Practical clinical workshop: Repetitive strain injuries

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Outline

- Definition repetitive strain injury
- 3 clinic cases of repetitive strain injury
- Prevention of repetitive strain injury

Repetitive strain injury definition

- Sustained work
- Repetitive work
- Awkward posture
- Soft tissue injury
  - Muscles
  - Tendons
  - Ligaments
  - Nerves

Case #1

- 32 y/o RHD woman presents with right wrist pain x 2 weeks.
- Localizes to the dorso-radial aspect of the wrist.
- Worse using the steering wheel, unscrewing bottles
- SHx: 3 months ago had her first child
What is the diagnosis?

A. Carpometacarpal osteoarthritis
B. Intersection syndrome
C. Wartenberg syndrome
D. De Quervain’s tenosynovitis

Differential diagnosis
cradial-sided wrist + forearm pain

- CMC osteoarthritis
  - CMC grind test
- Intersection syndrome
  - Pain where tendons of 1st dorsal compartment pass over the tendons of 2nd dorsal compartment
  - 4cm proximal to wrist
- Wartenberg syndrome
  - Neuritis of superficial radial nerve → tingling + numbness in distribution of nerve

De Quervain’s Tenosynovitis

- Inflammation of the tendons in the 1st dorsal compartment of the wrist as they pass over radial styloid
  - Abductor pollicis longus
  - Extensor pollicis brevis
- Most common in women ages 30-50
- Has been called mother’s wrist or new mother’s thumb because associated with mothers picking up their small child repetitively

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http://www.eorthopod.com/content/intersection-syndrome
De Quervain’s physical exam

- Swelling and tenderness at radial styloid
- Pain with resisted abduction and extension of thumb
- Finkelstein’s test
  - Make fist with thumb tucked inside
  - Ulnar deviate

De Quervain’s treatment

- Thumb immobilization: Thumb spica splint
- NSAIDs
- Injection
- Natural history not well-defined
- Majority are better by 18 months

De Quervain’s injection

<table>
<thead>
<tr>
<th>Syringe</th>
<th>Needle</th>
<th>Kenalog 40mg/ml</th>
<th>Lidocaine</th>
<th>Total volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1ml</td>
<td>25g 0.5inch</td>
<td>10mg (0.25 ml)</td>
<td>0.75ml 2%</td>
<td>1ml</td>
</tr>
</tbody>
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- Patient’s hand placed vertically with thumb in slight flexion
- Find gap between 2 tendons at base of 1st metacarpal
- Insert needle perpendicularly into gap then slide proximally between the 2 tendons, in tendon sheath
- Inject solution as bolus within tendon sheath
- Can often see sausage swelling where solution tracks up tendon sheath
- Risks: Depigmentation +/- fat atrophy
- Rest hand x 1 week after injection

Case #2
- 33 y/o RHD male w/ right lateral elbow pain x 3 weeks
- Insidious onset
- Pain worse with grip activities
  - Remodeling home: trouble using screwdriver
  - Feels weak carrying groceries
- No numbness or tingling of his arms or hands

Case #2 physical exam
- Normal neck exam.
  - Full AROM with forward flexion, extension, lateral bending, twisting
  - Nontender cervical spine
  - Negative Spurling's test
- No swelling or ecchymosis of elbow
- Tender lateral elbow 1-2 cm distal and anterior to lateral epicondyle
- Elbow ROM 0-150 ext-flexion, 90/90 supination, pronation
- Pain with resisted wrist extension.
- 5/5 strength and 2+ reflexes of upper extremities bilaterally
- (-) Tinel at ulnar groove
- No laxity with varus or valgus stress to the elbow

What's the diagnosis?
A. Lateral collateral ligament sprain of the elbow
B. Radial tunnel syndrome
C. Lateral epicondylitis
D. Cervical radiculopathy

Lateral epicondylitis
- Also known as common wrist extensor tendinopathy or tennis elbow
- Most common overuse elbow injury
- Degenerative tendon of extensor carpi radialis brevis muscle
Epidemiology

- Only 5% due to tennis
  - 10-50% of tennis players have this at some point in their tennis careers
  - Backhand most common stroke implicated
- Common in factory workers
  - 7-11% in meat processing factory
- Men = women
- Peak age 40-50 y/o

Pathophysiology

- Not inflammation
- High eccentric and concentric loads at ECRB origin + relative hypovascularity
- Angiofibroblastic tendinosis
  - Disorganized tissue
  - Immature fibroblasts
  - Nonfunctional vascular proliferation

Lateral epicondylitis history

- Aching pain worse with activity
- Frequently radiates into lateral forearm
- May have night pain
- Common in racquet sports & occupation requiring flexion/extension
- 75% dominant arm

Cozen’s test

- Elbow flexion or extension, forearm pronation, resisted wrist extension. (+) if pain at lateral epicondyle.

http://www.youtube.com/watch_popup?v=ehYTeDN4usc&vq=medium
Mill’s test

- Pain reproduced with passive wrist flexion, pronation, and radial deviation

http://www.youtube.com/watch_popup?v=sL-W5aeDsHl&vq=medium

Lateral epicondylitis differential diagnosis

- Lateral collateral ligament instability, sprain
  - Laxity with varus stress to the elbow
  - H/o elbow dislocation
- Radial tunnel syndrome
  - Pain 3-4 cm distal to lateral epicondyle
  - Most commonly where posterior interosseous nerve is compressed by the arcade of Frohse
- Fracture
- Intra-articular elbow pathology
- Triceps tendonitis
- Referred pain from C spine, shoulder

Radial tunnel syndrome

Radial tunnel syndrome at the elbow

Radial nerve

Supinator muscle

Anterior elbow

Lateral epicondylitis treatment: Pain control

- NSAIDs x 10-14 days if no contraindication
- Ice
- Activity modification
- Counterforce brace
- Cock-up wrist splint
- If above does not help
  - Corticosteroid injection
    - Short-term relief
    - No long-term benefit
  - Fallen out of favor as many studies have shown injections to be no more effective than placebo
Tennis modifications

- Avoid fully pronated forearm during backhand
- Impact of ball on racquet should occur when body weight moving forward
- Examine racquet handle size
- Decrease racquet string tension
- Enlarge grip handle
- Avoid using heavy tennis balls

Case #3

- 60 y/o RHD man presents with left wrist pain and finger numbness.
- Worst numbness in the index finger and middle finger.
- Worse at night, wakes up and shakes his hand to make it feel better
- Denies any trouble picking up small objects or buttoning his shirt
What’s the most common peripheral mononeuropathy?

Carpal tunnel syndrome

Diagnostic criteria
1. Numbness and tingling in median nerve distribution
   - Thumb, index finger, middle finger
2. Numbness at night
3. Weakness +/- atrophy of thenar muscles
   - Thumb abduction
4. (+) Tinel sign at carpal tunnel
5. (+) Phalen’s test
6. Loss of 2-point discrimination

Tinel sign at carpal tunnel


http://www.correctivechiropractic.net/why-chiropractic/why-people-come-in/carpal-tunnel/
What causes CTS?

- Popular perception: repetitive strain injury
  - Occupation
  - Repetitive wrist motion: keyboard, mouse
  - Vibration
- Evidence lacking for repetitive strain injury
- Other factors
  - Genetics
  - Age, gender, obesity, type 1 diabetes


Ddx carpal tunnel syndrome

- Pronator syndrome
  - Median nerve compression by pronator teres in the forearm
  - Same symptoms as CTS except...
    - Numbness of thenar eminence in pronator syndrome.
    - (-) Tinel sign and Phalen’s test
- Cervical radiculopathy


Diagnostic testing for CTS

- No gold standard tool
- CTS is a clinical diagnosis
  - Accurate diagnosis based on clinical findings high; added value of electrodiagnostic testing questionable
- EMG and NCS commonly used preoperatively
  - Confirmatory tool
  - Exclude other neurologic problems (cervical radiculopathy)
  - Monitor unexpected outcomes (nerve injury, incomplete release)

Treatment for CTS

• Early: no median nerve denervation
  – Nonsurgical
    • Splint
      – Benefit for up to 3 months
    • Steroid injection
      – Benefit over placebo, oral steroids, and splint for between 2 weeks – 6 months
      – Prognostic benefit: those who respond to steroid may have better response to surgery
  • Oral steroids
    – Benefit up to 8 weeks
  • Ultrasound

Carpal tunnel release

• Indications
  – Evidence of median nerve denervation
  – Failed nonsurgical treatment
  – At any stage if patient prefers surgery to nonsurgical treatment
• No significant cost difference between non-op and operative treatment
• High level of patient satisfaction
  – Reoperation occurs < 5% of cases

Prevention of repetitive strain injuries

• Hands, wrists, forearms parallel to the floor
• Head faces forward, bent slightly forward
• Elbows close to body bent at 90-120°
• Feet supported by floor or footrest
• Back supported by lumbar support, sitting vertical or leaning back slightly
• Thighs and hips supported by well-padded seat, parallel to the floor
• Knees same height as hips
• Feet slightly forward

Prevention

Prevention

• Take breaks: Stand up and walk around a few minutes every hour
• Change work position throughout the day
• Stretch fingers, hands, arms, torso

References


Thank you

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