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The clinical evaluation of the shoulder and accurate diagnosis of shoulder abnormalities are challenging. As in most disciplines of clinical medicine, accurate diagnosis begins with a thorough patient history. Patients often have more than one abnormality contributing to their shoulder symptoms, and the clinician must use all available evidence to make the diagnosis.

The clinician must first determine the patient's chief symptom and how the problem began (Table 4.1). A traumatic injury would lead the clinician to assess for a particular spectrum of disorders such as fracture, rotator cuff tear, dislocation, or acromioclavicular (AC) joint injury. Most shoulder disorders occur insidiously with no trauma. The most common condition that often has no inciting event is a stiff or "frozen" shoulder. Shoulder pain that occurs after activity that is outside the patient's normal routine (e.g., tennis, heavy lifting) typically indicates that the shoulder is inflamed or irritated. In these cases, the most likely diagnoses are rotator cuff syndrome or AC irritation.

If symptoms have followed a shoulder injury, it is important to determine the mechanism of

injury. The position of the arm at the time of the trauma, the amount of force applied, and the direction of the force can be important factors in the differential and definitive diagnosis. A patient with an injury that hyperabducts the arm in

Table 4.1 Patient history and possible diagnoses of shoulder abnormalities^a

| Patient history | Possible diagnoses |
|-------------------------------------|---|
| Trauma | |
| Arm abducted and externally rotated | Anterior instability; subscapularis tendon tear |
| Fall onto hyperabducted arm | Luxatio erecta (inferior dislocation) |
| Fall onto outstretched arm | Proximal humerus fracture; rotator cuff tear; SLAP lesion |
| Fall onto shoulder | AC separation; fracture; rotator cuff tear; SLAP lesion |
| Traction injury | SLAP lesion |
| No trauma | |
| Insidious onset of pain | Degenerative joint disease; frozen shoulder; tendinitis |
| Insidious onset of severe pain | Brachial neuritis; shingles |
| Night pain | Tumor |
| Weakness without pain | Chronic rotator cuff tear; nerve injury; muscle disease |

^aSource: Adapted with permission from *Examination of the Shoulder: The Complete Guide*. New York, NY: Thieme Medical Publishers, Inc.; 2006
AC acromioclavicular, SLAP superior labral anterior posterior

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external rotation can produce anterior instability but it also can tear the subscapularis tendon, fracture the greater tuberosity, or fracture the glenoid. A fall on an outstretched arm can result in a rotator cuff tear, biceps anchor lesion, or fracture. A fall on a flexed elbow with a posteriorly directed force or a posteriorly directed force from any cause can result in a posterior instability episode. A fall directly on the shoulder (e.g., a fall from a bicycle) typically causes AC injury or clavicle fracture.

Understanding the timing of symptom onset can help narrow the diagnosis. It is common for patients with insidious onset of pain (e.g., from rotator cuff issues) not to move their shoulders because of pain. The shoulder soon becomes stiff, and the patient cannot perform everyday activities such as donning a coat or reaching into the back seat of a car. In such a case, what began as a rotator cuff abnormality becomes a stiff or frozen shoulder. Although both disorders may require treatment, knowing that the stiffness followed an injury or painful condition helps the practitioner decide what to assess during examination and how to create a treatment plan.

Certain activities are strongly associated with particular injuries (Table 4.2). For example,

Table 4.2 Specific injuries associated with various sports activities^a

| Activity/athlete type | Associated injuries |
|-------------------------------|---|
| Adolescent baseball pitchers | Proximal humeral apophysitis (“Little League shoulder”) |
| Archery | Posterior shoulder instability |
| Bench presses | Pectoralis major tendon tears |
| Bench presses, dips, push-ups | Osteolysis of the distal clavicle; AC arthritis |
| Football linemen | Posterior shoulder instability |
| Golf, rowing | Rib stress fractures |
| Kayaking | Supraspinatus partial tears; anterior shoulder dislocations |
| Overhead athletes | SLAP lesions; partial cuff tears; “occult” instability |
| Trapshooting | Coracoid stress fractures |

^aSource: Adapted with permission from *Examination of the Shoulder: The Complete Guide*. New York, NY: Thieme Medical Publishers, Inc.; 2006

AC acromioclavicular, SLAP superior labral anterior posterior

patients who do many push-ups for exercise or in the workplace (such as military or law enforcement officers) commonly present with irritation of the AC joint. Patients who regularly perform bench pressing can present with osteolysis of the distal clavicle. Patients who use heavy weights when bench pressing often tear their pectoralis major tendons. It is helpful for the practitioner to have suspicion for injuries seen in certain sports, especially first-rib stress fractures in overhead athletes, which can present as pleuritic chest pain [1].

Orthopedists are taught to “consider the joint above and below.” In the case of the shoulder, the proximal “joint” is the cervical spine, which is often the cause of shoulder and upper extremity pain and weakness [2, 3]. Generally, cervical spine pain radiates down the arm to the hand, often in a dermatomal distribution. Cervical spine conditions cause pain into the trapezius or along the medial border of the scapula (Fig. 4.1) [4]. In patients with trapezius pain, it is important to evaluate the AC joint because it is the only joint in the shoulder where conditions can cause pain into the trapezius.

It is important to ask patients if they have a history of tingling numbness in their upper

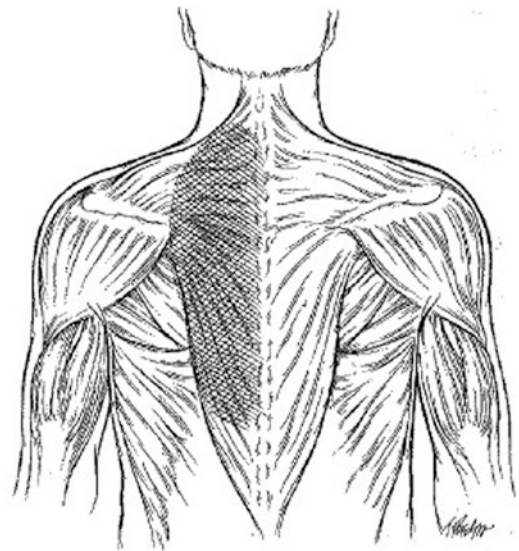


Fig. 4.1 Drawing showing the location of pain along the medial border of the scapula, which is most often caused by cervical spine disease (Reprinted with permission from *Examination of The Shoulder: The Complete Guide*, Thieme Medical Publishers, Inc., 2006. Figure 1-3, p. 3.)

extremities. Shoulder conditions rarely are the cause of paresthesias in the upper extremity. Tingling and numbness down the arm should be considered a neurological problem until proven otherwise. The clinician should consider thoracic outlet syndrome or peripheral nerve entrapment such as cubital or carpal tunnel syndromes to be the cause of paresthesia [5]. If a patient has undergone previous surgery involving the cervical spine or shoulder, then the relationship of the symptoms to the timing of the surgery is important to ascertain.

Similarly, painless weakness should be considered a neurological process until proven otherwise. Patients with rotator cuff disorders do not deteriorate suddenly without an injury. Volleyball players often have painless weakness caused by suprascapular nerve entrapment [6, 7]. Bilateral insidious onset of shoulder or upper extremity weakness necessitates a workup for neurological conditions. We recently saw an elderly patient who had insidious onset of bilateral shoulder weakness but no pain. He had undergone reverse total shoulder arthroplasty to treat the weakness, which did not improve after his surgery. Upon examination, we found the weakness to be diffuse in both upper extremities. Neurological workup revealed amyotrophic lateral sclerosis. A careful history and examination would have prevented this unnecessary procedure.

Another factor to consider when making a diagnosis is the patient's age. Rotator cuff conditions typically do not appear before the fourth decade of life [8, 9]. Athletic individuals may have rotator cuff-like symptoms but typically do not have full-thickness rotator cuff tears, so other disorders should be considered. Young athletes who perform repetitive motions such as throwing a baseball may have proximal humerus physeal injuries, whereas athletes with closed physes who perform throwing motions tend to have partial rotator cuff tears or superior labral anterior posterior lesions [10].

Unfortunately, the location of pain in the shoulder does not necessarily indicate the diagnosis (Fig. 4.2). Pain at the AC joint typically is on top of the shoulder and radiates into the trapezius but it also can radiate down the front or back of the shoulder [11]. Pain in the front of the

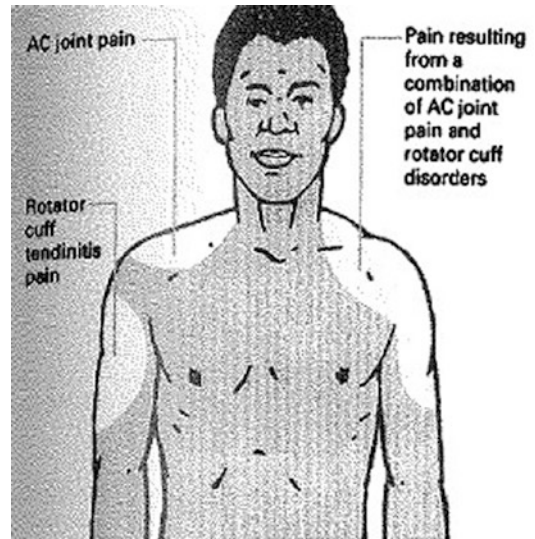


Fig. 4.2 Drawing showing the typical locations of pain from the acromioclavicular joint, the rotator cuff, and both simultaneously (Reprinted with permission from *Examination of The Shoulder: The Complete Guide*, Thieme Medical Publishers, Inc., 2006. Figure 1-2, p. 3.)

shoulder can indicate many abnormalities, including rotator cuff syndrome, biceps tendon disorders, arthritis, and stiffness of the shoulder. Therefore, some have suggested that pain in the front of the shoulder be called “anterolateral pain syndrome” rather than suggesting it is caused by one particular abnormality [12].

It is important to ascertain the nature of the patient's pain by asking standard questions. The patient's answers indicate the severity of the pain and may also provide warnings that the symptoms are serious in nature [13]. Pain that causes night waking, prevents participation in sports or activities of daily living, is not relieved with ice or heat, is not relieved by nonsteroidal anti-inflammatory drugs, requires increasingly stronger narcotics, or makes the patient miserable may indicate a serious condition such as a malignant tumor or more serious systemic illness. Patients should be asked what activities make their pain worse and what makes their pain better. They should always be asked about gastrointestinal problems, renal disorders, liver conditions, the use of blood thinners, and diabetes before prescribing anti-inflammatory medicines. Patients

with stiff shoulders from osteoarthritis or frozen shoulders have the most difficulty with activities of daily living, followed by patients with rotator cuff syndromes (Table 4.3).

Checklists of the symptoms also can be helpful (Table 4.4). The use of checklists will often

stimulate the patient to report other symptoms or conditions that might be associated with their more salient symptoms. When using checklists, it is important to note tingling, numbness, and temperature changes because these many indicate nerve involvement or infection.

Table 4.3 Difficulty performing specific activities with various shoulder pathologies^a

| Disease state | N | Difficulty with activity (%) ^b | | | | | | | |
|--------------------------------------|-----|---|------------------------|------------------|-----------|---------------------------|-------|-------------------|---------------------------|
| | | Use back pocket | Wash opposite underarm | Eat with utensil | Comb hair | Use arm at shoulder level | Dress | Use hand overhead | Carry weight ^c |
| Instability ^d | 208 | 18.0 | 12.5 | 9.4 | 18.5 | 31.7 | 13.5 | 55.1 | 31.0 |
| External impingement | 103 | 42.6 | 28.2 | 17.8 | 39.4 | 59.2 | 35.3 | 78.4 | 66.0 |
| Glenohumeral osteoarthritis | 99 | 89.4 | 78.4 | 38.3 | 71.0 | 79.6 | 66.3 | 92.9 | 73.7 |
| Acromioclavicular joint ^e | 78 | 39.7 | 33.8 | 17.3 | 32.5 | 47.4 | 36.4 | 69.3 | 62.2 |
| Rotator cuff ^f | 376 | 39.7 | 34.0 | 20.1 | 39.0 | 61.2 | 35.8 | 77.4 | 58.1 |
| SLAP lesion | 19 | 47.4 | 47.4 | 33.3 | 44.4 | 52.6 | 47.4 | 73.7 | 38.9 |

SLAP superior labrum anterior to posterior

^aSource: Adapted with permission from *Examination of the Shoulder: The Complete Guide*. New York, NY: Thieme Medical Publishers, Inc.; 2006

^bVariable for ability to perform activity from the American Shoulder and Elbow Surgeons score; included here are only those who reported difficulty, with assistance, or not at all

^c10–15 lb with arm at side using a shoulder and elbow score

^dAnterior, anterior traumatic, multidirectional, occult, or posterior instability

^eAcromioclavicular joint arthritis, separation, or osteolysis

^fRotator cuff tendinitis, partial tear, or full tear

Table 4.4 Examination history of the shoulder^a

| General Information | Medical information | Symptoms | Injury pattern | Symptom characteristics | Related symptoms |
|-------------------------|---|-------------------------|---------------------------|----------------------------------|------------------|
| Age | Chronic or acute problem | Pain | Sudden vs. acute onset | Location | Cervical |
| Dominant arm | Review of systems | Weakness or fatigue | Gradual vs. chronic onset | Character and severity | Peripheral nerve |
| Participation in sports | Preexisting or recurrent shoulder problem | Instability/subluxation | Traumatic onset | Provocation | Brachial plexus |
| Level of competition | Other musculoskeletal problems | Stiffness | Recurrent pattern | Duration | Entrapment |
| | | Catching/locking | | Paresthesias/referral pattern | |
| | | | | Effect on sport/other disability | |

^aSource: Adapted with permission from *Clinical Examination of the Shoulder*, Vol. 1. New York, NY: Elsevier Science; 2004

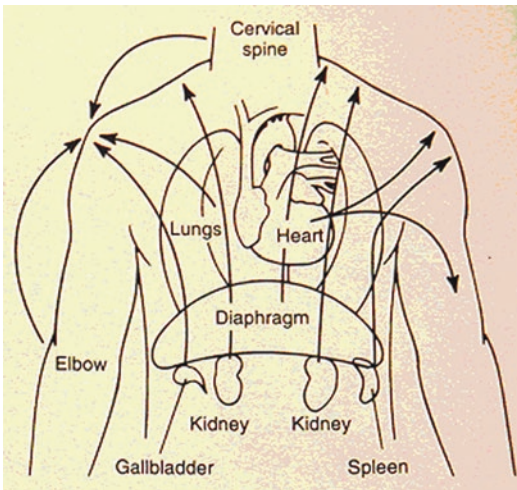


Fig. 4.3 Drawing showing the many possible visceral causes of pain in the upper or lower thorax, which can be mistaken for shoulder pain (Reprinted with permission from *Examination of The Shoulder: The Complete Guide*, Thieme Medical Publishers, Inc., 2006. Figure 1-6, p. 4.)

Finally, it is important to know the medical history of the patient. For example, a patient with insulin-dependent diabetes who develops insidious onset of pain with no trauma should be considered to have a frozen shoulder until proven otherwise. Patients with a history of oral or intravenous steroid use may have avascular necrosis. Patients with Crohn's disease, psoriasis, or ulcerative colitis might have an underlying immunological cause of pain and arthritis. Patients with a history of cancer should undergo careful examination and early imaging when there is pain in the shoulder area either from trauma or with insidious onset. Patients with abdominal conditions may have pain in the upper or lower thorax (Fig. 4.3). The types of medications the patient is taking and the types of comorbidities the patient has can influence whether the treatment is medical or surgical.

Few shoulder conditions are life-threatening. Therefore, the choice of treatment, be it medical or surgical, involves consideration of many objective and subjective variables. The presence of a lesion on examination or magnetic resonance imaging is not typically an indication for surgery unless it is symptomatic. The axiom, "the lesion is

attached to a person," is especially true in shoulder conditions. The type and urgency of treatment are determined by many factors, including the patient's age, occupation, and general health; whether the dominant or nondominant arm is affected; the patient's pain level at rest and at night; what makes the pain worse or better; the effects on exercise, hobbies, or activities of daily living; the ability of medicines to relieve the pain; and the perceived natural history of the condition. Information on all of these factors should be obtained so that an appropriate plan of treatment can be developed for the needs of each patient.

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