Shoulder Impingement

Carla M. Saulsbery LOTR, CHT
Dr. A. Hollister, MD
Compromised of the space between the humeral head and acromial arch.

Impingement or compression of the rotator cuff tendons, particularly the Supraspinatus tendon and the subacromial bursa.

Compression can occur against the acromion, or from osteoarthritic changes in the undersurface of the AC joint.

Results from either structural problem: bone or functional problem: muscular.

Intrinsic: muscle dysfunction
Extrinsic: shape of the acromion

Primary: usually due to degenerative changes and spurring Secondary: Problem with keeping the humeral head centered in the glenoid fossa. Caused by weakness of the RC muscles. Symptoms usually activity specific
**Causes**

Overuse overhead reaching (athletes: swimming, throwing, tennis)
   (worker: stocking shelves, painters)
Poor posture, rounded shoulders
Poor mechanics when performing shoulder activities
Increasing age
Poor muscular tone
Instability of the glenohumeral joint which allows increased translation of the humeral head
Degenerative arthritis
Osteopenia/ osteoporosis
Acromion morphologies (Type I-flat; Type II- curved; Type III-hooked)
Impingement

Neer described three stages

Stage 1: Edema and hemorrhage (patient generally <25 years)
- Intermittent pain with overhead activities
- Reversible cuff edema
- Painful arc of motion 60 to 120 degrees
- Palpable tenderness over the greater tuberosity

Stage 2: Fibrosis and tendinitis (patient 25 to 40 years)
- Mild to moderate pain with overhead activities or strenuous activities
- Duration of symptoms is usually years
- Symptoms and discomfort interfere with ADL’s/ sleep

Stage 3: Rotator cuff tear, biceps tendon rupture, bony changes (pt >40 yrs)
- Pain at rest
- Significant tendon degeneration is the hallmark of stage 3.
Primary External Impingement

White arrow— down sloping acromion
Black arrow— full thickness tear of the supraspinatus
Current Classification of Impingement

External
- Pathology is outside the GH joint and confined to the Subacromial space
- Compression of the rotator cuff, usually the supraspinatus by the acromion
- Slow insidious onset, no history of trauma

Secondary
- Problem with keeping the humeral head centered in the glenoid fossa during arm movement. Weakness of the Rotator Cuff

Subcoracoid impingement / Stenosis
- Anterior shoulder pain.

Internal (Glenoid) Impingement
- Posterior shoulder pain in the throwing or overhead athlete
- Stiffness, slow to warm up
Symptoms

Shoulder pain with shoulder level or overhead activity, lifting

Pain when reaching behind the back

Pain in the Deltoid region or lateral arm.

Shoulder tenderness

Decreased strength if prolonged

Loss of range of motion due to pain and disuse

Pain at night and inability to lie on the affected arm.

Locking sensation with abduction

Active “palm down” abduction is painful
Treatment

- Restore range of motion with proper stretching
- Strengthening of the shoulder stabilizing musculature
- Pectoral stretches
- Pain relief
- Improve mechanics
- Improve shoulder stability
- Patient education to minimize further trauma
- Patient education on correct posture
Examination

Pain grading, location, when it occurs, severity

Neck range of motion

Subacromial tenderness

Muscle atrophy

Range of motion both active and passive

Rotator cuff manual muscle testing:
  - drop arm
  - external rotation

Specialty testing:
  - Neer
  - Hawkins-Kennedy test
  - Empty can or full can test
**IMPINGEMENT TESTS**

**Neer Impingement Sign (passive painful arc maneuver)**

Forces the greater tuberosity against the anterior acromion  
Rotates the posterior cuff tendons under the acromion  
  - Infraspinatus  
  - Teres Minor  
Used to assess the degree of impingement. Note if patient is guarding by shrugging as maneuver is performed.

**Technique**
1. Arm at side with elbow fully extended  
2. Arm internally rotated with thumb touching side of leg  
3. Examiner passively forward flexes the shoulder overhead to 180 degrees

Severity is determined by the angle at which the arc becomes painful:  
  - Mild impingement: pain at 90 degrees  
  - Moderate impingement: pain at 60-70 degrees  
  - Severe impingement: pain at 45 degrees or below
**Hawkins Impingement Sign**

Impales tendons against coracoacromial arch

**Technique**
1. Arm forward flexed to 90 degrees
2. Elbow flexed to 90 degrees
3. Examiner grasps patients elbow with one hand and their wrist with the other
4. Examiner passively externally rotates the shoulder
   (impinges subscapularis muscle against the coracoacromial arch)
5. Examiners passively internally rotates the shoulder
   (impinges supraspinatus muscle, teres minor and infraspinatus muscles).

**Interpretation**
Pain suggests shoulder impingement of the affected rotator cuff muscles

LSUHSC-Shreveport
Supraspinatus Test (Empty can/Full can test)

Patient abducts the shoulder to 90 degrees, then adducts to 30°. (The plane of scapation).

Empty can isolates the supraspinatus muscle and may be more pain provoking (forearm/hand pronated, thumb pointing down). Full can is a more functional position, less pain provoking and may be better in the clinical setting.

Provocative Maneuver
Patient tries to maintain forward flexion against examiners downward pressure.

Arm weakness is specific to supraspinatus impingement.

Efficacy
Empty can test sensitivity: 44%
Full can test sensitivity: 90%
Neer Impingement

Hawkins

Supraspinatus Testing Full can /Empty can
Patient information on activity modification

Restrict over the shoulder positions until symptoms resolve

Left objects close to the body

Lift weights below shoulder level

Throw balls underhand

Maintain good posture while writing, assembly work

Do not use an arm sling
Conservative treatment

Pain relief
- Ice applied to reduce inflammation
  - Apply ice for 15 minutes every 4 to 6 hours as needed.

NSAID’s or glucosamine, Ca+, multi vitamin as prescribed by your doctor
Adequate Vitamin D & Ca+ is first line for arthritis pain relief

Stretching exercises

Range of motion

Posture

Strengthening
Posture

Scapular adduction exercise

Sit or stand upright
Pull both shoulder blades together and pull downward.
Hold for 5 seconds. Release and repeat 10 times. Do 2-3 times daily
Do not shrug the shoulders and keep the neck relaxed
Weighted ROM Codman pendulum stretch

Stretches the space in which the tendons pass
Prevents development of a frozen shoulder

Apply heat to shoulder prior to exercise 5-10 minutes
Relax the shoulder muscles.
You can stand or sit to do the exercises
Do not bend over too far as this may cause pinching of the rotator cuff tendons
Gradually increase the weight used and the diameter of the movements.
Perform two times daily
Range of Motion - with Overhead pulleys

Pull and hold to stretch

Pull and hold to stretch
Pectoral stretching

Use a rolled towel. Lay on your back on the towel. The rolled towel will run along the spine. Let your arms relax out to the side.

Stretch for 2-3 minutes.

Pectoral stretching is most important. Need to reverse forward shoulder lean
Stretching / Flexibility Exercises

Internal Rotation
Towel Stretch

Cross arm body stretch
Strengthening

All exercises are performed in pain free ROM

Perform once per day 4 days a week

In the elderly degenerative tears are common. Do not overload the muscles with resistance

The goal is to increase blood flow and promote strengthening/reconditioning of the muscle

Theraband or free weight for internal and external rotation

Scapular strengthening

Work in the plane of scapation

Ice following exercise
Strengthening using free weights

Abduction

External rotation

Forward flexion

Low Weight- Hi Reps
Strengthening using Resistive Band

- Abduction
- Flexion
- External Rotation
- Internal Rotation

Low Resistance
Hi Reps

LSUHSC-Shreveport
Scapular strengthening / Rowing exercises
Impingement treatment summary

Pain relief
   Ice
   NSAIDS or glucosamine, Ca+, multi vitamin

Patient education
   Posture
   Restricting over shoulder movements

Range of motion
   Codmans
   Overhead pulleys- stretch and hold. Work on Abduction range

Stretching
   Scapular stretch
   Pectoral stretch

Strengthening
   Free weight- low weight, high reps
   Theraband- low resistance, high reps
References

Dr. A. Hollister, MD. Associate Professor Dept. of Orthopaedics LSUHSC

Carla Saulsbery LOTR, CHT. Chief Occupational Therapy LSUHSC


Hunter; Mackin; Callahan. Rehabilitation of the Hand.

Pictures LSUHSC

Springer Images

Special Thanks to PT ‘s & PT tech: Trent, Tony and Tony