Technical Note

Double-Row Bony Bankart Bridge for Large Bony Bankart Lesions: Technical Considerations

Colin P. Murphy, M.D., Christopher J. Hawryluk, M.B.S., Ayham Jaber, M.D., Tyler J. Uppstrom, M.D., and Peter J. Millett, M.D., M.Sc.

Abstract: Anterior shoulder dislocations frequently cause glenoid labral pathology in the form of a Bankart lesion. Some patients also present with a concomitant fracture of the anterior glenoid rim, termed a bony Bankart lesion. A variety of approaches exist to treat and repair the lesion, depending on factors such as bone fragment size, acuity of injury, and patient activity level. This Technical Note describes the bony Bankart bridge, the authors' preferred technique for treating large bony Bankart lesions, consisting of a double-row suture anchor fixation.

The classic Bankart lesion is a soft tissue injury involving detachment of the anteroinferior glenoid labrum, most commonly due to an anterior shoulder dislocation.[1,2] A bony Bankart describes a fracture to the anterior glenoid rim.[3] The anterior glenoid labrum is injured in nearly 100% of patients with traumatic anterior shoulder instability,[2,4,5] while a concomitant bony injury is reported in 8.6% to 41% of first-time dislocators[6-8] and from 50% to 86% in cases with recurrent instability.[4,5,7,9] Increased glenoid bone loss at the anterior rim has been studied and shown to decrease stability of the glenohumeral joint, leading to recurrent dislocations and their associated complications.[3] Therefore, it is preferred to repair the acute glenoid fracture to avoid anterior glenoid bone loss, as patients with even small bone fragments are at risk of nonunion and resorption, leading to recurrent instability.[10]

Multiple techniques exist to repair bony Bankart lesions, including open reconstruction,[11] cannulated screw fixation,[12] arthroscopic single- and double-row suture anchor fixation,[13-15] double-pulley fixation,[16] the bony Bankart bridge (BBB),[17] and transosseous suture button fixation.[18] Although various techniques exist along with algorithms to guide treatment, no technique has been identified as the gold standard. Factors to consider when selecting treatment include osseous viability, bone fragment size, total glenoid bone loss, and the patient's functional demand.[3,19] When glenoid bone loss reaches 13.5%, an open Latarjet procedure is associated with improved clinical outcomes.[19]

In the approach to surgical repair, arthroscopic fixation has well-known advantages, such as being minimally invasive, low complication rates, improved cosmesis, and similar patient-reported outcomes compared to an open approach. The senior author (PJM) originally described the BBB repair technique in 2009, which utilizes 2 points of suture anchor fixation. This technique is technically reproducible to perform and avoids malreduction, tilting, and comminution of the fragment. The BBB has excellent biomechanical data, with short-, mid-, and now long-term clinical data to support its use.[20,21] In this article, we present the current BBB technique for large bony Bankart fragments, which expands on the previous technique to include a crossed, double-row repair construct. This technique is demonstrated in Video 1.

Surgical Technique

Patient Positioning

The patient is placed in the beach-chair position, but this technique can also be performed in the lateral decubitus position. The authors utilize a Schlein

From the Steadman Philippon Research Institute, Vail, Colorado, U.S.A. (C.P.M., C.J.H., A.J., T.J.U., P.J.M.); The Steadman Clinic, Vail, Colorado, U.S.A. (C.P.M., T.J.U., P.J.M.); and Department of Orthopedic Surgery, Heidelberg University Hospital, Heidelberg, Germany (A.J.).

Received June 3, 2025; accepted July 17, 2025.

Address correspondence to Peter J. Millett, M.D., M.Sc., Steadman Clinic & Steadman Philippon Research Institute, The Steadman Clinic, 181 West Meadow Drive, Suite 400, Vail, CO 81657, U.S.A. E-mail: drmillett@thesteadmanclinic.com

2212-6287/251053

https://doi.org/10.1016/j.eats.2025.103828

shoulder positioner (Mizuho/OSI) with lateral supports to position the patient in beach chair, and the bed is rotated 90° with the operative side facing into the sterile field. Following examination under anesthesia, the arm is prepped and draped in the usual sterile fashion.

Portal Placement

Three portals and a 70° arthroscope are utilized in this technique. First, a standard posterior viewing portal is created inferior and medial to the posterolateral corner of the acromion using a No. 11 blade scalpel. The arthroscope is introduced into the glenohumeral joint, and working portals are created anteriorly under direct visualization. The anterosuperior portal is created just inferior to the biceps tendon, and the anteroinferior portal is created just superior to the subscapularis tendon. A diagnostic arthroscopy is carried out to evaluate all landmarks within the glenohumeral joint.

Bony Bankart Repair

The glenoid fracture site is exposed, and the fracture fragment is elevated so that the anterior glenoid neck can be visualized with the 70° arthroscope (Fig 1). This allows for the percutaneous placement of the drill/anchor guide inferior and medial to the anteroinferior portal. The 2 fracture ends are roughened with a rasp and arthroscopic shaver to create a healing surface; care is taken not to disrupt the bony anatomy of the fracture fragments so as to allow for anatomic reduction. A 2.4-mm SutureTak (Arthrex) is placed on the medial (nonarticular) aspect of the native glenoid at the superior portion of the fracture site; the sutures from this anchor are then guided anterior to the fracture fragment and associated capsulolabral tissue using the drill guide to pass the sutures (Fig 2). A second 2.4-mm SutureTak anchor is placed in the medial aspect of the glenoid at the inferior portion of the fracture site, and again sutures are guided anterior to the fracture fragment and associated capsulolabral tissue with use of the drill guide. Alternatively, a shuttling device can be used to pass the sutures around the bone fragment, but in our experience, use of the drill guide is more efficient. Sutures are then retrieved through the skin of the anterosuperior portal, outside of the cannula, using a suture retriever.

Next, the labrum is secured inferior and superior to the bone fragment to help stabilize the bony fragment and the associated labral tear. A 1.8-mm Knotless FiberTak (Arthrex) is placed into the intact glenoid inferior to the Bankart lesion. The repair suture is passed through the torn capsulolabral tissue inferior to the anchor using a curved suture lasso and then shuttled through the anchor into the locking mechanism to secure the tissue to the bone. This process is repeated with a 1.8-mm Knotless FiberTak just superior to the Bankart lesion. The sutures from the previously placed 2.4-mm SutureTak anchors are then passed into two 2.9-mm PushLock (Arthrex) anchors to create a bridging double-row configuration, and the

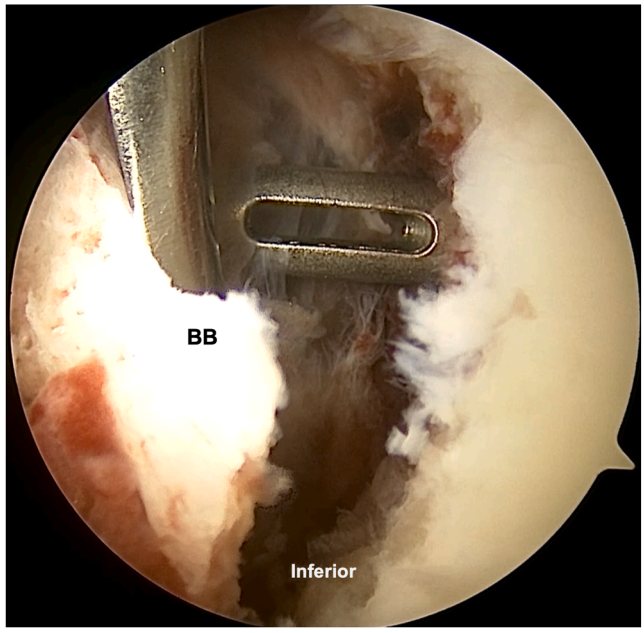

Fig 1. Left shoulder, visualized from the posterior portal. Elevation of the fracture fragment allows for visualization of the anterior glenoid neck and facilitates percutaneous placement of the guide for the medial anchors. (BB, bony Bankart fragment; G, glenoid.)

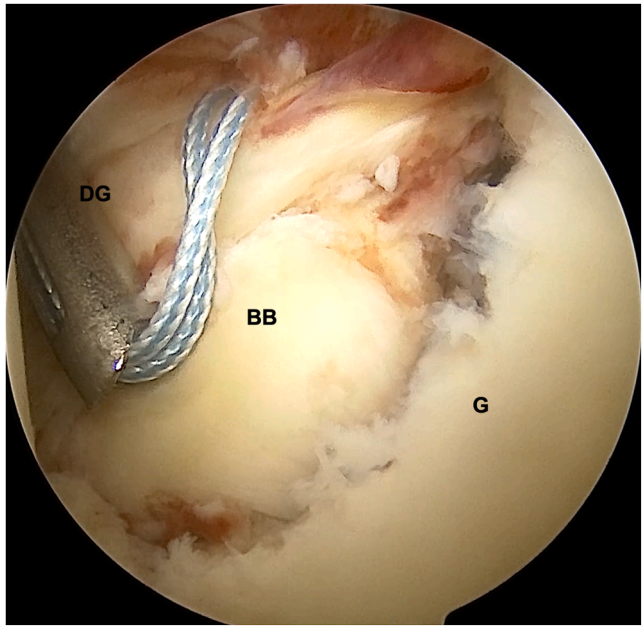

Fig 2. Left shoulder, visualized from the posterior portal. The drill guide is used to pass sutures anterior to the fracture fragment. (BB, bony Bankart fragment; DG, drill guide; G, glenoid.)

anchors are placed into the lateral (articular) surface of the glenoid at the superior and inferior portion of the fracture site, respectively. Sutures are tensioned and cut flush with the anchor (Fig 3). In this case, the sutures were not only bridged but also crossed. Since the labral tear extended to the 12-o'clock position, an additional 1.8-mm Knotless FiberTak was required superior to the bony Bankart repair in order to completely repair the labral tear. An arthroscopic view of the entire bony Bankart bridge is seen in Figure 4, and a diagram showing the final orientation of the 7-anchor repair is shown in Figures 5 and 6. The final construct is tested for stability. The shoulder is taken through gentle range of motion.

Closure

Portals are closed using buried 3-0 Monocryl (Ethicon) suture. Incisions are dressed, and the patient is placed in an abduction sling. The patient remains in the abduction sling for 6 weeks. Passive range of motion begins immediately postoperatively, with external rotation limited to 30° initially. Active range of motion begins at 6 weeks postoperatively, and strengthening begins at 10 weeks postoperatively. Patients typically return to full activities at 4 to 5 months postoperatively.

Discussion

Multiple techniques have been described in arthroscopic repair of the bony Bankart lesion. These include soft tissue—only repairs, anchor repairs with transosseous or bridging techniques, and screw fixation.[22-25]

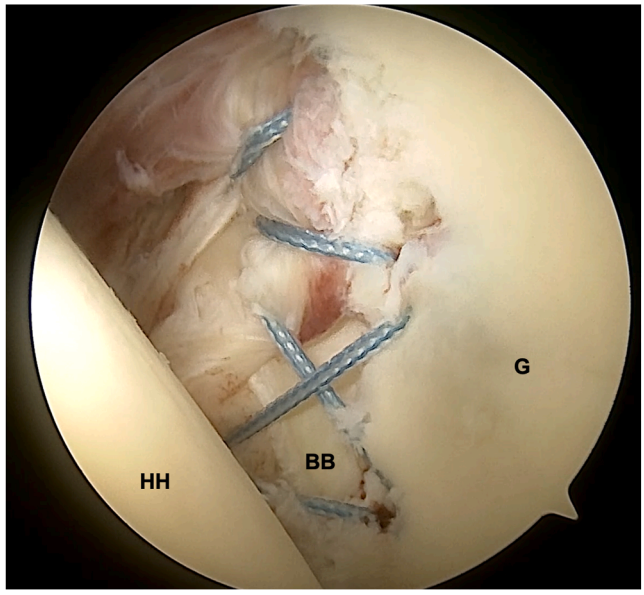

Fig 4. Arthroscopic view from the posterior portal, showing the final repair construct. (BB, bony Bankart fragment; G, glenoid; HH, humeral head.)

A consensus approach to fixation has not been established and is dependent on fragment size, bone quality, fracture pattern, acuity of injury, patient activity level, and surgeon preference.

Regardless of repair technique, outcomes of arthroscopic bony Bankart repair are generally positive, with an overall redislocation rate of 6% to 8%.[25] When

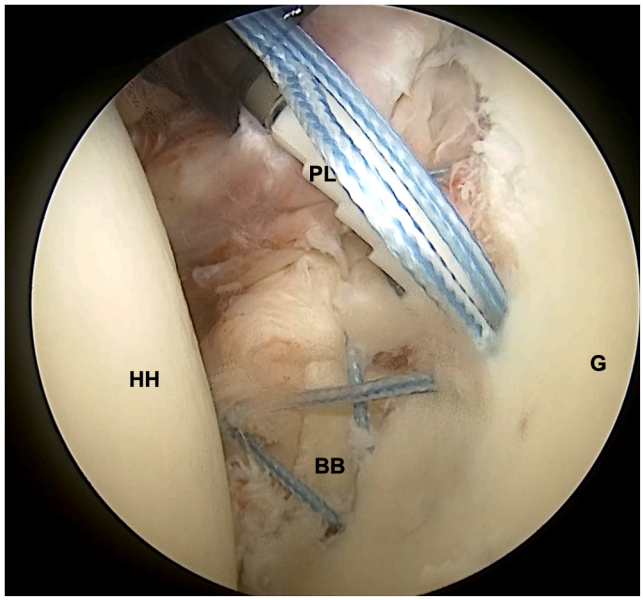

Fig 3. Left shoulder, visualized from the posterior portal. Sutures are tensioned with placement of the last anchor to compress the fracture fragment. (BB, bony Bankart fragment; G, glenoid; HH, humeral head; PL, PushLock anchor.)

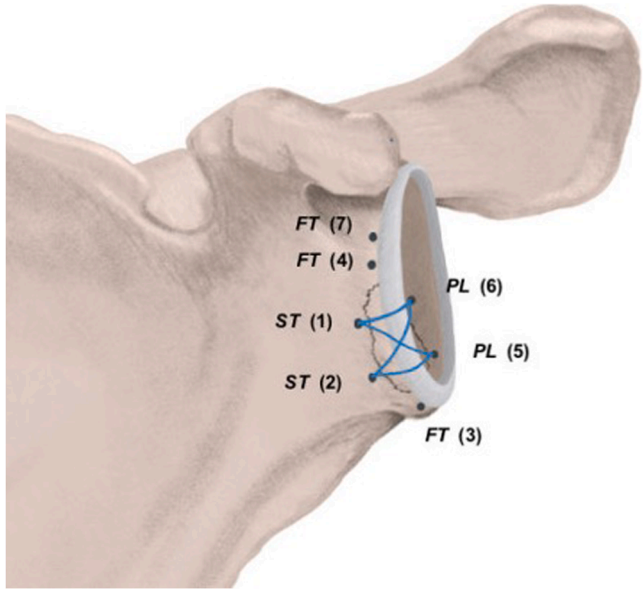

Fig 5. Bony Bankart bridge repair. (FT, FiberTak soft anchor; PL, PushLock anchor; ST, SutureTak anchor.). As would be viewed anteriorly with the patient in a beach-chair position looking at the left shoulder.

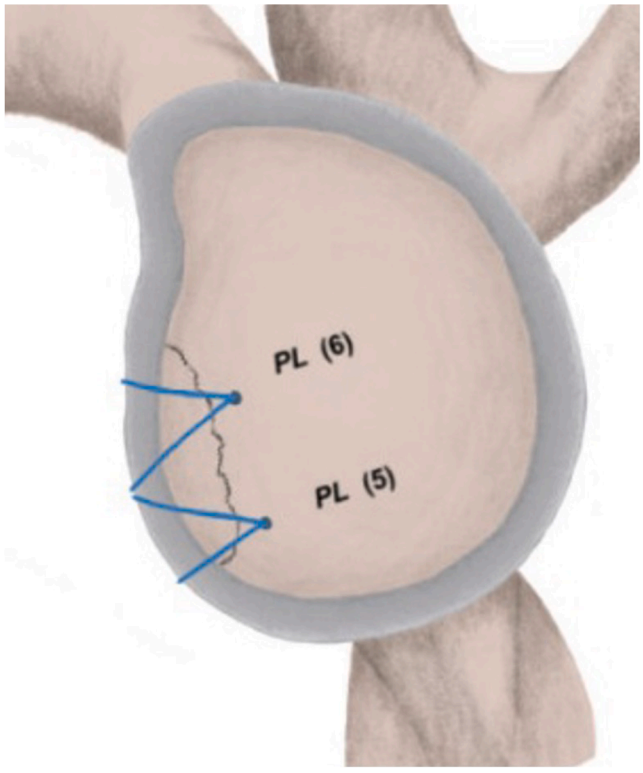

Fig 6. Bony Bankart bridge repair lateral view. (PL, PushLock anchor.) As would be viewed laterally with the patient in a beach-chair position looking at the left shoulder.

evaluating these patients, it is imperative to differentiate an acute bony Bankart fracture from attritional bone loss associated with recurrent instability. It is also crucial to identify large or engaging Hill-Sachs lesions and concomitant humeral avulsion of glenoid labrum lesions, as these can lead to failure if not addressed during surgery.[26,27] High-demand overhead activities, young male patients, and patients with ligamentous laxity are also risk factors for failure of arthroscopic treatment, and open treatment should be considered in these patients.[28]

Arthroscopic repair of bony Bankart lesions is indicated in acute cases with an unstable bony fragment. The bridging technique was initially described by Millett and Braun in 2009,[17] which provides 2-point fixation of the bony fragment onto the glenoid. This technique is further expanded upon in this article, with 4-anchor fixation around the bony fragment that provides a crossing double-row fixation configuration. This not only provides additional fixation of the bony fragment but also allows for additional control over the fragment to prevent tilting, malreduction, and comminution. The double-row repair technique, in which repair sutures are passed between anchors, provides dual-vector control and fixation across the fragment. This has been shown to result in improved fracture reduction and superior stability at time zero when compared to single-row repair in a cadaveric model.[15] Clinical outcomes are also favorable in short-, mid-, and long-term follow-up studies.[20,21,29] This technique is especially useful in larger fragments where fixation and control are essential to an adequate repair. Tables 1 and 2 demonstrate the advantages and disadvantages, as well as pearls and pitfalls of the presented technique.

Table 1. Advantages and Disadvantages of the Bony Bankart Bridge

Advantages	Disadvantages
Increased control over bony fragment	Technically challenging
Excellent reduction	Requires placement of percutaneous anchors
Compression distributed across the entire fracture fragment	Relatively difficult suture passage and management

Table 2. Pearls and Pitfalls of the Bony Bankart Bridge

Pearls	Pitfalls
Adequately mobilize fracture fragment for appropriate reduction	Disrupting osseous reduction with overpreparation of fracture edges
Secure double-row sutures last to allow for suture passage in labral repair	Difficulty passing sutures once double row is fixated
Pass medial row anchors anteriorly using drill guide	Take care not to cut or disrupt suture when using drill guide

Disclosures

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Financial support, administrative support, article publishing charges, and statistical analysis were provided by Steadman Philippon Research Institute. C.P.M. is employed as a sports medicine fellow at the Steadman Clinic (TSC) and the Steadman Philippon Research Institute (SPRI), which receive support from Arthrex, Department of Defense Office of Naval Research, DJO, MIB, Ossur, Siemens, Smith & Nephew, and XTRE. C.J.H. is employed as a research assistant at the SPRI, which receives support from Arthrex, Department of Defense Office of Naval Research, DJO, MIB, Ossur, Siemens, Smith & Nephew, and XTRE. A.J. is employed as a research fellow at the SPRI, which receives support from Arthrex, Department of Defense Office of Naval Research, DJO, MIB, Ossur, Siemens, Smith & Nephew, and XTRE. T.J.U. is employed as a sports medicine fellow at the TSC and SPRI, which receive support from Arthrex, Department of Defense Office of Naval Research, DJO, MIB, Ossur, Siemens, Smith & Nephew, and XTRE. P.J.M. is a sports medicine physician at the TSC and SPRI, which receives support from Arthrex, Department of Defense Office of

Naval Research, DJO, MIB, Ossur, Siemens, Smith & Nephew, and XTRE.

References

1. Mizuno K, Nabeshima Y, Hirohata K. Analysis of Bankart lesion in the recurrent dislocation or subluxation of the shoulder. *Clin Orthop Relat Res* 1993;288:158-165.
2. Blundell Bankart AS. Recurrent or habitual dislocation of the shoulder-joint. *Br Med J* 1923;2:1132-1133.
3. Nolte PC, Elrick BP, Bernholt DL, Lacheta L, Millett PJ. The bony Bankart: clinical and technical considerations. *Sports Med Arthrosc Rev* 2020;28:146-152.
4. Dickens JF, Slaven SE, Cameron KL, et al. Prospective evaluation of glenoid bone loss after first-time and recurrent anterior glenohumeral instability events. *Am J Sports Med* 2019;47:1082-1089.
5. Singson RD, Feldman F, Bigliani L. CT arthrographic patterns in recurrent glenohumeral instability. *Am J Roentgenol* 1987;149:749-753.
6. Taylor DC, Arciero RA. Pathologic changes associated with shoulder dislocations. Arthroscopic and physical examination findings in first-time, traumatic anterior dislocations. *Am J Sports Med* 1997;25:306-311.
7. Griffith JF, Antonio GE, Yung PSH, et al. Prevalence, pattern, and spectrum of glenoid bone loss in anterior shoulder dislocation: CT analysis of 218 patients. *Am J Roentgenol* 2008;190:1247-1254.
8. Provencher MT, Frank RM, LeClere LE, et al. The Hill-Sachs lesion: Diagnosis, classification, and management. *J Am Acad Orthop Surg* 2012;20:242-252.
9. Sugaya H, Moriishi J, Dohi M, Kon Y, Tsuchiya A. Glenoid rim morphology in recurrent anterior glenohumeral instability. *J Bone Joint Surg* 2003;85:878-884.
10. Nakagawa S, Ozaki R, Take Y, Mae T, Hayashida K. Bone fragment union and remodeling after arthroscopic bony Bankart repair for traumatic anterior shoulder instability with a glenoid defect: Influence on postoperative recurrence of instability. *Am J Sports Med* 2015;43:1438-1447.
11. Scheibel M, Magosch P, Lichtenberg S, Habermeyer P. Open reconstruction of anterior glenoid rim fractures. *Knee Surg Sports Traumatol Arthrosc* 2004;12:568-573.
12. Frush TJ, Hasan SS. Arthroscopic reduction and cannulated screw fixation of a large anterior glenoid rim fracture. *J Shoulder Elbow Surg* 2010;19:e16-e19. https://doi.org/10.1016/j.jse.2009.11.001.
13. Greenstein AS, Chen RE, Knapp E, et al. A biomechanical, cadaveric evaluation of single- versus double-row repair techniques on stability of bony Bankart lesions. *Am J Sports Med* 2021;49:773-779.
14. Judson CH, Voss A, Obopilwe E, Dyrna F, Arciero RA, Shea KP. An anatomic and biomechanical comparison of Bankart repair configurations. *Am J Sports Med* 2017;45:3004-3009.
15. Spiegl UJ, Smith SD, Todd JN, Coatney GA, Wijdicks CA, Millett PJ. Biomechanical comparison of arthroscopic single- and double-row repair techniques for acute bony Bankart lesions. *Am J Sports Med* 2014;42:1939-1946.
16. Qu D, Fu H, Shen Y, et al. Modified double-pulley fixation provides better reduction of bone fragments and union compared to single-point fixation in bony Bankart lesions. *Knee Surg Sports Traumatol Arthrosc* 2024;32:2141-2151.
17. Millett PJ, Braun S. The "bony Bankart bridge" procedure: A new arthroscopic technique for reduction and internal fixation of a bony Bankart lesion. *Arthroscopy* 2009;25:102-105.
18. Wafaisade A, Pfeiffer TR, Balke M, Guenther D, Koenen P. Arthroscopic transosseous suture button fixation technique for treatment of large anterior glenoid fracture. *Arthrosc Tech* 2019;8:e1319-e1326. https://doi.org/10.1016/j.eats.2019.07.007.
19. Giacomo G Di, Pugliese M, Peebles AM, Provencher MT. Bone fragment resorption and clinical outcomes of traumatic bony Bankart lesion treated with arthroscopic repair versus open Latarjet. *Am J Sports Med* 2022;50:1336-1343.
20. Millett PJ, Horan MP, Martetschläger F. The "bony Bankart bridge" technique for restoration of anterior shoulder stability. *Am J Sports Med* 2013;41:608-614.
21. Godin JA, Altintas B, Horan MP, et al. Midterm results of the bony Bankart bridge technique for the treatment of bony Bankart lesions. *Am J Sports Med* 2019;47:158-164.
22. Hoffer AJ, Tummala SV, Tokish JM. Arthroscopic technique for headless compression screw fixation of large bony Bankart fractures in anterior shoulder instability. *Arthrosc Tech* 2024;13:103029. https://doi.org/10.1016/j.eats.2024.103029.
23. Kuptniratsaikul S, Itthipanichpong T, Thamrongskulsiri N. Arthroscopic bony Bankart repair using suture suspension to increase bone contact area. *Arthrosc Tech* 2022;11:e681-e686. https://doi.org/10.1016/j.eats.2021.12.024.
24. Driscoll MD, Burns JP, Snyder SJ. Arthroscopic transosseous bony Bankart repair. *Arthrosc Tech* 2015;4:e47-e50. https://doi.org/10.1016/j.eats.2014.11.001.
25. Davis SM, Field LD. Arthroscopic techniques to stabilize glenoid bony Bankart fragments. *Arthrosc Tech* 2022;11:e1547-e1550. https://doi.org/10.1016/j.eats.2022.04.005.
26. Warner T, Kay J, McInnis S, Heyworth BE. Risk factors for recurrent instability after arthroscopic Bankart repair in pediatric and adolescent patients: A systematic review. *Am J Sports Med* 2025;53:1494-1504.
27. Verweij LPE, van Spanning SH, Grillo A, et al. Age, participation in competitive sports, bony lesions, ALPSA lesions, > 1 preoperative dislocations, surgical delay and ISIS score > 3 are risk factors for recurrence following arthroscopic Bankart repair: A systematic review and meta-analysis of 4584 shoulders. *Knee Surg Sports Traumatol Arthrosc* 2021;29:4004-4014.
28. Yeo MH, Lie D, Cheong T, Wonggokusuma E, Mak WK. Anatomic risk factors for arthroscopic Bankart repair failure: A case-control study comparing failure and non-failure groups in an Asian population. *J Orthop* 2023;41:73-78.
29. Hinz M, Kruckeberg BM, Davis CS, et al. Minimum 10-year clinical and functional outcomes after arthroscopic bony Bankart bridge for the treatment of bony Bankart lesions. *J Shoulder Elbow Surg* 2025;34(6S):S57-S63. https://doi.org/10.1016/J.JSE.2025.02.002.