Management of Impingement & Rotator Cuff Pathology

RHS 433
CLINICAL ROTATION
Credit: 3 hour
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Impingement Syndrome

Subacromial Space

Bounded by:

- Humeral head inferiorly
- Coraco-acromial arch superiorly
Structures Within Subacromial Space

- Long head of the biceps
- Superior capsule
- Supraspinatus tendon
- Upper margins of subscapularis and infraspinatus
- Subacromial bursa
- Inferior surface of A-C joint
Involves:

- Rotator cuff
- Biceps tendon
- Subacromial bursa
Stage I Impingement

Edema and Hemorrhage

• Typical age: < 25
• Clinical course: reversible
• Treatment: conservative

Neer 1983
Stage II Impingement

Fibrous and Tendinitis:

- Typical age: 25-40
- Clinical course: recurrent pain with activity
- Treatment: consider acromioplasty

Neer 1983
Stage III Impingement

Bone Spurs and Cuff Tears:

- Typical age: > 40
- Clinical course: progressive disability
- Treatment: acromioplasty and rotator cuff repair

Neer 1983
Primary vs Secondary Impingement

- **Primary impingement:**
  - Structural stenosis of the supraspinatus outlet

- **Secondary impingement:**
  - Functional stenosis of the supraspinatus outlet
Primary Impingement

Outlet Stenosis:

- Acromial spurs
- Acromial shape
- Prominence of greater tuberosity
Secondary Impingement

Abnormal Kinematics:

- Loss of dynamic stabilization
  - rotator cuff
  - long head of biceps
- Posterior capsular tightness
- Glenohumeral instability
- Functional scapular instability
Posterosuperior Impingement

“Internal Impingement:”

- Occurs between greater tuberosity & postero-superior margin of glenoid when arm is abducted & externally rotated
Special Tests

Impingement tests:

• Neer impingement sign
• Neer impingement test
• Hawkins impingement sign
• Apprehension and relocation test
Neer impingement test

- Indication
- **Shoulder Impingement** Testing
- Mechanism
- Forces greater tuberosity against anterior acromion
- Rotates posterior rotator cuff tendons under acromion
  - Infraspinatus
  - Teres Minor
- Technique
- Start
  - Arm at side with elbow fully extended
  - Arm internally rotated with thumb touching side of leg
- Maneuver
  - Examiner passively forward flexes shoulder overhead to 180 degrees
- Interpretation
- Pain suggests **Shoulder Impingement** of posterior cuff
Hawkins Test

- **Mechanism**
- Impales tendons against coracoacromial arch

- **Technique**
  - **Start**
    - Arm forward flexed to 90 degrees
    - Elbow flexed to 90 degrees
  - **Maneuver**
    - Examiner grasps patients elbow with one hand and their wrist with the other
    - Examiner passively externally rotates the shoulder
      - Impinges subscapularis muscle against coracoacromial arch
    - Examiner passively internally rotates the shoulder
      - Impinges supraspinatus muscle, Teres Minor muscle, and Infraspinatus muscle

- **Interpretation**
  - Pain suggests [Shoulder Impingement](#) of the affected rotator cuff muscles
Impingement Tests

Neer / Hawkins Tests:
Shoulder Apprehension Test

- **Technique**
- **Patient’s Start Position**
  - Elbow flexed 90 degrees
  - Shoulder abducted 90 degrees
- **Apprehension Maneuver**
  - Examiner holds patient's wrist
  - Apply forward pressure from behind shoulder
  - Externally rotate shoulder
  - Positive if produces pain
- **Relocation Maneuver**
  - Perform if Apprehension Test Positive
  - Continue external rotation as above
  - Apply backward pressure from front of shoulder
  - Positive if pain reduced from Apprehension Test
- **Interpretation**
  - Positive Apprehension Test
    - Pain reduced on Relocation Test
      - Anterior Shoulder Instability
    - Pain NOT relieved on Relocation Test
      - Acromioclavicular Impingement
  - Negative Apprehension Test
    - No obvious anterior Disability
Impingement Tests

Apprehension/Relocation Tests:

• Positive test is posterior pain that is reduced/eliminated with relocation maneuver
Treatment Considerations for Impingement Syndrome

Considerations for Non-operative Management:

- Develop glenohumeral and scapulothoracic motion necessary for function
- Strengthen RC and scapular stabilizers
- Enhance dynamic stabilization
- Functional training for UE
Rotator Cuff Injury

Spectrum includes:

- Strain
- Tendinitis
- Partial tear
- Complete tear
Rotator Cuff Injury

Associated factors:

• Affects:
  • Men more than women
  • Manual laborers more than sedentary workers
  • Dominant arm more than non-dominant arm
Rotator Cuff Injury

Associated factors:

• May also be associated with:
  • Smoking
  • Repeated steroid injections
  • Systemic disease such as RA, gout and neurogenic disorders
Rotator Cuff Function

- Approximates humerus to function
- Supraspinatus assists deltoid in abduction
- Subscapularis, infraspinatus & teres minor depress humeral head
Rotator Cuff Injury

Clinical Presentation:

- Attritional tears:
  - Symptoms may not appear until impingement of subacromial structures occurs
  - Pain greater at night
  - Passive motion maintained but active motion limited
  - Development of abductor weakness (positive drop arm test)
  - Altered scapulohumeral rhythm
Rotator Cuff Injury

Clinical Presentation:

• Acute tears:
  • Occur suddenly in more active individual
  • Related to specific traumatic event
  • Development of acute pain and weakness dependent on size and location of tear
Rotator Cuff Injury

Diagnosis:

- Active motion more limited than passive motion
- Pain & weakness with resisted tests
Resisted Tests for Shoulder

Resting Position in Scapular Plane:

- Abduction
- Adduction
- Forward flexion
- External rotation
- Internal rotation
- Elbow flexion/supination
- Elbow extension
Resisted Tests for Shoulder

Abdication/Adduction:
Resisted Tests for Shoulder

Forward Flexion:
Resisted Tests for Shoulder

External/Internal Rotation:
Rotator Cuff Injury

Special tests:

- **Supraspinatus:**
  - Empty can
  - Full can
- **Infraspinatus/teres minor**
  - Lag sign
- **Subscapularis:**
  - Lift off test
  - Belly press test
Resisted Tests for Supraspinatus

**Indication**
Empty vs. Full Can

*Shoulder Impingement*

**Technique: Start Position**
Patient forward flexes shoulder 90 degrees (directly in front or 30 degrees abducted to side)

**Hand position (pronation or supination isolates different muscles)**
- Empty Cans test (isolates supraspinatus muscle)
  - Wrists pronated as if emptying cans
- Full Cans Test (isolates biceps muscle)
  - Wrists supinated as if holding cans upright
  - May be more specific for Supraspinatus impingement

**Technique: Provocative Maneuver**
Patient tries to maintain forward flexion against the examiner's downward pressure

**Interpretation**
Arm weakness is specific to Supraspinatus impingement
Resisted Tests for Supraspinatus

Empty vs. Full Can:

Itoi et al. 1999
Resisted Tests for Supraspinatus

Empty vs. Full Can:

- Tests have similar accuracy when weakness used as positive result
- Less pain with full can test

Itoi et al. 1999
Resisted Tests for Infraspinatus/Teres Minor

Lag sign:
Resisted Tests for Subscapularis

Lift-off/Belly Press Test:
Speed Test

• **Indications**
  Shoulder Pain Evaluation

• **Technique**
  • **Start**
    • Arm forward flexed 50 degrees at shoulder
    • Hand Supinated (palm up)
    • Elbow flexed 15 degrees

• **Maneuver**
  • Patient forward flexes shoulder against resistance at forearm

• **Interpretation**
  • Pain sensitive for bicipital Tendonitis
  • Suggests bicipital Tendonitis involving long head of biceps
Rotator Cuff Injury

Diagnostic studies:

- Standard x-rays
- Arthrogram
- Ultrasound
- MRI with or without contrast
- Arthroscopy
Rotator Cuff Injury

Diagnostic studies:

- Standard x-rays
  - Superior migration of humeral head – break of line between medial neck of humerus & inferior aspect of glenoid
  - Degenerative changes of G-H joint margins, humeral head & inferior aspect of acromion
Rotator Cuff Injury

Treatment Options:

- Non-operative management - success is dependent on status of remaining rotator cuff
- Decompression without repair
- Repair
Rotator Cuff Injury

Post-operative Management:

- Small tears with arthroscopic or deltoid splitting approach:
  - Immediate passive motion for 4 weeks
  - Active-assisted motion from 4 to 6 weeks
  - Progress to active exercise after 6 weeks
  - Light resisted exercises for RC may be initiated after 8 weeks if active motion is satisfactory
Rotator Cuff Injury

Post-operative Management:

• Large tears with open deltoid detachment:
  • Passive motion within limits imposed by surgeon after 1 to 2 weeks
  • Continue passive motion for 6 weeks
  • Active-assisted motion after 6 to 8 weeks
  • Progress to active exercise after 8 weeks
  • Light resisted exercises for RC may be initiated after 12 weeks if active motion is satisfactory
Rotator Cuff Strengthening Exercises

• Isolated movement patterns
  • isometric
  • isotonic
    • concentric
    • eccentric
• Functional movement patterns
Rotator Cuff Strengthening Exercises

Isometric IR & ER
Rotator Cuff Strengthening Exercises

PRE IR & ER
Rotator Cuff Strengthening Exercises

Supraspinatus/Infraspinatus
Rotator Cuff Strengthening Exercises

Infraspinatus:
Rotator Cuff Strengthening Exercises

Subscapularis:
Rotator Cuff Strengthening Exercises

Teres Minor:
Rotator Cuff Strengthening Exercises

Supraspinatus

- Full can not empty can!
Thank you