



Trauma versus no trauma: an analysis of the effect of tear mechanism on tendon healing in 1300 consecutive patients after arthroscopic rotator cuff repair



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Background: Patients with rotator cuff tears often recall a specific initiating event (traumatic), whereas many cannot (nontraumatic). It is unclear how important a history of trauma is to the outcomes of rotator cuff repair.

Methods: This question was addressed in a study cohort of 1300 consecutive patients who completed a preoperative questionnaire regarding their shoulder injury and had a systematic evaluation of shoulder range of motion and strength, a primary arthroscopic rotator cuff repair performed by a single surgeon, an ultrasound scan, and the same subjective and objective measurements made of their shoulder 6 months after surgery. Post hoc, this cohort was separated into 2 groups: those who reported no history of trauma on presentation ($n = 489$) and those with a history of traumatic injury ($n = 811$).

Results: The retear rate in the group with no history of trauma was 12%, whereas that of the group with a history of trauma was 14% ($P = .36$). Those patients with a history of shoulder trauma who waited longer than 24 months had higher retear rates (20%) than those who had their surgery earlier (13%) ($P = .040$).

Conclusion: Recollection of a traumatic initiating event had little effect on the outcome of arthroscopic rotator cuff repair. Duration of symptoms was important in predicting retears if patients recalled a specific initiating event but not in patients who did not recall any specific initiating event. Patients with a history of trauma should be encouraged to have their rotator cuff tear repaired within 2 years.

Level of evidence: Level III, Retrospective Cohort Comparison, Treatment Study.

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Keywords: Shoulder; rotator cuff; trauma; injury; retear; muscle injuries

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Age-related degeneration and trauma have been implicated in the pathogenesis of rotator cuff tears.³⁹ Cadaveric studies have shown that the tensile strength of the supraspinatus tendon decreases with age.³² Rotator cuff tears are often but not always associated with shoulder trauma.^{8,33}

Retear is the most common complication of surgical repairs of rotator cuff tears.³¹ Recent estimates of postoperative re-tear rates range from 11% to 57%.^{3,15,34,36,42,43} Return tendons are associated with poorer shoulder function.^{1,3,11,15,17,20,23,27,34,38} Coleman et al⁹ demonstrated that sheep infraspinatus tendons repaired later than 18 weeks after tendon release had poorer tissue elasticity after repair compared with tendons repaired within 6 weeks of tendon release. Whereas some authors have found benefits of early surgical repair within 3 weeks to 6 months of injury in acute traumatic full-thickness rotator cuff tears in young patients, there is more debate on whether surgery is recommended for rotator cuff tears in older patients with no history of shoulder trauma.^{12,20,28,29,35,40} There have, however, been few clinical studies determining if traumatic rotator cuff tears heal better than nontraumatic rotator cuff tears. Braune et al⁴ found that traumatic rotator cuff tears occurred in younger patients, and these younger patients had better postoperative functional outcomes compared with older patients with nontraumatic tears. MacKechnie et al²⁴ found in their systematic review that full-thickness rotator cuff tears in patients younger than 55 years were mostly traumatic and responded clinically well to both open and arthroscopic rotator cuff repair.

We hypothesized that there will be a lower prevalence of re-tear after rotator cuff repair in patients with a history of a specific traumatic event to their shoulders than in those who could recall no such episode. Therefore, the aim of our study was to determine if the postoperative outcomes between repairs of traumatic and nontraumatic rotator cuff tears were different and the factors that affected re-tear in these repairs.

Materials and methods

Study design and patient selection

This is a retrospective case-control study of patients who had a primary arthroscopic rotator cuff repair. Our primary outcome measure was rotator cuff re-tear at 6-month follow-up postoperatively. Secondary outcomes were patient-reported shoulder pain and function scores and examiner-determined shoulder range of motion and strength.

From June 2005 to July 2013, our senior author performed 2080 arthroscopic supraspinatus repairs. Of these repairs, we excluded 95 repairs as they were revision surgeries, 52 repairs using a polytetrafluoroethylene patch, and 203 repairs for glenohumeral arthritis identified at the time of surgery. Of the remaining 1730 rotator cuff repairs, 358 patients were unwilling and unable to attend the 6-month follow-up, and 72 had missing data regarding injuries to their shoulders, leaving 1300 patients in the study group. Of these patients, 811 had reported a traumatic injury at their initial visit (traumatic group), and 489 patients reported no significant injury (nontraumatic group).

Initial visit

At the initial preoperative visit, before any diagnoses were made, patients completed a standardized questionnaire. We asked patients if they recalled a specific injury that caused their symptoms. If there was an injury, we recorded the date and mechanism of injury involved. Patients also completed the standardized modified L'Insalata Questionnaire¹⁹ consisting of 12 self-administered questions with scales for evaluating perceived shoulder pain, function, stiffness, level of activity at work, and highest level of sports. Our examiners measured shoulder range of motion and strength with a hand-held force gauge (HFG-110; Transducer Techniques, Temecula, CA, USA) using previously validated techniques.^{13,14} A single experienced sonographer confirmed the diagnosis of rotator cuff tear with an ultrasound scan on a Logiq 9 ultrasound system (GE Healthcare, Sydney, NSW, Australia) with a 15-MHz linear transducer, following a standardized protocol.^{5,6}

Surgical technique

Following interscalene local anesthetic administration, patients were positioned in the beach chair position for arthroscopy. The surgical technique for single-row arthroscopic knotless inverted mattress suture tension band rotator cuff repair has been described previously.^{27,41,43} In brief, the arthroscope was inserted through a standard posterior portal into the glenohumeral joint. A lateral portal was then created to visualize and to repair the tendon from the undersurface. Before repair of the rotator cuff, the tear size was measured under arthroscopic visualization. Dimensions in the anteroposterior and medial-lateral directions were measured on the basis of the known size of the head of the shaver, usually 5.5 mm in diameter. The rotator cuff tear edge and footprint were then débrided with an arthroscopic shaver. The torn rotator cuff tendon was grasped with an Opus SmartStitch suturing device (ArthroCare, Sydney, NSW, Australia), which inserts a single inverted mattress suture. Through the lateral port, a T-handle was used to create an anchor hole on the greater tuberosity of the humerus. The 2 ends of the mattress suture were then passed through the anchor (Opus Magnum, ArthroCare), which were later inserted into the anchor hole and deployed. Last, the sutures were wound through the anchor with the TensionLock winding mechanism to reduce and to lock the sutures from the rotator cuff tendon onto the anchor on the greater tuberosity. If we required multiple anchors for larger tears, the procedure was repeated to deliver more anchors.

Rehabilitation

We discharged patients on the same day with the surgical arm in a sling with a small abduction pillow (UltraSling; DJO, Normanhurst, NSW, Australia). A rehabilitation program was then commenced initially with pendulum exercises. At 8 days to 4 weeks after surgery, we added passive shoulder flexion-extension, external-internal rotation, and abduction exercises. We started active shoulder movement and isometric strengthening at 6 weeks postoperatively. At 3 months, patients commenced exercises with a TheraBand (Hygenic, Akron, OH, USA) and were permitted to perform overhead activities and lifting up to 10 kg.

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