

Open Shoulder Stabilization for Instability: Anterior Labral Repair With Capsular Shift



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Abstract: Although anterior shoulder instability is most commonly treated with arthroscopic fixation, open labral repair with capsular shift may be best for select patients and in cases of revision stabilization without significant bone loss. The technique described in this article uses the deltopectoral interval; it involves careful dissection of the subscapularis from the anterior capsule, repair of the Bankart lesion, and a lateral and superior capsular shift using all-suture anchors in the humeral head. Advantages of this technique include meticulous control of anchor placement and the ability to provide additional stability via a lateral and superiorly directed capsular shift. This operation can be performed in a reliable, efficient, and reproducible manner.

Anterior instability is a very common shoulder condition.¹ Hovelius et al.² found that after a single traumatic episode of anterior instability, 57% of patients <40 years of age suffered at least 1 recurrent episode, whereas 27% of patients ultimately required an operative procedure to address recurrent instability. Other studies have found a substantial risk of recurrent instability after a first-time dislocation, especially in the young, active population.²⁻⁵

Operative management of recurrent shoulder instability has shown an improvement in patient outcomes compared with nonoperative treatment.^{5,6} These surgeries include both arthroscopic and open surgical

repairs.⁶ Open surgical stabilization was first described by Bankart in 1923.⁷ The Bankart technique involved reattachment of the torn labrum and glenohumeral ligament to the glenoid using interrupted sutures, and in the United States it became the gold standard operative treatment for anterior instability for decades.^{7,8} In 1980, Neer and Foster⁹ described the open capsular shift, which was modified by Altchek et al.¹⁰ in 1991 to include a concomitant Bankart repair. Open repair remained the mainstay of treatment until it was shown in the early 2000s that arthroscopic repair showed equivalent efficacy with less morbidity.⁸ Arthroscopic stabilization remains the preferred treatment for anterior shoulder instability for most patients because of improved postoperative pain, lower morbidity, and improved cosmesis compared with open repair.⁶ In the presence of a critical anterior glenoid bone defect, transfer of the anterior portion of the coracoid to the anteroinferior glenoid—the Latarjet procedure—is most commonly performed.¹¹

Although arthroscopic stabilization is the preferred surgical management of anterior instability for most shoulders without critical bone loss, some outcome studies have found recurrence rates ranging from 16% to 26% after arthroscopic repair, a suboptimal failure rate.¹²⁻¹⁶ Further analysis identified a select patient population at high risk of arthroscopic failure, in which open surgical stabilization is indicated.^{17,18} This population includes patients with ligamentous laxity, multidirectional instability, or failure of a previously well-performed arthroscopic repair with no bone loss and high-risk patients (typically young men participating in contact sports).¹⁹⁻²³ In many of these

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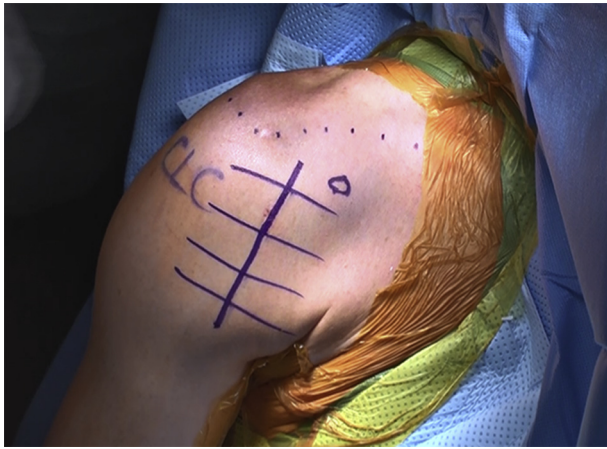


Fig 1. Preoperative photograph showing right shoulder in standard beach chair position with appropriate topical landmarks outlined. The skin incision for the deltopectoral approach is identified by a solid line. Surface landmarks are also visualized, including the coracoid process (circle) and acromioclavicular joint (dotted line).

circumstances, coracoid transfer procedures are considered, but open capsular shift is a reasonable alternative as well. The purpose of this technical article is to describe an open technique for anterior shoulder stabilization using modern instrumentation. Special attention is paid to surgical exposure, meticulous dissection of the subscapularis from the anterior glenohumeral joint capsule, and lateral capsular shift via humeral head anchors ([Video 1](#)).

Technique

Patient Positioning

The patient is placed in the standard beach chair position with the surgical arm and medial edge of the

scapula free from the bed ([Fig 1](#)). The arm can be held and positioned using a mechanical arm holder or a Mayo stand. A shoulder examination under anesthesia is critical for confirming direction of instability and determining the extent of capsular shift.

Surgical Exposure

A standard deltopectoral approach is performed. For shoulder arthroplasty and proximal humerus fracture fixation, the skin incision is placed somewhat lateral, but for open instability surgery, the skin incision is best placed along the line that connects the coracoid tip with the axillary fold.

The conjoint tendon is then identified, and the clavipectoral fascia lateral to this structure is incised, revealing the underlying subscapularis and bursa. The bursa is removed using electrocautery, and the arm is subsequently externally rotated to protect the axillary nerve and facilitate visualization of the subscapularis. Dissection of the subscapularis from the underlying anterior capsule is performed using dissecting scissors or a periosteal elevator ([Fig 2A](#)). The plane between the subscapularis and capsule is generally easiest to identify inferiorly and medially and can then be carefully followed superiorly and laterally toward the lesser tuberosity. Separation of the often-attenuated anterior capsule from the upper two-thirds of the subscapularis is typically best performed with a combination of blunt dissection and electrocautery. Tagging sutures are placed through the subscapularis to aid in retraction and, later, identification for closure.

Subscapularis Tenotomy

Using electrocautery or a sharp 15-blade knife, a tenotomy of the subscapularis is made just medial to its lateral insertion, leaving 8-10 mm of subscapularis attached to the lesser tuberosity to optimize secure

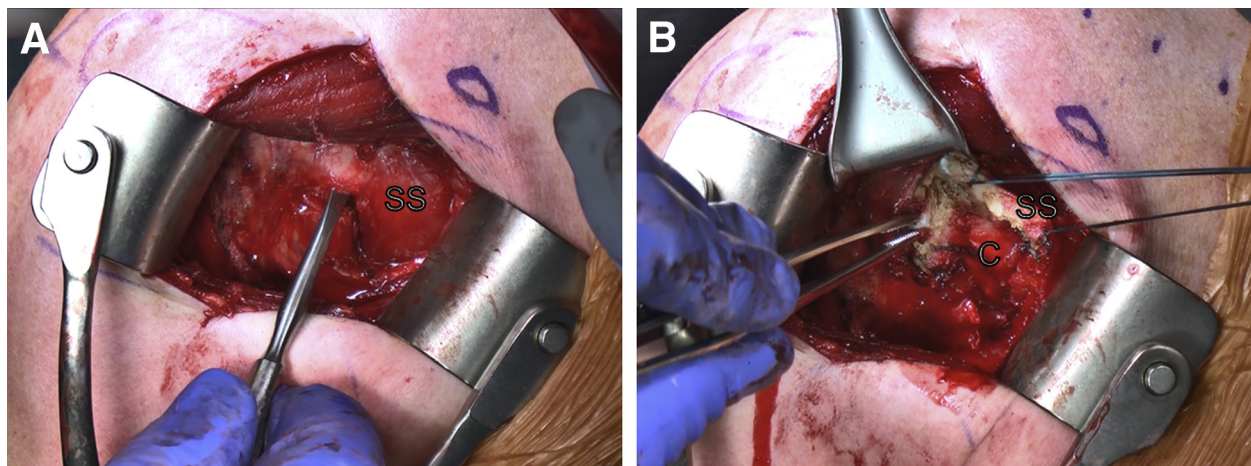


Fig 2. Deltopectoral approach of a right shoulder in standard beach chair position after identification of the subscapularis. (A) A periosteal elevator is placed between the subscapularis (SS) and anterior capsule (C). (B) Subscapularis tenotomy is performed, showing the underlying anterior capsule. Sutures retract the subscapularis medially, revealing the underlying anterior capsule.

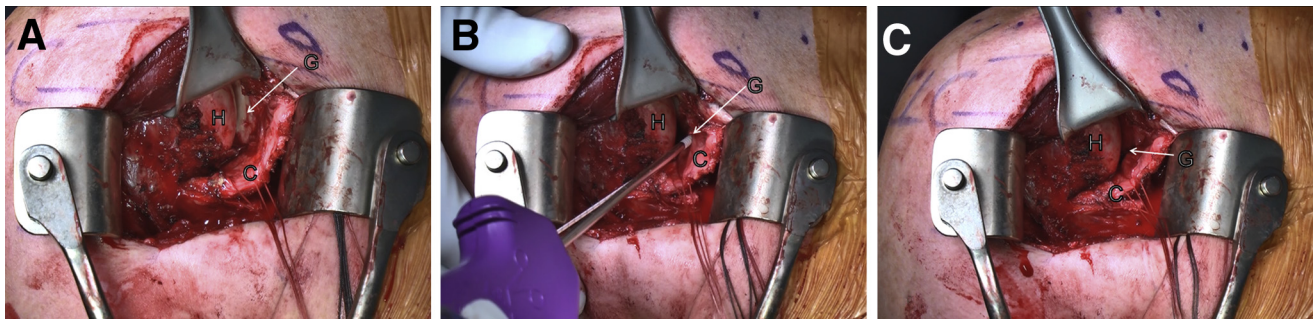


Fig 3. (A) The glenohumeral joint is exposed in this right shoulder after release of the anterior capsule (C). The capsule is retracted medially using suture. The glenoid (G) and humeral head (H) are labeled. (B) After passing sutures around the labrum and capsule in an oblique mattress fashion using a self-retrieving suture-passing device, a knotless push lock anchor is placed in the glenoid for the anterior labral repair. (C) Additional push lock anchors are placed more superiorly as needed to complete the labral repair.

tendon-to-tendon repair at the end of the procedure. The subscapularis is carefully dissected from the underlying capsule, and a second suture is placed through the superior subscapularis for additional retraction (Fig 2A). Once released, the subscapularis tendon may be placed under the medial side of a self-retaining retractor.

Capsulotomy

The anterior capsule is released along the margin of the humeral neck (humeral-based capsular shift) to expose the glenohumeral joint, beginning superiorly and continuing inferiorly to the 6-o'clock position. Often, the interval region is attenuated. Two sutures are placed through the lateral portion of the anterior capsule and

used to retract the free edge medially. Using electrocautery, the inferior capsule is incised to extend the exposure. One or 2 additional sutures are placed in the inferior capsule and retracted medially (Fig 3A).

Glenoid Anchors

The anterior labrum is subsequently inspected for a Bankart lesion and is dissected from the anterior glenoid. To avoid chondral damage to the humeral head, a posterior glenoid retractor (such as a Fukuda) is not typically used but may be needed in certain patients. Glenoid visualization is improved by forward elevating the arm and applying light posterior pressure to the upper third of the humeral shaft. The anterior glenoid

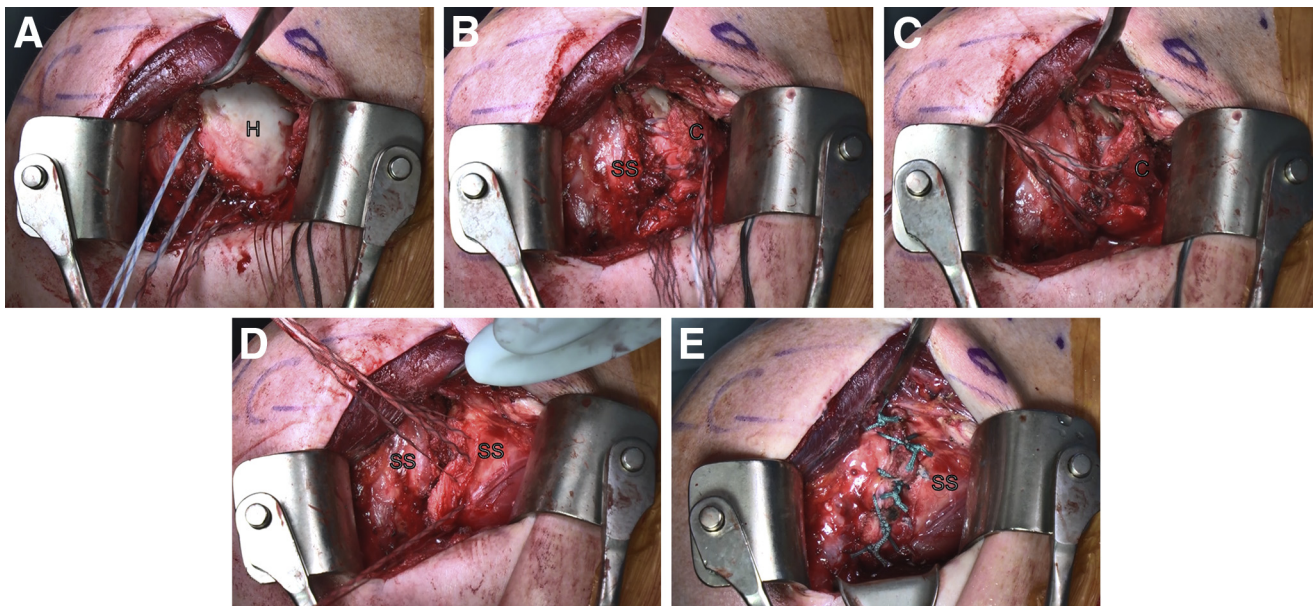


Fig 4. The right shoulder is prepared for anterior capsular shift. (A) All suture anchors are placed along the humeral (H) insertion of the lateral capsule. (B) Sutures are passed through the anterior capsule (C) in an inferior and medialized position to prepare for capsular shift. The residual edge of the subscapularis (SS) tenotomy is shown. (C) Tying these sutures shifts the capsule superolaterally. (D) These same sutures are then passed through the subscapularis for tenotomy repair. (E) Additional repair of the subscapularis tenotomy closure is performed with #5 nonabsorbable suture.

Table 1. Advantages and Disadvantages of the Open Labral Repair with Capsular Shift

Advantages	Disadvantages
• Standard deltopectoral approach • Permits precise glenoid and humeral head anchor placement under direct visualization • Controlled augmentation of shoulder stability with superolateral capsular shift • Low incidence of recurrent instability and high patient satisfaction, with high rates of return to preoperative levels of athletic competition	• Technical difficulty establishing the anatomic plane between subscapularis and anterior capsule • Larger anterior scar compared with portals used in arthroscopic repair • Potential for decreased shoulder external rotation

rim is prepared using an arthroscopic elevator to separate the rim and labrum from one another. The elevator, rasp, or burr is used to create a bleeding, bony bed at the junction of glenoid rim and labrum to facilitate healing. Beginning as inferiorly as needed, sutures are passed around the labrum and capsule in an oblique mattress fashion using a self-retrieving suture-passing device. This suture is then fixed to the glenoid using 2.9-mm knotless push lock anchors (Arthrex, Naples, FL) identical to those used in arthroscopic repairs. These steps are repeated to place subsequent anchors more superiorly as needed (Fig 3 A and B).

Humeral Head Anchors

Attention is then turned to the humeral head. The arm is flexed and externally rotated 30° to expose the anteroinferior anatomic neck. Working inferiorly to superiorly, a total of 4 all-suture 1.6-mm FiberTak suture anchors (Arthrex) are placed along the humeral insertion of the lateral capsule in a sequential fashion (Fig 4A).

Table 2. Pearls and Potential Pitfalls of the Open Labral Repair with Capsular Shift

Pearls	Potential Pitfalls
• Begin inferiorly and medially when establishing the plane between subscapularis and capsule • Leave 8-10 mm of the subscapularis tendon attached to the lesser tuberosity for adequate tenotomy repair • Elevate the arm and apply light posterior pressure to the upper third of the humeral shaft to optimize glenoid visualization • Ensure adequate subscapularis tenotomy repair using a 2-layer closure augmented with heavy, nonabsorbable suture	• Inadequate exposure of the glenoid may lead to improper glenoid anchor placement • Overtightening the capsular shift results in decreased shoulder range of motion

Capsular Shift and Subscapularis Repair

Once all anchors are placed, the sutures are passed through the capsule in an inferior and medialized position. Beginning inferiorly, these are sequentially tied, which shifts the capsule laterally and superiorly (Fig 4 B and C). The axillary pouch should be closed down so that it is not possible to place a finger between the capsule and the humeral neck in the pouch. If properly shifted, there will be redundant capsule laterally and superiorly to the normal capsular insertion. This excess tissue is left in place and can be used to augment the repair of the subscapularis tenotomy. Once the capsule has been tied down, these same sutures are sequentially passed through the subscapularis and tied, beginning with the inferior-most suture (Fig 4D). Additional repair of the subscapularis tenotomy is performed using nonabsorbable No. 5 sutures in an interrupted figure-8 fashion between the free edge of the subscapularis and the 8-10 mm of tendinous stump attached to the lesser tuberosity (Fig 4E). The wound is thoroughly irrigated and closed in layers.

Postoperative Rehabilitation

Patients are placed in a shoulder sling with abduction pillow for 6 weeks after surgery. Emphasis is placed on avoiding any shoulder elevation and external rotation during this time. Patients are permitted to perform active range of motion (ROM) of the elbow, wrist, and hand during this time. The patients are initially seen in clinic after 2 weeks for examination of the surgical wound and then again at 6 weeks. After this 6-week visit, patients begin work with a physical therapist on progressive shoulder ROM and shoulder strengthening exercises, with a goal of full ROM 12 weeks from the date of surgery. Careful attention should be paid to rehabilitation of the periscapular musculature, especially in patients with mild preoperative scapular dyskinesis. Scapular isometrics may be instituted early on, whereas formal periscapular strengthening is added later as needed. An interval return to sport program is typically started 4 to 5 months after surgery, with a goal of returning to competitive athletics ~6 months postoperatively.

Discussion

In the properly selected patient, open shoulder stabilization procedures are successful, with a 2% to 8%

Table 3. Equipment Required

• Periosteal elevator • No. 2-0 absorbable suture • Self-retrieving suture-passing device • 2.9-mm knotless push lock anchors (Arthrex) • 1.6-mm FiberTak suture anchors (Arthrex) • No. 5 heavy, nonabsorbable suture • Posterior glenoid ring retractor (i.e., Fukuda) occasionally

recurrence of instability noted in the literature.^{24,25} Satisfaction scores have been reported as good to great in 81% to 97% of patients after surgery,^{25,26} and 82% to 92% of patients returned to sports at the same level of competition after open stabilization.^{10,24,27} Although overall outcomes have been favorable, a potential disadvantage of open repair is residual stiffness (Table 1). Some studies have reported an average loss of 5° of external rotation after open shoulder stabilization^{10,24}; other studies have found no difference in shoulder ROM.^{6,27}

Technical challenges of this procedure include properly developing the plane between the subscapularis and anterior capsule during the surgical approach and adequate closure of the subscapularis tenotomy (Table 2). Historically, open shoulder stabilization procedures were commonly performed with excellent results,^{6,7,9,10,24-27} and although arthroscopic repair is the preferred approach in most cases of anterior instability in which surgical repair is required, open shoulder stabilization may be a viable option in patients at high risk of arthroscopic failure, including those with ligament laxity, high-risk patients even in the absence of bone loss, and patients with failure of a previous well-performed arthroscopic repair.

Conclusions

This Technical Note illustrates a technique using modern instrumentation for open shoulder stabilization that we believe can be performed in an efficient, reliable, and reproducible manner (Table 3).

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