

Anterior Shoulder Stabilization Using a Single Portal Technique With Suture Lasso



Nicholas Elena, M.D., Brittany M. Woodall, D.O., Sohyun Ahn, B.S.,
Patrick J. McGahan, M.D., Neil P. Pathare, M.D., Edward C. Shin, M.D., and
James L. Chen, M.D., M.P.H.

Abstract: Open Bankart repair was the standard technique used in the past, but the request for less invasiveness, always pursued by every surgeon, pushed the development of the arthroscopic procedure. Nowadays the stabilization of the anteroinferior labrum is usually performed with an arthroscopic technique that uses the classic posterior portal and 2 anterior working portals. Because arthroscopy is progressing steadily under every aspect, there is now the chance to use only one working portal with the aid of a suture passer. One less portal not only means less invasiveness but also less postoperative pain and possible shorter operative time. This Technical Note is focalized in the description of a Bankart repair technique with a single working portal and the aid of a suture lasso.

Open Bankart repair was considered the gold standard until about a decade ago, but recent literature has not shown a discernable difference between arthroscopic and open procedures.¹ The main drawback of the first generation of arthroscopy techniques was the high recurrence rate of shoulder anterior instability, with rates reported to be around 10% to 30% after repair.²⁻⁴ However, recurrent instability after arthroscopic Bankart repair has recently decreased to 5.3% during the first 2 years of follow-up.⁵ The advantages of arthroscopic Bankart techniques, reported by multiple studies, are more than just low recurrence rate: smaller incisions, shorter surgical times, less postoperative pain, decreased blood loss, decreased rate of complications, and improved shoulder motion. Standard arthroscopic Bankart repair involves 2 anterior portals to facilitate suture shuttling and anchor placement. Arthroscopic Bankart repair with a

single anterior portal would theoretically reduce scarring and be even less invasive; however, it has not been previously described with a unique suture lasso.

The aim of this paper is to describe a simple and reproducible single anterior portal Bankart repair using a ReelPass suture lasso (Arthrex, Naples, FL).

Surgical Technique

Preoperative Evaluation

A thorough history, physical examination, and review of imaging studies are mandatory to diagnose anterior shoulder instability. Most patients with anterior shoulder instability report an initial historical trauma such as a fall that has injured the anterior capsulolabral structures, followed by subsequent dislocations. There is typically discomfort and instability in the abduction external rotation position, also known as the position of “apprehension.” In addition to apprehension, the relocation test is often positive. The anterior load and shift test will often be rated as 2+, meaning the humeral head will shift to the edge of the anterior glenoid. Radiographs of the glenohumeral joint are typically normal; however, the axillary or Stryker notch views may detect anterior subluxation or glenoid rim fractures. The diagnosis of Bankart tear is typically confirmed with magnetic resonance imaging showing an anterior inferior labral tear with Hill-Sachs impaction of the posterior humeral head.

Anesthesia and Positioning

The patient is placed supine on a beach chair positioner, whereas an interscalene nerve block is placed in

From Advanced Orthopaedics & Sports Medicine, San Francisco, California, U.S.A.

The authors report the following potential conflicts of interest or sources of funding: J.L.C. receives personal fees from Arthrex. Full ICMJE author disclosure forms are available for this article online, as [supplementary material](#).

Received November 7, 2017; accepted January 8, 2018.

Address correspondence to Nicholas Elena, M.D., Advanced Orthopaedics & Sports Medicine, 450 Sutter Street, Suite 400, San Francisco, CA, 94108, U.S.A. E-mail: nicholas@aosportsmed.com

© 2018 by the Arthroscopy Association of North America. Published by Elsevier. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

2212-6287/171362

<https://doi.org/10.1016/j.eats.2018.01.002>

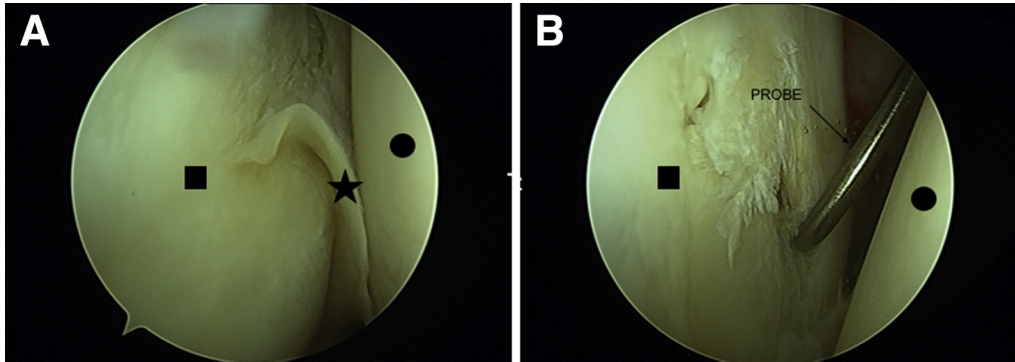


Fig 1. Images from the diagnostic arthroscopy of a right shoulder. Visualization from the posterior portal of the glenoid (square) and the humeral head (circle). (A) Inferior border of the lesion presenting a cartilage flap (star) in the axillary recess. (B) A probe is testing laxity and extent of the anterior border of the Bankart lesion.

the upper extremity. General anesthesia is then induced and the patient is placed in the beach chair position. After positioning, an examination under anesthesia is performed comparing the contralateral extremity.

After sterile preparation, a sterile McConnell arm holder is used.

Portal Placement

The anatomical landmarks of the shoulder are palpated and marked. A posterior portal is made in the soft spot of the shoulder with a No. 11 blade. The glenohumeral joint is then entered using a blunt trocar and arthroscope sheath. A 30° 4.0-mm arthroscope is used to visualize the glenohumeral joint. A spinal needle is used to needle-localize the anterior portal under arthroscopic visualization. The entry point of the needle is the lateral aspect along the superior border of the subscapularis tendon in the appropriate trajectory to access the 5 to 6 o'clock position for the right shoulder and 6 to 7 o'clock position for the left shoulder. An 8-mm vertical incision is made, followed by a switching stick, and then an 8.25 cannula (Arthrex).

After standard diagnostic evaluation of the anatomic structures of the glenohumeral joint (Fig 1), attention is turned to the stabilization procedure.

Glenoid Preparation and Anchor Placement

While viewing from the posterior portal, the anterior inferior labrum is freed from the glenoid using a sharp arthroscopic freer elevator. Once the labrum is mobilized, a shaver is introduced through the anterior portal to remove residual fragments and debris from the glenoid rim. A rasp is then used to create a bleeding bony bed and prepare the glenoid (Fig 2).

Anchor placement is fundamental to recreate the anatomical position of the labrum and decrease possible recurrence in the future. The anchor placement starts from the most inferior part of the lesion and moves anteriorly; therefore, the ideal placement of the first anchor must be as close as possible to the 5 o'clock position in a right shoulder.

A 45° angled ReelPass SutureLasso (Arthrex) is used to pierce the capsule and labrum in one pass. An abundance of polydioxanone (PDS) suture is advanced out of the suture lasso into the joint. The Reelpass

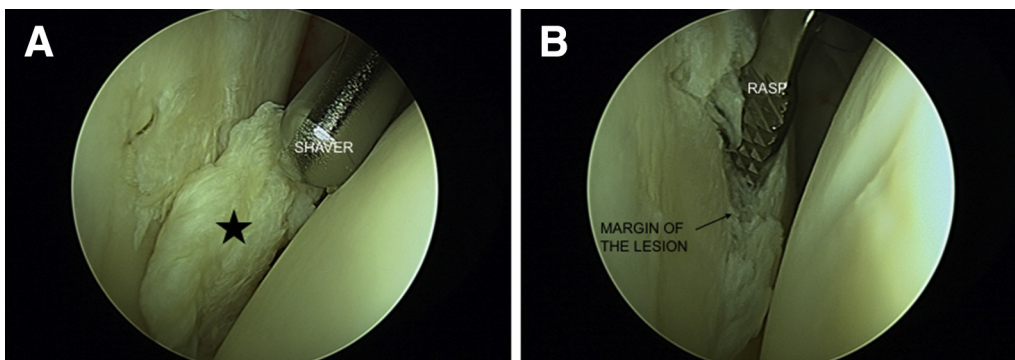


Fig 2. Arthroscopic images from the posterior portal of a right shoulder. (A) The cartilage flap (star) previously flipped with a probe or a freer elevator is now debrided using an arthroscopic shaver. (B) The margin of the lesion is being leveled with a rasp to create a bleeding bony bed and help the labrum healing after the surgery.

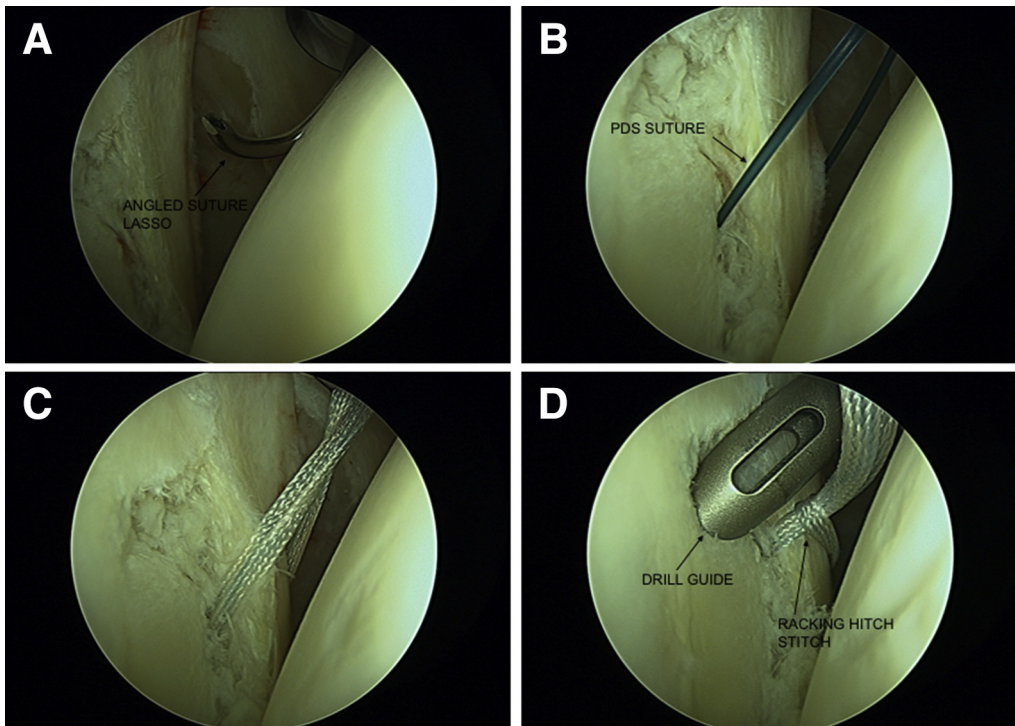


Fig 3. Arthroscopic images from the posterior portal of a right shoulder. (A) The right angle suture passer is introduced and is about to take a healthy bite of the labrum and capsule. (B) The uncoiled PDS monofilament of the suture passer is retrieved from the anterior portal and the FiberTape is tied to its end to be shuttled. (C) FiberTape replaces the PDS. (D) The racking hitch stitch has been cinched down and slightly above it a drill guide is in place to drill a pilot hole for the PushLock. (PDS, polydioxanone.)

SutureLasso contains 10 yards of PDS suture, and therefore there is no concern for unloading the lasso. Once ample suture has filled the joint, the suture lasso is withdrawn from the anterior portal and a grasper is used to retrieve the PDS suture passed through the labrum.

A FiberTape suture (Arthrex) is then passed in a manner to create a racking hitch stitch or luggage tag stitch around the labrum. Specifically, the center of the FiberTape suture is secured to the PDS monofilament. The FiberTape suture is then passed through the antero-inferior labrum (Video 1) so that a loop is created and

pulled through the anterior cannula. The free ends of the FiberTape suture are then pulled through the looped end and then cinched down to create a racking hitch stitch to secure the labrum (Fig 3).

A pilot hole is drilled in the glenoid slightly above the first racking hitch stitch, and then a 2.9 PushLock anchor is loaded with the respective suture and impacted into the pilot hole (Fig 4).

The remaining suture is finally cut with an arthroscopic suture cutter.

An additional 2 sutures and anchors are placed in a similar manner. At minimum, a 3-anchor repair with

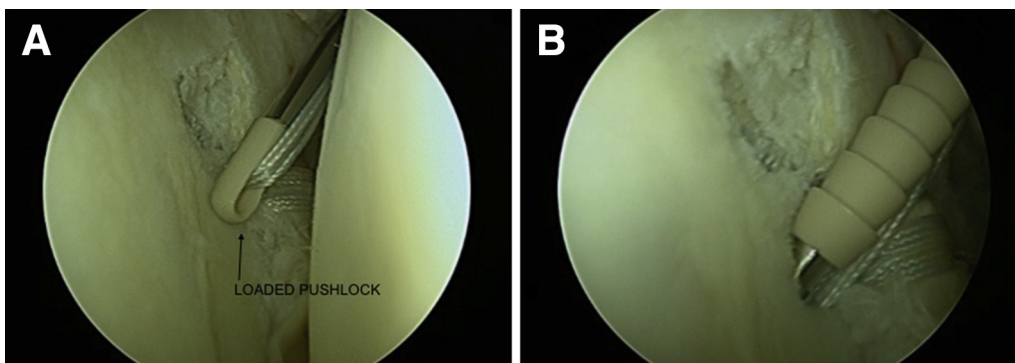


Fig 4. Arthroscopic images from the posterior portal of a right shoulder. (A) The FiberTape is loaded on the 2.9 PushLock and tensioned to guarantee a solid labral repair. (B) The suture anchor is being impacted with a mallet into the pilot hole previously drilled.

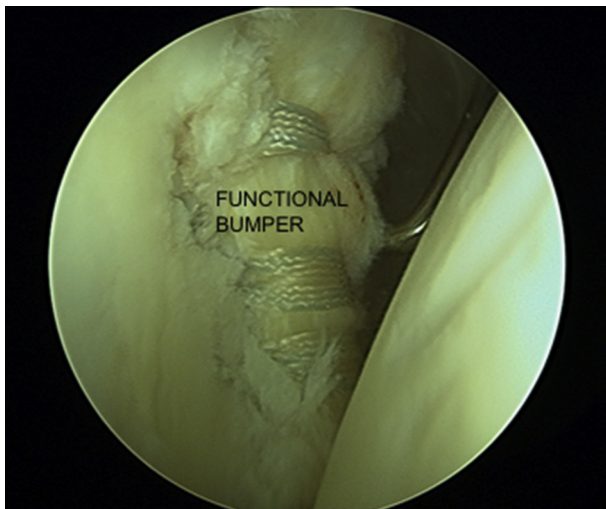


Fig 5. Final impression of the functional bumper on the repaired labrum viewed from the posterior portal of a right shoulder with a probe in the background testing the integrity of the repair.

anchors positioned at the 3:30, 4:30, and 5:30 positions in a right shoulder is necessary for multiple points of fixation and to recreate the functional bumper effect of the labrum (Fig 5).

Postoperative Rehabilitation

The wounds are closed in a standard fashion and the operative arm is immediately placed in an immobilization sling that will be worn for the next 6 weeks. During the “early postoperative phase” (0-2 weeks) passive range of motion (ROM) is allowed but elevation of the arm overhead is restricted. From week 2 to 4, active ROM is allowed and physical therapy is prescribed. Sling immobilization is discontinued after 6 weeks and gradual full ROM is achieved by 18 weeks. Once the patient achieves full ROM and strength, he or she may return to sports.

Discussion

A single anterior portal Bankart repair technique is performed with the help of an angled suture lasso that contains an abundant monofilament suture. The theoretical advantages of one less incision than the classic arthroscopic Bankart repair are a decrease in postoperative pain, loss of motion, and operative time. Furthermore, the learning curve with a unique suture lasso is short due to fewer suture management and shuttling steps during the repair (Table 1).

There are 2 features of this technique that allow a single anterior portal to be used to stabilize the capsule and labrum in a knotless fashion. First, a suture lasso that contains 10 yards of monofilament PDS suture allows the abundant suture to be passed through the soft tissue into the joint without concern for unloading the passed suture when withdrawing the lasso from the

Table 1. Advantages and Disadvantages of the Suture Lasso Technique

Advantages	
•	Decreased operative time
•	Less invasive
•	Decreased postoperative pain
•	Shorter learning curve
Disadvantages	
•	Requires precise anterior portal placement
•	Possibility of entangled sutures

cannula. This allows the passed suture to be retrieved from the same portal without the need for suture management between 2 anterior portals. Second, the racking hitch stitch or “luggage tag” suture is a simple and secure suture configuration that can be placed through a single portal and allows for a knotless fixation. Knotless fixation of the glenoid reduces any trauma to the joint from prominent knots and has been shown to be equivalent in pullout strength compared with knot-tying sutures.^{6,7}

The use of a single anterior portal for anterior shoulder stabilization does not preclude passing multiple sutures before anchor placement. Some authors have recommended that after each stitch is placed, its anchor should be placed to avoid excessive sutures entangling and obstructing the anterior portal.⁸ However, we have found no difficulty in placing 2 sutures before placing an anchor. In cases where the capsule is capacious and a healthy bite cannot be achieved initially, we pass one suture that serves as a tensioning suture while placing a second suture with a healthier bite of capsular tissue.

The most challenging part of our technique is to perfectly place the anterior portal in the appropriate trajectory to reach the most inferior part of the injured labrum. Some studies have advocated the use of a transcapularis portals during Bankart repair to have a better view of the inferior part of the lesion, but the close proximity and possible subsequent risks associated with the axillary artery and nerve, the musculocutaneous nerve, and the cephalic vein discourage this portal placement.⁹⁻¹¹ Therefore, we place our portal on the superior border of the subscapularis muscle (Table 2). The higher position of this portal does not preclude a good stabilization of the glenoid labrum, as

Table 2. Pearls of the Single Portal and Suture Lasso Technique

•	Working portal on the superior border of the subscapularis muscle in the anterior triangle
•	Adequate mobilization of the capsulolabral sleeve to create a bumper
•	Preparation of the glenoid with a shaver, burr, and/or rasp
•	Healthy bite of the capsule and labrum with a suture passer
•	Pilot hole drilled on the glenoid slightly superior to the respective suture

long as the most inferior anchor is placed in the closest position possible to 5 to 6 o'clock position. As already stated, the optimal placement of the most inferior anchors could be difficult because of the nonoptimal angle of approach. In fact, failure to place anchors in a good position can lead to failure of the repair, recurrence of instability, and high chances of reintervention.¹²

Although the recurrence rate of anterior shoulder instability comparing the single anterior portal with the classic 2-portal technique has not been studied yet, we have found stabilization of the shoulder using a single anterior portal technique to be a simple, reliable, and reproducible technique for anterior shoulder stabilization.

References

1. Wang L, Liu Y, Su X, Liu S. A meta-analysis of arthroscopic versus open repair for treatment of Bankart lesions in the shoulder. *Med Sci Monit* 2015;21:3028-3035.
2. Frank RM, Saccomanno MF, McDonald LS, Moric M, Romeo AA, Provencher MT. Outcomes of arthroscopic anterior shoulder instability in the beach chair versus lateral decubitus position: A systematic review and meta-regression analysis. *Arthroscopy* 2014;30:1349-1365.
3. Judson CH, Charette R, Cavanaugh Z, Shea KP. Anatomic and biomechanical comparison of traditional Bankart repair with bone tunnels and Bankart repair utilizing suture anchors. *Orthop J Sports Med* 2016;4. 2325967115621882.
4. Harris JD, Gupta AK, Mall NA, et al. Long-term outcomes after Bankart shoulder stabilization. *Arthroscopy* 2013;29:920-933.
5. Armangil M, Basat HC, Akan B, Karaduman M, Demirtaş M. Arthroscopic stabilization of anterior shoulder instability using a single anterior portal. *Acta Orthop Traumatol Turc* 2015;49:6-12.
6. Martetschläger F, Michalski MP, Jansson KS, Wijdicks CA, Millett PJ. Biomechanical evaluation of knotless anterior and posterior Bankart repairs. *Knee Surg Sports Traumatol Arthrosc* 2014;22:2228-2236.
7. Ng DZ, Kumar VP. Arthroscopic Bankart repair using knot-tying versus knotless suture anchors: Is there a difference? *Arthroscopy* 2014;30:422-427.
8. Çiçek H, Tuhanioglu U, Ogur HU, Seyfettinoglu F, Çiloglu O, Beyzadeoglu T. Single anterior portal: A better option for arthroscopic treatment of traumatic anterior shoulder instability? *Acta Orthop Traumatol Turc* 2017;51:298-302.
9. Mehta VM. Clinical safety of the 5 o'clock portal in shoulder arthroscopy: A prospective study. *Shoulder Elbow* 2010;2:17-19.
10. Jazini E, Shiu B, Robertson A, et al. A biomechanical analysis of anchor placement for Bankart repair: Effect of portal placement. *Orthopedics* 2016;39:e323-e327.
11. Li X, Eichinger JK, Hartshorn T, Zhou H, Matzikin EG, Warner JP. A comparison of the lateral decubitus and beach-chair positions for shoulder surgery: Advantages and complications. *J Am Acad Orthop Surg* 2015;23:18-28.
12. Hendawi T, Milchtein C, Ostrander R. Bankart repair using modern arthroscopic technique. *Arthrosc Tech* 2017;6:e863-e870.