Elbow Impairments

PT 614
MS III

Objectives

- Identify signs and symptoms of musculoskeletal issues that can be addressed by PT including:
  - Ligament sprain/strain
  - Instability
  - Arthritis
  - Dislocation
  - Myositis Ossificans
  - Medial/lateral epicondylitis
  - Olecranon Bursitis
  - Bicep/Tricep Tendonitis
  - Bicep/Tricep rupture
  - Little league elbow
  - Pronator Teres Syndrome
  - Radial nerve entrapment
  - Ulnar nerve entrapment

- Identify signs and symptoms of issues that require immediate referral including:
  - Arthrosis
  - Infective arthritis
  - Gout
  - Volkman's Ischemia
  - Acute axillary or brachial artery occlusion
Conditions of Hypomobility

- Medial collateral ligament sprain (UCL)
  - Common mechanism:
    - Chronic valgus and external rotation forces
  - Ulnar neuritis
  - Patient presentation:
    - Medial elbow pain at origin of ligament
      - Insertion if ruptured
    - Pain on palpation of MCL
    - + valgus stress testing
  - Common interventions
    - Rest and activity modification for 2-4 weeks
    - PT
    - Surgery for competitive athletes and individuals involved in heavy labor
      - + moving valgus stress test

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Conditions of Hypomobility

- **Instability**
  - Classification system (5 criteria):
    - **Timing**
      - Acute, chronic, re-current?
    - **Articulation involved**
      - Which jt?
    - **Direction of displacement**
      - Varus/valgus/anterior/posterior
    - **Degree of displacement**
      - Sublux vs. incomplete dislocation vs. dislocation
    - Presence or absence of associated fractures

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Conditions of Hypomobility

**Dislocations**

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Conditions of Hypomobility

• Instability
  – Patient presentation:
    • Recurrent clicking, locking, etc.
    • Occurs in extension with full supination
    • + varus/valgus testing; + posterolateral pivot shift apprehension test
    • Potential neural or vascular issues
    • History of dislocation

• Traumatic arthritis
  – Typically from hyperextension injury
  – Tissue affected:
    • Anterior capsule/anterior band of UCL (MCL)
  – Patient presentation:
    • Diffuse elbow pain
    • Capsular pattern
  – Treated with corticosteroid injection, possible immobilization in children
Tests and Measures
Special Tests

- Varus/valgus stress test (C&H, 140-141)
  - Medial/lateral instability, ligament strains
  - Dislocations/instability
- Posterolateral pivot-shift apprehension test (C&H, 139)
  - Posterior-lateral dislocations
- Moving valgus stress test (C&H, 138)
  - Medial instability, ligament strains
  - Posterior-lateral instability

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Conditions of Hypomobility

1. Dislocation of the radial head
   - Aka as nursemaids elbow or pulled elbow
   - Results from:
     - Forceful yank of the arm when the elbow is extended
   - Typical age?
     - Children under the age of 5
   - May produce:
     - Tear of the annular ligament
     - Fracture of the radial head

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Myositis Ossificans

- The development of bone tissue in a muscle and surrounding connective tissue
- Commonly result of?
  - Acute or chronic injury
  - Can be a progressive condition starting in childhood
- Common sites?
  - Brachialis or joint capsule
  - Quadriceps
- Palpation?
  - Hardened tissue in the muscle belly
  - Often painful
Myositis Ossificans

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- Palpation?
  - Hardened tissue in the muscle belly
  - Often painful
- Differential diagnosis (traumatic arthritis):
  - Limitation in passive $E > F$
  - Active flexion limited and painful

Musculoskeletal Impairments III

Overuse Syndromes/Repetitive Trauma
Overuse Syndromes/Repetitive Trauma

1. Lateral epicondylitis/epicondylalgia
   - Injury to?
     ■ The common extensor tendon
     ■ ECRB most common
   - AKA tennis elbow or epicondyalgia
   - Patient presentation:
     ■ Localized pain, inflammation, and tenderness anterior to lateral epicondyle
     ■ Pain with:
       - resisted wrist extension with elbow in extension (+ Cozens)
       - Resisted middle finger extension with elbow extended (+ Maudsleys)
       - Passive wrist flexion with elbow extended and pronated (+ Mills)

Overuse Syndromes/Repetitive Trauma

1. Lateral epicondylitis/epicondylalgia
   - Most common age?
     ■ between ages of 35 and 50
   - Most common gender?
     ■ men > women
   - Typically results from work-related injuries
     ■ IE excessive writing or typing, painters, manual labor requiring repetitive wrist extension
Overuse Syndromes/Repetitive Trauma

Differential diagnoses for lateral epicondylitis:
- Entrapment of the radial nerve
- Degenerative changes at the radiohumeral joint
- Instability of the radiohumeral joint
- RA
- Tendinitis of the long head of biceps
- Brachial plexus dysfunction
  - Test wrist E in different positions of shldr motion
- Insertitis of the triceps
- Referred pain from the cervical spine
  - Nerve root compression – test wrist E in different c-spine positions

Overuse Syndromes/Repetitive Trauma

2. Medial epicondylitis/epicondylalgia
- Results from?
  - Repetitive wrist flexion and pronation with fatigue
- AKA golfers elbow, swimmers elbow or medial tennis elbow
- Patient presentation:
  - Localized pain, inflammation, and tenderness distal and anterior to medial epicondyle
  - Pain with:
    - Resisted wrist flexion with elbow extended
    - Passive wrist extension with elbow extended
Overuse Syndromes/Repetitive Trauma

- Differential diagnosis for medial epicondylitis
  - UCL injury/instability
  - Ulnar nerve entrapment
  - Medial elbow intra-articular pathology

Musculoskeletal Impairments III

Overuse Syndromes/Repetitive Trauma

3. Bicep Tendonosis
- Overuse injury
- Mechanism:
  - Repetitive hyperextension w/ pronation
  - Repetitive flexion w/ stressful pronation-supination
- Patient presentation:
  - Pain at anterior distal arm
  - Tenderness to palpation at distal biceps belly, tendon insertion or MT junction
  - Pain with resisted elbow flexion and supination
  - Pain with passive shoulder and elbow extension

Musculoskeletal Impairments III
Overuse Syndromes/Repetitive Trauma

4. Bicep Rupture
- 3-10% occur distally and primarily in males in 5th decade of life
- Patient presentation:
  - Report of sharp, tearing pain with acute injury
  - Swelling and activity-related pain in the antecubital fossa from chronic injury
  - Eccymosis in antecubital fossa
  - Palpable defect of distal biceps
  - Decreased strength of elbow flexion, grip, and esp. supination

5. Tricep Tendonosis
- Repetitive extension activities
- Patient presentation:
  - Tenderness at tricep insertion
  - Increased pain with resisted elbow extension
- Differential Diagnosis:
  - Olecranon apophysitis in adolescence
  - Avulsion fracture in adults

6. Tricep Rupture
- Deceleration force during extension or uncoordinated contraction of tricep against flexing elbow
- Patient presentation:
  - Decreased elbow extension strength
  - Inability to extend elbow overhead against gravity
  - Tendon defect if complete tear
Overuse Syndromes/Repetitive Trauma

7. Olecranon bursitis
- Located superficially over the olecranon process
- May be acute or chronic
- Acute injuries occur from blunt force trauma, such as falling and landing on the elbow
- Chronic injuries occur from repetitive weight-bearing
  - AKA students elbow
- Acute:
  - Sudden swelling
- Chronic:
  - Gradual swelling

Musculoskeletal Impairments III

Prepared by L. Murray, Division of PT; Walsh University
Overuse Syndromes/Repetitive Trauma

8. Little league elbow
   - An overuse injury of the elbow characteristic of pitchers in little league
   - Injuries may include:
     - Sprain/strain of the medial collateral ligament
     - Osteochondritis dissecans of the capitulum
     - Overgrowth of the capitulum
   - May result in premature closing of the epiphyseal plate in the distal humerus

Tests and Measures
Special Tests

- **Overuse injuries**
  - Cozen’s test (C&H, 143)
  - Mills (Dutton, 683)
  - Maudsley’s Test (C&H, 144)
  - Medial epicondylitis (Dutton, 683)
Neurological Conditions

1. Pronator teres syndrome
   - Compression of the median nerve as it courses between the 2 heads of the proximal pronator teres
   - Patient reports?
     - Paresthesias along the median nerve distribution
     - Pain over anterior elbow, radial side of palm and palmar side of 1st/2nd/3rd and ½ 4 the digits
Neurological Conditions

1. Pronator teres syndrome
   - Differential diagnosis with carpal tunnel syndrome
     - Special tests +?
     - Special tests -?
   - Can reproduce symptoms with:
     - Direct palpation over the muscle belly
       - 4 cm distal to cubital crease
     - Muscle contraction
       - Pronation, elbow F, wrist F
       - Resistance of finger F, supination
     - Elongation of the muscle

Neurological Conditions

2. Ulnar nerve entrapment
   - Compression of the ulnar nerve at the medial aspect of the elbow by either:
     - Ligament of Struthers
       - Only present in 70% of people
     - Between the 2 heads of the flexor carpi ulnaris
       - Zone III – cubital tunnel
Neurological Conditions

2. Ulnar nerve entrapment
   - Patients report?
     ■ Paresthesias along the distribution of the nerve
       - 4th/5th digits
     ■ Activity related pain on medial elbow
     ■ Especially worse at night
   - Observation/exam:
     ■ Hypothenar muscle atrophy may be apparent
       - Loss of grip and dexterity
     ■ May be able to elicit pain/paresthesias with elongation, contraction or palpation of the proximal FCU

Musculoskeletal Impairments III

Neurological Conditions

3. Radial nerve entrapment
   - Rare distal to the elbow
   - May have injury from blunt force trauma to the posterior upper arm
   - Posterior interosseus nerve, the main motor branch of the radial nerve, passes thru the supinator and may become entrapped
   - Patient presentation?
     ■ Localized pain to the supinator
     ■ Weakness with extension of the wrist and MCP joints
     ■ No significant loss of supination
     ■ No paresthesias should be present

Musculoskeletal Impairments III
Tests and Measures
Special Tests

- **Neurological pathology**
  - Tinel’s sign (C&H, 135)
  - Elbow flexion test (C&H, 133)
  - Test for pronator teres syndrome (see PPT on special tests)

Differential Diagnosis

Elbow
Differential Diagnosis

- **Arthrosis**
  - Result of previous trauma
  - Minimal pain (if not severe) except w/ activity
  - Capsular pattern with bony end-feel in both motions
  - Early morning stiffness and pain at end of day

- **Infective arthritis**
  - Severe aching or throbbing
  - Fever and joint tenderness
  - Hot, swollen and held in slight flexion
  - Tooth decay or pelvic disease

- **Gout**
  - Acute pain, swelling, redness, and tenderness
Differential Diagnosis

- Volkmann’s ischemia
  - Anterior compartment syndrome
  - Increased tissue fluid pressure in fascial muscle compartment
  - Decreases capillary blood perfusion
  - Most common in forearm
    - Nerve injury → Volkmann’s Ischemic contracture
  - Causes:
    - Constrictive casts or dressings
    - Limb placement with surgery
    - Blunt trauma
    - Hematoma
    - Burns
    - Fractures

- Volkmann’s Ischemic contracture
  - Causes:
    - Constrictive casts or dressings
    - Limb placement with surgery
    - Blunt trauma
    - Hematoma
    - Burns
    - Fractures

- Patient presentation:
  - Swollen and tense, tender compartment
  - Severe pain, exacerbated with stretch of muscle
  - Sensibility deficits
  - Motor weakness or paralysis
  - Radial and ulnar pulses still present at wrist
- Diagnosis via compartment pressure measurement
Differential Diagnosis

- Acute Axillary or Brachial artery occlusion
  - Causes:
    - Emboli from heart
    - Plaque or aneurysm of innominate or subclavian-axillary artery
    - Trauma to chest, shoulder or upper arm
  - Patient presentation
    - Pain
      - Severe and constant
      - Usually in forearm, hand and fingers
    - Paralysis*
    - Paresthesias*
    - Pallor
      - Lack of blood flow and VC
    - Pulses (absent)
  - Gout can develop within 6 hours if paralysis and paresthesia present

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