

Recent Advances in Arthroscopic Repair of Traumatic Anterior Glenohumeral Instability

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Traumatic anterior instability is the most common type of glenohumeral instability. Although surgical treatment with an open technique has produced excellent results, there has been a trend toward arthroscopic treatment. As understanding of instability advances along with improvements in surgical techniques and instrumentation, arthroscopic results are fast approaching those seen with open procedures. Studies done at the authors' institution showed a 97% satisfactory outcome at short-term followup with 93% stable shoulders in a patient population with high physical demands. Others recently reported similar results. As more surgeons become familiar with the techniques, it is thought that arthroscopic Bankart reconstructions will be the preferred method in the future.

Traumatic anterior instability is the most common type of glenohumeral instability. Several studies have shown the importance of the anteroinferior capsulolabral structures in maintaining joint stability.^{2,13,16,20} The anteroinferior labrum serves as the anchor point for the

inferior glenohumeral ligament, the primary static restraint to anterior humeral translation in the abducted shoulder.²¹ An avulsion of the capsulolabral structures from the glenoid rim and scapular neck was described by Perthes¹⁷ and Bankart³ as the essential lesion leading to recurrent instability. More recently, biomechanical studies and arthroscopic observations have clarified the incidence of specific patterns of capsulolabral injuries that accompany shoulder instability, with the most common disorder being the Bankart lesion, occurring approximately 80% of the time.^{2,11} The standard form of treatment for the patient with multiple anterior dislocations has become the repair of the Bankart lesion.

Open techniques for repair of the avulsed anteroinferior capsulolabral structures generally have had recurrence rates reported of fewer than 10%.¹⁸ Although Rowe and coworkers¹⁸ reported a 96.5% success rate, only 2/3 of the patients were reexamined, and only 1/3 of those involved in sports returned to a competitive level of participation. The open technique also has morbidity including scarring from the dissection required for adequate exposure. This occasionally leads to a limitation of postoperative functional ability and is problematic in athletes and laborers because of loss of motion, specifically external rotation. Bigliani and coworkers⁴ reported that only 67% of ath-

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letes who throw return to their normal activity level after an open capsular shift despite their extensive experience.

Although arthroscopic techniques have improved, their results must be compared with results of repair with an open technique. Early arthroscopic techniques used metal staples and screws with success rates ranging from 66% to 85%.¹⁰ However, significant complications were encountered, including loose hardware, articular injury, persistent pain attributable to hardware, and problems with recurrent instability. Later, a transglenoid suturing technique for repair of the Bankart lesion was developed.⁹ In 1987, Morgan and Bodenstab¹² reported their preliminary results using transglenoid suture technique for repair in 25 shoulders; a 100% success rate was reported. However, in a long-term study and followup, loosening of the repair and redislocation were reported.⁸ The current authors think the anteroinferior capsulolabrum was repaired medial to the glenoid rim and accounted for these poor long-term results. Caspari and Savoie⁵ later reported the importance of repairing the anteroinferior capsulolabrum to the glenoid rim.

Snyder and Stafford¹⁹ described the use of anchors and sutures in arthroscopic repair of the anteroinferior capsulolabrum to the glenoid, eliminating transglenoid suturing. Suture anchors subsequently were used by Wolf,²² Snyder and Stafford,¹⁹ and Bacilla and coworkers¹ with excellent preliminary results. More recently, Cole and coworkers⁶ reported similar results after repair between the open and arthroscopic techniques. However, in their study the more difficult cases were repaired with the open technique.

Indications

At the authors' institution, current criteria for arthroscopic treatment of traumatic anterior instability includes patients of all ages and all activity levels with recurrent anterior instability who are impaired functionally and who have not responded to nonoperative treatment. Currently, patients with first-time, acute shoulder dislocations do not have stabilization.

The Authors Preferred Technique

The patient is placed in the lateral decubitus position for the arthroscopic technique. The upper extremity is suspended with 5 to 10 lb traction. A standard posterior portal is established and a diagnostic arthroscopy is done. When there has been recurrent, traumatic anterior dislocation, the pathoanatomy usually includes capsulolabral avulsion, the Bankart lesion, and a widened rotator interval (Fig 1). An anterior portal then is established using an outside-in technique to ensure proper orientation and access to the anteroinferior glenoid for reconstruction.

The Bankart lesion and anteroinferior capsulolabrum are evaluated from the anterior portal for associated midcapsular or humeral insertion site tears. The arthroscope then is returned to the posterior portal, and the anterior portal is used for debriding and releasing the anteroinferior capsulolabral complex from the glenoid. The release is extended medially along the glenoid neck until the subscapularis muscle can be observed. The release also is done inferiorly to the 6 o'clock position (straight inferior) of the glenoid. The anteroinferior glenoid then is abraded to a bleeding surface.

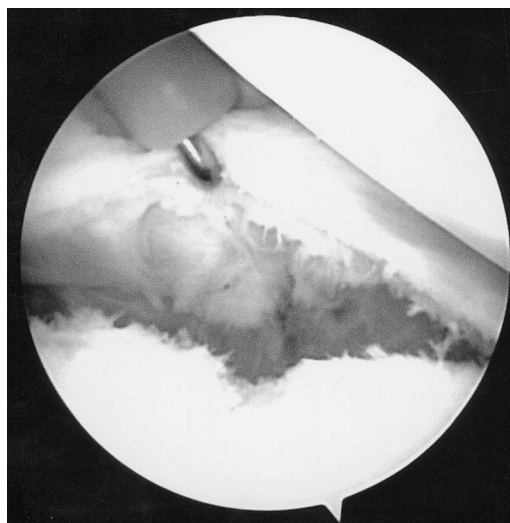
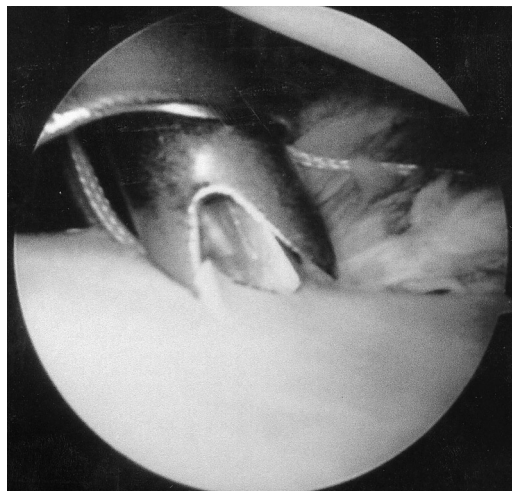


Fig 1. An arthroscopic view of Bankart lesion is shown.

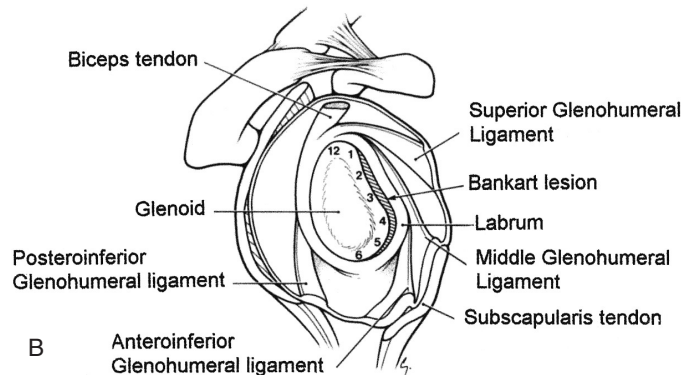
The anterior cannula is removed and a standard suture punch cannula (Linvatec, Largo, FL) is inserted. The drill guide (Mitek Products, Ethicon, Johnson and Johnson, Norwood, MA) is introduced and placed just at the edge of the glenoid articular surface at the 5 o'clock position (Fig 2). The drill should angle 45° from the articular surface and be perpendicular to the superoinferior axis. A Panalok anchor (Mitek Products, Ethicon, Johnson and Johnson) made of long-term absorbable polylevolactic acid with long-term absorbable Panacryl suture material (Ethicon, Johnson and Johnson) then is inserted and the sutures are tagged.

After placement of the suture anchor, a nonmodified, closed-ended Caspari suture punch (Linvatec) is loaded with a double (two

free ends in the punch), 48-inch long, 2-0 prolene suture. The punch is placed through the anterior cannula and used to pass the doubled prolene through the capsule at the 6 o'clock position. As the suture punch is withdrawn from the cannula, the two free ends are grasped in one hand, and the loop end is grasped in the other hand (Fig 3). One limb of the panacryl suture is placed through the loop and the two free ends of the prolene are pulled, dragging the looped end and the panacryl suture through the capsule and back out the same cannula. If a mattress stitch is desired, the steps are repeated with the other limb of the suture. Suture placement is critical at this portion of the procedure to allow for adequate tensioning of the capsule. A modified Roeder knot then is tied to secure the capsule.



A



B

Fig 2 A–B. (A) The first anchor position (drill) is shown. (B) An illustration of the glenoid clock face is shown. (Reprinted with permission from Rook RT, Savoie III FH, Field LD: Arthroscopic treatment of instability attributable to capsular injury or laxity. Clin Orthop 390:52–58, 2001.)

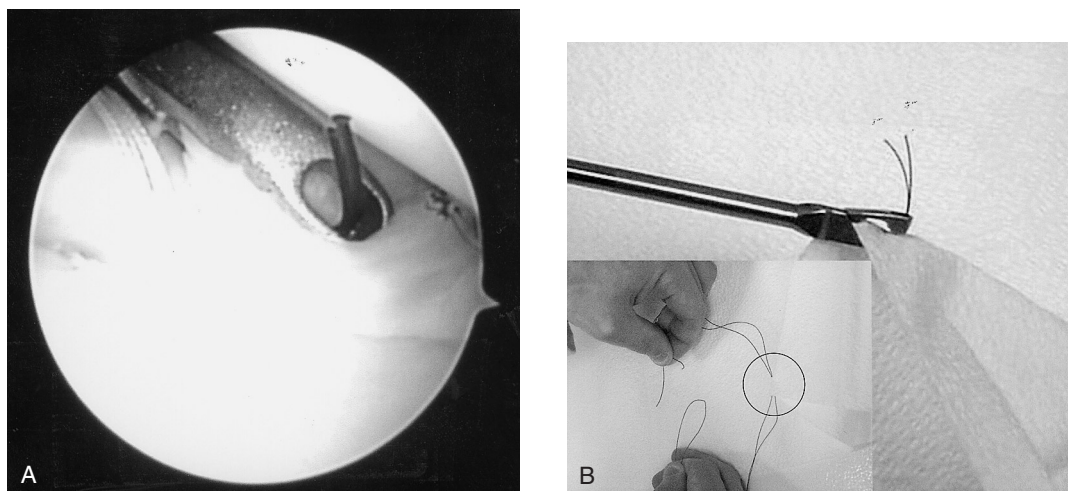


Fig 3 A–B. (A) The Caspari suture punch is shown through the labrum. (B) A representation of the Caspari suture punch through labrum and the free and loop ends coming out of the cannula are shown.

Additional anchors are placed in a similar manner at the 3 o'clock and 1 o'clock positions. A retrograde suture retriever may be necessary above 3 o'clock to retrieve the sutures through the tissue. The complete repair is assessed from the posterior and anterior portals (Figs 4, 5). The posterior capsule also is assessed and tightened if necessary. The rotator interval then is plicated, taking care not to incorporate the biceps tendon. This is accomplished by passing a spinal needle through the anterior edge of the supraspinatus tendon, incorporating the anterior capsule and occasionally the middle glenohumeral ligament. The suture limbs then are retrieved through the anterior cannula and tied blindly using a modified Roeder knot. This completes the repair with the current arthroscopic technique.

For the first postoperative week, the shoulder is maintained in a shoulder sling with a small abduction pillow. The patient begins a home exercise program of shoulder shrugs, passive forward flexion of the shoulder, and passive external rotation taking care not to elicit pain. These exercises are continued for 2 weeks. At 3 weeks, active internal and external rotation begin with the arm at the side with slight resistance and continue for 3 additional weeks. At 6 weeks, physical therapy is started,

emphasizing active range of motion with rotator cuff strengthening, without stretching. Plyometric exercises may begin at 2 months followed by return to low velocity throwing at 3 months. Return to contact sports and aggres-

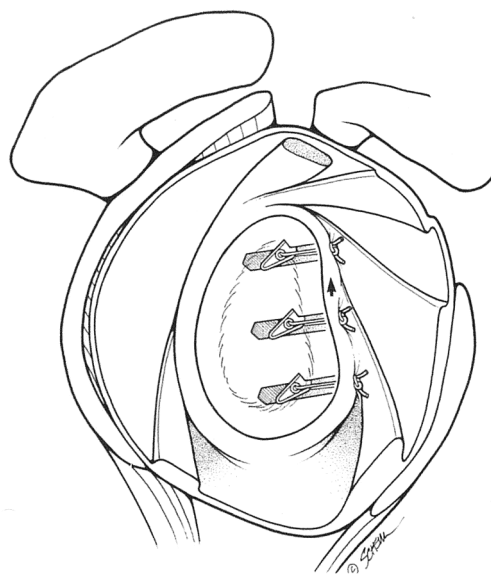


Fig 4. Illustration shows the final repair. (Reprinted with permission from Noojin FK, Savoie III FH, Field LD: Arthroscopic Bankart repair using long-term absorbable anchors and sutures. *Tech Shoulder Elbow Surg* 1:262–267, 2000.)

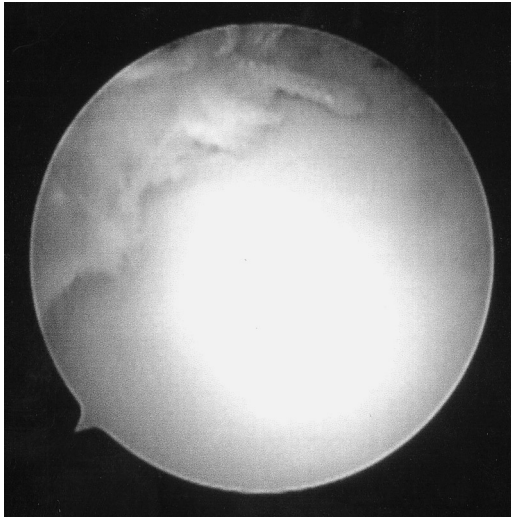


Fig 5. An arthroscopic view after the entire repair is shown.

sive sports specific drilling is determined on an individual basis and usually is delayed until 4 months postoperatively.

RESULTS

The results of repair of traumatic anterior instability using an arthroscopic technique with anchors and sutures in 35 consecutive patients were studied.¹⁵ All patients had sustained at least two dislocations, were impaired functionally with activities, and had not responded to an aggressive physical therapy program in an attempt to relieve their symptoms. The mean age of the patients was 27 years, each had a Bankart lesion, and each had an arthroscopic repair using a minimum of three Panalok anchors. Followup included physical examination and radiographic evaluation at a minimum of 2 years (range, 24–36 months). All patients had regained a minimum of 170° frontal flexion and abduction and had an average postoperative Bankart score of 93 (range, 50–100). The average external rotation with the shoulder abducted 90° was 110° (range, 95°–135°). There was a 97% success rate and one failed result in a patient with a repeat traumatic dislocation that occurred 11 months postoperatively.

In a second arthroscopic study from the authors' institution¹ the same criteria were used in 40 patients; however, all of these patients were younger than 23 years and were involved in high demand athletics. Each patient had a Bankart lesion. The average followup was 30 months (range, 18–36 months). The shoulders in 37 of the 40 patients (93%) remained stable, and the patients returned to normal activities including participation in athletics by 6 months postoperatively. The average postoperative Bankart score was 90 (range, 30–100). The shoulders in three patients redislocated postoperatively.

DISCUSSION

Shoulder stabilization with an arthroscopic technique was successful in more than 90% of patients with traumatic anteroinferior instability at relatively short-term followup. In addition to repair of the Bankart lesion, the authors also did soft tissue tensioning through plication of the rotator interval that may have contributed to these favorable results. The results were similar to the 96.5% success rate reported by Rowe and coworkers.¹⁸ Gartsman and coworkers⁷ reported 92% good or excellent results at 2 to 5 years followup (average, 33 months). They also did a soft tissue tensioning procedure in addition to repair of the Bankart lesion using laser thermal capsulorrhaphy of the anteroinferior capsulolabrum in 48 of the 53 shoulders. Although these results are encouraging, they may deteriorate with time. Torchia et al¹⁹ showed the incidence of recurrent instability increases for as many as 7 years postoperatively. Therefore, although the current authors are excited with the initial high success rate, it is assumed that the success rate will decrease with time.

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