  2. Ulnar plus (ulna is longer)
  3. Ulnar negative (ulna is shorter)

Ulnar Variance

Reduction in distal radius length alters the force distribution through the radius and the ulna.
- Normal 80% radius and 20% ulna
- The ulnar side of wrist is not intended to be the primary weight-bearing joint
- Positive ulnar variance has a greater chance of TFCC injuries

Distal Radius Fracture Types

- **Colles’ Fracture:**
  - Complete extra-articular fracture of distal radius w/dorsal displacement
  - 80% require reduction
  - Often loose reduction & require ORIF
- **Smith’s Fracture:**
  - Reverse Colles’
  - Radius displaces palmarly (volar displacement)

Distal Radius Fracture Types

- **Barton’s Fracture:**
  - Rim of distal radius with volar or dorsal displacement; intra-articular
- **Chauffeur’s Fracture:**
  - Fracture of radial styloid

Barton’s w/dorsal displacement

Classification System of Distal Radial Fx

- **Frykman Classification:**
  - Distinguishes between intra-articular and extra-articular fractures and includes DRUJ involvement
  - Types I-VIII: higher numbers indicate more severity
  - Even types are based on odd types + Ulnar styloid process

Ulna Fractures

- **Ulnar shaft fractures:** may disrupt distal radioulnar joint (DRUJ)
- **Ulnar styloid fractures:** seen in 50% of distal radius fractures
Distal Radius Fractures
Therapeutic Intervention

- Edema Control
  - Compression
  - Elevation
- Digit Motion
  - Active
  - Passive
- ROM of Proximal Joints
  - Forearm
  - Elbow
  - Shoulder

Tendon Gliding Exercises

- Hook fist
- Tabletop
- Flat fist
- Composite fist

Therapy: Non-displaced Closed Reduction

- Initiate early treatment, if indicated, while wrist is immobilized
- 4-6 weeks: cast removed; fit with prefabricated or custom wrist splint; worn continuously or between exercise
- AROM to forearm, wrist 4-6 weeks
- PROM, joint mobs 8 weeks
- Wean splint usage
- 8-12 weeks: strengthening

Therapy: Distal Radius ORIF

- Splint for protection
- AROM can usually begin at 1-2 weeks. Hardware provides stability
- Wean from splint and progress AROM/PROM weeks 5-8
- Wrist and forearm strengthening at 8-10 weeks

Therapy Distal Radius External Fixation

- Wound care—light dressing if needed, care of other wounds per MD orders, pin site care
- Follow treatment guidelines for casted fracture
- Splinting as needed for ulnar support and/or web space
- Treat as normal fracture after removal
Wrist Fracture Complications

- Joint stiffness
- Malunion
- Complex Regional Pain Syndrome
- Median nerve compression
- Radiocarpal arthritis
- Weakness of grip
- Long term edema
- Carpal instability
- EPL rupture
- TFCC injury/tears
- Intrinsic contracture
- Persistent pain
- Need for further surgery
- Hardware failure

Wrist ROM Research and Therapy Goals

- 40° flexion 40° extension
- 40° combined RD/UD are considered functional ROM at the wrist
- Patient can be fully functional with less than “normal” wrist ROM
- Goal is functional, pain-free ROM

Distal Radius External Fixation Complications

- Pin tract infections
- Non-union
- Median neuropathy
- Irritation of dorsal sensory branch of radial nerve
- RSD/CRPS
- Damage to tendons or intrinsic hand muscles

Healed Distal Radius Fractures

- Strengthening
- BTE
- Putty
- Wrist/FA curls
- FES – tendon excursion and retraining
- Composite dynamic splinting: extrinsic muscle tightness
- Refer for F.C.E. if unable to RTW
- Return to leisure activities modifications as needed

Carpal Fractures - Frequency

- Occur 1/10th as frequently as distal radius fractures
- Scaphoid: account for 60-70% of all carpal fractures
- Triquetrum/Lunate: second most common - account for 20% of all fractures
- Others: combined account for only 7-10% of carpal fractures
Carpal Fractures – Less Common

• Trapezium: often associated with fractures/dislocations involving thumb
• Pisiform: trauma over ulnar/volar wrist, proximal hypothenar eminence
• Capitate: rare because this carpal is in a centrally located and protected position
• Trapezoid: rare; crush or high energy impact

Scaphoid Fractures

• 90% occur from force applied with wrist in extension (FOOSH)
• Vulnerable to injury
• Difficult to diagnose - often made based on clinical signs
• Delayed presentation on x-ray
• Variable healing times according to fracture site

Healing Times: Scaphoid Fractures

• 5-20 weeks depending on location
• Blood supply enters distal to proximal
• Proximal Pole: poor vascular supply; longest healing time 16-20 weeks

Non-Operative Management and Therapy

• Immobilization 6-12 weeks in cast/splint
• Forearm based thumb spica with IP free
• AROM to uninvolved joints including fingers, thumb IP
• Follow guidelines for healing/healed fractures

Therapy: ORIF with bone graft (Herbert screw, Russe Technique)

• Immobilize 4-16 weeks in cast or orthosis
• Immobilized until bone union in a thumb spica with the IP free
• Orthosis can be worn post-op or post immobilization for rigorous activity

Complications: Scaphoid Fractures

• Non-union
• Carpal instability
• Carpal ligament injuries
• Delayed diagnosis
• Normal anatomical alignment not restored
• AVN: Avascular Necrosis
Therapy: ORIF of Scaphoid

- AROM initiated when bone union is verified
- PROM 1 week later or per MD recommendations
- Strengthening 3-4 weeks later or per MD

Carpal Fractures: Less Common 7-10%

- Trapezium: associated with fracture/dislocation involving thumb
- Pisiform/Hamate: trauma over ulnar/volar wrist from fall or blow from handle of club, racquet or bat
- Capitate: rare because centrally located and protected
- Trapezoid: rare; crush or high energy impact

Triquetrum Fractures:

- 2nd most common carpal fracture
- Caused by FOOSH with wrist extended and ulnarly deviated
- Requires 4-6 weeks in short arm cast

Lunate Fractures:

- Often result of repeated compression or from FOOSH
- Potential to develop avascular necrosis (Kienbocks disease)
- Short arm cast x 6-8 weeks

Kienbock’s

- Avascular necrosis of the lunate
- Associated with negative ulnar variance
- Varying degrees of disability - wrist pain, limited extension, weak grip
- Point tenderness over dorsal aspect of lunate

Hamate Fractures

- Easily missed, so look for tenderness over hook
- Body of hamate: usually stable, casted 4-6 weeks
- Hook of hamate: can be associated with ulnar nerve involvement due to hemorrhage or compression in Guyon’s canal
- May require excision of hook
Therapy: Healed Carpal Fractures

- Follow treatment guidelines for distal radius fractures
- Focus on wrist and thumb ROM, composite flexion
- May require protective splint post cast removal and between exercise
- Evaluate/treat for intrinsic, extrinsic flexor/extensor tightness

- Use static progressive/dynamic splinting for wrist flex/extension
- Grip/wrist strengthening within pain free range
- Work hardening depending on RTW status
- Provide home exercise program

Carpal Fractures – Complications

- Re-fracture - wrist absorbs stress during normal activities - prolonged protective splinting helps to avoid
- Persistent pain - emphasize pain-free ROM over achieving maximum motion
  - Non-union, malunion, and delayed union - secondary to poor blood supply to many areas

Metacarpal Fractures

- 40-50% all hand fractures
- Quick healing
- Commonly seen in 1st and 5th "border" digits
- Disruption of Interossei muscles
- Potential angulation with fisting from rotational deformity
- Extensor lag may result from metacarpal bone shortening

Metacarpal Fractures-Orthosis

- Collateral ligaments at MP shorten in extension
- MP's need to be immobilized in flexion, safe position
- Goal is to achieve alignment without rotation or shortening

Anatomical Considerations

- Shortening by 3-5 mm can produce intrinsic/extrinsic imbalance
- Malrotation = finger overlap with fisting
- Angulation tolerated better in 4th/5th MCP
- Provide de-rotational taping during early phases, if malrotation is noted
Non-operative Management

- Non-displaced/minimally displaced tend to be stable
- Splint or cast 3-4 weeks
- Safe position
- PIP/DIPs optional per MD request
- Consider forearm- based versus hand- based splint depending on location of fracture

- Initiate AROM to uninvolved joints ASAP
- Initiate AROM for MP flex/ext as indicated by fracture location
- PROM to wrist, MPs 4-6 weeks
- Strengthening 6-8 weeks

Operative Indications

- Multiple fractures
- Open fractures
- Comminuted fractures
- Displaced fractures
- Multitrauma
  - i.e. head injury
- Spiral fractures
  - Tend to be unstable
- Oblique fractures
  - Tend to shorten

Therapy Timeline: Post-Op

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Instructions</th>
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<tbody>
<tr>
<td>24 - 48 Hours Post-Op:</td>
<td>Fabricate protective splint</td>
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<tr>
<td></td>
<td>• Edema management</td>
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<tr>
<td></td>
<td>• AROM to MPs</td>
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<td>• A/PROM to uninvolved joints</td>
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<tr>
<td>2 Weeks Post-Op:</td>
<td>• Isolated ED glides</td>
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<td>• Add scar massage 24 hours following suture removal if wounds are well healed.</td>
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<tr>
<td>3-4 Weeks Post-Op:</td>
<td>• Splint may be discontinued and replaced with buddy taping</td>
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<td>• Continue taping until 6 weeks post-op</td>
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<tr>
<td>6 Weeks Post-Op:</td>
<td>• Begin gradual strengthening program</td>
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Metacarpal Neck Fractures

- Most common site, is the weakest portion
- Caused by compressive force- (blow with closed fist)
- Boxer’s Fracture in 4<sup>th</sup> or 5<sup>th</sup> metacarpal
- Angulation (rotation deformity) can cause pain in palm, claw deformity, trapping of digits)
- Can protrude into palm

Unstable Metacarpal Fracture Therapy Progression

- 0-4 wks: cast or clamshell splint
- 4wks: D/C cast, AROM: resting splint between exercise; scar control
- 2 wks after union: lifting up to 5 lbs., pinch
- 4 wks after union: resistive ex, lifting up to 25 lbs; D/C protective splint
- 8 wks after union: return to sports; heavy work

Metacarpal Fracture External Fixation

- Shortening of 3-5 mm can produce intrinsic/extrinsic imbalance
- Malrotation= finger overlap
- Angulation tolerated better in 4/5th MC
**Metacarpal Fracture, Stable ORIF**

**Therapy Progression**

- **0-3 days:** protective splint; AROM all joints
- **1-3 wks:** sutures removed, scar management; dynamic splinting prn
- **2 wks after union:** lifting up to 5 lbs
- **4 wks after union:** resistive ex, lift up to 25 lbs; d/c splint
- **8 wks after union:** return to normal activities

**Therapy Considerations: Metacarpal Fractures**

- Manage edema (often excessive dorsal edema) to prevent tissue shortening in extended position
- Assess soft tissue over fracture site (extensor tendons)
- Use compressive dressings, elevation, Isotoner gloves, Tubigrip, Coban, etc.

**Therapy to Increase Motion**

- **Hook Fist → Full Fist**
- **Isolates EDC glide**
- **Joint blocking**
- **Tendon gliding**
- Static-progressive splinting may be needed for MCP flexion
- Scar management against adhesions: elastomer, silicone gel sheets

**Complications of MCP Fractures**

- **MP joint contractures common w/head and neck fractures**
- **Extension contractures**
- **Decreased strength especially power grip in 4th/5th MCPs**
- **Decreased composite wrist/digit flexion due to extrinsic extensor tightness**

**Extensor Tendon Adherence**

- Little soft tissue between extensor tendons and metacarpals
- Results in MCP extension lags and extrinsic extensor tendon tightness
- Treatment: wrist flexion with composite fist, isolated EDC exercises, scar massage, scar molds, FES, combined wrist/finger flexion, continuous ultrasound, dynamic splinting

**Specific Exercises**

- **Extrinsic excursion**
  A: Synergistic wrist extension/finger flexion
  B: Synergistic wrist flexion/finger extension
  C: MCP blocking for extrinsic tendon extension
  D: Composite extension and composite flexion
PHALANGEAL FRACTURES

Proximal, Middle, and Distal P1, P2, P3

Types of Phalangeal Fracture

• Oblique, transverse, spiral
• Spiral/oblique tend to be unstable
• Often cause soft tissue adherence
• Comminution = more soft tissue damage
• Stable fractures can be buddy taped

Management of P1, P2 Fractures

STABLE
• Simple nondisplaced fractures can be splinted and/or buddy taped
• Splint can be hand-based or finger-based depending on fracture location
• Consider hand-based for children or at-risk patients

UNSTABLE
• Displaced, mal-aligned or intra-articular fractures are surgical candidates
• 2-3 days post-op: remove bulky dressing and make dorsal/volar based splint to allow easy AROM (hand- or finger-based)

P1, P2 Stable Management

• Weeks 0-4: hand-based, finger-based or buddy taped
• AROM all joints
• 4 weeks (or when stable): PROM
• 2 weeks after union: dynamic splinting; d/c protective splint
• 4 weeks after union: PREs; lifting up to 25 lbs.
• 12 weeks (8 weeks after union): unrestricted activities

Therapy for Proximal and Middle Phalanx Fractures

• Edema control
• Protective splinting
• Facilitate soft tissue glide over dorsal hood
• Tendon glides
• Prevent PIP flexion contractures
• Provide 3 point pressure with extension splinting

P1 Base Fractures

• Hand-based Dorsal Extension Block splint in safety position 2-4 weeks for non-articular fractures
• Design allows compression of fracture
• Allows protected early AROM

Digi Sleeve

3 Point Fixation for Correction of Flexion Deformity
Therapy for P1/P2 Fractures

- Facilitate soft tissue glide over dorsal hood
- A: FDP blocked flexion
- B: FDS blocked flexion
- C: Central slip/lateral bands gliding
- Blocking exercises
- Differential Tendon Gliding
- Composite wrist/digit flexion/extension

ORIF: P1/P2 Fractures

2-5 Days Post-op:
- Replace post-op dressing with protective splint
- Hand-based for P1
- Hand-based or finger-based for P2 depending on patient compliance
- Wound care as needed
- Initiate AROM
- Edema control
- Follow same guidelines for non-operative treatment
- Can initiate earlier PROM/strengthening due to rigid fixation

Complications of P1, P2 Fractures

- PIP flexion contracture - splint in extension
- Limited active PIP extension - use joint blocking
- Flexor tendon adherence at fracture site - tendon gliding

Distal Phalanx Fractures

- Account for 50% of hand fractures
- Thumb/middle most commonly injured
- Crush injury is the most common mechanism
- Heal without excessive treatment

Therapy: Distal Phalanx Fracture

- DIP protective splinting; leave PIP free if possible
- Wound care
- Edema control
- Desensitization program
- Restore DIP ROM when appropriate
- Watch for extensor lag and modify exercises and splinting as needed

Tuft Fractures

Crush/ comminuted fracture
- Painful- hematoma
- Soft tissue injury – debridment
- Often involves the nail bed

Rehab:
- Restore DIP motion without > 10° extension lag
- Desensitization
- Protective splinting to DIP leave PIP free
Mallet Fracture

• Inability to extend the distal phalanx at the DIP joint
• Two forms of mallet finger
  • Tendinous: extensor tendon rupture
  • Bony: bony avulsion fracture of distal phalanx
• Causes a “flexion drop” deformity

Bony Mallet

Therapy: Mallet Fractures

• DIP splint worn continuously
  • DIP in 0°
  • PIP not included in splint
• Splint usage 6-8 weeks
• Different protocols for duration/weaning of splint
• Check for extensor lag, 5° considered within normal limits

Fractures of the Thumb

Phalangeal Fracture Complications

• Numbness
• Cold sensitivity
• Limited DIP ROM
• Nail abnormalities
• PIP flexion contracture
  - splint in extension
• Limited active PIP extension
  - use joint blocking
• Flexor tendon adherence at fracture
  - reduced tendon gliding

Thermoplastic Web Space Splint

Thermoplastc Web

Thermoplastc Web

Thumb Fractures

Bennett’s Fracture

• Intra-articular fracture + dislocation at first metacarpal base
• Intact oblique ulnar ligament stabilizes the small fracture fragment
• Metacarpal shaft is displaced proximally
• Closed vs. open reduction
  • Splint (short arm thumb spica with IP free) x 6 weeks

Thermoplastc Web

Thermoplastc Web

Thermoplastc Web

Thermoplastc Web

Thermoplastc Web

Thermoplastc Web
Post-Op Treatment: Bennett’s Fracture

6 Weeks Post-Op:
- If the fracture is clinically healed, the short arm thumb spica cast is removed
- AROM and gentle PROM to the wrist and thumb
- Thumb spica splint worn between exercise sessions and at night

8 Weeks Post-Op:
- If the fracture is well healed
- Discontinue splinting
- Use taping or dynamic splinting as needed to increase ROM
- Begin gentle strengthening

10 Weeks Post-Op:
- Return to normal activities

Thumb Fractures

Rolando’s Fracture
- Usually caused by axial loading of a partially flexed metacarpal, e.g. football
- Comminuted intra-articular fracture at the first metacarpal base
- Surgery is almost always indicated and immobilized in thumb spica 4-6 weeks

Ulnar Collateral Ligament Injury

Skiers thumb/Gamekeepers thumb
Closed reduction
- Hand based thumb spica splint x 6 weeks
- Surgery if UCL rupture is complete
- Immobilized in thumb spica x 6 weeks
- Controlled AROM 3-4 weeks post op
- Avoid lateral stress to thumb

References