

Technical Note

The “Floating Labrum”: Bankart Lesion Repair With Anterior Capsular Extension Using 2 Anterior Working Portals

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Abstract: Surgical repair of a Bankart lesion requires thorough recognition of the capsulolabral attachment and adequate visualization for suture anchor repair. The glenoid labrum usually detaches from its capsule and bony attachment anteriorly and inferiorly; however, the labral and capsule detachment can sometimes extend beyond this zone of injury. Identification and repair may require additional viewing and working portals to allow for ease of suture passage and anchor placement. This technique guide describes a case scenario of a Bankart lesion with anterior extension of the capsular tear, repaired with use of 2 anterior working portals.

Anterior glenohumeral shoulder dislocation can result in a Bankart lesion, a tear of the anterior-inferior labrum, with separation from the glenoid rim. In a Bankart lesion, the glenoid labrum usually detaches from its capsule and bony attachment, because the labrum is in continuity with the capsule and anterior periosteum of the scapular neck.^{1,2} However, although uncommon, it is possible for the labrum to tear from both the capsule and bone, with the potential for the capsular tear to extend.

Suture passage through the anteroinferior capsule and labrum can be one of the most challenging aspects of Bankart repair.³ In our experience with arthroscopic Bankart repair, standard posterior and anterior portal placement may be insufficient for labral suture

passage, knot tying in the anteroinferior quadrant, or placement of suture anchors. Instead, use of an accessory anterior portal, with 2 working anterior portals, while viewing posteriorly, can give the surgeon better access to the labrum and allow for easier suture passage. We present our preferred technique for arthroscopic Bankart repair involving anterior extension of capsular tearing, emphasizing both the unique tear pattern resulting in a “floating labrum” and the use of 2 anterior portals for fixation. [Video 1](#) shows a narrated review of the surgical technique, with a step-by-step guide in [Table 1](#).

Technique

Surgical Setup and Examination Under Anesthesia

The patient is placed in the lateral decubitus position with a traction arm holder (Biomet Zimmer, Warsaw, IN). All bony prominences are well padded, and an axillary roll is placed. Examination under anesthesia is performed, showing a grade 3+ shift in the anterior-superior, anterior-middle, and anterior-inferior directions under load. There is also grade 1+ posterior translation with the load-and-shift test. A complete examination under anesthesia including passive range of motion, the anterior and posterior load-and-shift test, and the sulcus sign should be performed before preparation and draping.

Diagnostic Arthroscopy

A standard posterior viewing portal is established, followed by establishment of an anterior-inferior rotator interval portal, through an outside-in spinal needle

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Table 1. Step-by-Step Guide to Floating Labrum Repair

View the entire extent of the labrum including the capsule and bony attachment.
Establish an accessory anterior and 2 anterior working portals, viewing from posterior.
Debride the glenoid neck to promote healing.
Circumferentially perform labral repair, incorporating in the capsular split.
Continue to shift the capsule superiorly.
Perform labral repair from inferior to superior.
Confirm that the labral repair and capsular shift and plication have resulted in a centered humeral head.
Take the arm out of the arm holder, and repeat the examination under anesthesia to confirm that the shoulder is stable to load-and-shift testing in all directions.

technique. Diagnostic arthroscopy is performed, examining the biceps tendon and anchor, rotator interval, middle glenohumeral ligament, subscapularis and subscapularis recess, superior glenohumeral ligament, humeral head, glenoid surface, rotator cuff, inferior glenohumeral ligament, and capsule. Diagnostic arthroscopy is notable for the intact cartilage surface of the glenohumeral head. No loose bodies are noted within the subscapular recess or axillary pouch. The labrum is then inspected. There is a Bankart tear from the 6- to 12-o'clock position (Fig 1). The posterior labrum is intact. In addition, the anterior-inferior and posterior-inferior capsular structures are well attached

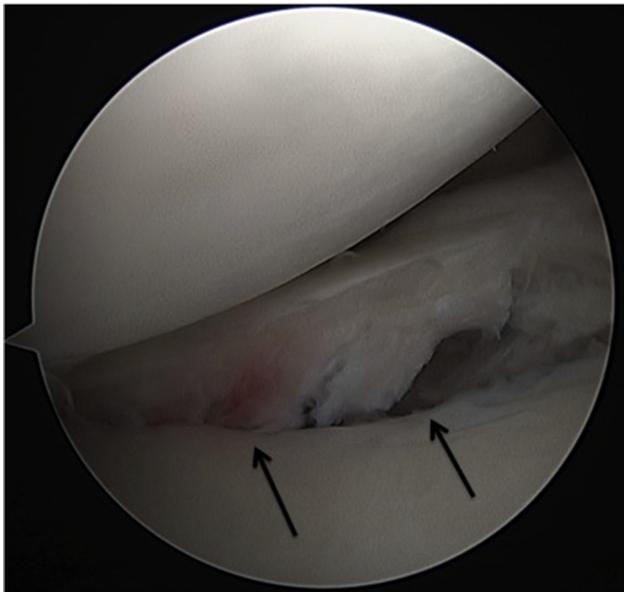


Fig 1. Viewing from the anterior-superior portal in a left shoulder, the Bankart and capsular split becomes evident. The capsule is torn in addition to the labrum (as indicated with the long arrows), which also needs to be addressed. Recognition of the capsular tear creates a floating labrum, which needs to be addressed in addition to the labral repair.

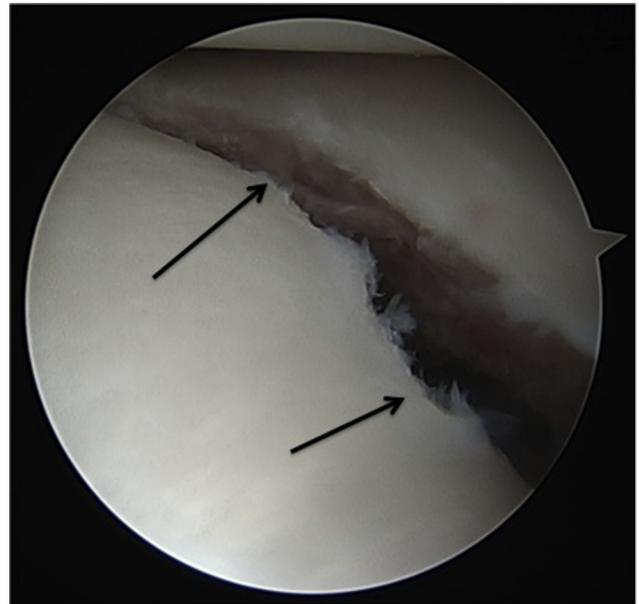


Fig 2. Viewing from the anterior-superior portal in a left shoulder, the capsular and Bankart lesion becomes evident. This is a unique pattern in which the labrum is torn away from both the bone and capsule more anteriorly (as indicated with the long arrows). Recognition requires looking from both posterior and anterior portals to view the entire labrum and capsule.

down to the humerus (Fig 2). This unique pattern is a variant in which the labrum is torn off the bone but also the capsule more anteriorly, showing a floating labrum.

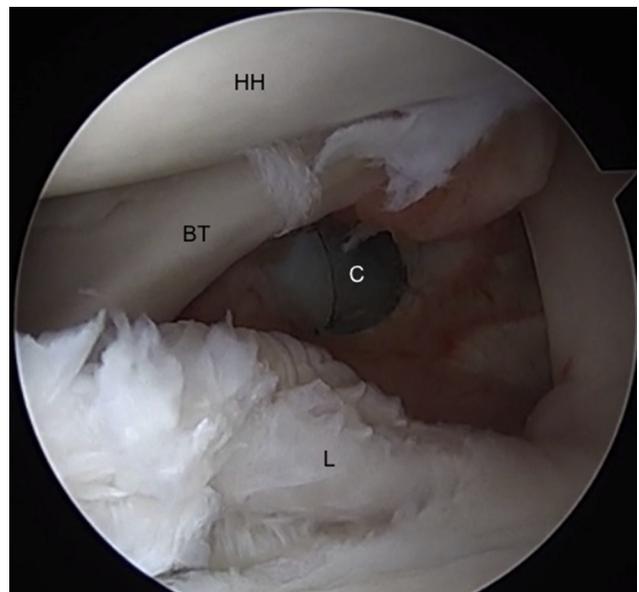


Fig 3. Viewing posteriorly in a left shoulder, an anterior-inferior interval portal and an additional anterior-superior portal are used to allow for both a grasper and suture passer to work in the same area for labral and capsular repair. (BT, biceps tendon; C, cannula; HH, humeral head; L, labrum.)

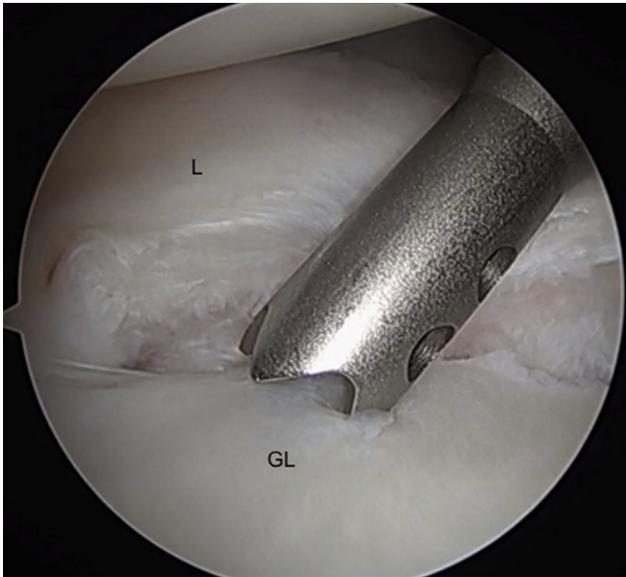


Fig 4. Viewing posteriorly in a left shoulder, while using an anterior-inferior interval portal and anterior-superior portal, a total of five 1.7-mm SutureFix anchors are placed at the articular margin edge. (GL, glenoid; L, labrum.)

Labral Repair

Viewing posteriorly, the surgeon uses the anterior-inferior interval portal and an additional anterior-superior portal to allow for both a grasper and suture passer to work in the same area (Fig 3). Attention is then turned to the glenoid neck. This area is debrided to a light bleeding surface to promote healing. A total of

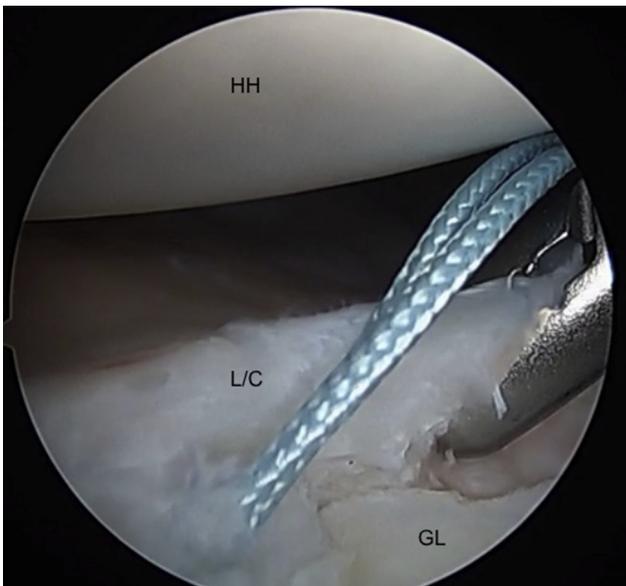


Fig 5. Viewing posteriorly in a left shoulder, while using an anterior-inferior interval portal and anterior-superior portal, sutures are placed circumferentially in a single fashion around the labrum while also incorporating them into the split in the capsule, taking care to shift the capsule superiorly. (GL, glenoid; HH, humeral head; L/C, labrum and capsule.)

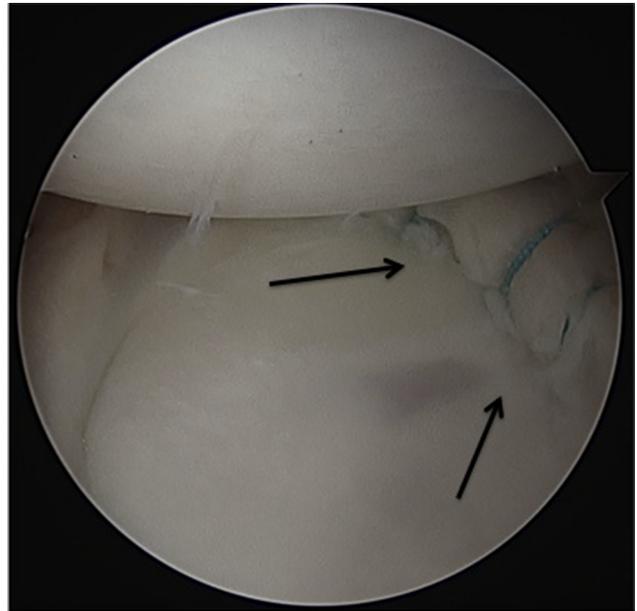


Fig 6. Final repair of the Bankart labral tear and capsular tear in a left shoulder, showing retensioning of the inferior and middle glenohumeral ligaments (as indicated with the long arrows). The final repair addresses both the capsular and labral tears, recentering the humeral head from anterior to posterior.

five 1.7-mm SutureFix anchors (Smith & Nephew, Andover, MA) are placed at the articular margin edge (Fig 4). The sutures are then passed using an Accu-Pass suture passer (Smith & Nephew) in a single fashion around the labrum, while also incorporating them into the split in the capsule (Fig 5). Care is taken to shift the capsule superiorly. The labrum is fixed progressively from inferior to superior, achieving both a labral repair and capsular shift and plication with the suture anchors. Once the labrum and capsule are repaired, the head is now centered from anterior to posterior (Fig 6).

The arm is taken down, and a repeat examination under anesthesia is performed. The shoulder is now

Table 2. Advantages and Disadvantages of Floating Labrum Repair

Advantages

- Using an accessory anterior and 2 anterior working portals allows easy suture passage.
- Capsular shift and plication center the humeral head from anterior to posterior.
- There is a decreased risk of residual laxity with complete labral and capsular repair.
- The technique allows easy access to the labrum from the 6- to 12-o'clock position.
- The technique is minimally invasive.

Disadvantages

- The repair is technically challenging.
- Increased arthroscopic time is required, leading to swelling and fluid extravasation.

Table 3. Pearls and Pitfalls of Floating Labrum Repair

Pearls
View the entire extent of the labrum and capsule.
Initially, use both anterior and posterior viewing portals.
Recognize tear patterns and use portals to best allow for working and viewing.
If the capsule is also torn, incorporate this into the labral repair for appropriate retensioning.
Pitfalls
Avoid viewing only posteriorly because this may not allow for complete visualization of the labrum and capsule.
Be aware of capsular tears.
Be aware of humeral avulsion of glenohumeral ligament lesions.

stable to load-and-shift testing in all directions, including anterior-superior, anterior-middle, anterior-inferior, and posterior.

Postoperative Rehabilitation

Postoperatively, the patient is placed in an Ultrasling (DJO Global, Vista, CA) with instruction to avoid combined external rotation and abduction. From day 1 to 5 postoperatively, the Ultrasling is worn continuously except during therapy or exercise sessions. Active range of motion of the elbow, wrist, and hand is allowed, but no motion of the shoulder is permitted. Physical therapy is begun with range-of-motion exercises on day 5 until 4 weeks postoperatively. The Ultrasling is worn until the 4-week mark, at which time its use can be weaned for the next 2 weeks. Beginning at 2 weeks, active and passive range of motion of the shoulder is allowed, with flexion up to 120°, abduction to 90°, and external and internal rotation in the scapular plane to only 30° of abduction. Pendulum exercises are performed daily. From week 4 to 10 postoperatively, active and passive range of motion is gradually progressed. Strengthening begins at week 4 with 50% effort and is increased at week 6 to resisted strengthening. From week 10 to 16, combined external rotation and abduction are still avoided and strengthening is advanced as tolerated. By week 16, athletes can begin returning to throwing programs and sport-specific exercises, and a return to noncontact sports is allowed.

Discussion

Successful repair of Bankart lesions requires adequate assessment of the extent of disruption; advancement of the capsule, labrum, and periosteal sleeve; and secure fixation. Magnetic resonance imaging alone can be difficult to interpret in the diagnosis of a floating labrum; the pathology will likely not be recognized until diagnostic arthroscopy is performed with thorough examination of Bankart lesions. It is important to note that Bankart lesions should be viewed from both anterior and posterior portals to allow for full assessment of the extent

before any repair. This also allows the surgeon to determine a plan for fixation, either working posteriorly or anteriorly. The described technique illustrates a relatively simple portal configuration for a unique floating labrum. This technique allows for posterior viewing with adequate visualization, while using 2 anterior working portals to allow for suture anchor placement and suture passage (Tables 2 and 3).

Given the rarity of the floating labrum, there are no prior literature reports on its incidence or outcomes of repair. However, we would compare its incidence with that of an anterior labroligamentous periosteal sleeve avulsion lesion. Previous studies have found that in the setting of chronic dislocations, although a Bankart lesion has an incidence from 60% to 80%, an anterior labroligamentous periosteal sleeve avulsion lesion is only found in approximately 10% of cases.^{4,5} Similarly, establishing the diagnosis and distinguishing a floating labrum from a Bankart lesion can be difficult to do on magnetic resonance imaging alone; therefore, careful inspection of the capsule and bony attachment during diagnostic arthroscopy is recommended to ensure that a lesion is not missed. Although no outcomes have been reported on floating labrums, it is clear that with more extensive soft-tissue or bony injury, the risk of recurrence is generally expected to be increased.

Previous techniques have described other methods for addressing the technical difficulty of labral repair encountered with Bankart lesions. Adams et al.⁶ described use of a posterolateral portal to allow access to the inferior labrum and superior advancement. The trans-subscapularis portal has been described as another option for accessing the inferior labrum in a Bankart repair.^{3,7} Although the trans-subscapularis portal has been shown in cadaveric studies to decrease the risk of suture anchor penetration of the inferior cortex, it is anatomically closer to the cephalic vein.^{3,8} In addition, accessory posterior portals have been described as working portals, with a theoretic advantage of a flat, direct working angle; access to the inferior portion of the capsulolabral junction; and better grasp of tissue.⁹⁻¹²

Although these portals may aid in accessing a common Bankart lesion that occurs from the 3- to 6-o'clock position, in the case presented, in which the Bankart lesion extended from the 6- to 12-o'clock position, an anterior portal allowed for more technically easy portal placement and passage of sutures. This case also illustrates the importance of recognition of the extent of injury, pattern, and fluency with different portal placements to tailor the surgical technique to the individual.

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