Hand Muscle Power Deficits

ICD-9-CM codes: 727.03 Radial styloid tenosynovitis
727.04 Trigger digits

ICF codes: Activities and Participation Domain codes: d4301 Carrying in the hands; d4400 Picking up; d4401 Grasping; d4452 Reaching; d4453 Turning or twisting the hands or arms
Body Structure code: s73012 Muscles of forearm
Body Functions code: b7300 Power of isolated muscles and muscle groups

Common Historical Findings:

Thumb abductors/extensors musculotendinous involvement:
- Pain in dorso-radial wrist that is most noticeable with pinching and wrist movements
- Onset associated with repetitive thumb and wrist movements or trauma to the area (e.g., blow to lateral wrist)

Finger flexors musculotendinous involvement:
- Pain, stiffness, and swelling of the volar surface of finger and palm
- Snapping or locking with attempted movement

Common Impairment Findings - Related to the Reported Activity Limitation or Participation Restriction:

Thumb abductors/extensors musculotendinous involvement:
Symptoms reproduced with:
- Resisted APL and EPB tests (weak & painful)
- Stretch to APL/EPB tendons (Finklestein’s)
- Palpation/provocation of the APL and EPB tendons

Finger flexors musculotendinous involvement:
Symptoms reproduced with:
- Resisted FDP and FDS tests (weak and painful)
- Palpation/provocation of the FDP and/or FDS tendon

Physical Examination Procedures:

Manual Resistive Test
Abductor Pollicis Longus

Manual Resistive Test
Extensor Pollicis Brevis

Cues: Abduction of the thumb is a movement perpendicular to the palm-away from the palm
Extension of the thumb is a movement parallel to the palm - away from the palm
Provocation of APL and EPB Tendons

Cues: If acute - gentle palpation reproduces symptoms
      If sub acute - stronger provocation may be required to reproduce the symptoms
      In normals - firm pressure is painfree

Finkelstein’s Test

Cues: Stretch of APL and EPB
      Instruct patient to grab thumb with fingers - then slowly ulnarly deviate the wrist
      (demonstrate motion to the patient)
      Perform test slowly to avoid further tissue injury and pain
Wrist Mobility Deficits: Description, Etiology, Stages, and Intervention Strategies

The below description is consistent with descriptions of clinical patterns associated with wrist Radial Styloid Tenosynovitis the vernacular term “DeQuervain’s Syndrome”

Description: Pain, tenderness and swelling over the first dorsal compartment, increased with thumb and/or wrist motions. Pain is worse with passive stretch into wrist ulnar deviation with the thumb held in neutral (Finklestein’s test) or repetitive active thumb abduction and extension. The aggravating stress is greatest when radial deviation is combined with a gripping motion of the thumb because of the angulation of the tendons causes tearing stress to the extensor retinaculum. Pain may radiate either proximally or distally toward the thumb or elbow. There may be decreased abduction range in the carpometacarpal joint of the thumb, and palpable thickening of the extensor sheath and the tendons distal to the extensor tunnel.

Etiology: A stenosing tenosynovitis of the first dorsal compartment. The compartment is approximately 1 in. in length and is formed by the osseous groove in the radial styloid and the overlying extensor retinaculum. This first dorsal compartment houses the tendons of abductor pollicis longus (APL) and extensor pollicis brevis (EPB). It usually affects women between the ages of 30 and 60 years old, and those who participate in wheelchair sports. It is most common in repetitive activities such as keyboarding, filing, carpentry, assembly-line work, and golfing. It may also occur transiently during pregnancy and breast feeding.

Acute Stage / Severe Condition: Physical Examinations Findings (Key Impairments)

ICF Body Functions code: b7101.3 SEVERE impairment of mobility of several joints

- Palpable crepitus is occasionally present moving through the extensor sheath
- Symptoms reproduced with provocative pressure over the first compartment
- Triggering of thumb may imply excessive stenosis or a nodule formation on APL or EPB
- Weakness in the wrist radial deviation, EPB, APL
- Tenderness is usually felt in the “anatomical snuff box” along radial side of wrist with palpation. Pain can radiate distally into thumb/hand, and proximally to elbow.
- Pain may limit thumb active extension and abduction

Sub Acute Stage / Moderate Condition: Physical Examinations Findings (Key Impairments)

ICF Body Functions code: b7101.2 MODERATE impairment of mobility of several joints

As above – but with the following differences
- The movement limitations are decreased
- Strength deficits are less
- Provocatory pain is less intense, and provoked closer to end range of motion

Settled Stage / Mild Condition: Physical Examinations Findings (Key Impairments)

ICF Body Functions code: b7101.1 MILD impairment of mobility of several joints

As above – but with the following differences
- Movement limitations are less
- Strength deficits are minimal
- The provocative pain is elicited primarily with overpressure at end range
Intervention Approaches / Strategies

**Acute Stage / Severe Condition:**

Goals: Control pain and symptoms, and decrease inflammation

- **Physical Agents**
  - Ultrasound or phonoporesis to aid reduction of inflammation over the first dorsal compartment
  - Iontophoresis may also be used to aid reduction of inflammation

- **External Devices (Taping/Splinting/Orthotics)**
  - A thumb spica short-arm splint may help position the wrist and decrease the use and irritation of the first dorsal compartment

- **Manual Therapy**
  - Soft tissue mobilization to restricted myofascial tissue (e.g., extensor retinaculum, APL, and EPB) that may be causing restriction, or in muscle spasms
  - Mobilizations with movement (MWM) of active movements of the thumb and wrist superimposed on a passive radial glide of the proximal row of carpal bones

- **Therapeutic Exercise**
  - Gentle passive range of motion of thumb and wrist

- **Medications**
  - Anti-inflammatory medications (NSAIDS), and pain relievers. After 2 weeks if unsuccessful at pain relief, corticosteroid injections.

- **Ergonomic Instruction**
  - Modify or avoid aggravating activities during work or recreational environments, postures and tasks (e.g., hand/wrist position while filing, golfing, or doing assembly line work)

**Sub Acute Stage / Moderate Condition**

Goals: Restore normal and pain free range of motion

As above with the following differences: Inflammation is controlled, so mobilization phase begins.

- More aggressive with repetitive activities of the thumb especially at end range
- Progressive resistive exercise begin when 80-85 % of painless range of motion is attained
- Less use of modalities for treatment, and only for post exercise pain, and inflammation management
Settled Stage / Mild Condition

Goals: Maintain or return to functional activities of the wrist and hand

- Correct any biomechanical deficits that may occur during functional activity
- Therapeutic Exercise:
  Increase progressive resistive exercises and functional strengthening exercises as tolerated

Intervention for High Performance / High Demand Functioning in Workers or Athletes

Goals: Return to optimum level of function for work and leisure time activities, and reduce likelihood of re-injury while attaining previous level of function. (usually within 1 month)

Approaches / Strategies listed above

- Work on endurance training and work hardening for specific occupation or sport activity
- Gripping activities should be painless
Selected References


Cooney WP. *The Wrist Diagnosis, and Operative Treatment.* vol. 2 Mosby, St. Louis, 1998.


