THE WRIST AND HAND

PTA 216
The Wrist and Hand

- Most active and intricate part of the upper extremity
- Especially vulnerable to injury
- Do not respond well to serious trauma

Magee, 2008. pg. 396
28 bones
Numerous articulations
19 intrinsic muscles
20 extrinsic muscles

Magee, 2008. pg. 396
Entrapment compression neuropathy of the median nerve

Most common compression neuropathy of the wrist

Caused by repetitive motion

Shankman, 2011. pg. 438
Symptoms of Carpal Tunnel Syndrome

- Pain
- Numbness
- Parasthesia
- Weakness of grip and pinch
- Edema in the hand and forearm
- Atrophy of the thenar muscles
- Symptoms are usually worse at night

Shankman, 2011. pg. 438
Initial Treatment

- Elimination of symptom producing movements
- NSAIDS as per MD recommendation
- "Cock-up" splinting in 0-20 degrees of extension
- Modified activity
- Physical therapy: (initiated 4-5 weeks after onset)
  - Progressive ROM activities
  - Modalities as needed

Shankman, 2011. pg. 438
If symptoms do not respond to conservative treatment, surgical release is an option.

Patient with constant sensory loss, pain, and atrophy.

Cutting of the transverse carpal ligament.

Shankman, 2011. pg. 438
Post-Operative Care

- Immobilization x 2-14 days
- Use of upper extremity as tolerated
- As per MD recommendation, wrist AROM is initiated
- Prevention of post-operative scarring is of upmost concern

Shankman, 2011. pg. 438
De Quervain’s Tenosynovitis

- Cumulative trauma disorder
- Affects the tendon of the abductor pollicis longus and extensor pollicis brevis
- Disorder of the first dorsal compartment
- Pain at the radial styloid and decreased thumb ROM

Shankman, 2011. pg. 439
Treatment Options

- Wrist/thumb immobilization x 2-4 weeks
- NSAIDS
- Ice
- Iontophoresis/phonophoresis
- Gentle ROM
- Cortico-steroid injections
- Surgical decompression

Shankman, 2011. pg. 439
Distal Radial Fractures

- **Colles’ Fracture**
  - A radial fracture within 2.5 cm of the wrist
  - Distal radius is displaced in a dorsal direction

- **Smith’s Fracture**
  - “Reverse Colles’ fracture”
  - Results from a fall on the dorsum aspect of the hand
  - Distal radius is displaced in a palmar direction
Colles’ and Smith’s Fractures

- Stable / minimally displaced: closed reduction and rigid immobilization
- Comminuted / unstable: ORIF or an external fixator

Shankman, 2011. pg. 441
Rarely occur as isolated injuries
Usually in conjunction with distal radius fractures
Avulsion fractures of the ulna occur with 90% of all distal radius fractures
Treatment/rehabilitation mimics that of distal radius fractures

Shankman, 2011. pg. 442
Scaphoid fractures are the most common (60%)
- Pain localized to the anatomic snuffbox
- Mechanism of injury is wrist hyperextension with ulnar deviation
- Stable fracture: closed reduction and immobilization x 6 – 12 weeks
- Unstable fracture: ORIF
  - Higher risk of non-union and avascular necrosis
    - Immobilization can be longer than stable fracture

Shankman, 2011. pg. 442
Metacarpal Fractures

**BOXER’S FRACTURE**
- Fracture to the neck of the 2\(^{nd}\), 3\(^{rd}\), 4\(^{th}\), or 5\(^{th}\) metacarpal
- High incidence among fighters

**BENNETT’S FRACTURE**
- Fracture-subluxation of the proximal first metacarpal

Shankman, 2011. pg. 445
Gamekeeper’s Thumb

- Also known as Skier’s thumb
- Injury to the ulnar collateral ligament of the thumb
- Mechanism of injury: sudden valgus stress and hyperextension of the thumb
- Results in partial (Grade I or II) or complete rupture (Grade III)

Shankman, 2011. pg. 444
For Grade I and II: Thumb spica cast or rigid immobilization x 3-6 weeks

Grade III: ORIF using pins and wires to stabilize the joint to allow healing
  - Short arm, thumb spica is then used for 4-6 weeks

Gentle ROM avoiding abduction and extension as tolerated

Shankman, 2011. pg. 444
Dupuytren’s Contracture

- Disease that affects the palmar fascia with fibrodysplastic development in the connective tissue
- Develops nodules that progress into cord-like contractures
- Usually affects men over 40 years of age
- 45% of all cases are bilateral

Shankman, 2011. pg. 445
Eventually will cause contractures of the fingers (usually the ulnar aspect of the hand)

Contractures greater than 20 degrees usually indicate surgical release

Fasciectomy or excision of the palmar fascia

Surgical incision is usually left open to prevent the development of scar tissue
Reflex Sympathetic Dystrophy (RSD)

- Reflex vasomotor response to a chronic sensory stimulus
- One of the most complex and challenging conditions to treat
- Gradual development after various soft-tissue injuries, fractures, or surgical procedures
- Mechanism of RSD is not clear
- Develops in 3 stages

Shankman, 2011. pg. 448
Stage I: (Acute stage) may last up to 3 months
- Pain and edema, discoloration, excessive sweating, obvious temperature changes

Stage II: last from the 3rd month to up to 1 year
- Pain and edema increase, skin coloration changes, tissue atrophy, skin becomes dry, development of osteoporosis

Stage III: involves increasing trophic changes, muscle atrophy, severe motion restriction, and the development of inelastic fibrous tissue

Shankman, 2011. pg. 448
Reflex Sympathetic Dystrophy

- Treatment throughout all stages focuses on pain management and edema control
- Nerve blocks
- Moist heat
- Gentle ROM
- TENS
- Electrical Stimulation
- Manual intervention
- All activities causing pain should be avoided

Shankman, 2011. pg. 448
SPECIAL TESTS FOR THE
Wrist and Hand
The patient sits or stands and forms a fist around the thumb. The tester stands with their proximal hand grabbing the patient’s forearm and the distal hand grasping the patient’s fist, with the patient’s thumb in the tester’s thenar eminence.

While stabilizing the patient’s forearm, ulnarly deviate the patient’s wrist.

Cook, 2013. pg. 239
Pain over the distal abductor pollicis longus and extensor pollicis brevis is a positive result indicating tenosynovitis of these tendons (De Quervain’s disease)
Phalen Test

- The patient sits or stands with the dorsal aspect of both hands in full contact so that both wrists are maximally flexed.

Konin, 2006. pg. 115
Numbness and parasthesia in the median nerve distribution of the fingers are a positive result indicating carpal tunnel syndrome.
The patient sits and the tester taps the volar aspect of the patient’s wrist over the area of the carpal tunnel.

Complaints of tingling, parasthesia, or pain in the area of the first 3 digits and the radial ½ of the 4th digit is indicative of median nerve compression (carpal tunnel syndrome).

Cook, 2013. pg. 262
Valgus/Varus Stress Test

- The tester maintains stabilization of the proximal bone between the thumb and forefinger, and grasps the distal bone.
- The tester provides a valgus force to the joint, creating a fulcrum while attempting to “gap” the joint.
- Excessive gapping when compared to the uninvolved side may indicate a collateral ligament tear.

Konin, 2006. pg. 119/ Cook, 2013. pg. 238
Bibliography