Rotator Cuff Tears in Football

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Disclosures

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Anatomy

- 4 major muscles: SITS
  - Supraspinatus
  - Infraspinatus
  - Teres Minor
  - Subscapularis

Rotator Cuff Function

- Provides dynamic stability and a compressive force to the glenohumeral joint
- Each muscle has specific actions

Supraspinatus

- Origin: supraspinatus fossa
  - passes under the acromial arch
- Insertion: the greater tuberosity.
- Innervation: suprascapular nerve
- Function:
  - Primary: Initiates abduction
  - Secondary: Stabilizes humeral head

Infraspinatus

- Origin: infraspinatus fossa
- Insertion: posterior aspect of the greater tuberosity.
- Innervation: suprascapular nerve (below spinoglenoid notch)
- Function:
  - Primary: External Rotator
**Teres Minor**

- **Origin:** lateral border of scapula
- **Insertion:** posterior aspect of the greater tuberosity.
- **Innervation:** axillary nerve
- **Function:**
  - Primary: External Rotator

**Subscapularis**

- **Origin:** subscapular fossa
- **Insertion:** Lesser tuberosity
- **Innervation:**
  - Upper = upper subscapular nerve
  - Lower = lower subscapular nerve
- **Function:**
  - Primary: Internal Rotator

**Footprint**

- It’s important to understand the size of the rotator cuff footprint to properly treat partial tears
- **Subscapularis (2)**
  - 40 mm x 19 mm
- **Supraspinatus (3)**
  - 12-23 mm x 7-16 mm (12mm)
- **Infraspinatus (4)**
  - 28-32 mm x 10-18 mm (14mm)
- **Teres Minor**
  - 28 mm x 10 mm

**Partial Thickness Tear**

- **Bursal Sided**
- **Articular Sided**
- **Grades**
  - I = <25% (< 3mm)
  - II = 25-50% (3-6 mm)
  - III = >50% (>6 mm)

**Full Thickness Tear**

- **Complete separation of a portion of the rotator cuff from the greater tuberosity**

Ellman H. Orthop Relat Res 1990

Ellman H. Orthop Relat Res 1990
Trauma

- A significant rotator cuff tear in a younger athlete is relatively rare.
- Typically requires a substantial traumatic event.

History and Physical Exam

History

- Injury
  - Tearing or ripping sensation
  - Pop
  - Shoulder dislocation or subluxation

- Post-Injury Symptom's
  - Deltoid Pain
  - Pain may radiate down arm but not past elbow
  - Night Pain
  - Pain with overhead activities

Cuff Tear After Shoulder Dislocation

- Shoulder instability is common
- Numerous studies have documented full or partial tears with shoulder dislocations (7%-32%)
- Contact athletes and are higher risk - high energy
- A missed full thickness cuff tear in a young athlete is a disaster
- Don't miss it! Image it (MRI).

Physical Exam

- Inspection
  - Take shirt off - ecchymosis, swelling, atrophy
- Palpation
- ROM
- Test Rotator Cuff Strength
- Impingement Signs
- Compare contralateral side

Prevalence and Variance of Shoulder Injuries in Elite Collegiate Football Players

- 336 elite collegiate American football players were invited to the National Football League Combine for physical testing and medical evaluation
- 50% had a history of shoulder injuries
- Acromioclavicular separation (41%)
- Anterior instability (20%)
- Clavicle fracture (4%)
- Posterior instability (4%)
- 4 Rotator cuff tears (1.8%)
Jobe’s Test, Empty Can

- Used to evaluate the strength and integrity of the supraspinatus
- Shoulder abducted 90 degrees, 30 degrees forward with thumbs down with resisted downward pressure
- Positive findings: Decreased strength or pain on resisted testing

External Rotation Strength

- Examines the strength of the infraspinatus and teres minor
- Patient’s arms at their side, externally rotated 45° and elbow flexed to 90°, the examiner applies an internal rotation
- Positive Findings: Decreased strength or pain on resisted testing

Lift-off test

- Evaluates the muscular strength of the subscapularis
- Place the arm behind the back and ask the patient to raise forearm off of back
- Positive findings: Inability to lift the forearm off the back

Radiographs

- AP
- Axillary
- Supraspinatus outlet
  - Acromion shape
  - Fractures
  - Bankart lesions
  - Hill-Sachs
  - Chronic findings
    - Sclerosis
    - subchondral cysts
    - osteolysis of the greater tuberosity

MRI

- Test of choice to evaluate for rotator cuff tear
- Conventional MRI
- MRI Arthrography

Ultrasound

- Inexpensive
- User dependent
- Newer studies seem to have better results
  - More practice?
  - Better equipment?
- Limited information
Treatment Options

& Surgical Decision Making

FullThickness Tears

Treatment

• Surgery
• Full thickness tears don’t heal
• No role in my mind for delayed treatment or return to play
• A delay can result in significant deterioration and inability to repair
• Difficult to predict who will deteriorate quickly and who won’t
• Irreparable cuff tear in a young patient is a disaster!

Partial Thickness Tears

Treatment

• The Consensus.....
  - There is no Consensus
  - Treatment should be individualized and based on type of tear, size of tear, symptoms, etc.
  - Should they be allowed to play?

Natural history

• Yamanaka, CORR, 1994.
  - 61 patients diagnosed with partial cuff tear
  - Repeat MR Arthrography on 40 subjects was performed at an average of 412 days.
    • 20% stable
    • 53% increased in size
    • 28% progressed to full thickness tears

Partial Thickness Tear

Treatment

• Grade 1
  - <25% (< 3mm detachment)
• Grade 2
  - 25-50% (3-6mm detachment)
• Most would recommend nonoperative treatment
• Return to play is possible
• Close monitoring is required
• Consider repeat MRI

Partial Thickness Tear

Treatment

• Grade 3
  - >50% (> 6mm detachment)
• I would recommend operative treatment
• If allowed to play, have a low threshold for repeating MRI
Surgical Treatment
Partial Thickness Tears

Partial Rotator Cuff tears
Surgical Treatment

- Consensus
  - < 50% (Grade 1 & 2) = debride, decompression
  - 50% = consider repair
  - > 75% = repair

- If repair, there are 2 options
  1. Take down the remaining cuff and do a standard repair
  2. “PASTA” repair “Partial Articular-Sided Supraspinatus Tendon Avulsion”

Partial Rotator Cuff tears
PASTA repair

- Preserve the intact cuff
- Anchor placed while viewing from the GH joint
- Sutures passed anatomically
- Sutures tied in subacromial space.
- Advantages
  - Preserving good tissue
  - Not creating a full thickness tear
  - Anatomic repair

Pasta Repair

- Bursal Side, Double Row Repair
- Anchor in Place, Sutures Passed

Pasta Repair

- Articular Sided Grade 3 Tear
- Intact Bursal Side

Articular Sided Grade 3 Tear
Articular side repair
Full Thickness Tears
Surgical Options

- Arthroscopic repair
- Mini-open repair
- Full open repair “old school”

Arthroscopic Repair
Triple Row

Full Thickness Subscapularis Tear

- Less Common
- Difficult to repair full tear arthroscopic
- Most repair with open approach

NFL receiver

- Sustained a posterior shoulder dislocation
- Injury:
  - Posterior capsule and labrum injury
  - Partial subscap tear
  - Medial biceps dislocation
  - Massive complete cuff tear - supraspinatus, infraspinatus, teres minor
Surgery
- Posterior capsule and labrum repair
- Biceps tenodesis
- Subscap, Supraspinatus, Infraspinatus and teres minor repair

NFL linemen
- Massive retracted Supraspinatus and Infraspinatus tears

Conclusions
- Relatively rare
- Need to have a high index of suspicion
- MRI is indicated after shoulder dislocation
- A missed full thickness rotator cuff tear in a young athlete is a potential disaster
- Minor (Grade 1 & 2) partial tears may be able to return to play
- Grade 3 partial and full thickness tears should be managed surgically.

Thank You