The Rotator Cuff Explained

Live Teleseminar with Brian Schiff, PT, CSCS
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Objectives

• Review pertinent shoulder anatomy
• Discuss tendonitis, bursitis & tears
• Highlight common injury causes & diagnosis
• Identify surgical indications & outcomes
• Briefly review rehab timelines
• Discuss other related shoulder issues
• Summarize current relevant literature
Knowledge = Injury Prevention
Anatomy

• Static Anatomy
  – Scapula
    • Acromion
    • Coracoid process
    • Clavicle
    • Glenoid
  – Humerus
  – Capsule, labrum, ligaments & cartilage

• Dynamic Anatomy
  – Rotator Cuff Muscles
  – Scapular Stabilizers
Bony Anatomy
Anatomy - Rotator Cuff Muscles

• 4 small muscles that form a sleeve around the shoulder joint & compress the humeral head into the glenoid
  – Supraspinatus
  – Subscapularis
  – Infraspinatus
  – Teres Minor
Subscapularis

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Supraspinatus
Infraspinatus & Teres Minor
Superior Labrum
Rotator Cuff Pathology

• Neer Classification
  – Stage 1 (inflammation, edema, & pain) < 25
  – Stage 2 (tendon fibrosis) 25 - 40
  – Stage 3 (progressive tearing) > 40
Tendonitis vs. Bursitis

**Tendonitis**
- Acute or Chronic
- Pain with activity
- Pain with sleep or laying on that side
- ↓’d strength & motion
- Tendon inflamed
- Result of impingement or overuse

**Bursitis**
- Acute or Chronic
- Pain with activity
- Pain with sleep or laying on that side
- ↓’d strength & motion
- Bursa inflamed
- Causes impingement
- Seen after overuse
Impingement

• What does this really mean?
• Primary impingement (Internal)
• Secondary impingement
  – Postural deficiencies (tight pecs)
  – Mechanical issues
  – Laxity
Injury Factors

- Overhead activities
- Poor biomechanics/posture
- Muscle imbalance
- Repetitive microtrauma
- Age & decreased vascularity
- Flexibility & instability
Rotator Cuff Testing

• Common clinical tests used include:
  – Hawkin’s – Kennedy Test
  – Neer Impingement Sign
  – Drop arm test
  – AC compression test
  – Shrug sign
Hawkin’s Kennedy Test
Neer Impingement
AC Compression
Shrug Sign
Apley Internal Rotation
Rotator Cuff Tears

• More common in men > 65
• Causes include:
  – Attrition (wear & tear)
  – Bone spurs
  – Shape of acromion? (Hooked, Flat or Normal)
  – Tendinosis leads to tears
  – Trauma (falls, sliding, dislocations)
Rotator Cuff Tears

- Partial Thickness
- Full Thickness
- Bursal & Articular (undersurface) tears
- Small = ≤ 1 cm
- Medium = 1 – 3 cm
- Large = 3-5 cm
- Massive = > 5 cm
Partial Thickness Tears

- PASTA lesions – partial articular supra tendon avulsion
- PAINT lesions – partial articular tear with intratendinous extension
- Location – articular, interstitial, or bursal
- Grades *(Ellman Clin Orthop Rel Res. 1990)*
  - Grade 1 = < 3 mm deep
  - Grade 2 = 3-6 mm deep
  - Grade 3 = > 6 mm deep
Rotator Cuff Tear Scenarios

• **Case Study 1**
  - Male age 65
  - Full thickness tear of supra, moderate OA
  - Full range of motion
  - Min. pain ≤ 3/10 avg.
  - No ADL restriction
  - No sleep disturbance
  - + response to rehab

• **Case Study 2**
  - Male age 45
  - Partial thickness tear of supra, minimal OA
  - ↓’d range of motion
  - ↓’d strength
  - Pain ≥ 5/10
  - Unable to reach behind back
  - + sleep disturbance
  - Mixed response to rehab
Indications for Surgery

- Unremitting pain (esp. at night)
- Loss of ADL function
- Significant loss of strength
- Bony impingement with failed rehab
- Moderate to massive tears w/active job, healthy and < 50
- Isolated partial & full thickness tears with high probability of success without relief from rehab
Contraindications to Surgery

• Weakened tissue (too much retraction)
• Multiple tears in older population
• Failed previous RC repair
• High risk patients
• No rehab trial to date
• Partial or full thickness tears with good motion and ADL strength
Surgery Types

• Arthroscopic
  – Less invasive
  – Faster recovery
  – No deltoid incision
  – Visualize the whole joint
  – Requires more technical skill
  – Debridement only?

• Open
  – More invasive
  – Slower recovery
  – Deltoid taken down
  – More swelling/pain
  – Can not visualize the whole joint
  – Less technical skill required

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Timing of Surgery

• Consider date of injury
• Reasonable attempt at rehab (≥ 6 weeks)
• Returning to what activities?
• Age
• Associated trauma
• Tissue retraction concerns
Surgical Risks

- Failed repair
- Infection
- Loss of motion
- Less than full strength recovery
- Adhesive capsulitis
- Nerve injury
Rehab Tips

• Always try conservative care first
• Pre-op rehab can also improve post-op recovery
• Avoid forcing the range of motion if limited by pain
• Use ice, not heat in general
• Pain with exercise is not a good thing
• It takes time so be patient
Surgical Rehab Cliff Notes

• Arthroscopic
  – Sling 2-3 weeks
  – PROM/AAROM for 2-3 weeks, then AROM
  – No PRE’s for 4 weeks
  – Isometrics at week 2
  – Isotonics at week 4
  – Full ROM in 4-6 weeks
  – Normal strength in 3-6 months

• Open
  – Sling 4-6 weeks
  – PROM for 4 weeks
  – AAROM at week 4
  – No PRE’s for 6-8 weeks
  – Isometrics at week 4-6
  – Full ROM in 6-8 weeks
  – Normal strength in 6–18 months
Return to Sports

• Golf – Open (4-6 mo.), Arthros. (2-3 mo.)
• Tennis – Open (6-9 mo.), Arthros. (3-6 mo.)
• Throwing – Open (6-9 mo.), Arthros. (3-4 mo.)
• Swimming – Open (5-6 mo.), Arthros. (2-4 mo.)
• Weights – Open (4-6 mo.), Arthros. (2-3 mo.)
Associated Shoulder Issues

- Labral tears (most common is SLAP lesion)
- Arthritis (bone spurs, calcification, AC joint OA)
- Adhesive capsulitis (mimics RC symptoms)
- Subluxation or acquired laxity
- Dislocations & instability
- Nerve related injuries (may cause weakness and faulty movement patterns – clear C spine)
Review of Literature - MRI

• MRI is 90 – 100% sensitive for full thickness tears, but only 35 – 82% for partial thickness tears

• Agreement among fellowship trained surgeons good with determining FT vs. PT tears (80%) but dropped below 60% for predicting the quantity of supraspinatus involved and the grade of partial thickness tears

• Poorest agreement seen when looking at features common in the literature such as acromion type and size of the tear
Literature – PT Tears

- Articular side of the cuff is more hypovascular
- Vast majority of tears seen in supraspinatus
- Intratendinous tears > articular & bursal in cadavers
- Clinically, articular tears are 2-3x more likely than bursal
- Bursal sided tears are commonly associated with external impingement
- Articular sided tears more common in throwing athletes due to posterosuperior impingement
Treatment of PT Tears

- Try non-operative for 3-6 months
- No more than 2-3 injections
- Arthroscopic debridement, debridement w/acromioplasty and cuff repair with or without acromioplasty
- Most authors suggest repair if depth > 50% but no data to support this figure
- No long term data on non-operative management and outcomes, although MD’s feel progressive tearing is a concern (80% of articular sided tears ↑ over 2 years in a group of 40 patients, 10% shrank, 10% healed)
Operative Management – PT Tears

• Arthroscopic debridement alone – satisfaction ranges from 81 – 89%

• Debridement with decompression – 66% - 86% satisfaction rate for PT tears

• Arthroscopic Repair – Good to excellent results ranged from 82% - 95% in PT and FT tears at mean follow up of 34 months
Treatment of FT Tears

• 2/3 of patients whose duration of pain < 3 months were still asymptomatic at 7 years and 56% of patients were asymptomatic if duration > 6 months

(Bokor et al Clin Orthop. 1993)

• Bartolazzi et al Clin Orthop. 1994 – in 136 patients with a full thickness tear, they did poorly non-operatively if:
  – ≥ 1 square cm tear
  – Symptomatic > 1 year
  – Had functional impairment & weakness
What About Re-tear Rates?

- MRI reveals the overall re-tear rate to be between 20 and 39%.
- In larger tears (> 2 cm) it’s to 41 – 94%.
- Outcome of revision is inferior to successful primary repair (69% satisfaction).
- Even in re-tear situations, most people still report improvement at 12 months.
Operative Management - FT Tears

• No consensus on how long to wait
• Several authors find that longer symptoms often correlate with larger tears and ↑ difficulty of repair
• However, some find no correlation of duration of symptoms and outcome of repair
• Age > 65 = less satisfactory results
• With adhesive capsulitis, treatment focus is on ROM and not surgical repair
• < 100° of abduction = poor post-op outcomes
Questions?