Wrist and Hand

Pathology 2

Objectives

- Identify signs and symptoms of musculoskeletal issues that can be addressed by PT including:
  - Carpal tunnel release
  - Trigger finger
  - DeQuervains Disease
  - Tendonitis/Tenosynovitis
  - Neurological conditions
    - Peripheral nerve entrapments
  - Miscellaneous pathology
    - Dupuytrens contracture
    - Ganglion cysts
- Identify signs and symptoms of issues that require immediate referral including:
  - Gout/Pseudogout
  - Rheumatoid Arthritis
  - Infection
  - Kienbock’s disease
  - Peripheral nerve entrapment
  - Raynaud’s Phenomenon
  - Viscerogenic Referred pain
  - Scleroderma

Muscloskeletal Impairments III
Repetitive Trauma Syndromes/Overuse Syndromes

Carpal Tunnel Syndrome

Pathology
Repetitive Trauma Syndromes/Overuse Syndromes

- Carpal tunnel syndrome
  - Characterized by numbness and pain in the palmar aspect of fingers 1-4 1/2
  - Typically a gradual progression
  - Exacerbated by repetitive overuse of the extrinsic wrist flexors
  - Tenosynovitis and crowding of the structures in the carpal tunnel causing entrapment of the median nerve
  - Patient presentation:
    - May c/o dropping items from sensory loss
    - May have pain travel proximally into the forearm and shoulder in severe, chronic cases
    - Women who are post-menopausal are most susceptible and thought to be a metabolic issue
  - Examination:
    - Phalens and/or reverse phalens are +
    - Differential diagnosis of pronator teres syndrome and C7 nerve root entrapment in the cervical region
    - Also assess for lunate volar subluxation

Musculoskeletal Impairments III

Repetitive Trauma Syndromes/Overuse Syndromes

- Carpal Tunnel Syndrome
  - Impairments?
    - Pain with repetitive use
    - Progressive weakness and atrophy in thenar and 1st two lumbricles
    - Tightness in adductor pollicis and extrinsic extensors of thumb/2nd and 3rd digit
    - Irritability/sensory loss in median nerve distribution
    - Decreased joint mobility in wrist/MCP joints of thumb and 2nd and 3rd digit
    - Sympathetic changes
  - Functional Limitations/Disabilities
    - Decreased prehension activities requiring thumb opposition
    - Decreased use of hand in area of altered sensation
    - Inability to perform sustained or repetitive wrist motion
Trigger Finger

Pathology

Repetitive Trauma Syndromes/Overuse Syndromes

- Trigger finger
  - Finger that is locked in flexion
  - Flexor tendons are not able to glide through the A1 pulley to allow for finger extension resulting in the finger remaining flexed
  - Occurs from:
    - Inflammation of the synovial tissue of the flexor sheath
    - Thickening/fibrosis of the A1 pulley
    - Nodule present on the flexor tendon
      - Fibrotic tendon sheath and presence of a nodule occur together in 70% of cases
  - Repetitive overuse is attributed to the onset

Muscloskeletal Impairments III
Repetitive Trauma
Syndromes/Overuse Syndromes

- Trigger finger (Con't)
  - Patient presentation:
    - Gradual onset
      - First signs:
        - Stiffness in flexing and extending the involved finger
        - Pain to direct palpation
      - As the condition progresses:
        - MCP joint flexion or extension produces a snapping feeling or sound produced when the tendon passes in/out of the A1 pulley
    - Involved finger remains flexed while the remaining fingers extend at the MCP joints upon opening the hand
  - Most commonly affected?
    - Thumb (50-70%)
    - Third and fourth finger (10-20%)
    - Fifth finger (5%)
    - Second finger (2%)

De Quervain’s Disease

Pathology
Repetitive Trauma Syndromes/Overuse Syndromes

- **de Quervain’s disease**
  - Inflammation of the tendons and synovium affecting the ABD pollicis longus and extensor pollicis brevis
  - Aka stenosing tenosynovitis of 1st dorsal compartment
  - Occurs from?
    - Repetitive overuse especially with thumb extension/ABD,
      radial deviation or wrist extension with radial deviation
  - May have crystals form in the tendinous sheaths
    contributing to the progressive nature of the disease
  - Patient presentation:
    - Localized pain to the APL and EPB tendons that increases with ulnar deviation or thumb ABD/Extension
  - Examination:
    - Finkelstein’s test is +
    - Differential diagnosis with Wartenburg’s syndrome and OA of the 1st CMC joint or radioscaphoid joint

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Tendonitis/ Tenosynovitis

Pathology and Management
Repetitive Trauma Syndromes/Overuse Syndromes

Tendonitis/tenosynovitis
– Inflammation resulting from:
  ■ Repetitive use of involved muscle
  ■ RA
  ■ Stress overload to contracting muscle
  ■ Roughening of surface of tendon or sheath

Musculoskeletal Impairments III

Repetitive Trauma Syndromes/Overuse Syndromes

■ Tenosynovitis/Tendinitis
  – Impairments?
    ■ Pain with muscle contraction or gliding of tendon with associated joint movement
    ■ Tenderness to palpation, warmth
    ■ Imbalance in muscle strength, endurance, and length
  – Functional Limitations/Disabilities?
    ■ Pain that worsens with activity
  – Management:
    ■ Acute phase:
      – Splinting
      – Cross-friction massage in elongated position
      – Multiple-angle muscle-setting in pain-free positions
      – Pain-free ROM
      – Tendon-gliding exercises
    ■ Subacute/chronic phase:
      – Progress previous rx
      – Assess accessory joints for proper biomechanics

Musculoskeletal Impairments III
Tests and Measures
Special Tests

- **Neurological**
  - Tinels sign
  - Phalen’s test
  - Reverse phalen’s
  - *Carpal compression test
  - *Flick test

- **Muscle Pathology**
  - Finklestein Test

- **Vascular**
  - Allen test

Neurological Conditions
Neurological Conditions

- **Superficial Radial Nerve**
  - Includes Wartenburg's disease
  - Where?
    - Entrapment of superficial radial nerve between the tendons of brachioradialis and ECRL
  - Patient presentation:
    - Pain and numbness over the dorsum of the hand and most prominent just proximal to the anatomical snuff box
  - Examination:
    - Pronation and ulnar deviation exacerbate symptoms
  - Can be misdiagnosed as deQuervains disease
  - Blunt force trauma can also produce a palsy of this nerve

Musculoskeletal Impairments III

Neurological Conditions

- **Ulnar Nerve**
  - Occurs in Guyon's tunnel which is found under the hook of hamate
    - Floor is formed by the pisohamate ligament
    - Roof is formed by fascia and palmaris brevis
  - Direct compression over the tunnel can produce entrapment of the ulnar nerve
Neurological Conditions

- Ulnar Nerve (Con’t)
  - Primary symptoms include
    - Paresthesias in the 5th and half of the 4th fingers
    - Weakness in the intrinsic hand muscles

Miscellaneous Pathology
Miscellaneous Pathology

■ Dupuytren’s Contracture
  - A disease characterized by:
    ■ Development of new fibrous tissue forming nodules and cords in the palmar and digital sheaths of the hand
    ■ Leads to formation of flexion contractures of the fingers
    ■ Primarily involves MCP and PIP joints
    ■ More common in?
      ■ People with diabetes, liver disease, alcoholism, and smokers
      ■ Caucasians, advancing age
    ■ Most common gender?
      ■ Men occurring at a 9:1 ratio to women

Musculoskeletal Impairments III

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Miscellaneous Pathology

■ Dupuytren’s Contracture
  - Classified into 3 biologic stages:
    ■ First stage
      - Proliferative stage
      - Myoblast proliferation and formation of nodules
    ■ Second stage
      - Alignment of myofibroblasts along lines of tension
    ■ Third stage
      - Tissue becomes acellular and devoid of myofibroblasts
      - Primarily thick bands of collagen

Musculoskeletal Impairments III
Miscellaneous Pathology

- Dupuytren’s Contracture
  - Usually bilateral with one hand worse than other
  - May have 1, 2, or 3 rays involved
  - Most commonly involves 5th digit (little finger)
    - 70% of patients
  - Surgical intervention when MCP joint contracts to 30°
  - Post-operative success (50%) dependent on effective splinting and exercise
  - Splinted in 10-20° MCP flexion with PIP extension

- Ganglion cysts
  - Mucus-filled cysts found in the wrist
  - No known cause
  - Typically found people with repetitive wrist ROM
  - More common in women than men
  - Ganglions are most commonly found?
    - 70% in the dorsal aspect
    - 20% in the palmar aspect
    - 10% in the tendon sheaths
Miscellaneous Pathology

- Ganglion cysts (con’t)
  - May interfere with ROM
  - Patient presentation:
    - Appearance of the cyst during wrist flexion
    - Soft, squishy, and tender to palpation
  - May require surgical excision

Differential Diagnosis

Wrist and Hand
Differential Diagnosis

- **Gout/Pseudogout**
  - Metabolic joint diseases with deposition of sodium urate or calcium pyrophosphate crystals in the joints
  - Wrist 2nd most common after knees
  - Moderate night pain that increases with no positional relief

- **Rheumatoid arthritis**
  - Ulnar deviation of MCP joints, boutonniere and/or swan-neck deformity of digits

- **Infection**
  - Cellulitis
    - Infection of skin and underlying structures
    - Patient presentation:
      - Localized redness, swelling and pain
      - Fever, chills, nausea and vomiting

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**Musculoskeletal Impairments III**

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Differential Diagnosis

- **Kienbock’s Disease**
  - Aseptic or avascular necrosis of the lunate
  - Etiology uncertain but trauma believed to be part of cause
  - Prevalence in males and 20-40 y.o.
  - Patient presentation:
    - Pain on the dorsal aspect of wrist, esp. during and after activity
    - Hand stiffness
    - Increasing severity of pain and weakness of grip
    - Loss of wrist motion, esp. wrist extension
  - Conservative treatment:
    - Immobilization
    - Surgical options
Differential Diagnosis

- Peripheral nerve entrapment
  - Lateral:
    - C6/C7 radiculopathy
    - Thoracic outlet syndrome
  - Medial:
    - C8 radiculopathy
    - Brachial plexus compression at thoracic outlet
    - Cubital tunnel syndrome

Differential Diagnosis

- Vascular Occlusion
  - Raynaud’s phenomenon:
    - Affects one hand or both
    - Reversible vasospasm with or without underlying disorder
    - Patient presentation:
      - Digital pallor followed by cyanosis and rubor
    - Throbbing and tingling accompany rubor
  - Viscerogenic referred pain
    - Heart, apical lung and bronchus
Differential Diagnosis

- **Scleroderma**
  - Two types:
    - **Localized**
      - Primarily cutaneous
    - **Systemic**
      - Multisystem connective tissue disease
      - Two types:
        - **Limited**
          - Long history of Raynaud's
          - Mildly puffy or swollen fingers
          - Digital ulcer, heartburn, or SOB
        - **Diffuse**
          - Much more acute onset
          - Arthralgia, CTS, swollen hands and legs
          - Crepitus-like over tendon areas of hands
          - Other systemic issues in GI, pulmonary, CV and renal