Differential Diagnosis For Wrist and Thumb Pain

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Wrist and Thumb Injuries

- Presentation of Wrist pain:
  - Scaphoid fractures
    - Therapy:
      - Non-surgical
      - Surgical
  - Triangular Fibrocartilage Complex (TFCC) Injuries
    - Therapy:
      - Non-surgical
      - Surgical
- Thumb MP joint pain
  - Therapy:
    - Non-surgical
    - Surgical management
- Steps for successful Return to Sport

Wrist Pain:
Scaphoid Injuries
**Where is Scaphoid?**

- Second largest carpal bone
- “Kidney Bean”
- Sits in Proximal row  
  - Spans over mid-carpal joint
- Blood supply enters at dorsal distal pole  
  - If fracture disrupts the proximal pole, a non-union may occur

**How does it occur?**

- Mechanism of injury  
  - Fall on outstretched hand (FOOSH)  
  - Wrist usually extended with radial deviation  
  - Compression of the waist of scaphoid against radial styloid
- Typically patient presentation  
  - Young Male  
  - Often complaining of wrist pain for a while  
  - “Sprain”  
  - Forearm based thumb spica

**Evaluation…..**

- Primary responsibility with patient presenting with wrist pain symptoms:  
  - Good clinical reasoning to monitor progress or lack of progress  
  - Good biomechanical evaluation of tissues
- Discuss:...  
  - Good history injury  
  - Mechanism of injury  
  - Course of treatment thus far  
  - Early on in treatment:  
    - Splints?
    - Therapy?
    - Exercise?
### Evaluation....

- **Physical Exam**
  - Tenderness and pain over scaphoid
    - Aggravated by palpation at "snuff box"
  - Restricted Range of Motion
    - Wrist extension - Primary
    - Ulnar deviation
    - Radial deviation

- **Functional measurements:**
  - Thumb
    - Radial abduction
    - Palmar abduction
    - Opposition
  - Grip strength
    - Reduced by more than 50%

- **Edema**
  - Consider volumetric measurement
  - Complete on both sides

### Evaluation.....

- After few session is there improvement with.....
  - Pain
  - Range motion
  - Edema

- Communicate with MD!!!!
Conservative management

- Treated with cast immobilization
  - Long thumb spica
    - 6 weeks
  - Short thumb spica
    - Fractured heal
    - 6 weeks
  - May be longer depending on location and healing

While in cast....

- Edema control of digits
  - Compressive wraps
  - Edema massage

- AROM digits
  - What they need to succeed?
    - 504
    - Private school
    - Assist in talking to coaches and peers

While in cast....

- How do we get buy in?
  - Educate on:
    - Proximal Stability for distal function
    - Effects of substitution and compensatory motion
  - Have them doing:
    - Postural stretch/strengthening
    - Shoulder stretching/strengthening
    - Posterior Strengthening
    - Elbow strengthening
    - Core strengthening
    - Endurance
After cast is removed…

- **Primary Goals of Therapy:**
  - Elimination of wrist pain
  - Restore maximum ROM and strength within pain limits!!!!
  - AVOID aggressive therapy
- **Splints…**
  - Forearm based thumb spica

- **Motion**
  - PROM (6-8x/day)
    - Elbow, forearm, wrist and thumb
  - AROM – (6-8x/day)
    - Wrist
    - Thumb
    - Light functional tasks

After cast removed…

- **Good pain free motion:**
  - Strengthening
    - Begin Slowly
    - Edema
    - Pain
    - Discomfort
  - When strengthening is improving…
    - Begin with weight bearing

Weight Bearing

- **KEYS**
  - Avoid torsion loading to wrist
  - Look for substitution in other joints due to lack of strength
    - Shoulder, elbow, forearm
  - If no pain with initial weight bearing, proceed to return to sport activities
Scaphoid Fracture:
Surgical Management

Post-Operative Management

- Casted
  - 10-14 days
- Therapy
  - Sutures removed
  - Splints
    - Short arm thumb spica fabricated with IP free
  - Active and PROM
    - Fingers
    - IP joint of thumb
  - Scar management

- Edema control

Post-operative Management

- Primary Goal:
  - No wrist pain
  - Restore maximum ROM within pain limits!!!!
  - AVOID aggressive therapy
- What they need to succeed?
  - 504
  - Private school
  - Assist in talking to coaches and peers
- How do we get buy in?
  - Postural stretch/strengthening
  - Shoulder stretching/strengthening
  - Posterior strengthening
  - Elbow strengthening
  - Core strengthening
  - Endurance
Progression...

Weeks 2-4
- Flexible wrist splint
  - Controlled active wrist flexion and extension
  - Advantage:
    - Helps to decrease bone osteopenia
    - Helps to maintain articular cartilage health
    - Promotes bone mineralization of fracture site
- Continue with:
  - Scar management
  - Edema control
  - Strengthening to:
    - Scapula/Shoulder area
    - Elbows
    - Forearms
    - Endurance training

Weeks 4-16
- Progression depends on:
  - Fracture showing clinical and radiographic healing
  - MD will determine
- When you have clearance that fracture is healed:
  - Active range of motion to wrist

One week after active motion:
- Active assistive motion
  - Gentle Passive motion
- Complication:
  - Having trouble regaining Motion
- Solution:
  - Try using heat modalities
  - Switch to a static progressive or dynamic splint
Progression....

- 3-4 weeks after active motion began
  - Progressive strengthening to entire upper extremity

- Continue with:
  - Scar management
  - Edema control
  - Strengthening to:
    - Scapula/Shoulder area
    - Elbows
    - Forearms
    - Endurance training

After cast removed...

- When strengthening is improving...
  - Begin with weight bearing

- KEYS
  - Avoid Torsion load to wrist
  - Look for substitution in other joints due to lack of strength:
    - Shoulder, elbow, forearm
  - If no pain with initial weight bearing – progress with return to sport activities

TIPS...

- Complication
  - Over dorsal radial wrist, complaint of following:
    - Pain
    - Numbness
    - Tingling
    - Burning
  - Aggravated by:
    - Wrist flexion and ulnar deviation and thumb flexion

- Common Answer:
  - Compression of dorsal radial sensory nerve

- Treatment:
  - Radial nerve gliding exercises
    - 5 times per day
Wrist Pain: TFCC Injury

Where is TFCC?

- "Hammock-like" Structure
- Composed of:
  - Cartilage and Ligaments
- Acts as:
  - Suspension of the ulnar carpus
  - Distributor of force between the ulnar head and triquetrum
  - Primary stabilizer for distal radioulnar joint

How does it occur?

- When there is a high demand for the wrist to become weight bearing structure:
  - Increase in ulnar-sided force transmission
  - Ulnar positive variance
  - Change in forearm motion and force distribution, which can lead to tear
- Most common ligamentous injury to gymnast wrist
- Location of injury:
  - Central:
    - Poor blood supply = poor healing
  - Peripheral:
    - Good Blood supply = good healing

Dobyns and Gabel
Cooper 2007
Evaluation.....

• Primary responsibility with patient presenting with wrist pain symptoms:
  – Good clinical reasoning to monitor progress or lack of progress
  – Good biomechanical evaluation of tissues

• Discuss:
  – Good history injury
  – Mechanism of injury
  – Course of treatment thus far
  • Early on in treatment:
    – Sleeps??
    – Therapy??
    – Exercise??
    – What else hurts??

Evaluation....

• Physical Exam
  – Complaint of ulnar sided wrist pain
  – Palpable tenderness over ulnar wrist joint

• With movement of:
  – Ulnar deviation and pronation/supination = popping or clicking
  – Forearm rotation or axial loading = pain

• Functional measurements:
  – Decreased strength with gripping
  – Pain with any activity that loads wrist
    • Types activities
    • Biomechanics

Evaluation....

• What else is there to look for?
  – Where does pain occur?
    • Daily activities and/or gym
    • Have they changed how they are doing things?
    • Are there overuse issues?

• Why is it occurring:
  – Is there postural issues?
  – Is there good proximal control/strength?
  – Is there substitution patterns?

• Evaluation:
  – Postural
  – Motion/strength test:
    • Observe if there is hyperextensions
    • Substitution at:
      – Elbow/forearm/wrist
    • Look at weight bearing in multiple positions
Patient X

• After few session is there improvement with.....
  – Pain
  – Range motion
  – Weight bearing

• Communicate with MD!!!!
TFCC: Conservative Management

Conservative approach...

• Typically: 0-6 weeks
  – Splint
  – Rest of forearm and hand
  – Do they need something else to address secondary injury

• Keys:
  – Educate on:
    • Proximal stability for distal function
    • Effects of substitution and compensatory motion
  – Have them doing:
    • Postural stretch/strengthening
    • Shoulder stretching/strengthening
    • Posterior strengthening
    • Elbow strengthening
    • Core strengthening
    • Endurance

Conservative approach...

• Typically: 6-8 wks.
  – Splinting
    • Progress to wrist immobilization
  – ROM
    • Active and Active Assistive exercise to wrist and forearm
  • Modalities
    • Ultrasound/Moist heat
    • Cryotherapy at end of sessions
### Conservative approach...

- Typically 8-12 weeks:
  - Splinting:
    - Wean from splint
    - Consider taping or supportive brace with weight bearing
  - ROM
    - Active and Passive exercise to wrist and forearm

- Closer to 10 Weeks:
  - Strengthening
    - If asymptomatic progress to hand and wrist strengthening
    - Low weight light repetitions

### Conservative approach...

- After improvement in strength...
  - Begin with weight bearing

- KEYS
  - Avoid Torsion load to wrist
  - Look for substitution in other joints due to lack of strength:
    - Shoulder, elbow, forearm
  - If no pain with initial weight bearing – progress with return to sport activities

### Conservative Management

- Typically......
  - If pain persist with strengthening or there is no improvement in pain/symptoms after 2-4 weeks:
    - Refer back to MD for evaluation for surgical interventions
  - Keep in mind that for long standing injuries conservative management is not typically effective
    - > than 6 months

- TIPS:
  - Refer sooner:
    - If plateau with:
      - Pain
      - Range of motion
      - Strengthening
      - Returning symptoms
### Tips....

- If pain persist with strengthening
  - Refer back to MD to consider surgical interventions
- If minimal to no improvement in pain/symptoms 2-4 weeks
  - Refer back to MD to consider surgical interventions

### Keep in mind....

- If it is long standing injury (>6 months)
  - Conservative management typically not effective

### TFCC: Surgical Management

### Post-operative Management: Phase I

<table>
<thead>
<tr>
<th>Central repair</th>
<th>0-3 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral repair</td>
<td>0-4/6wks</td>
</tr>
<tr>
<td>Patient is in:</td>
<td>Bulky post-operative dressing/splint</td>
</tr>
</tbody>
</table>

**Interventions:**
- Edema control
- Ice
- Elevation
- Control pain
- Protect Repair
- No weight bearing activities
- Minimized de-conditioning
  - Postural stretch
  - Shoulder stretching
  - Posterior Strengthening
  - Core strengthening
### Post-operative Management: Phase II

- **Central repair**
  - 3-4 weeks
- **Peripheral repair**
  - 4/6 to 7 weeks
- **Patient has:**
  - Bulky post-operative dressing removed
  - Long forearm based ulnar gutter
  - No forearm rotation
  - Allows elbow, finger and thumb motion

- **Continued Interventions:**
  - Control edema
  - Control pain
  - Protect repair
  - Continue with no weight bearing
  - Continue with minimizing de-conditioning

- **New Interventions:**
  - Begin Scar management
  - Begin ROM
    - Central: AROM and ANROM wrist and forearm
    - Peripheral: AROM and PROM elbow and wrist
  - Emphasize EDC excursion

### Post-operative Management: Phase III

- **Central repair**
  - 5-6 weeks
- **Peripheral repair**
  - 7-8 weeks
- **Continued Intervention:**
  - Control edema
  - Control pain
  - Protect repair
  - Continue with no weight bearing
  - Continue with minimizing de-conditioning
  - Continue Scar management

- **New Interventions:**
  - Central:
    - PROM wrist and forearm
    - Light wrist strengthening
    - Light ADL’s
    - Woven from long splint; consider ulnar wrist gutter splint
  - Peripheral:
    - AROM to forearm
    - Weighted stretches to elbow
    - Wrist mobility and weighted stretches
    - Light ADL’s

### Post-operative Management: Phase IV

- **Central repair**
  - 6 weeks
- **Peripheral repair**
  - 8-10 weeks
- **Continued Intervention:**
  - Control edema
  - Protect repair
  - Continue with no weight bearing
  - Continue with minimizing de-conditioning
  - Continue Scar management

- **New Interventions:**
  - Central:
    - Initiate strengthening if patient is pain free with ROM
    - If patient is asymptomatic= discharge splint
  - Peripheral
    - PROM exercises to forearm
    - Dynamic splinting
      - if needed to increase ROM
    - Light strengthening
    - Splint:
      - Long arm splint changed to wrist immobilization splint
Post-operative Management:

Phase V

- Central repair
  - 7-8 weeks
- Peripheral repair
  - 10-12 weeks

- Continued Intervention:
  - Continued scar management
  - Continue with ROM and strengthening
  - Continue with minimizing de-conditioning

- New Interventions:
  - Central and Peripheral:
    - Begin progressive weight bearing
  - Wean from all splints
  - If no pain with initial weight bearing – progress to return to sport activities

Tips.....

- As athlete is returning to higher level activity:
  - Bracing
    - Ulnar gutter splint
    - UlnarMapped strap
    - Tiger Paws
    - Stock
  - Taping

Thumb MP Pain
Overview of Thumb MP

- Primarily:
  - Hinge joint
  - Arc of motion
- Secondary Arc of motion
  - Flexion/extension
  - Abduction/adduction
- Stability
  - Flexor muscles
  - Abductor pollicis
  - Finger abduction
- Flexor pollicis brevis
  - Abductor pollicis brevis

Range of Motion
- Flexion varies:
  - 6 to 86 degrees
- Lateral motion:
  - 0 to 20 degrees with MP in extension

Thumb MP Joint Injuries

- Injury can happen to the UCL or RCL
  - UCL injuries occur 10x’s more than RCL
- Cause UCL:
  - “Skier’s thumb” or “Gamekeepers thumb”
    - Outstretched hand with thumb in abduction
    - Forced radial deviation of thumb

Thumb MP Joint Injuries

- Symptoms:
  - Along collateral ligaments
    - Pain
    - Tenderness
    - Swelling
  - Any gentle passive stress
    - Tender
    - Painful
Conservative Treatment of Thumb MP Injury

Conservative Management

- Goal therapy
  - Stable and pain free functional joint
- Week 0-4
  - Edema control
  - Short opponens splint
    - Fitted palmar abduction
    - No MP motion
    - As edema decreases may need to adjust

What they need to succeed?

- 504
  - Private school
  - Assist in talking to coaches and peers
- Educate on:
  - Proximal stability for distal function
  - Effects of substitution and compensatory motion
- Have them doing:
  - Postural stretch/stretching
  - Shoulder stretching/strengthening
  - Posterior strengthening
  - Elbow strengthening
  - Core strengthening
  - Endurance
**Progression**

- **Week 4-6**
  - Re-evaluate!!!!
  - If pain is significantly decreased:
    - AROM to thumb
    - Not uncommon to have to wait until 6 weeks
  - If pain is significantly decreased:
    - AROM to thumb
    - Not uncommon to have to wait until 6 weeks

- **Week 6**
  - Relatively asymptomatic:
    - Unrestricted AROM thumb
    - Lateral pinch only

**Progression...**

- **Week 8**
  - Splint is D/C as long as:
    - Non-tender along collateral borders
  - Begin Tip pinch

- **Tips:**
  - Persistent discomfort may benefit:
    - Heat
    - Deep heat in conjunction with active exercise

- **When good pain free motion with light resistance is achieved:**
  - Begin Strengthening:
    - Begin Slowly
      - Edema
      - Pain
      - Discomfort

- **When strengthening is improving...**
  - Begin with weight bearing

- **When tolerate weight bearing – return to sport activities**
Surgical Treatment of Thumb MP Injury

RCL/UCL Repair Thumb MP Joint

- **10-14 Days**
  - Edema control
  - Scar massage
  - Long thumb spica with IP joint free

- **Week 4**
  - Pin removed
  - Continue:
    - Edema control
    - Scar management
  - AROM
    - DIP and IP

- **Week 6**
  - Active Assist ROM 6-8 times per day
    - Manual resistance
    - Abduction/adduction and in abduction
  - Lateral pinch activities

- **Week 7**:
  - PROM
  - Dynamic flexion splint

- **Week 8**
  - Long thumb spica splint D/C
    - except for heavy lifting
  - Begin Tip pinch and tip pinch loading exercises

(Cannon 2001)
Progression....

- When you have:
  - Good, pain free motion with light resistance is achieved:
    - Begin Strengthening:
      - Go Slow
        - Monitor
          - Edema
          - Pain
          - Discomfort

- At 10 weeks:
  - Return to normal activity with exception of:
    - Avoid sustained power pinch until 14-16 weeks
  - Weight bearing...
    - Watch biomechanics!

TIPS.....

- If Incision is over EPL:
  - Scarring may become issue prevent good excursion of EPL

- Solution
  - Consider IP splint in extension at night and between exercises

Tips....

- FPL is easier than FPB to fire:
  - So with stiffness of MP - may be hard to isolate active flexion at MP....

- Solution
  - Fabricate a volar IP extension gutter splint then do MP flexion exercises
Return to Sport Activities

At this point, patient has progressed to:
• Stable
• Full range of motion
• Pain free with:
  – At rest
  – With all motion
  – Light strengthening
  – Light weight bearing activities
  – Began strengthening for proximal stability

Return to Sports:

• GOAL:
  – Return to full Sport Activity
  – Give them tools to remain injury free
    • No repeat of same injury
• How do we do?
  – Assess all biomechanics
    • Postural Stretching
    • Shoulder Stretching and Strengthening
    • Proximal Stability
    • Posterior Strengthening
    • Core Strength
    • Elbow Position
    • Wrist Position
Postural Stretching

- Towel Stretching and Retraining Scapular Positioning
  - Supine Towel Roll Stretch
  - Side lying Towel Roll Stretch and Elongation stretch
  - Trunk rotation

Shoulder Strengthening

- Proximal Stability
  - Shoulder collapse allows for wrist hyperextension forces
- Posterior Strengthening
  - Prevent injury/re-injury

Air Splints Exercises

Theraband Exercises

Shoulder Stability

- Shoulder Collapse
- Stable Shoulder
Core Strengthening

Stability in Elbows
- Watch for hyperextension since this cause over-rotation of wrist

Wrist Positioning
At the End, We have this....

References


THANK YOU