Sprains, Strains, and Musculoskeletal Maladies

Robert Hosey, MD
University of Kentucky Sports Medicine

Objectives
- Define sprains and strains
- Systematically evaluate and manage joint / muscle injuries
- When to refer

Sprains
- Injury involving a joint affecting a ligament
  - Intra-articular
    - Think ACL
  - Extra-articular
    - Collateral ligaments (MCL)

Sprains
- Injury severity
  - Grade 1: stretching of lig. fibers
  - Grade 2: partial tearing
  - Grade 3: complete tear

Increased injury severity
- Increase in laxity of joint
- Longer recovery time etc.

Sprains
- Shoulder– A-C joint sprains
  - Injury mechanism
    - Fall on point of shoulder
  - Multiple ligaments
  - Typically look worse than they are.

Physical Exam
- Inspection
- Palpation
- Range of Motion
- Special tests for stability
**Sprains**

- **A-C joint**
  - Conservative management
  - Most types (1-3)
  - Sling for comfort
  - RICE
  - Therapy

- **Knee**
  - History a large clue to dx
  - Acute vs long standing
  - Injury often opposite side of direction of force
  - Presence of effusion

- **FCL**
  - Extra-articular
  - Varus force
  - Instability (0 and 30 degrees)
  - Tears w/ instab.
  - Require surgery

- **ACL**
  - Intra-articular
  - Pivot or twisting injury with "pop"
  - Tears in young athletes-- reconstruction

- **PCL**
  - Intra-articular
  - Straight post. Force "dashboard" injuries
  - Isolated injuries somewhat uncommon
  - Tx controversial

- **Sprains**
  - **Knee**
    - MCL
      - Extra-articular
      - Valgus force
      - Soft tissue swelling
      - Instability (0 / 30 degrees)
      - Conservative tx for majority
Sprains

- Ankle
  - MOI usually inversion
  - Lateral sided injury

- Differential DX
  - Syndesmotic ankle sprain
  - Fracture/ Growth plate injury
  - Osteochondral fracture
  - Tendon injury
    - peroneal, posterior tibial, achilles

Treatment: Operative vs. Conservative

- In general only controversy is for severe sprains.
- Grade I-II sprains can be treated conservatively

Operative vs Conservative Management

- Cochrane Library information
  - Studies evaluated showed surgical treatment group had better results in 3 areas:
    - Return to pre-injury level of sports
    - Less subjective instability
    - Less pain and pain with activity
  - No difference for recurrence of ankle sprain
  - Surgical group: longer time to return to normal activities, higher incidence of ankle stiffness (trend)


Strains

- Involve muscle or tendon (or both)
- Occur when tensile strength of tissue is exceeded.

Mechanisms of Injury

- Muscle strain
  - Eccentric overload of muscle tendon unit
  - Usually occurs at myotendinous junction
  - Acute or chronic
**Muscular Strain**

- **Potential risk factors**
  - Strength imbalances
  - Inadequate flexibility
  - Biomechanical
    - Excessive anterior pelvic tilt
    - Decreased mobility of lumbar spine
  - Prior muscular injury
    - Peak torque levels achieved at shorter lengths than normal muscle

- **Grading of injury**
  - Mild: tear of few muscle fibers, minimal strength or motion loss
  - Moderate: greater muscle damage, clear loss of strength, motion
  - Severe: complete rupture of muscle, total lack of muscle function

**Diagnostic Imaging**

- **Plain radiographs**
  - Occasionally helpful
    - Avulsion injuries
    - Myositis ossificans
    - Soft tissue swelling

- **CT scan**
  - Better for bone

**MRI**

- Becoming test of choice
  - Site of injury
  - Extent of injury
  - Associated injuries

**Rehab. Principles**

- "RICE"
  - Limit pain, hemorrhage, edema

- **Therapeutic Exercise**
  - Progression from isometric—isotonic to isokinetic
  - Eccentric training, muscle strengthening in late phase

---

**Diagnostic Imaging of Muscle Injury**

- **Plain radiographs**
  - Occasionally helpful
    - Avulsion injuries
    - Myositis ossificans
    - Soft tissue swelling

- **CT scan**
  - Better for bone

**MRI:** ? Usefulness

- Fairly strong correlation with days lost from competition and % of abnormal muscle area and to lesser extent volume of muscle affected.

Prevention

**Goals**
- Decrease muscle tension
- Increase muscle elasticity

**Strategies**
- Warm up
- Stretching
- Conditioning

---


---

Prevention

**Eccentric training holds promise**
- Nordic Hamstring curls
  - Improves eccentric strength
  - Decrease injuries

---

"Quit whining, Sir. and walk it off. I'm not talking for that pitiful excuses thing again!"