

# Posterior Labral Repair and Reverse Remplissage for Acute Posterior Instability in High-Risk Athletes



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**Abstract:** Posterior shoulder instability is increasingly recognized, particularly among contact athletes subjected to repetitive posterior loading. Posterior dislocation causes an anterior impaction of the humeral head known as a reverse Hill-Sachs lesion. In elite contact sport athletes, a labral repair may not be sufficient. We describe a posterior labral repair with all-suture anchors in the beach-chair position with an adjunct arthroscopic reverse remplissage procedure for added stability. This presents a reliable, minimally invasive treatment option in these high-risk patients.

Posterior labral tears are now more widely acknowledged as a major cause of shoulder pain and limited function, especially in people who are active and athletes. Sports that involve heavy contact, like football and ice hockey, carry a greater risk of leading to posterior shoulder dislocations.<sup>1</sup> As the result of posterior translation and direct force of the humeral head against the glenoid rim, an anterior defect of the humeral head occurs, known as a reverse Hill-Sachs lesion (rHSL). The mainstay of surgical treatment of acute posterior labral tears in patients with acute shoulder instability is similar to that of anterior labral tears, which includes a labral repair. In the past years, the remplissage procedure has been gaining popularity as an adjunct procedure to anterior labral repairs, not only in individuals with a large Hill-Sachs lesions, but also in young patients who seek to return to their intensive sports. The McLaughlin

procedure was similarly introduced as an adjunct procedure for posterior instability.<sup>2</sup> The original McLaughlin procedure involves transferring the lateral subscapularis tendon into the rHSL, whereas the modified version includes an osteotomy of the lesser tuberosity, which is then transferred to fill the defect.<sup>3</sup> This was described as an open procedure. In this Technical Note, we demonstrate the senior author's technique for posterior labral repair in a high-risk patient using knotless all-suture anchors and an adjunct arthroscopic soft-tissue filling of the rHSL using the nearby subscapularis tendon, termed the reverse remplissage.<sup>4,5</sup>

## Surgical Technique

We describe the senior author's preferred surgical technique for posterior labral repair in the beach-chair position using all-suture anchors in addition to an arthroscopic reverse remplissage procedure, as outlined in [Video 1](#). The patient is placed in the beach-chair position with the index arm positioned in a pneumatic arm holder. A thorough shoulder examination is conducted to verify instability. The surgical area is prepped and draped in the standard sterile fashion. A standard posterior portal is established and a 30° arthroscope is introduced. Standard anteroinferior and anterosuperior portals are created. A 5.5-mm cannula is placed in the anterosuperior portal and an 8.25-mm cannula is placed in the anteroinferior portal. Diagnostic arthroscopy is performed to assess the glenoid rim, labrum, humeral head, and other associated structures.

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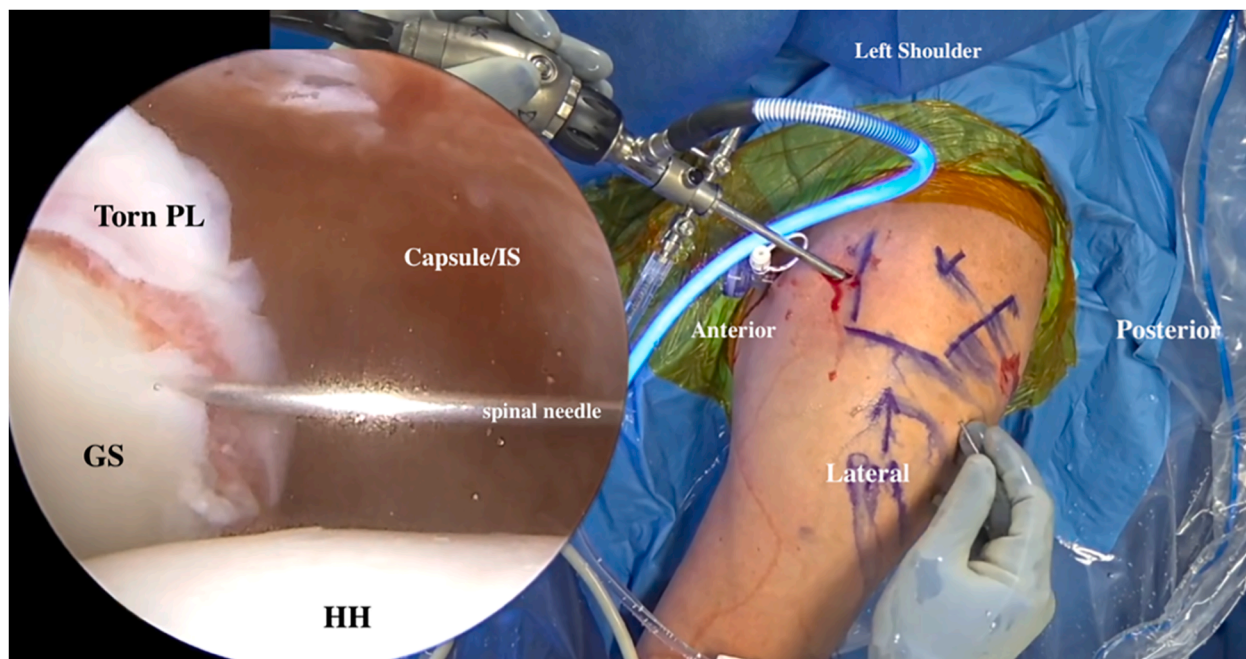
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**Fig 1.** Left shoulder with the arthroscope in the anterosuperior portal. Using a spinal needle for localization, a posteroinferior portal is made approximately 4 cm distal to the posterolateral corner of the acromion before the 5.5-mm cannula is placed. Correct positioning of this portal is essential to allow for appropriate trajectory of anchor placement and suture passage posteriorly. (GS, glenoid surface; HH, humeral head; IS, infraspinatus; Torn PL, torn posterior labrum.)

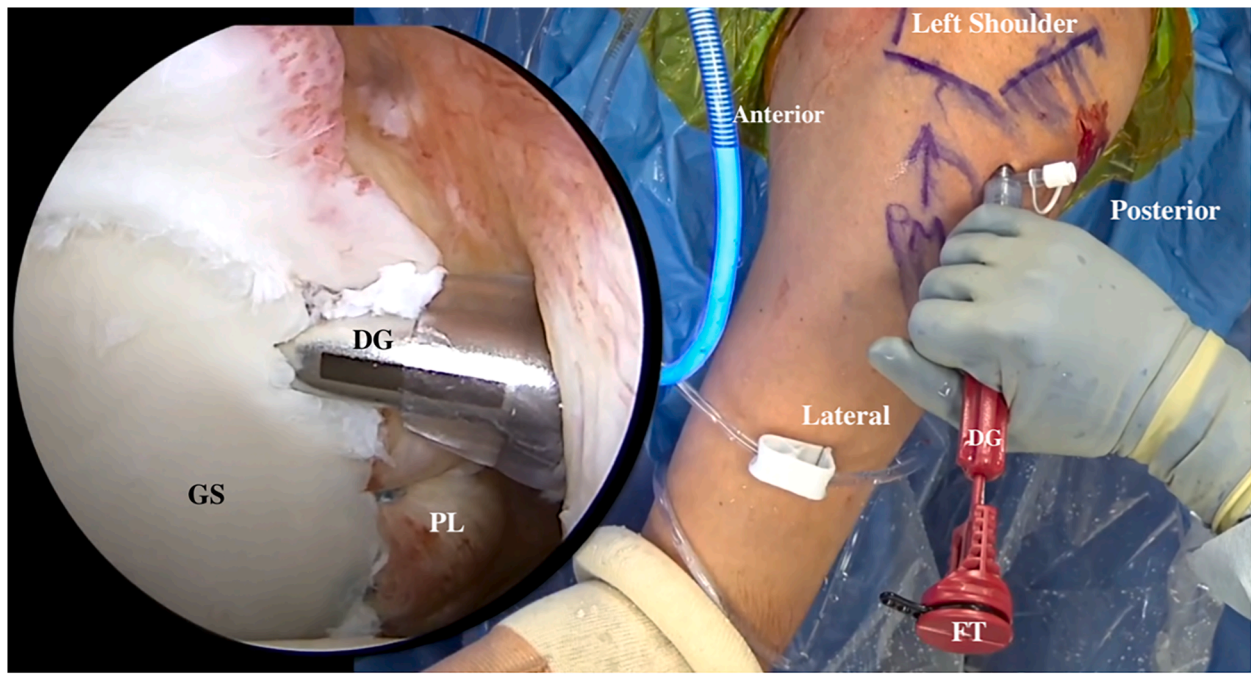
The arthroscope is then moved to the anterosuperior portal and the posterior labral tear and the rHSL is identified. Using a spinal needle for localization, a posteroinferior portal is made approximately 4 cm distal to the posterolateral corner of the acromion and a low-profile 5-mm cannula is placed (Fig 1). Correct position of this portal is an essential step to allow for appropriate trajectory of anchor placement and suture passage posteriorly.

The posterior labral tear is then debrided with an arthroscopic Torpedo Shaver (Arthrex, Naples, FL) to better facilitate a healing surface. The posterior capsulolabral tissue is elevated from the posterior aspect of the glenoid to allow for adequate mobilization for repair. This is a critical step to allow for adequate posterior labral repair and capsular shift. A 1.8-mm Knotless FiberTak anchor (Arthrex, Naples, FL) is then drilled into the articular margin of the posterior glenoid and placed in standard fashion (Fig 2). A straight crescent SutureLasso (Arthrex) is then passed through the capsulolabral tissue and the repair stitch is shuttled using the Nitinol wire. The repair stitch is then shuttled through the anchor and tensioned appropriately to reduce the labrum to the posterior aspect of the glenoid. A No. 5 ETHIBOND suture (Ethicon, Somerville, NJ) is used as a counter-tension stitch while shuttling the repair suture through the anchor, as this aids in preventing tangling or twisting of the repair suture that may

prevent smooth passage. A second 1.8-mm knotless FiberTak anchor is then drilled into the posterosuperior aspect of the glenoid. A SutureLasso is again used to pass the stitch through the capsulolabral tissue, and the repair suture is passed and tensioned similarly to the inferior labrum. Additional anchors may be placed as needed, depending upon the tear pattern.

With the arthroscope switched to the standard posterior portal, attention is then turned to the rHSL, which is debrided with an arthroscopic shaver from the anterosuperior portal to create a bony bed for healing. Care is taken to avoid damage to the overlying subscapularis tendon. Next, a straight crescent SutureLasso is used from the anteroinferior portal to pierce the lateral subscapularis tendon from anterior to posterior and the Nitinol wire is used to shuttle a 1.3-mm SutureTape (Arthrex). The posterior limb of the SutureTape is then retrieved through the anteroinferior portal, such that both limbs are exiting the anteroinferior portal. The SutureTape limbs are then loaded into a 4.75-mm SwiveLock anchor, and the appropriately sized punch is placed into the reverse Hill-Sachs defect (Fig 3). The anchor is then placed in standard fashion (Fig 4), with each suture limb tensioned individually. The sutures are then cut and the repair is assessed, demonstrating excellent reduction of the lateral upper subscapularis into the reverse Hill-Sachs defect (Fig 5).



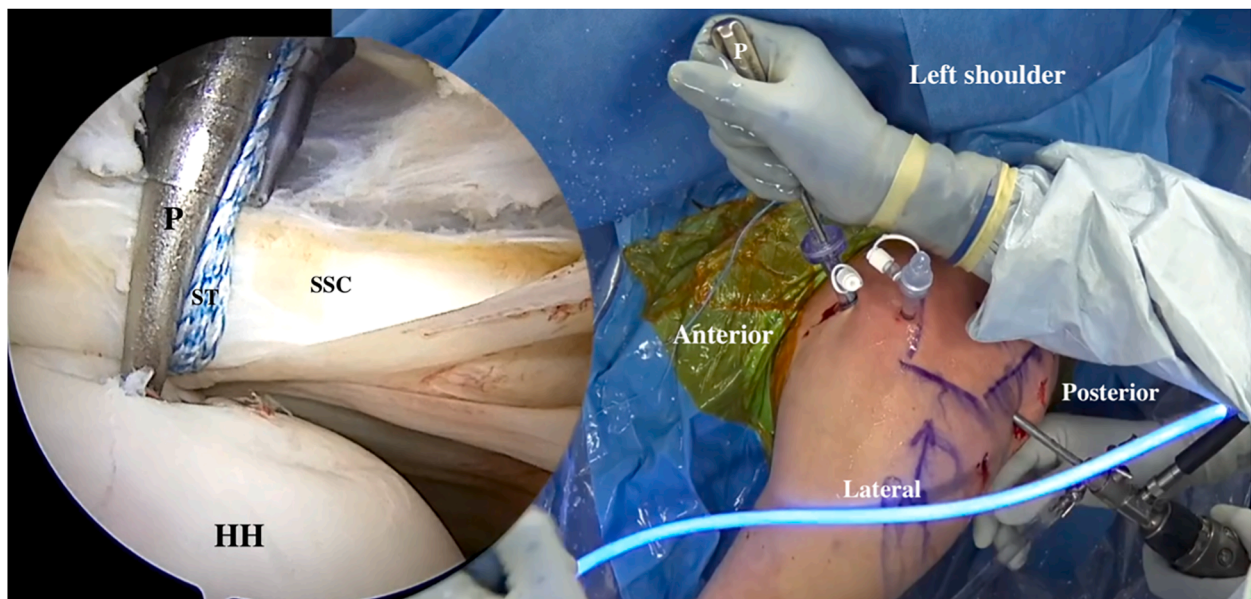


**Fig 2.** Left shoulder with the arthroscope in the anterosuperior portal. The hole for the 1.8-mm knotless FiberTak anchor is drilled into the articular margin of the posterior glenoid. The drill guide is held in position while a 1.8-mm Knotless FiberTak anchor is placed in standard fashion. A curved guide is also available if the correct trajectory cannot be directly reached. (DG, drill guide; FT, FiberTak anchor; GS, glenoid surface; PL, posterior labrum.)

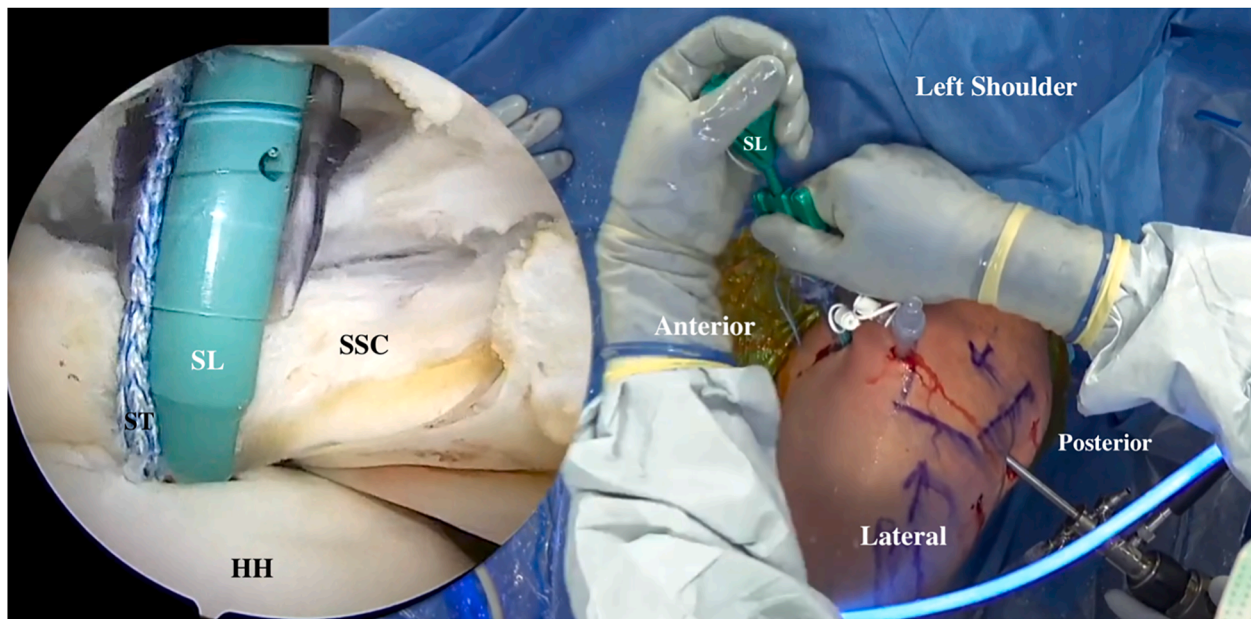
The arthroscope is switched back to the anterosuperior portal and the SutureLasso is used from the posterior portal to shuttle a No. 0 polydioxanone suture around the posterior portal and tied into the posterior aspect of the capsule to provide deep closure of the

arthroscopic portal. This step is critical to maintain posterior capsular tension in patients with posterior instability.

Postoperatively, patients are placed in a sling for 6 weeks, and passive range of motion is restricted for



**Fig 3.** Left shoulder with the arthroscope in the posterior portal. After the SutureTape is shuttled through the subscapularis tendon at the level of the reverse Hill-Sachs lesion, a punch is used to determine the position of insertion in the bony lesion. (HH, humeral head; P, punch; SSC, subscapularis.)

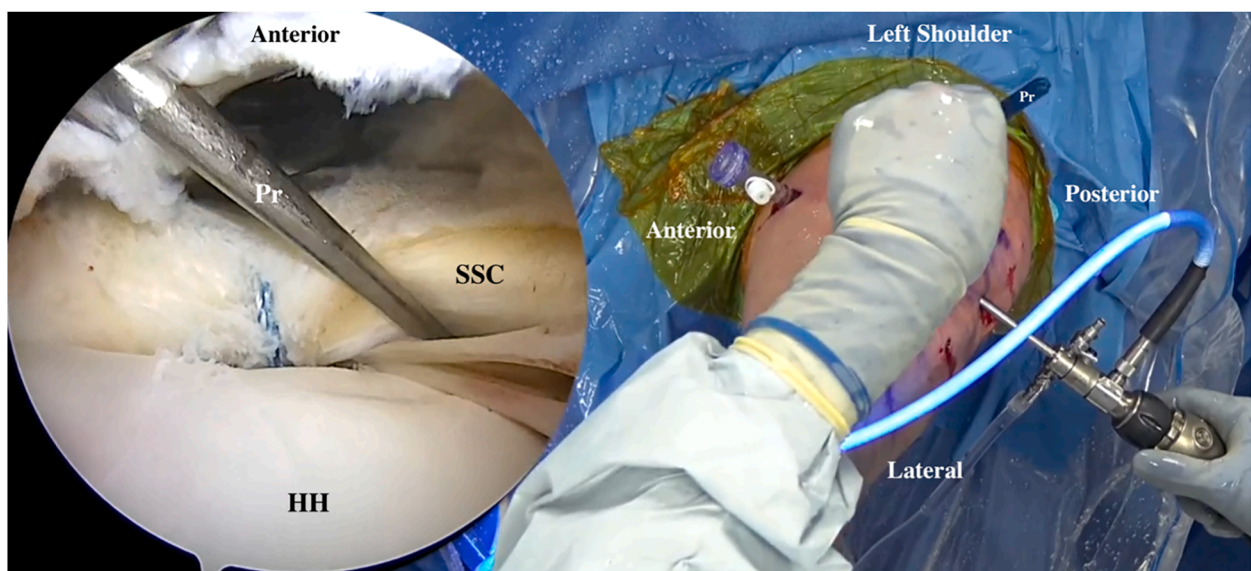


**Fig 4.** Left shoulder with the arthroscope in the posterior portal. The SutureTape limbs are loaded into a 4.75-mm SwiveLock anchor and the anchor is inserted in the reverse Hill-Sachs lesion. (HH, humeral head; SL, SwiveLock anchor; SSC, subscapularis.)

the first 3 weeks to forward elevation less than 120°, external rotation less than 30°, internal rotation is limited to the side of the body, and abduction less than 90°. Starting from week 4, full passive and active range of motion are initiated as tolerated. At 8 weeks postoperatively, resistance strengthening is allowed. Return to full activity and recreational activities without restriction is permitted at 3 months postoperatively.

## Discussion

Experience with posterior instability remains considerably lower than anterior instability as a result of its considerably lower prevalence.<sup>6</sup> Solid hard body suture anchors have been the mainstay of labral repair.<sup>7</sup> In the last several years, the use of knotless all-suture anchors has been gaining popularity, as they have been shown to result in excellent fixation and a



**Fig 5.** Left shoulder with the arthroscope in the posterior portal. The final result and stability testing of the reverse Remplissage using a probe from the anterosuperior portal. (HH, humeral head; Pr, probe; SSC, subscapularis.)



**Table 1.** Advantages and Disadvantages

Advantages	Disadvantages
Arthroscopic and minimally invasive approach to the reverse remplissage, not involving bony osteotomy.	All-suture anchors should be avoided in revision setting
Labral repair with all-suture anchors allows for more bone preservation when compared to other suture anchors.	Reverse remplissage could affect rotational range of motion. This should be tested intraoperatively. Although this has not been described/established clinically.
Easily reproducible soft-tissue filling of the reverse Hill-Sachs lesion.	The reverse remplissage might not be sufficient in addressing very large reverse Hill-Sachs Lesions.
Performing the procedure in the beach-chair position allows for easier and quicker patient positioning than the lateral decubitus position.	

reduction in operating room time.<sup>8-12</sup> Using just one working portal, this technique tends to disturb the posterior capsule less than methods that involve multiple portals. This could help lower the chance of instability recurrence. Advantages and disadvantages/pearls and pitfalls are listed in [Tables 1](#) and [2](#).

A subset of athletes are at a particularly greater risk of posterior dislocations than the general population. These include athletes of sports such as American football, wrestling, weightlifting, ice hockey, and throwing sports.<sup>1,13,14</sup> Even if the rHSL lesion size does not directly present a reason to worry about engagement of the lesion, and significant bone-loss is not present, the senior author recommends the adjunct procedure in these high-risk patients to lower the risk of a recurrence. The original McLaughlin procedure was initially described in 1952 as an open procedure to transfer of the subscapularis tendon into the defect created by the rHSL.<sup>2</sup> Xiong et al.<sup>3</sup> described a novel modified McLaughlin procedure that involves the transfer of the partial lesser tuberosity to repair the reverse Hill-Sachs defect. Both the original and the modified approach resulted in significant improvements and low recurrence rate.<sup>15,16</sup> The approach described here, known as the reverse remplissage, is straightforward and reproducible. However, clinical outcomes and comparisons with isolated posterior labral repair are yet to be reported.

### Disclosures

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: A.J. reports that financial support, administrative support, article publishing

**Table 2.** Pearls and Pitfalls

Pearls	Pitfalls
A thorough diagnostic arthroscopy is essential to identify and address all lesions associated with posterior instability, including reverse Bankart lesions, posterior capsular laxity, reverse humeral avulsion of the glenohumeral ligament (HAGL) lesions, and reverse Hill-Sachs defects.	Careful attention is required when debriding anterior to the subscapularis tendon to avoid injuring the axillary nerve, which runs along its inferior border.
Use of a spinal needle to establish the posterolateral portal to assure access and appropriate trajectory of anchor placement and suture passage posteriorly.	Incorrect placement of the posterolateral portal.
Use a 5-mm low-profile cannula in the posterolateral portal for minimally invasive cuff sparing approach. It accommodates the crescent SutureLasso and the curved guide of the knotless FiberTak.	Ensure bone is of good quality to support all-suture anchor.
When using knotless FiberTak anchors, apply countertension to the repair loop for a more controlled reduction by using an extra suture through the loop of the repair suture. This can help prevent twists as the suture loop is being reduced.	All suture anchor insertion should be perpendicular to bone.
	Ensure the passing suture is threaded with sufficient length through the suture loop to prevent accidental anchor unloading during pull-through.

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