Evaluation and Treatment of Shoulder Pain

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INTRODUCTION

Shoulder pain is a common presenting concern in outpatient medical practice. Shoulder problems can significantly affect a patient’s ability to work and other activities of daily life such as driving, dressing, brushing hair, and even eating. “The shoulder” consists of a complex array of bones, muscles, tendons, and nerves, making the cause of pain seem difficult to decipher. Shoulder pain can be caused by structures within the shoulder or can arise from problems external to the shoulder. Fortunately, most shoulder pain falls into one of several patterns.

The rotator cuff provides stabilization to the glenohumeral joint, and contributes to mobility and strength of the shoulder. Disease of the rotator cuff is the most common cause of shoulder pain seen in clinical practice. The prevalence of rotator cuff disease increases with age, obesity, diabetes, and chronic diseases that affect the strength of the shoulder such as stroke. An experienced practitioner can often recognize the cause of a patient’s shoulder pain with a few questions and a focused examination.

Treatment of shoulder pain can be successfully managed by a primary care provider in most cases. Referral to a physical therapist can be important to help improve the patient’s mechanics and strength. Early use of imaging studies and specialist referrals are overutilized by primary care providers, and should be limited to specific indications. Consultation with an orthopedic surgeon for fractures and tendon tears will be necessary in some cases.

KEYWORDS

- Rotator cuff disease
- Subacromial impingement syndrome
- Adhesive capsulitis
- Painful arc

KEY POINTS

- Shoulder pain can have a significant impact on function.
- A thorough examination of the shoulder is a necessity.
- Most shoulder pain is due to the structure supporting the shoulder joint.
- Pain relief and exercises are the mainstays of therapy.
When evaluating patients with shoulder pain, it is important to understand the anatomy of the region. The major anatomic structures of interest include (Fig. 1)\(^3\):

- Four main bony structures: proximal humerus, clavicle, scapula, and ribs. The acromion, the superior, anterior extension of the scapula, forms the roof of the shoulder.
- Three main joints: glenohumeral, acromioclavicular (AC), sternoclavicular.
- Four rotator cuff muscles/tendons (SITS): supraspinatus (abduction), infraspinatus (external rotation), teres minor (external rotation, adduction), and subscapularis (adduction, internal rotation). The supraspinatus and infraspinatus tendons pass through the subacromial space to insert on the greater tubercle of the humerus.

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![Fig. 1. Muscles: back and scapula region. From Netter illustration from www.netterimages.com. © Elsevier Inc. All rights reserved.](Image)
- Bursa: the subacromial bursa provides a cushion as the rotator cuff tendons move below the acromion.
- Surrounding musculature: biceps, deltoid, pectoralis, latissimus dorsi, rhomboids.
- Neurovascular: suprascapular nerve and vessels.

**Important Terms**

**Rotator cuff disease**
Rotator cuff disease (RCD) is a term encompassing tendinopathy, partial-thickness tear, or complete tear of one or more of the rotator cuff tendons. RCD also includes subacromial bursitis. In general, the term RCD is used synonymously with subacromial impingement syndrome (SIS).

**Subacromial impingement syndrome**
SIS is an umbrella term that encompasses rotator cuff tendinopathy and partial tears, as well as subacromial bursitis. The term is meant to convey the proposed etiology of these conditions. Inflammation and pain are caused by compression or impingement of the supraspinatus tendon (most common), infraspinatus tendon, subacromial bursa, biceps tendon, or other structures as they pass through the space between the lateral aspect of the acromion and the humeral head. Functional impingement can occur when there are problems with the mobility and stability of the rotator cuff muscles or the position and movement of the scapula. Risk factors for impingement include repetitive activity above the head, increasing age, and conditions such as stroke and Parkinson disease. These risk factors are related to poor mechanics or decreased strength and stability of the rotator cuff and other supporting muscles. The natural history of SIS is often chronic or with recurrent pain and dysfunction.

**Adhesive capsulitis (frozen shoulder)**
Chronic pain and reduced active and passive mobility in the glenohumeral joint is associated with a variety of shoulder problems or occur as a primary problem of unknown cause. Adhesive capsulitis typically is seen in patients in their 40s to 60s, but is more common in diabetics in whom it is likely to present at a younger age. Adhesive capsulitis may resolve spontaneously over a period of years, but causes significant pain and functional limitations in the meantime.

**SYMPTOMS**

Symptoms should be evaluated in the context of the patient as a whole. Age, underlying medical conditions, body habitus and overall strength, and smoking status are all important considerations. A systematic approach to history taking is crucial to avoid missing historical information. The most important factors include:

- Prior condition of shoulder
- Location of current pain:
  - Localized or diffuse
  - Anterior, lateral, or posterior
- Radiation patterns (clue: radiation past the elbow suggests a neurologic component)
- Timing of pain onset: sudden onset or developed gradually? (clue: came on all at once suggests a tear)
- Associated factors: repetitive stress or recent or prior injury
- Duration: acute (<6 weeks), subacute (6–12 weeks), chronic (>3 months)
Quality of pain: sharp, dull
Associated symptoms: weakness, stiffness, crepitus, swelling (clue: fear of recurrence suggests shoulder instability)
Alleviating and exacerbating factors: pain at night, pain worse with overhead activities (pain at night is a classic symptom for tear but likelihood ratios [LRs] are not significant in systematic review)\(^7\)
Systemic factors: fever, numbness, weight loss, fatigue, dyspnea, chest pain

**Common Symptom Patterns**

Subacromial impingement: lateral pain, subacute, worse with movement overhead
Rotator cuff tear: sudden onset, weakness, pain at night
Adhesive capsulitis: distant injury or chronic pain, progressive inability to reach overhead, decreased mobility

**DIAGNOSTIC TESTS AND IMAGING STUDIES**

**Physical Examination**
The physical examination is used to diagnose the cause of the patient’s pain but also to assess functional abilities. Elderly patients in particular may not be able to perform activities of daily living and may require assistance at home. A systematic approach to the examination is essential. The initial physical examination for shoulder pain should focus primarily on the musculoskeletal complex. Additional components of the examination can be performed if there is concern about an extrinsic cause of the patient’s shoulder pain.

**Observing Both Shoulders for Comparison**
Further specific testing can be done based on the results of the initial examination. There are many tests for shoulder mobility and strength. None of the maneuvers has been found to be the ideal test for diagnosis of a particular syndrome or lesion.\(^8\) Abduction maneuvers are recommended, given their better performance in systematic reviews in the diagnosis of specific pathologic conditions of the shoulder.

1. **General appearance** (Fig. 2): Symmetry, bulk, deformities, atrophy above or below the scapular spine. Atrophy in the space below the scapular spine suggests RCD (positive LR 2.0, negative LR 0.61)\(^7\) or injury to the suprascapular nerve.\(^6\)
2. **Palpation:** Sternoclavicular joint, clavicle, acromioclavicular joint, lateral acromion, biceps tendon in the groove between the greater and lesser tubercle of the humerus. Remember: some patients can be tender at many points but you are trying to recreate the pain that they have been experiencing at home. The anterior joint line can be palpated.
3. **General range of motion (ROM)/pain provocation testing:** ROM testing identifies limitations in ROM and localizes pain. Start with these basic ROM tests with the patient standing. Test active ROM first and add passive ROM if the patient has pain or limited motion. All maneuvers start from the anatomic position with arms at the side and palms facing forward.

**Abduction**
Ask the patient to raise the arm from the side (0°) to overhead (Fig. 3). Normal ROM is 180°. If the patient has limitation in active ROM, assist with passive ROM. Stand behind the patient and place a hand on the unaffected shoulder. With the other hand support the patient’s affected arm just above the elbow. The patient’s arm...
should remain within the horizontal plane. Raise the arm until limited by pain. If pain occurs with active or passive ROM, specify the location (0°–180°).

Pain in the lateral shoulder between 60° and 120° abduction is known as the painful arc, and suggests disease in the rotator cuff or subacromial bursa,9–11 also known as subacromial impingement. The painful arc is one of the most helpful physical examination findings when considering RCD (positive LR 3.7, negative LR 0.50).7

Pain between 120° and 180° suggests a problem with the AC joint.

**External rotation**
Stand in front of the patient. Ask the patient to hold the arms in front of the body with elbows bent to 90°, palms facing in; ask the patient to hold the elbows against the sides and move the hands outward, parallel to the floor. Normal external rotation is at least 55° and up to 80°. For passive ROM grasp the affected arm proximal to the wrist and externally rotate. Pain or decreased ROM suggests a problem with the teres minor or infraspinatus muscle.

**Internal rotation**
Stand in front of the patient. Ask the patient to hold the arms in front of the body with elbows bent to 90°, palms facing in; ask the patient to hold the elbows against the
sides and move the hands inward, parallel to the floor. Normal internal rotation is at least 45°. For passive ROM, grasp the affected arm proximal to the wrist and internally rotate. Pain or decreased ROM suggests a problem with the subscapularis muscle.

**Cross-body adduction**
Cross-body adduction is also known as the scarf test (Fig. 4). The patient reaches the affected arm across the body to the opposite shoulder. Pain in the front of the shoulder suggests AC joint abnormality.
• If the basic examination and ROM testing are normal, STOP and consider problems external to the shoulder itself. Pursue more generalized examination: neurovascular examination of the upper extremity, cardiac, pulmonary, abdominal, and neurologic examinations.
• If you are concerned about adhesive capsulitis or glenohumeral arthritis, poorly localized pain, limited range of all active and passive ROM, STOP.
• If you are concerned about AC joint disease, pain over AC joint, pain on abduction, STOP.
• If you are concerned about RCD, further testing for impingement (Fig. 5) and strength testing (Fig. 6) is required.
• If you are concerned about instability, biceps tendinopathy, or posterior pain, further tests as shown in Fig. 7 should be considered.

Anteroposterior and Axillary Plain Radiographs of the Shoulder

Radiographs are useful in the setting of trauma, in particular:
• Fall on outstretched arm: fracture of the proximal humerus
• Fall on lateral shoulder: AC joint separation, clavicular or humeral fracture

Radiographs are also useful in evaluating:
• Presence and extent of glenohumeral arthritis, or to differentiate glenohumeral arthritis from adhesive capsulitis in a patient with limited passive ROM
• Presence and extent of AC arthritis
• Shoulder pain in patients with rheumatoid arthritis

Ultrasonography of the Shoulder

Ultrasonography of the shoulder can be used to assess:
• Shoulder dislocation.
• Biceps disorder. Compared with arthroscopy, ultrasonography performs well in the diagnosis of dislocation or subluxation of the long head of the biceps (sensitivity 96%, specificity 100%). Ultrasonography is also reliable for detecting complete tears of the biceps tendon, but may not be adequate for the detection of partial tears (sensitivity 49%, specificity 97%).
• Rotator cuff tears. This modality is operator dependent, but in the hands of a good technician can be as good as magnetic resonance imaging (MRI) for detecting full-thickness tears (sensitivity 92%, specificity 94%) and partial-thickness tears (sensitivity 67%, specificity 94%).
• Summary data for detecting any rotator cuff tear is sensitivity 91% and specificity 85%. Ultrasonography is less expensive than MRI, and is better tolerated and preferred by patients.

Magnetic Resonance Imaging

MRI of the shoulder is indicated for:
• Possible labral tear (trauma, repetitive overhead throwing or playing tennis, catching, or locking)
• Possible rotator cuff tear when quality ultrasonography not available (weakness)

As with ultrasonography, performance characteristics are better for full-thickness tears (sensitivity 84%–96%, specificity 93%–98%) than for partial-thickness tears (sensitivity 35%–44%, specificity 85%–97%). For diagnosing any rotator cuff tear, sensitivity is 98% and sensitivity 79%. MRI allows a better look at the shoulder as a whole, and can be useful if a surgical procedure is planned.
Magnetic resonance arthrography (MRA) is better than either ultrasonography or MRI in detecting rotator cuff tears, especially partial-thickness tears. MRA is generally ordered by sports medicine or orthopedic consultants on referral for possible surgical repair in a patient who has not improved with conservative therapy or who has significant strength lost on examination, but in whom a tear was not detected on initial imaging.

Fig. 5. Additional range of motion/pain provocation tests for suspected impingement. (A) Hawkins-Kennedy Impingement Sign: Patient holds arm at 90° flexion with elbow at 90° flexion. Place downward pressure on the forearm and passively internally rotate the arm. (positive LR 1.5, negative LR 0.51). (B) Neer’s Impingement Sign: The patient internally rotates their hand (thumb toward the ground). Place your hand on the back of the patient’s shoulder to stabilize the scapula. Forward flex the patient’s straight arm by grasping just below the elbow and lifting. (positive LR 1.3). Full ROM 180°.

Magnetic resonance arthrography (MRA) is better than either ultrasonography or MRI in detecting rotator cuff tears, especially partial-thickness tears. MRA is generally ordered by sports medicine or orthopedic consultants on referral for possible surgical repair in a patient who has not improved with conservative therapy or who has significant strength lost on examination, but in whom a tear was not detected on initial imaging.
**Bottom Line**

Check radiograph if: trauma or possible arthritis
Check sonogram or MRI if: concern for labral or rotator cuff tear

**DIFFERENTIAL DIAGNOSIS**

The differential diagnosis is broad and can be aided by the primary location of the pain.

**Lateral Shoulder Pain**

SIS, rotator cuff tendonitis, subacromial bursitis, full-thickness or partial-thickness tears of the rotator cuff tendons, adhesive capsulitis, multidirectional instability, cervical radiculopathy, proximal humeral fracture, glenohumeral osteoarthritis (Table 1).
Anterior Shoulder Pain

RCD, glenohumeral osteoarthritis, AC arthritis, AC separation, biceps tendonitis, adhesive capsulitis, anterior instability, biceps tendon rupture (sudden-onset pain, weakness and swelling), proximal humeral fracture, labral tear (Table 2).

Posterior Shoulder Pain

Posterior instability/dislocation, suprascapular nerve entrapment, RCD, labral tear, glenohumeral osteoarthritis, cervical radiculopathy, proximal humeral fracture.

Nonspecific Shoulder Pain

- Polymyalgia rheumatica: older patient, bilateral shoulder pain, full ROM, no weakness, may have hip pain, claudication, fatigue

Fig. 7. Further testing if suspecting something other than subacromial impingement syndrome. (A) Apprehension Test- patient lies on the table. With their arm positioned off the side of table it is abducted 90° and externally rotated 90° (positive LR 17.2). A positive test is patient apprehension in this position. (B) Speed’s Test: The patient flexes their arm to 90° with palm facing upward. Press downward as the patient resists arm movement. A positive test is pain in area of bicipital groove. (C) Yergason’s Test: The patient flexes their elbow to 90°. Provide resistance to supination. A positive test is pain in area of bicipital groove.

Greenberg
Table 1
Common causes of lateral shoulder pain

<table>
<thead>
<tr>
<th></th>
<th>SIS/RCD</th>
<th>Complete Rotator Cuff Tear</th>
<th>Adhesive Capsulitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associated factors</td>
<td>Repetitive movement</td>
<td>Long history of shoulder problems</td>
<td>Diabetes Age</td>
</tr>
<tr>
<td></td>
<td>Stroke</td>
<td>Trauma</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parkinson disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onset</td>
<td>Subacute to chronic</td>
<td>Acute or chronic with sudden worsening</td>
<td>Subacute to chronic</td>
</tr>
<tr>
<td>Other findings</td>
<td>Tenderness below lateral edge of acromion</td>
<td>Pain at night$^a$ Weakness Catching sensation</td>
<td>Stiffness Significant functional limitations</td>
</tr>
<tr>
<td>Range of motion</td>
<td>Full passive ROM</td>
<td>Limited active ROM due to weakness Full passive ROM</td>
<td>Decreased active and passive ROM</td>
</tr>
<tr>
<td>Pain with range of motion</td>
<td>$^a$Painful arc ± External rotation ± Internal rotation</td>
<td>Often in setting of impingement, thus similar findings possible</td>
<td>Pain with ROM on multiple maneuvers</td>
</tr>
<tr>
<td>Weakness</td>
<td>No</td>
<td>Yes Drop-arm test Other tests (see Fig. 6)</td>
<td>No</td>
</tr>
<tr>
<td>Atrophy</td>
<td>No</td>
<td>Maybe</td>
<td>Maybe</td>
</tr>
</tbody>
</table>

Acute: ≤6 weeks; subacute: 6–12 weeks; chronic: ≥3 months.

Abbreviations: RCD, rotator cuff disease; ROM, range of motion; SIS, subacromial impingement syndrome.

a Classic symptom but likelihood ratios not significant in systematic review.$^7$

- Cervical radiculopathy: pain below the elbow, numbness or weakness, decreased reflexes
- Glenohumeral osteoarthritis
- Rheumatoid arthritis: stiffness and other joint involvement
- Consider pulmonary, gastrointestinal, and cardiac causes of diaphragm irritation or referred pain

**TREATMENT**

The goal of treatment is to reduce pain and improve ROM, thus restoring function to the shoulder.

**General Measures**

- Analgesics: Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly recommended for the treatment of shoulder pain because of their anti-inflammatory effects. Experience suggests that any commonly used oral analgesics can be used for the treatment of shoulder pain thought to be due to RCD, SIS, AC joint disease, or adhesive capsulitis. There have been no studies comparing oral over-the-counter or prescription acetaminophen with NSAIDs. Thus either can be used, depending on coexistent disease and provider and patient preference.
- Should patients put ice or heat on their shoulder? Ice has traditionally been recommended for painful muscles and joints.$^{18}$ There is little evidence to show
<table>
<thead>
<tr>
<th>Associated factors</th>
<th>Biceps Tendonitis</th>
<th>AC Separation</th>
<th>AC Arthritis</th>
<th>Proximal Humeral Fracture</th>
<th>Adhesive Capsulitis</th>
<th>Labral Tear</th>
<th>OA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Fall onto lateral shoulder</td>
<td>Repetitive lifting</td>
<td>Age</td>
<td>Fall on shoulder or outstretched arm</td>
<td>Chronic progressive pain/stiffness</td>
<td>Repetitive overhead throwing Trauma</td>
<td>Age</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Onset</th>
<th>Subacute to chronic</th>
<th>Acute</th>
<th>Chronic</th>
<th>Acute</th>
<th>Subacute to chronic</th>
<th>Acute</th>
<th>Chronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific findings</td>
<td>Tenderness in bicpital groove with internal and external rotation</td>
<td>Unilateral deformity and tenderness of AC joint</td>
<td>Tenderness over AC joint</td>
<td>Bruising</td>
<td>Decreased passive/active ROM</td>
<td>Deep shoulder pain</td>
<td>Stiffness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Joint-line tenderness</td>
<td>Crepitus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROM</th>
<th>Normal</th>
<th>Normal except adduction</th>
<th>Normal except adduction</th>
<th>Reluctant to attempt</th>
<th>Decreased passive/active ROM</th>
<th>Normal</th>
<th>Decreased passive/active ROM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maneuver</td>
<td>Speed</td>
<td>Yergason</td>
<td>Cross-arm adduction</td>
<td>Cross-arm adduction</td>
<td>None</td>
<td>Forward flexion reduced</td>
<td>None</td>
</tr>
<tr>
<td>Initial evaluation</td>
<td>None</td>
<td>Radiograph</td>
<td>Radiograph</td>
<td>Radiograph</td>
<td>None</td>
<td>MRI</td>
<td>Radiograph</td>
</tr>
</tbody>
</table>

Abbreviations: AC, acromioclavicular joint; MRI, magnetic resonance imaging; OA, osteoarthritis; ROM, range of motion; SIS, subacromial impingement syndrome.
whether ice is effective or even counterproductive in the treatment of soft-tissue inflammation. Ice does produce analgesia. Recommend ice for 20 to 30 minutes as often as every 2 hours if it provides relief to the patient. Ice should not be used before vigorous exercise. If ice is not helpful, the patient can try heat.

- Activity and work modification: Patients should limit activities that exacerbate their discomfort, especially overhead movements.

**Menu of Additional Therapeutic Options**

- Physical therapy: Therapists often use a combination of modalities, which can include manual mobilization, ice, heat, ultrasonography, massage, supervised progressive resistance exercises, electric stimulation, acupuncture, and stretching.
- Exercise therapy: Exercise therapy is generally initiated by a physical therapist. The patient is given instruction on strengthening exercises with movements against gravity and then progressive resistance exercises. The patient then follows a self-management plan at home.
- Manual therapy: Joint and soft-tissue mobilization and manipulation. Manual therapy is thought to break down the adhesions that form between different layers of soft tissue and allow unimpeded movement of the muscle. It can be used alone or in combination with exercises.
- Acupuncture: Needles are placed into specific acupuncture points. Sessions typically last 30 to 60 minutes and are performed 1 to 2 times a week for 4 to 8 weeks. Acupuncture can reduce pain, allowing the patient to participate in exercise therapy.
- Subacromial corticosteroid injection: The injection can be guided by ultrasound or by clinical landmarks. There is no difference in safety or efficacy with either approach. The routine use of ultrasound-guided glucocorticoid injection is discouraged, given the excess cost. Patients should not engage in heavy lifting for 2 weeks following an injection.
- Platelet-rich plasma injection: Injection of autologous platelet-rich plasma into the subacromial space. There is no evidence that platelet-rich plasma injections in addition to exercise improve pain or function of the shoulder to a greater extent than exercise alone.
- Immobilization should be avoided unless directed by a surgeon for fracture.
- Botulinum toxin: Intramuscular injection of botulinum toxin A, which may be useful in reducing shoulder pain after stroke and in osteoarthritis of the shoulder.
- Surgical intervention.

**Condition-Specific Treatment**

**SIS/RCD, subacromial bursitis**

**Bottom Line**

1. General measures: ice/heat, oral analgesic, avoid exacerbating activities.
2. Patient should have exercise therapy as part of a home self-management plan or as part of a physical therapist treatment plan.
3. The addition of manual therapy, acupuncture, or a subacromial steroid injection can have added benefit. Consider based on availability, cost, and patient preference.
4. If symptoms fail to improve after 3 months of conservative therapy, referral for surgical intervention can be considered.

The cause of this syndrome is dysfunctional mechanics, primarily of the scapula or rotator cuff muscles, leading to inflammation and pain as tendons and other structure
are compressed between the acromion and humeral head. Treatment is designed to reduce pain, allowing sufficient strengthening exercises to correct the mechanical deficiencies.

Exercise therapy is universally recommended for the treatment of SIS and RCD. Exercise can significantly reduce pain and improve function. Recommended exercises run the gamut from nonspecific shoulder strengthening to exercises designed to correct the mechanical issues leading to impingement. In one study of patients awaiting surgery for impingement, exercise focusing on eccentric strengthening of the rotator cuff muscles and eccentric/concentric strengthening of the shoulder stabilizers substantially reduced the need to for surgery in comparison with nonspecific shoulder exercises (odds ratio 7.7, 95% confidence interval 3.1–19.4; P<.001). Exercise therapy can be supervised as part of regular visits to a physical therapist, or done independently by the patient at home as part of a self-management plan. Patients willing to participate in self-training typically meet with the therapist initially and then attend 1 to 3 follow-up visits to adjust the exercise plan. Both supervised and independent exercise programs improve symptoms in patients with shoulder pain. Self-management involves fewer visits with the therapist and thus, lower cost. Patients who are willing to adhere to a home program likely have better improvement in pain and function than patients who participate in a more traditional physical therapy program.

Exercise therapy can be combined with manual therapy or acupuncture, or started after a subacromial steroid injection. Manual therapy in addition to exercise may be more effective than exercise alone in reducing pain. Subacromial steroid injection or acupuncture plus home exercise therapy are equally effective at reducing pain and improving function in patients with SIS both short term and after 1 year. Initiation of exercise should be delayed for 2 weeks after a steroid injection.

Surgical decompression, either arthroscopically or as an open procedure, is designed to reduce compression in the subacromial space. Studies have not shown a benefit of surgery over conservative therapy for the reduction of pain or improvement of function in patients with impingement syndrome. Given the risks of surgery, this modality should be considered only after conservative therapy has failed.

**Rotator cuff tear**

Rotator cuff tears can be asymptomatic or can cause significant pain and disability. Patients with a rotator cuff tear who are surgical candidates should be referred to an orthopedic surgeon to discuss the risks and expected benefits of surgical repair. Some patients will recover sufficient pain relief and function without surgery, but the outcome in an individual patient is difficult to predict. Because delayed surgery can cause complications in some patients owing to atrophy and scarring of tissue, patients should be fully informed of their options.

**Adhesive capsulitis**

Reduction of pain followed by improved ROM is the goal of therapy. Pain reduction can be achieved with a subacromial corticosteroid injection or oral analgesics. Randomized trials have shown that steroid injections and oral NSAIDs, when accompanied by therapeutic exercise, are equally effective in improving pain and function over a period of 6 months. The choice of therapy should be based on patient preference, comorbidities, and availability of treatment options. It is unclear whether manual therapy in addition to other treatments improves outcomes. If the patient is in significant pain, declines injection, and has contraindications to other oral
analgesics, oral steroids can reduce pain and improve ROM in the short term, but are unlikely to improve long-term function.\textsuperscript{33} Patients should be educated on the time course of recovery. Full recovery can often take as long as 6 to 18 months. Adhesive capsulitis may be self-limited in some patients over a period of months to years.\textsuperscript{5} Patients who fail to respond to 3 months of therapy or are unable to participate in therapy because of significant pain can be referred for consideration of imaging-guided capsular distention, manipulation under anesthesia, or other surgical options.

\textbf{Osteoarthritis of the glenohumeral joint}

Initial conservative therapy can include pain relief with analgesics and exercise therapy, although there is limited evidence that these modalities improve function or outcomes. Limited evidence suggests that injectable viscosupplementation can be helpful for some patients.\textsuperscript{34} Patients who fail conservative therapy can undergo total arthroplasty of the shoulder joint with hopes of reducing pain and improving function. There are no randomized trials comparing surgical treatment with continued conservative measures in these patients.\textsuperscript{35}

\textbf{Nonspecific shoulder pain/dysfunction}

Massage therapy helps improve pain and ROM in short-term studies, especially in patients with posterior shoulder pain and limited internal ROM.\textsuperscript{36} There is little evidence that it helps improve function of the shoulder over the long term.\textsuperscript{28}

\section*{MANAGEMENT}

\textit{Education}

In addition to the specific treatment of shoulder pain, patients should be educated on the cause of their problem and the role of each of the modalities used in treatment. Failure to engage in self-management, particularly rehabilitation exercises, can significantly delay or prevent full return to function.

\textit{Prevention}

Many shoulder problems are due to repetitive motion with the arms or the lack of strength and mobility. Patients with work-related symptoms should undergo an ergonomic review at work to reduce the risk of persistent problems.\textsuperscript{37} All patients should be encouraged to incorporate upper extremity ROM and strengthening to their overall fitness routine.

\section*{CASES}

\textit{Case 1}

A 58-year-old man with a history of obesity and diabetes reports pain in his right shoulder over the last several months. He does not remember a specific injury, but is now having difficulty performing his job as a house painter and putting on and taking off his shirt. He has difficulty laying on his right side to sleep. When asked to locate the pain he places his hand over the lateral aspect of his right shoulder. On physical examination he has tenderness below the lateral edge of the acromion. His active ROM is limited to 100° abduction because of the pain, but he has full passive ROM. He has pain with external rotation but no evidence of weakness in his right arm. Hawkins and Neer tests are positive. He has tried ice, a 2-week trial of ibuprofen, and then a 2-week trial of acetaminophen without significant improvement.
Discussion
This patient has a history and examination consistent with SIS. Review his dosing of analgesics to ensure that he tried adequate doses. Further NSAIDs may be contraindicated if he has renal dysfunction. He should be prescribed ice, heat, and then specific exercises with manual therapy, acupuncture, or a subacromial bursa injection.

Case 2
A 63-year-old woman has had pain in her left shoulder for the last 6 months. Pain began while trimming some plum trees in her yard. Initially she had difficulty putting dishes into an overhead cabinet. She has been avoiding all overhead activities for the last 3 months. She finds that her shoulder is stiff and she has difficulty brushing her hair. She is not able to localize her pain to one spot. On examination she has limited active and passive ROM with forward flexion, abduction, internal rotation, and external rotation of her left arm. She does not have weakness.

Discussion
This patient most likely has adhesive capsulitis. If you were concerned about glenohumeral arthritis, a radiograph would be reasonable to exclude this possibility. Oral analgesics and referral to a physical therapist for exercises is the appropriate initial step.

Case 3
A 74-year-old woman lost her balance while boating. She fell and hit her right shoulder against the seat in the boat. She had immediate pain in her right shoulder, and has been holding her arm against her side in the 3 hours since the accident, as any movement is uncomfortable. Her arm is bruised and she is reluctant to move it. Her pulses and neurologic testing in that arm are intact.

Discussion
No further examination is needed at this point. A radiograph to assess for fracture showed a proximal nondisplaced humeral fracture. After discussion with an orthopedist, she was placed in an arm sling and followed up in the clinic.

FUTURE CONSIDERATIONS AND SUMMARY
Shoulder pain is a common symptom in the adult population. The most common cause of shoulder pain is SIS, reflecting a problem with the rotator cuff or subacromial bursa. Determining the cause of a patient’s pain is usually a clinical diagnosis based on careful history taking and physical examination. Limited use of imaging studies will be needed in the setting of trauma, possible glenohumeral arthritis, or when a complete tendon tear is suspected. Therapy is based on pain control and therapeutic exercises in almost all cases. Despite the prevalence of shoulder pain, there is no consensus on the best way to achieve pain control or on the type of exercise most likely to achieve speedy recovery.

REFERENCES


