



# Arthroscopic Bankart Repair With Inferior to Superior Capsular Shift in Lateral Decubitus Position

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**Abstract:** Traditional Bankart repairs for anterior labral tears of the shoulder use suture anchors to repair the anterior shoulder labrum and capsule to the glenoid. The technique described here involves releasing the anterior capsule of the glenoid and shifting it superiorly along with the labrum before anchoring. The intention of this extra step is to replicate the open technique, where the entire capsule is shifted superiorly on the glenoid.

The shoulder has the greatest mobility of any joint in the body, and as such it is the most frequently dislocated.<sup>1-4</sup> This often results in recurrent anatomic instability, which can have a major effect on patient function and is a contributor to patient morbidity and future osteoarthritis.<sup>5-7</sup> If patients do not respond to conservative treatment, surgical repair of a dislocation often is used to address the recurrent instability and historically has involved the traditional open Bankart technique. The traditional open Bankart repair requires a larger skin incision, more dissection through soft tissue, some method of accessing the glenohumeral joint through the subscapularis muscle, and often is associated with more postoperative pain compared with evolving arthroscopic methods; however, it is accepted that the open technique results in less recurrence rates of shoulder instability.<sup>8,9</sup>

Since 2002, improving arthroscopic techniques are yielding reduced rates of recurrent instability, rates of reoperation, shortened hospital stays, and have led to comparable functional outcomes with the open Bankart

repair.<sup>8,10</sup> In traditional arthroscopic Bankart repairs, the joint capsule and labrum are repaired to the glenoid using a suture hook to plicate the tissue.<sup>11,12</sup> This is done with the intention of shifting the capsule/labral complex by grasping the tissue inferior to the suture anchor.<sup>11</sup> There are currently several variations of Bankart repairs that involve different methods to shift the capsule and tension the soft tissues of the glenohumeral joint.<sup>4,13-15</sup>

In this paper, we describe a technique for Bankart repair in the lateral decubitus position that involves a capsular release and an inferior to superior shift of the labrum and joint capsule along the anterior glenoid that closely resembles the open technique while avoiding the damage to the subscapularis muscle. In this technique, we place a free traction suture in the anterior labrum at the 3-o'clock position. This is for manipulation of the labrum throughout the procedure and to assist in the release of the anterior joint capsule from the glenoid.<sup>16</sup> After release, the traction suture is used to shift the capsular labral complex superiorly, and traditional anchors are used along the glenoid rim to secure the shifted tissue. Finally, the traction suture is secured onto the glenoid with a knotless suture anchor. This allows measurement of how much shift was performed. Pearls and pitfalls are listed in [Table 1](#).

## Surgical Technique (With Video Illustration)

### Preoperative Assessment

The patient should undergo a thorough preoperative assessment<sup>1,7</sup> (as detailed in [Table 2](#)).

### Patient Positioning

A vacuum bean bag positioner is used to secure the patient in the lateral decubitus position after

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**Table 1.** Pearls and Pitfalls of the Bankart Repair With a Capsular Shift

Pearls	Pitfalls
<ul style="list-style-type: none"> <li>• No disruption of osseous anatomy</li> <li>• Less pain than osseous stabilization procedures</li> <li>• More stability than a traditional Bankart repair</li> </ul>	<ul style="list-style-type: none"> <li>• Longer operative time than a simple Bankart repair</li> <li>• Disruption of capsular soft tissues</li> <li>• Recurrent instability is a potential complication</li> </ul>

anaesthesia. The patient is tilted 30° posterior to allow the glenoid to be parallel to the floor. The operative arm is placed in a pneumatic limb positioner (Spider 2; Smith & Nephew, Memphis, TN), and abducted at 60° (Fig 1).

### Portal Placement

The relevant bony landmarks (clavicle, scapular spine, acromion, acromioclavicular joint, coracoid process, and posterior portal site) are identified and marked with a sterile marker (Fig 1). A standard posterior shoulder arthroscopy approach should be used to visualize the anatomy within the joint and the exact pathology of the injury, as seen on preoperative imaging. With direct visualization within the joint from the posterior portal, the anterior superior and anterior inferior portals are introduced using an outside-in technique. Cannulas are then inserted to maintain position of each portal (Fig 2).

### Capsular Release

At this point, the arthroscope is moved from the posterior portal to the anterior superior portal. A suture passer (Spectrum II; ConMed, Utica, NY) is inserted through the anteroinferior portal. Using a standard suture technique, the labral tissue at the 3-o'clock position is secured with a traction suture to aid with manipulation of the labrum and joint visualization throughout the remainder of the procedure (Fig 3).<sup>16</sup> This traction suture will also be used to secure this 3-o'clock labral tissue to the 12-o'clock position on the

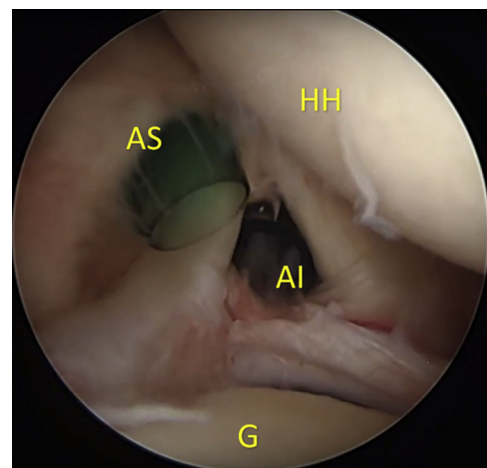
**Table 2.** Preoperative Assessment for Shoulder Instability, and Evaluation for Capsular Shift Procedure<sup>1,7</sup>

<ul style="list-style-type: none"> <li>• A complete medical history, including events surrounding initial dislocation, subsequent instability episodes, and treatment to date</li> <li>• A focused physical examination for instability including special tests for instability such as: apprehension test, relocation test, and load and shift test, as well as an assessment of rotator cuff patency</li> <li>• Radiographs of the glenohumeral joint in anteroposterior view, scapular Y-view and axillary view</li> <li>• Computed tomography scan with 3-dimensional reconstruction to assess glenoid anatomy</li> <li>• Magnetic resonance imaging to further assess soft tissue pathology of glenohumeral joint</li> </ul>
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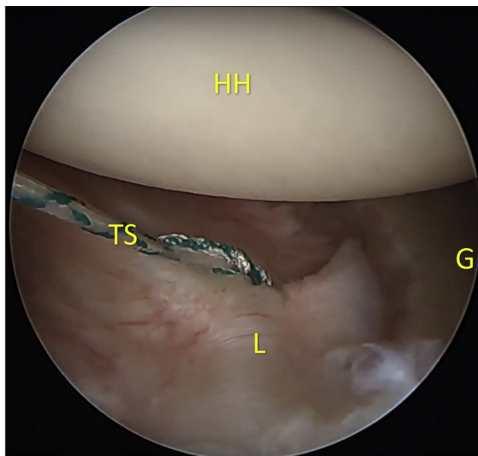


**Fig 1.** The patient undergoing an arthroscopic Bankart repair with inferior to superior capsular shift is positioned in the lateral decubitus position with the shoulder (right) anatomically marked. The operative arm is placed in a pneumatic limb positioner at 60°, and locations of AI, AS, and P portals labeled. (AI, anteroinferior; AS, anterosuperior; P, posterior.)

glenoid at the end of the procedure. A radiofrequency tissue ablator/cautery (Smith & Nephew) is then inserted into the anterior inferior portal. As the labrum is controlled with the original suture, the anterior glenoid capsule is cut and released from the 12-o'clock position to the 7-o'clock position using the radiofrequency ablator facing bone (Figs 4 and 5). The soft



**Fig 2.** Internal glenoid anatomy can be visualized as well as the location of the AI and AS portals, as viewed from the posterior portal in a right shoulder of a patient in the lateral decubitus position. (AI, anteroinferior; AS, anterosuperior; G, glenoid; HH, humeral head.)

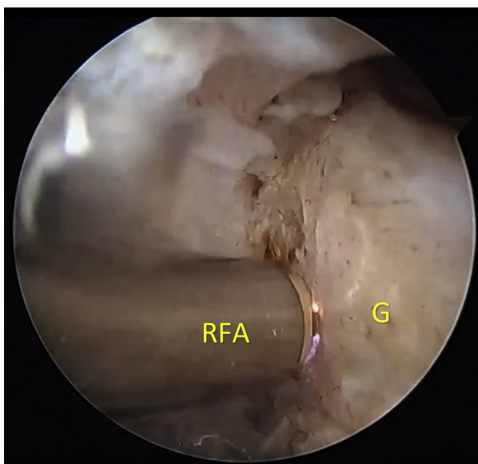


**Fig 3.** TS placement at the 3-o'clock position, for manipulation and final fixation of the labral tissue (L) for inferior to superior shift, as viewed from the AS portal in a right shoulder of a patient positioned in the lateral decubitus position (AS, anterosuperior; G, glenoid; HH, humeral head; L, labral tissue; TS, traction suture.).

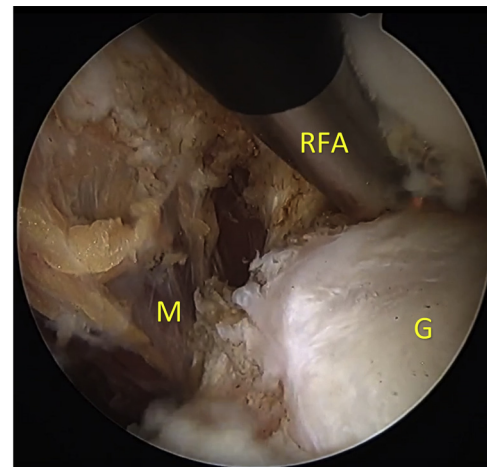
tissue is then released from the glenoid rim until the muscle belly is visualized, resulting in a semi-mobile capsule.

#### Suture Anchor Placement

Suture anchors (Double Loaded Q-Fix; Smith & Nephew) are used to secure and shift the labrum superiorly. The first anchor is set at 5 o'clock in the glenoid and one of the suture tails is retrieved from the posterior canula for management. Using the curvature of the suture passer to estimate where to grab (Fig 6), the 6-o'clock labrum and capsular tissue (inferior to the anchor) are secured while the tissue is under upward

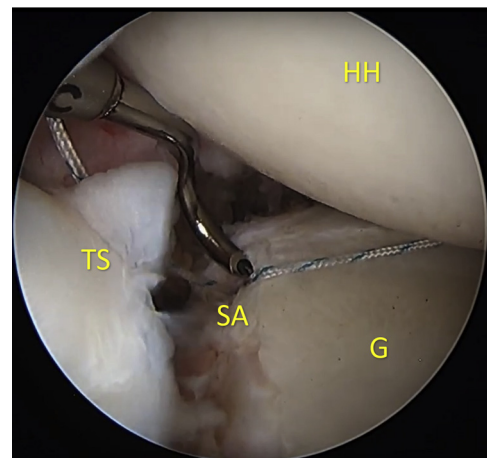


**Fig 4.** Glenoid capsular release with an RFA at the 2-o'clock position to mobilize capsular tissue for inferior to superior shift, as viewed from the anterosuperior portal in a right shoulder of a patient positioned in the lateral decubitus position. (G, glenoid; RFA, radiofrequency ablator.)

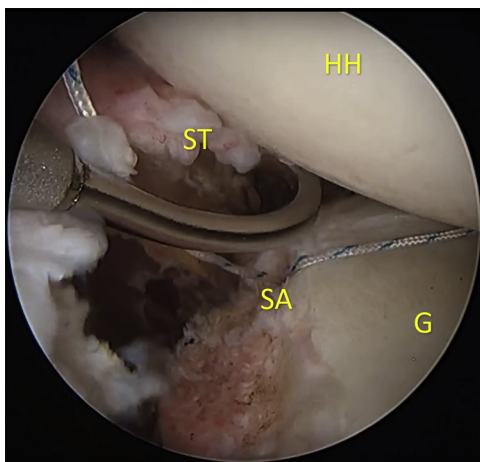


**Fig 5.** Glenoid capsular release with an RFA at the 7-o'clock position showing the release of tissue down to muscle belly (M) for complete mobilization of capsule for inferior to superior shift, as viewed from the AS portal in a right shoulder of a patient positioned in the lateral decubitus position. (AS, anterosuperior; G, glenoid; M, muscle belly; RFA, radiofrequency ablator.)

tension from the original traction suture (Fig 7). This labrum and capsular tissue are then secured to the 5-o'clock position on the glenoid using knot pusher and a Seoul Medical Center knot,<sup>17</sup> followed by alternating half hitches. A second suture anchor is then secured at the 3-o'clock position on the glenoid. Using the same technique, the curvature of the suture passer is used to estimate and grab inferior labral tissue relative to the point of the anchor while under superior tension from the original traction suture (Fig 8). This labral and

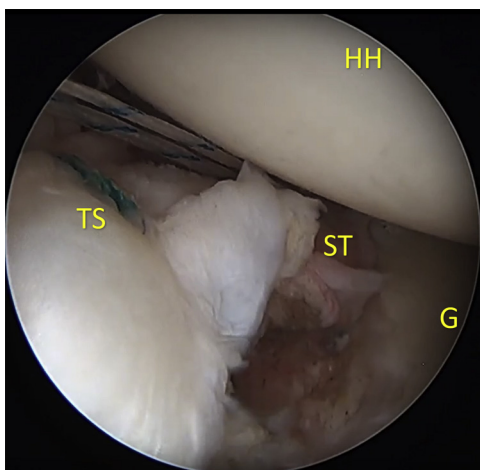


**Fig 6.** The curvature of a suture passer can be used to estimate where to grab the labral/capsular tissue for appropriate suture anchor placement while it is under superior tension from the TS. Right shoulder, viewed from the AS portal in a patient positioned in the lateral decubitus position. (AS, anterosuperior; G, glenoid; HH, humeral head; SA, suture anchor; TS, traction suture.)

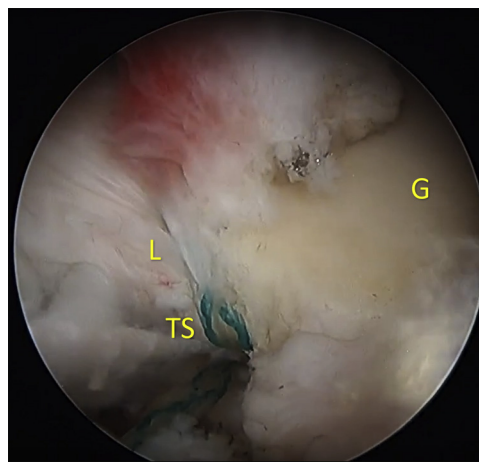


**Fig 7.** Grabbing the estimated site of released inferior ST to shift it to a superior anchor point on the glenoid at 5 o'clock, in a right shoulder in a patient positioned in the lateral decubitus position as viewed from the AS portal. (AS, anterosuperior; G, glenoid; HH, humeral head; SA, suture anchor; ST, soft tissue.)

capsular tissue is again secured superiorly to the glenoid with a standard Seoul Medical Center knot followed by alternating half hitches. A knotless suture anchor (BIORAPTOR; Smith & Nephew) is placed at the 12-o'clock position on the glenoid and used to secure the original 3-o'clock traction suture placed at the beginning of the procedure to tension the remainder of the labrum (Fig 9). Any excess tissue transposed inside the joint can then be ablated. All tools and portals are removed, and the shoulder is examined for stability. This completes the Bankart repair and inferior to superior capsular shift. Intraoperative video footage of critical steps can be seen in [Video 1](#).



**Fig 8.** Anchoring of inferior ST to the glenoid in a superior position at 3 o'clock, in a right shoulder as viewed from the AS portal in a patient positioned in the lateral decubitus position. (AS, anterosuperior; G, glenoid; HH, humeral head; ST, soft tissue; TS, traction suture.)



**Fig 9.** Securing the original 3-o'clock TS to the 12-o'clock position on the glenoid (G) to tension the remainder of the labrum (L) and complete the inferior to superior capsular shift, in a right shoulder as seen from the AS portal in a patient positioned in the lateral decubitus position. (AS, anterosuperior; G, glenoid; L, labrum; TS, traction suture.)

## Postoperative Management

Patient instructions for postoperative management can be found in [Table 3](#).

## Discussion

This Technical Note illustrates a traditional Bankart repair with an additional capsular release and inferior to superior labrum/capsular shift. The intention is to increase stability of the glenohumeral joint by creating a sling for the humeral head to support it from below with the shifted soft tissue. This soft-tissue shift and Bankart repair is explained in this Note, in addition to the traction suture technique used to manipulate the labrum throughout the procedure, as described by Boileau and Ahrens.<sup>16</sup> [Table 4](#) contains a list of tips and tricks for successful capsular and labral shift with this technique.

## Risks and Complications

This procedure has the same general risks as described in other arthroscopic Bankart repairs.<sup>18</sup> These include

**Table 3.** Postoperative Patient Instructions Following Arthroscopic Bankart Repair With Inferior to Superior Capsular Shift<sup>1,7</sup>

- 0-2 weeks: Complete immobilization in sling with exercises for wrist, hand, and elbow, with very limited passive ROM exercises for the operative shoulder
- 2-6 weeks: Pendulum and limited passive ROM exercises for the operative shoulder
- 6-12 weeks: Discontinue sling, active ROM exercises, and progress to light strengthening
- 12 weeks: Continue active ROM exercises, strengthen dynamic stabilizers of the shoulder to reduce any further instability

ROM, range of motion.

**Table 4.** Tips and Tricks for a Successful Inferior to Superior Capsular/Labral Shift During Bankart Repair

Tips and Tricks for Inferior to Superior Capsular/labral Shift during Bankart Repair
<ul style="list-style-type: none"> <li>• Place an anchoring suture at 3 o'clock in the labrum for manipulation during the procedure and to provide superior tension during the capsular shift</li> <li>• When landmarking the anteroinferior portal location with spinal needle, make sure it is positioned so it is above subscapularis tendon and able to access 6 o'clock on the glenoid for ease of capsular release</li> <li>• Release the capsule entirely from the anterior surface of the glenoid from 12 o'clock to 6 o'clock until you can see the muscle belly beneath, to help shift the capsule superiorly</li> <li>• Use the curvature of the suture passer to estimate the approximate inferior site to secure the capsule</li> <li>• If working with low quality tissue, excessive tension of the Seoul Medical Center knots may tear the labrum</li> <li>• Aim to get the original 3-o'clock labral anchor suture to 12 o'clock on the glenoid</li> </ul>

but are not limited to recurrent shoulder instability, failure of fixation, osteoarthritis development, and stiffness.<sup>15</sup> When specifically referring to the inferior to superior capsular and labral shift, there are few risks that are associated with this technique. One potential complication is a tear of the labral tissue, which could occur when tensioning the labral traction sutures. The chance of this complication may increase if the patient has a greater degree of labral degeneration. A second potential complication is a failure of the capsular shift to restore stability of the shoulder. This could be caused by the capsular release from bone required to shift the labrum superiorly, as well as the overreliance on soft tissue to provide support for the humeral head. Otherwise, this procedure poses very little increased risk from a traditional Bankart repair.

### Limitations

This procedure does pose certain limitations. One limitation is the increased technical skill required for the capsular release and labral shift. Another limitation is the lack of any current literature to show superiority of this inferior to superior capsular shift procedure compared with a traditional Bankart repair. Although this is a newly described procedure, anecdotally it has very good results in terms of stability and less reported postoperative pain compared with alternative bony reconstructions. Long-term patient outcomes remain to be studied.

### Conclusions

Overall, we feel this technique is a simple modification on a traditional Bankart repair and has many potential upsides. The concept behind this technique intends to improve the stability beyond a simple Bankart and provide equal functionality, without any disruption of osseous anatomy. Arthroscopic Bankart

repairs are a minimally invasive technique with a very safe track record, and this procedure doesn't add any exceptional risks aside from a slightly longer surgical time. Anecdotal outcomes regarding pain and functionality have been very positive compared with other shoulder stabilization options. We hypothesize the long-term results of this inferior to superior labral shift to yield excellent patient outcomes.

### References

1. McNeil D, Coady C, Wong I. Arthroscopic anatomic glenoid reconstruction in lateral decubitus position using allograft with nonrigid fixation. *Arthrosc Tech* 2018;7:e1115-1121.
2. Streubel PN, Krych AJ, Simone JP, et al. Anterior glenohumeral instability: A pathology-based surgical treatment strategy. *J Am Acad Orthop Surg* 2014;22:283-294.
3. Bencardino JT, Gyftopoulos S, Palmer WE. Imaging in anterior glenohumeral instability. *Radiology* 2013;269:323-337.
4. Levy DM, Cole BJ, Bach BR. History of surgical intervention of anterior shoulder instability. *J Shoulder Elbow Surg* 2016;26:e139-e150.
5. Pickett A, Svoboda S. Anterior glenohumeral instability. *Sports Med Arthrosc Rev* 2017;25:156-162.
6. Gao B, DeFroda S, Bokshan S, et al. Arthroscopic versus open Bankart repairs in recurrent anterior shoulder instability: A systematic review of the association between publication date and postoperative recurrent instability in systematic reviews. *Arthroscopy* 2020;36:862-871.
7. Whelan A, Coady C, Wong I. Anterior glenohumeral capsular reconstruction using a human acellular dermal allograft. *Arthroscopy* 2018;7:E1235-E1241.
8. Petreria M, Patella V, Patella S, Theodoropoulos J. A meta-analysis of open versus arthroscopic Bankart repair using suture anchors. *Knee Surg Sports Traumatol Arthrosc* 2010;18:1742-1747.
9. Bishop Y, Hidden K, Jones G, Hettrich C, Wolf B. Factors influencing surgeon's choice of procedure for anterior shoulder instability: A multicenter prospective cohort study. *Arthroscopy* 2019;35:2014-2025.
10. Hurley E, Manjunath A, Bloom D, et al. Arthroscopic Bankart repair versus conservative management for first-time traumatic anterior shoulder instability: A systematic review and meta-analysis. *Arthroscopy* 2020;36:2526-2532.
11. Wolf EM, Wilk RM, Richmond JC. Arthroscopic Bankart repair using suture anchors. *Oper Techn Orthop* 1991;1:184-191.
12. Zhu YM, Lu Y, Zhang J, Jiang CY. Arthroscopic Bankart repair combined with remplissage technique for the treatment of anterior shoulder instability with engaging Hill-Sachs lesion: A report of 49 cases with a minimum 2-year follow-up. *Am J Sports Med* 2011;39:1640-1648.
13. Natero LG, Consigliere P, Witney-Lagen C, et al. The "purse string" procedure for recurrent anterior glenohumeral instability: A simple technique to achieve Bankart repair, capsular shift and a good labral bumper. *Arthrosc Tech* 2017;6:e1245-e1251.

14. Uchiyama Y, Handa A, Shimpuku E, et al. Open Bankart repair plus inferior capsular shift versus arthroscopic Bankart repair without augmentations for traumatic anterior shoulder instability; a prospective study. *J Orthop Surg* 2017;25:1-8.
15. Zaffagnini S, Muccioli GMM, Giordano G, et al. Long-term outcomes after repair of recurrent post-traumatic anterior shoulder instability; comparison of arthroscopic transglenoid suture and open Bankart reconstruction. *Knee Surg Sports Traumatol Arthrosc* 2012;20:816-821.
16. Boileau P, Ahrens P. The TOTS (temporary outside traction suture): A new technique to allow easy suture placement and improve capsular shift in arthroscopic Bankart repair. *Arthroscopy* 2003;19:672-677.
17. Kim SH, Ha KI. The SMC knot—a new slip knot with locking mechanism. *Arthroscopy* 2000;16:563-565.
18. Matsuki K, Sugaya H. Complications after arthroscopic labral repair for shoulder instability. *Curr Rev Musculoskelet Med* 2015;8:53-58.