


## Sprains, Strains, and Musculoskeletal Maladies

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## Objectives

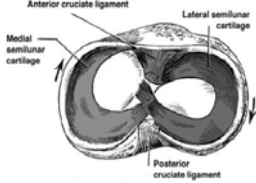
- Define sprains and strains
- Systematically evaluate and manage joint / muscle injuries
- When to refer



A faulty part from an independent supplier leads to the creation of a multibillion-dollar sports medicine profession.


## Sprains

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



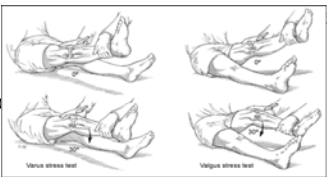
## Sprains

- 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.



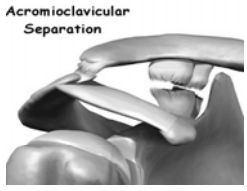

## Physical Exam

- Inspection
- Palpation
- Range of Motion
- Special tests for stability



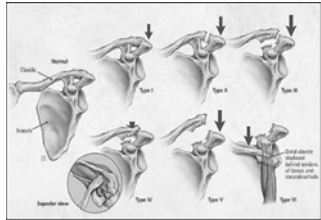
## Sprains

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

### Sprains

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



### Sprains

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



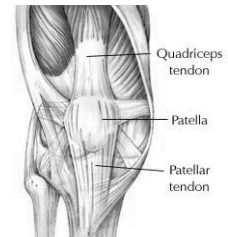
### Sprains

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



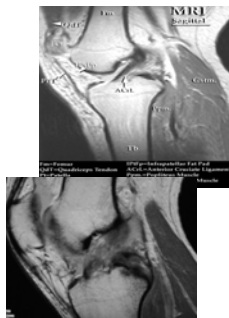
### Sprains

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



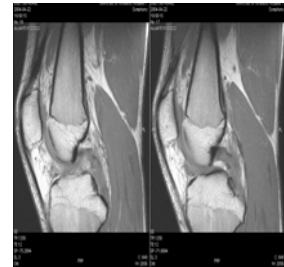
### Sprains

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



### Sprains

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



## Sprains

- Ankle
  - MOI usually inversion
  - Lateral sided injury



## Sprains

- Ankle: 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)

Kerkhoffs GMMJ, Handoll HHG, de Bie R, et al. Surgical versus conservative treatment for acute injuries of the lateral ligament complex of the ankle in adults. In: The Cochrane Library, Issue 3, 2003. Oxford: Update Software.

## 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



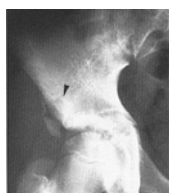
## Muscular Strain

- 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



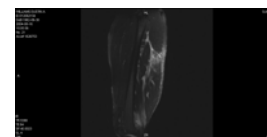
## Diagnostic Imaging of Muscle Injury

- Plain radiographs
  - Occasionally helpful
    - Avulsion injuries
    - Myositis ossificans
    - Soft tissue swelling
- CT scan
  - Better for bone



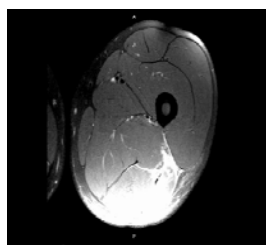
## Diagnostic Imaging

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



## Diagnostic Imaging

- MRI: ? Usefulness
  - Predict duration of injury?
    - Fairly strong correlation with days lost from competition and % of abnormal muscle area and to lesser extent volume of muscle affected.
- Slavotinek JP et al. Hamstring Injuries in Athletes: Using MRI measurements to extent of muscle injury with amount of time lost from competition. AJR 179,2002:1621-1628.



## Muscular Strain

- Rehab. Principles
  - “RICE”
    - Limit pain, hemorrhage, edema
  - Therapeutic Exercise
    - Progression from isometric—isotonic to isokinetic
    - Eccentric training, muscle strengthening in late phase



## Prevention

- Goals
  - Decrease muscle tension
  - Increase muscle elasticity
- Strategies
  - Warm up
  - Stretching
  - Conditioning



## Prevention

- No sufficient evidence to conclude that stretching reduces risk of injury
- Conditioning employing use of warm up and stretching, in combination with one or more techniques (plyometrics, strength training and proprioception) may enhance performance and reduce certain types of injury.

• Thacker SB et al. The impact of stretching on sports injury risk: a systematic review of the literature. Med Sci Sports Exer. 36(3) 2004:371-378.

## Prevention

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



"Quit whining, Sid, and walk it off! I'm not falling for that pulled muscle thing again!"