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Pearls and Pitfalls

Pearls

- It is important to determine if the patient's primary complaint is pain or weakness since treatments may differ.
- Patients may have significant atrophy in the infraspinatus fossa.
- If a patient is unable to actively elevate, an injection of local anesthetic with reexamination can be useful to determine if their weakness is due to pain or a biomechanical imbalance.
- Patients with an external rotation lag with elevation often have difficulty positioning their hands in space in order to perform activities of daily living, such as hair care.

Pitfalls

- Patients with Parsonage-Turner Syndrome, or brachial neuritis, may present similar to a patient with a massive rotator cuff

tear and should be considered in the diagnosis.

- Patients with pseudoparalysis due to pain inhibition should make drastic improvements with cortisone and physical therapy, and therefore quick decisions to proceed with surgery should be avoided.
- It is important to examine and document the function of the axillary nerve and the integrity of the deltoid since most treatments will depend on their function in the absence of a functional rotator cuff.

Introduction

The history and physical examination of a patient who presents with a massive rotator cuff tear is arguably the most critical aspect of their evaluation. Most patients can be diagnosed with a large rotator cuff tear based on their history and physical examination alone. As with any subjective data accumulation, the information gleaned from this portion of the evaluation is user dependent. However, accuracy improves with experience. Comfort with the techniques outlined in this chapter is important to be able to accurately diagnose massive rotator cuff tears and develop treatment plans that can most adequately address the patient's concerns.

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History

The most important information that is gathered from the initial visit is the patient's chief complaint. Patients may complain of pain, weakness, or a combination of both. It is important to delineate which one is the most important to them. This will set forth a treatment algorithm based on why the patient is seeking medical intervention. A patient without any pain who presents solely with weakness should be offered different treatment options than a patient who presents with only pain and no complaints of weakness. Both scenarios are possible, even in patients with massive rotator cuff tears. Patients will often state that both are equally important. In those scenarios, an attempt should be made to have the patient try to choose one or the other. This can be helpful in determining the reason for why the patient is seeking medical care and will help set expectations moving forward.

Once a chief complaint is established, a history of present illness should follow. During this portion of the history, all pertinent information such as duration of symptoms, location and quality of pain, any antecedent trauma, pain at night, and whether radicular symptoms are present can be important in localizing the pathology. Patients may or may not report an antecedent trauma prior to their symptoms. When pressed, patients may state that they did have trauma several years back or initially had pain but then improved. Most patients with massive tears do report a long-standing history of shoulder complaints prior to presentation. The exact location of the pain can be very helpful in determining the pathology present. It is often useful to ask the patient to point with one finger to where the pain is most severe. On occasion, patients will point directly over their acromioclavicular (AC) joint or over their long head of the biceps tendon. This can alert the examiner to pathology at those two structures. While patients may have a massive rotator cuff tear, their symptoms may adequately be treated by recognizing and addressing pathology at the long head of the biceps tendon and the AC joint [1]. Patients may also report that the pain

is mostly in the back of their shoulder or into their neck. This should direct the examiner to scapulothoracic or cervical spine issues. This would be particularly true if the patient also complains of radicular symptoms that traverse down the arm.

A very useful question that should be asked of all patients is what they would like to do but cannot do, because of pain and dysfunction of their shoulder. This simple question gets to the heart of why the patient is seeking treatment and what components of their shoulder dysfunction they would like to improve. It also helps set expectations in terms of whether or not these things can reasonably be attained.

A thorough history of any previous treatment on the involved shoulder should be obtained. If the patient has had previous surgeries, operative notes can be helpful to determine exactly what was done. Often, there are discrepancies between the patient and the surgeon's descriptions of what was found and accomplished at the time of surgery. Any history of infection should also be determined. Pertinent issues in the patient's medical history are also important since they may affect rotator cuff healing. In particular, comorbidities such as diabetes, smoking, and autoimmune disease are a poor prognostic indicator of achieving healing following any rotator cuff repair [2–5]. This should be determined in the initial consultation. Also, a history of frequent falls may warn against surgical intervention.

Physical Examination

In order to perform a thorough physical examination, the patient needs to be dressed appropriately. Men are asked to take off their shirts in order to facilitate visual inspection of the shoulder girdle. Women are asked to either wear a tank top or a gown that is placed under both arms, but over the breasts, such that both shoulders can be evaluated.

The physical examination of the shoulder begins by evaluating the patient's cervical spine. The patient is asked to move their head up, and down, and to each side. A Spurling's test is then performed by extending the patient's neck and

then moving it from side to side. This maneuver can impinge the nerves in the foramen and recreate radicular pain. Many patients will have pain with neck maneuvers, and it is important to determine if the pain they experience with the examination is the same pain for which they are seeking treatment, or if this is a different pain.

Inspection of the shoulder girdle can yield valuable information. Previous incisions should be inspected for any signs of infection such as erythema, warmth, or swelling. Tone of the deltoid can also be ascertained. This is particularly important if the patient had previous open rotator cuff repairs, as deltoid dehiscence can occur and complicate future treatments. Atrophy of the infraspinatus fossa is a common finding in patients with massive rotator cuff tears and can be easily identified in most patients.

Palpation then follows in a purposeful manner. In particular, it is useful to palpate directly over the AC joint and the long head of the biceps tendon. Throughout the palpation, it is important to compare the contralateral side since deep palpation of any shoulder may cause pain that is not necessarily pathologic. It is also important to determine whether or not the pain the patient experiences during the physical examination is the pain they most commonly experience or if a new pain is being created in response to the examination itself. Tenderness to palpation directly over the AC joint or the long head of the biceps tendon may serve as a guide to direct future treatment options [1]. In patients who were previously in an accident or have ongoing legal disputes present, it can be useful to palpate nonanatomic locations around the shoulder. Exquisite pain to palpation throughout the entire shoulder girdle over nonspecific anatomic areas may indicate either malingering, or a myofascial injury, that may not be amenable to surgical intervention.

Active and passive motion should be evaluated. Active motion is evaluated with the patient being asked to elevate the arms in the scapular plane. Patients are next asked to externally rotate the arms with the elbows at the side and then internally rotate by placing the hand behind the back as far up as they are able to achieve. If a patient has full active range of motion, then there

is no need to test passive range of motion. However, if there is a discrepancy or lack of active range of motion, then passive range of motion should be determined. If the active and passive range of motion are limited and equivalent, then concern should be raised for either arthritis or a frozen shoulder. However, if there is a lag between active and passive range of motion, this can be indicative of a rotator cuff tear. When patients are performing active range of motion, it is important to evaluate the scapula for scapular rhythm. It is also important to identify other compensatory mechanisms such as a shrug or if there is anterosuperior escape present.

Most compensatory mechanisms such as a shrug and scapular dyskinesia can typically be corrected with a targeted physical therapy regimen. However, if frank anterosuperior escape is present, then this is a poor prognostic indicator for eventual arm elevation even with adequate physical therapy [6]. Anterosuperior escape is identified on physical examination by seeing the humeral head becoming more prominent in the anterior deltoid. It becomes quite evident especially in smaller patients that the humeral head is not being contained under the coracoacromial arch. This is typically seen in patients that have involvement of the subscapularis in addition to superior and possibly posterior rotator cuff tears.

The most important thing to determine when performing the physical examination of the patient is whether or not they are able to elevate their arm above horizontal. Patients who are unable to elevate their arm above horizontal in the absence of a nerve injury are considered to have pseudoparalysis [7]. Patients who are able to adequately elevate their arm above their head can typically have enough strength to perform most activities of daily living; however, they usually state that pain is their primary complaint. In patients with pseudoparalysis, it is important to understand whether the inability to elevate is coming from a true biomechanical insufficiency or if it is the result of pain inhibition. In these circumstances, an injection of local anesthetic can be very useful. Typically, this is also combined with cortisone to potentially give the patient some lasting relief as well. After the patient



Fig. 2.1 The Jobe test, or “empty can test,” is useful to evaluate for tears that involve the supraspinatus. The test is performed with the patient’s shoulders flexed to 90° in the plane of the scapula and maximally internally rotated. The examiner then applies a downward force on the patients arm, and they are asked to resist. Weakness with this maneuver can indicate a tear in the supraspinatus tendon

receives the injection, they should be examined again approximately 10 min later to allow the local anesthetic time to become effective. If a patient has adequate pain relief from the local anesthetic and is now able to elevate their arm above their head, then it can be surmised that pain inhibition is the true cause of their pseudo-paralysis and not a biomechanical insufficiency. This information is useful in dictating future treatment options.

Targeted manual muscle testing of the rotator cuff should be performed. The Jobe test, or “empty can test,” can be useful to test the integrity of the supraspinatus (Fig. 2.1). This test is performed with the shoulder abducted to horizontal, in the plane of the scapula, and internally rotated so the thumb is pointing to the floor. The examiner then applies a downward force on the arm and asks the patient to resist. The strength



Fig. 2.2 Resisted external rotation with the patient’s arm at their side can indicate a tear that involves the infraspinatus when weakness is present

can then be assessed. This test is only useful for patients who are able to elevate to horizontal against gravity. External rotation with the arm at the side can be useful in determining the strength of the infraspinatus (Fig. 2.2), while external rotation with the arm in 90° of abduction can be useful in isolating the teres minor. Subscapularis-specific testing such as the belly press (Fig. 2.3a), the bear hug (Fig. 2.3b), and the lift-off tests (Fig. 2.3c) can also be performed.

Lag signs are a useful adjunct to the physical examination and may be more sensitive and specific than manual muscle testing [8]. An external rotation lag can be evaluated with either the patient’s arm at their side to evaluate for tears of the supraspinatus and infraspinatus (Fig. 2.4a, b) or in 90° of abduction to evaluate for teres minor insufficiency (Fig. 2.5a, b). Patients with massive rotator cuff tears often present with a large external rotation lag, as evidenced by a Hornblower’s sign with functional activities [9]. This can often be ascertained upon initially greeting the patient

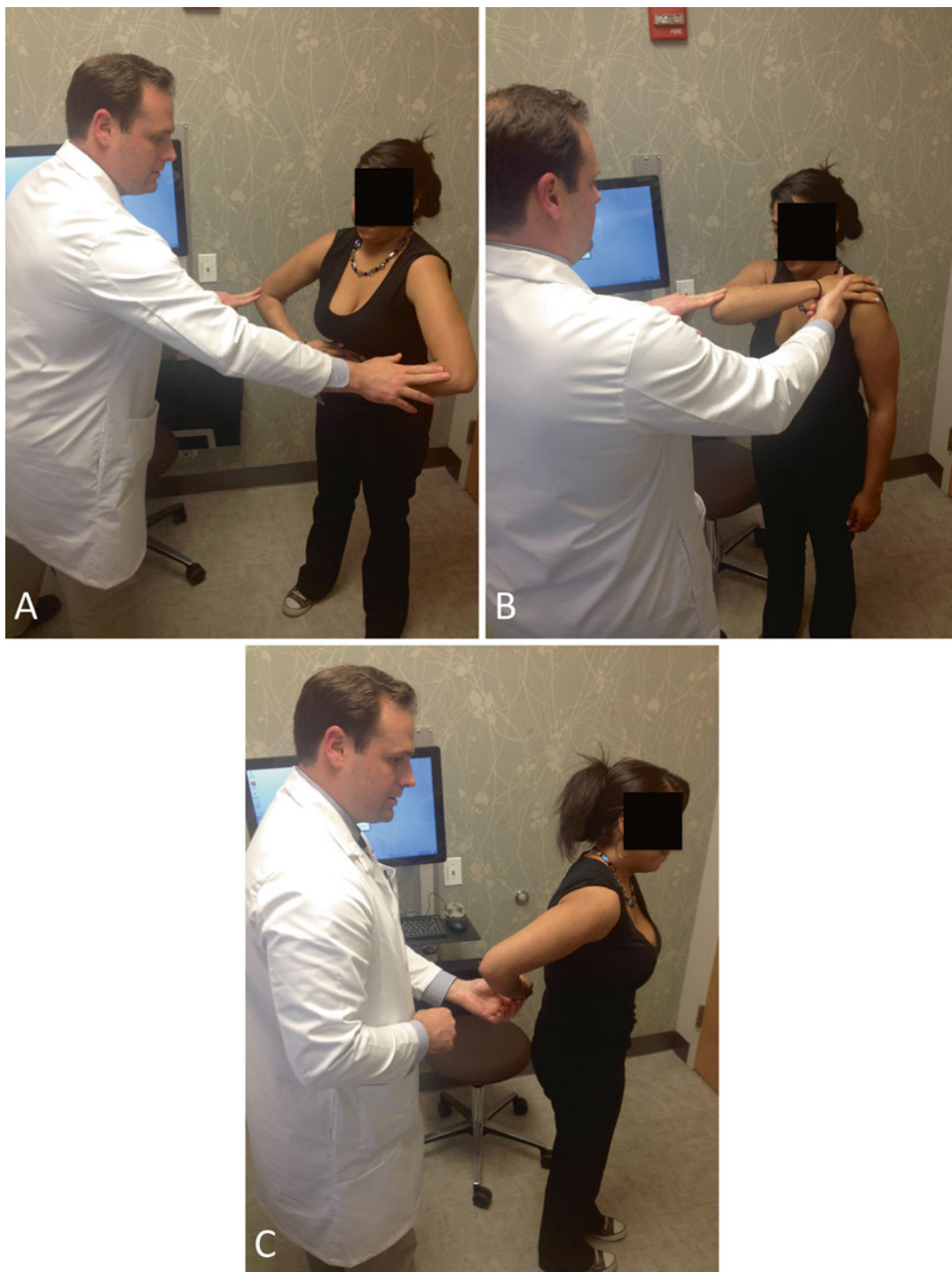


Fig. 2.3 The subscapularis can be tested through three commonly used tests. The belly press is the easiest for a patient with a painful shoulder to perform (a). This involves asking the patient to press their hands into their belly and move their elbows forward. A positive test is obtained with the patient's elbow drops back or is unable to be brought forward. The bear-hug test is also a useful test that many patients can easily perform (b). This involves having the patient place their hand on their opposite shoulder while elevating their elbow. The examiner

then attempts to elevate the patient's hand off of their shoulder, and a positive test is obtained when this is easily accomplished. The lift-off test is typically very difficult to perform with patients with significant shoulder pain, or who lack enough internal rotation to put their arm behind their back (c). This test involves pulling the patient's hand away from their low back and asking them to hold it there. In a positive test, the hand falls back to the patient's back. Typically, all three tests can be used in conjunction with one another when examining a patient



Fig. 2.4 An external rotation lag can be identified when the patient is unable to hold their arm in an externally rotated position. The examiner places the patient's arm in external rotation (a) and then asks them to hold it there. If

the arm falls back in internal rotation, then the test is positive (b). This is indicative of a tear that involves the infraspinatus tendon

with a handshake. The Hornblower's sign is readily apparent if the patient's elbow goes away from their side as they attempt to elevate their shoulder. This can be a devastating functional problem since the shoulder external rotation with elevation is necessary to put the hand in a functional position to perform many activities of daily living, such as hair care.

Conclusion

The diagnosis of a massive rotator cuff tear can typically be made based on history and physical examination alone. In the history, it is most important to determine what the patient's chief complaint is whether it be pain, weakness, or a combination of

both. In the physical examination, it is most important to determine whether or not the patient is able to elevate their arm. If they are not able to elevate their arm, it is important to determine whether or not they are unable to due to pain or biomechanical weakness. To delineate between the two, an injection with local anesthesia can be very effective at eliminating pain as a possible reason. If patients continue to have pseudoparalysis after an injection that achieves adequate pain relief, then it can be surmised that there is a biomechanical weakness. The history and physical examination does set forth a treatment algorithm for patients with massive rotator cuff tears. Comfort with these techniques comes with experience but is a crucial part in determining the adequate diagnosis and treatment options for these patients.



Fig. 2.5 A lag sign can be determined with the patient's shoulder in abduction. The examiner holds the patients shoulder in 90° of abduction and neutral rotation (hand facing the ceiling) (a). The patient is then asked to hold that position while the examiner lets go. If the arm goes into internal rotation, this is considered a positive test and is indicative

of a tear that extends into the teres minor (b). Patients with external rotation lag with the arm in elevation are also said to have a Hornblower's sign. This can be a devastating functional problem since the shoulder external rotation with elevation is necessary to put the hand in a functional position to perform many activities of daily living, such as hair care

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