



Q / Which history and physical findings are most useful in identifying rotator cuff tears?

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EVIDENCE-BASED ANSWER

A / IT'S UNKNOWN WHICH—IF ANY— HISTORICAL FACTORS ARE MOST USEFUL, because no studies evaluating their accuracy with rotator cuff tears have been done. As for physical findings, no single physical examination finding is sensitive or specific enough to detect partial-thickness rotator cuff tears (strength of recommendation [SOR]: B, systematic review of lower-quality cohort studies).

The combination of the painful arc sign, drop-arm sign, and infraspinatus muscle strength test are helpful in detecting a full-thickness rotator cuff tear (SOR: B, a single prospective study).

A negative supraspinatus muscle strength test alone is sensitive enough to decrease the likelihood of a significant rotator cuff tear (SOR: B, a single prospective study).



No single physical examination finding is sensitive or specific enough to detect partial-thickness rotator cuff tears.

Evidence summary

The largest meta-analysis to look at the effectiveness of clinical examination and patient history for diagnosing soft-tissue shoulder disorders evaluated 10 cohort studies.¹ Pooled results from 4 of the studies suggested that a composite clinical examination could safely rule out a full-thickness rotator cuff tear with a sensitivity of 0.9 (95% confidence interval [CI], 0.87-0.93). The standard in the studies cited was either arthrography or surgery. No single physical examination finding, when looked at in isolation, could reliably produce comparable accuracy.

The best 3 tests for full-thickness rotator cuff tear

A retrospective cohort study stratified 352 patients who had undergone operative evaluation by the degree of severity of rotator cuff pathology.² Investigators assessed 8 physical exam tests—the Neer impingement sign, Hawkins-Kennedy impingement sign, painful

arc sign, supraspinatus muscle strength test, Speed's test, cross-body adduction test, drop-arm sign, and infraspinatus muscle strength test—to determine their diagnostic utility. (See "A glossary of tests for rotator cuff injury" on page 180.)

The combination of the painful arc sign, drop-arm sign, and weakness in external rotation (positive infraspinatus muscle strength test) produced the best likelihood ratios (LRs) for detecting full-thickness rotator cuff tears (TABLE).

A winning diagnostic combination for any degree of impingement disease

The best combination of tests to diagnose any degree of impingement disease is:²

- a positive Hawkins-Kennedy impingement sign
- a positive painful arc sign
- a positive infraspinatus muscle strength test.

Useful LRs resulted if all 3 tests were positive or negative (LR+=10.56; LR-=0.17).

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➤ The painful arc sign, drop-arm sign, and a positive infraspinatus muscle strength test, taken together, are helpful in detecting full-thickness rotator cuff tears.

A glossary of tests for rotator cuff injury

Cross-body adduction test. The examiner adducts the arm across the patient's body toward the opposite shoulder. Pain may indicate acromioclavicular joint pathology.¹

Drop-arm sign. The examiner raises the patient's arm to 160° and instructs the patient to lower the arm slowly to his or her side. If the patient has a rotator cuff tear, he or she won't be able to control lowering the arm, and it will drop quickly to the side. The arm also may give way if the examiner taps it gently.^{1,2}

Hawkins-Kennedy impingement sign. Patient flexes arm to 90° and bends elbow at 90°. The examiner stabilizes the shoulder with 1 hand and internally rotates it with the other hand. Pain on internal rotation may indicate subacromial impingement, including rotator cuff tendinopathy or tear.^{1,3}

Infraspinatus muscle strength test. Patient holds both arms at his or her sides with elbows flexed at 90° and actively rotates both arms externally against resistance by the examiner. Weakness on the affected side compared with the opposite side may signify infraspinatus or teres minor tendinopathy or tear.¹

Neer impingement sign. With the patient's arm fully pronated, the examiner stabilizes the scapula with 1 hand while performing maximal passive forward flexion and internal rotation with the other hand. Pain indicates subacromial impingement.^{4,5}

Painful arc sign. The patient abducts the affected arm from his side to a fully raised position then slowly returns the arm to his side. Pain occurring between 60° and 120° of elevation may indicate inflammation of the tendons of the supraspinatus muscle.^{6,7}

Speed's test. While holding the affected arm with the elbow extended, forearm supinated, and humerus elevated to 60°, the patient flexes the shoulder forward 60°. The examiner resists the forward flexion while palpating the biceps tendon over the anterior aspect of the shoulder. Pain or tenderness in the bicipital groove indicates bicipital tendinitis.^{4,8}

Supraspinatus muscle strength test (empty can test). With arms abducted to 90° and flexed forward 30° and thumbs turned downward, the patient actively resists downward pressure applied by the examiner. Weakness on the affected side compared with the opposite side may signify rotator cuff pathology, including supraspinatus tendinopathy or tear.¹

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Negative supraspinatus test helps rule out massive tear

A third study evaluated the validity of the supraspinatus muscle strength test alone to diagnose patients with rotator cuff pathology using arthroscopy or open surgery as the reference standard.³ A negative supraspinatus

test, when defined by weakness, significantly decreased the posttest probability (LR=0.17) of detecting a massive rotator cuff tear.

Correlate test results with clinical history

Most individual tests for rotator cuff disease are not sensitive or specific enough to ef-

TABLE
Comparison of tests to detect full-thickness rotator cuff tear

Test	Sensitivity	Specificity	LR+	LR-
Painful arc ²	75.8%*	61.8%*	15.57 [†]	0.16 [†]
Drop-arm ²	34.9%*	87.5%*		
Infraspinatus muscle strength ²	50.5%*	84%*		
Supraspinatus muscle strength ³	88% (95% CI, 0.79-0.97)	70% (95% CI, 0.58-0.82)	2.93	0.17

CI, confidence interval; LR, likelihood ratio.
 *Confidence intervals not reported.
[†]LR when all 3 tests are combined.

fectively rule in or rule out a rotator cuff tear. Many of the findings studied can be positive in the presence of other shoulder conditions and should be correlated with the clinical history of each patient. One of the noted limitations of these 3 studies is that none was carried out in a primary care setting.

Recommendations

A textbook published by The American Academy of Orthopedic Surgeons describes a continuum of injuries from impingement syndrome to full-thickness rotator cuff tears that commonly present as anterior and lateral shoulder pain and are often associated with

night pain.⁴ Atrophy of the supraspinatus and infraspinatus muscles may indicate a long-standing rotator cuff tear. The authors' recommendations for clinical examination include performing the Neer and Hawkins-Kennedy tests before and after subacromial injection with a local anesthetic and testing for weakness of the supraspinatus tendon.

Conservative management is recommended by the authors for patients with any rotator cuff tear, except for acute tears in younger patients.⁵ **JFP**

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A negative supraspinatus test significantly decreases the probability of a massive rotator cuff tear.

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