



## General Rehabilitation Guidelines

### *Rotator Cuff Tendinosis & Impingement Syndrome* Protocol for Non-operative Treatment

**Samir Patel, MD**

#### **Considerations**

- Impingement Syndrome and Rotator Cuff Tendinosis may have many different causes that culminate in shoulder pain. Each potential cause must be sought and addressed through effective rehabilitation to permit tissue healing and remodeling.
- Potential causes
  1. **Overuse**: repetitive use of the arms, especially at or above shoulder level may cause fatigue and damage to the rotator cuff tendons. If the rate of tissue breakdown exceeds the rate of tissue healing, tendon degeneration may occur. This may be known as Repetitive Strain Injury (RSI). Giving the damaged tissue sufficient time to heal is essential to recovery. Continued pain during activity is an indicator of internal tissue damage and should not be ignored. Efforts to "work through" the pain will likely only result in further injury. Once symptoms have subsided, activity is progressively resumed with an emphasis on proper technique and paced resumption of normal levels of performance.
  2. **Poor posture**: forward slumping of the shoulders causes the scapula to tilt anteriorly and laterally. This narrows the space available for the rotator cuff tendons and may cause abrasion of its surface. In addition, excess pressure from the downward sloping acromion bone may "wring out" the tendon's blood supply resulting in tissue breakdown. Therapy must address postural control both by stretching the anterior chest wall muscles and posterior shoulder capsule. Greater flexibility in these structures will allow the scapula to shift back into its proper position. The muscles that stabilize the scapula to the chest wall must also be strengthened to support the improved posture.
  3. **Stiffness**: Injury to the shoulder, whether from a single traumatic incident or from repetitive overuse, often causes the capsule surrounding the ball and socket joint to contract and tighten. This is particularly true for the posterior capsule of the shoulder. Posterior capsule tightness causes the ball to slide upwards on the socket during many activities such as reaching and lifting. This abnormal movement of the ball on the socket results in abrasion of the rotator cuff on the acromion bone and coracoacromial ligament which form the roof above the tendons. Therapy must address restoration of full flexibility in the shoulder capsule through an effective stretching program.
  4. **Weakness**: Many people who engage in repetitive motion activities, whether through work, sport or recreation, develop fatigue in the rotator cuff muscles. If the muscles are not allowed sufficient time to rest, recover and remodel, fatigue can lead to internal damage to the muscle and tendon. In addition, fatigue promotes faulty mechanics in the ball and socket mechanism that accelerate this damage. Muscle strengthening exercises must first re-establish endurance in the rotator cuff. This promotes remodeling of the tendon to later adapt to exercises that promote power.
  5. **Instability**: Some people are born with particularly elastic connective tissue and may have shoulder joints that are very lax (wide range of motion). Such "hyperlaxity" may predispose some people to develop subtle shoulder instability

whereby the ball does not stay properly centered in the shoulder socket during shoulder movement. This condition may be associated with impingement of the rotator cuff on the acromion bone and coracoacromial ligament. Therapy must therefore effectively re-educate the rotator cuff and scapular muscles to keep the ball centered on the socket during functional shoulder activities.

6. **Core deconditioning**: the shoulder is a linkage that transmits energy from the legs and trunk to the arm and hand. If the trunk (core) muscles are weak and cannot effectively stabilize the pelvis to allow efficient energy transfer, the shoulder girdle may have to compensate by working harder. This promotes muscle fatigue which leads to poor mechanics in the linkage system. The end result is tissue breakdown. This problem may be particularly evident in people whose work involves heavy physical labor. Therapy must therefore evaluate and treat weakness of the core body muscles and transfer of energy through the linkage. General aerobic conditioning is also important to promote healing.
  7. **Smoking**: As with many other tissues in the body, the connective tissues of the musculoskeletal system are adversely affected by smoking. Specifically, smoking damages the circulation to tendons and bones. This not only places these tissues at risk for injury but also slows or prevents their healing during a recovery period.
- Many people have had prolonged therapy for shoulder pain related to impingement syndrome and rotator cuff tendinosis and have failed to respond with improvement in comfort and function. It is important to address the following questions before deciding that rehabilitation has failed: (1) was the therapy program effective in correcting all possible abnormalities?; (2) was sufficient time allotted for tissue healing and remodeling including an initial period of rest? If the answer to either of these questions is "No" then it is worthwhile to start back at the beginning prior to embarking on surgical treatment. Surgical treatment cannot correct problems such as poor posture and these must be addressed before surgery can be expected to provide good outcomes.

### **Outpatient Phase 1**: Acute Phase

- **ROM**
  - Full flexibility program to address capsular imbalance
  - Emphasis on posterior capsule stretching cross body stretch, sleeper stretch, and roll-over sleeper stretch
  - Anterior chest wall stretching
  - Glenohumeral and scapulothoracic joint mobilizations emphasizing posterior and inferior capsule
  - HEP should be done 2-3x day
  - Wand and pulleys may be used if deemed appropriate
- **Other**
  - Correction of postural abnormalities
  - Cryotherapy after exercise sessions
  - Modalities to decrease pain and inflammation such as ultrasound and electrical stimulation
  - Cross friction massage for supraspinatus, infraspinatus and biceps tendon
    - Supraspinatus: arm in adduction and internal rotation with forearm behind back (brings tendon out from under acromion)
    - Biceps tendon: external rotation with arm at side and pronation of forearm (elbow bent at 90°)

## **Outpatient Phase 2: Early Recovery Phase**

- **ROM**

- Continue capsular flexibility program with emphasis on posterior and inferior capsule and HEP 2-3x/day
- Glenohumeral and scapulothoracic mobilizations
- Correct any capsular imbalance
- Continue anterior chest wall stretching

- **Strength**

- **Notes**

- strengthening should be withheld for a period to allow adequate rest and recovery of motion. If pain is encountered during strengthening exercises, they should be delayed or modified until they can be done with minimal discomfort
- early strengthening should be performed in non-impingement positions and progressively advanced to horizontal plane during later recovery phases
- early emphasis should be placed on lower weight, higher repetition exercises to prevent fatigue and promote contractile remodeling of tissues and hypertrophy of muscle fibers
  - start with eccentric contractions with low resistance at a slow pace
  - as patients become less symptomatic, can progress to higher resistance and increase speed of contraction
  - with further progress, progress to concentric contractions
- early strengthening should be performed with rubber tubing (therabands) to provide more controlled resistance and dumbbells may be incorporated in later recovery phases for concentric isotonic strengthening
- in later recovery phases, higher weights can be added to promote strengthening and power. Exercises should focus on functional positions
- strengthening exercises should be followed by a day of rest and stretching and allow tissue recovery
- evaluate for scapulohumeral rhythm abnormalities and upper trapezial compensation during lifting maneuvers

- **Scapula Strengthening**

- Isometric shoulder retraction and depression
- Shrugs
- Seated rows and prone rowing
- Table top ball rolls
- Scapular clocks with hand stabilized on wall in horizontal abduction
  - Protraction/retraction, elevation/depression
- Low resistance UBE below shoulder height

- **Rotator Cuff Strengthening**

- Submaximal isometric IR, ER, flexion, abduction, extension
- Side-lying IR and ER in modified neutral position
- Flexion and scaption (empty and full can)
  - Start below 60° and progress to 90° abduction as tolerated
- Start with eccentric cuff strengthening and progress to concentric

- **Other Strengthening**
  - Biceps (elbow supported) and triceps with theraband or dumbbells
  - Core body strengthening to address lumbopelvic stability
  - Aerobic conditioning
    - Stationary bike as medical condition permits
    - No running at this time (must be pain free for at least 3 weeks before resuming running)
  - Assess and correct any substitution patterns
- **Other**
  - Continue cryotherapy after exercise sessions
  - Continue modalities to decrease pain and inflammation
  - **Notes:** aquatherapy may be used to assist and range of motion and early strengthening phases as necessary

### **Outpatient Phase 3: Late Recovery Phase**

- **ROM**
  - Progressive return to full ROM and continue HEP
  - Continue joint mobilization as indicated
- **Strength**
  - **Scapula Strengthening**
    - Continue warm up with UBE
      - May increase height, resistance and time as tolerated
      - Emphasize reverse cycles for scapular rehabilitation
    - Continue scapular stabilization with shrugs, prone and seated rowing, low rows
    - Push-ups with a plus: progress from wall to table to floor as tolerated
    - Scapular diagonals, dumps and punches
      - Incorporate trunk movement for core rehabilitation
    - Progress from table top rolls to wall washes
      - Start wall washes at low height and progress to horizontal as tolerated
  - **Rotator Cuff Strengthening**
    - Multiangle submaximal isometrics
    - Continue progressive strengthening
      - Include IR and ER at 45° abduction as tolerated
      - Progress flexion and scaption above horizontal as tolerated
    - Prone scaption and abduction in neutral and ER
    - Prone posterior deltoid
    - Prone ER
    - **Notes:** may progress to concentric work with dumbbells as tolerated
  - **Other Strengthening**
    - Continue biceps and triceps strengthening
    - Continue aerobic conditioning
    - Continue core strengthening and lumbopelvic stabilization
    - Assess and correct any remaining substitution patterns

### **Outpatient Phase 4: Functional and Remodelling Phase**

- **ROM**
  - Continue maintenance flexibility program

- Place emphasis and any remaining capsular restrictions
- **Strength**
  - Continue strengthening program with progressive increase in resistance
    - Emphasis on regaining functional strength necessary for vocational and recreational activities
  - Large muscle exercises including shoulder press, lat pull-downs, bench press
  - May include IR/ER isokinetics in modified neutral position and progress to 90/90 position in scapular plane as tolerated
  - Functional and sport specific training
  - Progressive gym program for continued strengthening and endurance as part of HEP