Technical Note

Combined Double-Pulley Remplissage and Bankart Repair

Dong Hyeon Kim, B.A., Joo Yeon Kim, B.A., Juho Park, B.A., Mika Talwar, M.D., Sarah Jenkins, M.D., Brandon Gardner, M.D., Ph.D., Patrick McGahan, M.D., and James L. Chen, M.D., M.P.H.

Abstract: The use of arthroscopic Bankart repair to treat anterior shoulder instability has become increasingly widespread. However, high rates of recurrent instability within the presence of glenohumeral bony defects, specifically Hill-Sachs lesions, have well documented a key concern regarding the arthroscopic Bankart repair process. Our technique describes the pairing of a remplissage to fill the Hill-Sachs lesion with the Bankart repair, preventing loss in shoulder stiffness and stability. This technique involves a double-pulley-combined remplissage and Bankart repair to maintain a low-failure, minimally invasive procedure.

Introduction

The glenohumeral joint is the major joint determining shoulder stability, and given its high mobility and various anatomical and biochemical purposes, shoulder dislocations sit among the top of all major joint dislocations rates.[1−4] Of said subluxations and dislocations, anterior shoulder dislocation induced by anteroinferior instability of the humeral head is the most common, with incidence rates of up to 25 per 100,000 person-years in the general population.[1,3−6]

Currently, the most popular surgical option for anterior shoulder instability consists of arthroscopic Bankart repair in cases with minimal or no bone loss.[6−11] However, concerns over the elevated rates of isolated surgical failures and shoulder instability recurrence within the presence of glenohumeral bony defects and/or lesions remain.[8,10−17] The elevated recurrence rates may be primarily attributed to reduced shoulder stiffness induced by Hill-Sachs defects and other bony defects.[11,18]

The Hill-Sachs defect is characterized by a depression on the posterolateral humeral head and is observed in up to 80% of recurrent shoulder dislocations.[10,11,19−21] As a result, arthroscopic Bankart repairs have been increasingly paired with remplissage procedures to fill the lesion by reducing the infraspinatus tendon to the humerus.[10−13] Alternative surgical treatment options for anterior shoulder instability with glenohumeral bone defects consist of glenoid reconstruction procedures, such as distal tibia allografts and autogenous iliac crest bone grafts,[22,23] and procedures addressing the humeral bone deficiency, including osteochondral allograft transplantations,[24,25] and the Latarjet procedure.[7,13,17,26−28]

Given the many glenohumeral patterns of recurrent shoulder instability following isolated arthroscopic Bankart repair, soft-tissue stabilization Bankart repairs may be paired with arthroscopic remplissage.[8,10,11,14,29,30] The purpose of this technique is to provide a convenient, step-by-step, method for addressing both a labral tear and Hill-Sachs lesion simultaneously. The presented technique and accompanying Video 1 detail the combined arthroscopic Bankart and double-pulley remplissage procedure using only 2 portals and knotless sutures.

Surgical Technique

Preoperative Considerations

Preoperative assessment involves taking the patient's history, conducting a physical examination of the patient,

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

The authors report the following potential conflicts of interest or sources of funding: J.L.C. is an educational consultant for Arthrex and receives compensation for medical educational lectures and instruction only. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

Received August 31, 2021; accepted November 14, 2021.

Address correspondence to Dong Hyeon Kim, B.A., Advanced Orthopaedics and Sports Medicine, 450 Sutter St., Ste. 400, San Francisco, CA, 94108, U.S.A. E-mail: dhdkim0808@gmail.com

2212-6287/211269

https://doi.org/10.1016/j.eats.2021.11.011

and imaging the patient to assess for labral tears and Hill-Sachs lesions. Ultrasound and magnetic resonance imaging can further assist with diagnosis and preoperative planning. Preoperative magnetic resonance imaging of the patient's left shoulder indicates anteroinferior labral tear, consistent with labral Bankart repair extending to the anterior mid-labrum. Additionally, impaction of the posterolateral humeral head occurs with edema, consistent with Hill-Sachs impaction fracture.

Patient Positioning

The patient is positioned on the operating room table in the supine position for induction of general anesthesia. The patient is then repositioned into the beach chair position with the left shoulder and arm positioned using a Trimano limb positioner. The left shoulder is prepared with preoperative skin prep solution proximally from the shoulder to the hand and is draped in the usual sterile fashion (Video 1).

Diagnostic Arthroscopy

Anatomic landmarks are identified and marked. A standard posterior portal is made with no. 11 blade and bluntly dilated with scope sheath and trocar. Diagnostic shoulder arthroscopy is performed, and the large posterior humeral head osteochondral defect with associated loose bodies and anterior labral tear is easily identified. Viewing from the anterior portal with a 4-0 mm 30° angled arthroscopic camera, the damaged labrum is also identified. Then viewing from the posterior portal, the Hill-Sachs defect is identified and prepared using a 4-0 shaver to gently debride soft tissue (Fig 1).

Remplissage Preparation

Percutaneous access is placed, via needle localization, superolateral and posterolateral to the posterior portal

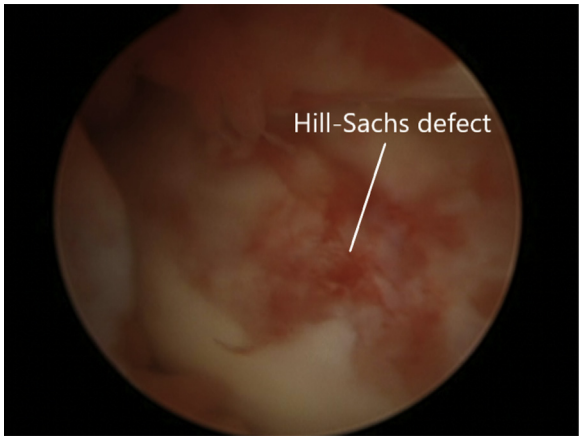

Fig 1. Patient is positioned in the beach chair position with the left shoulder and arm positioned with a Trimano limb positioner. Diagnostic arthroscopy of the left shoulder shows a large Hill-Sachs defect on the humeral head, as seen through the posterior portal. A 4-0 shaver is used to debride soft tissue for remplissage preparation.

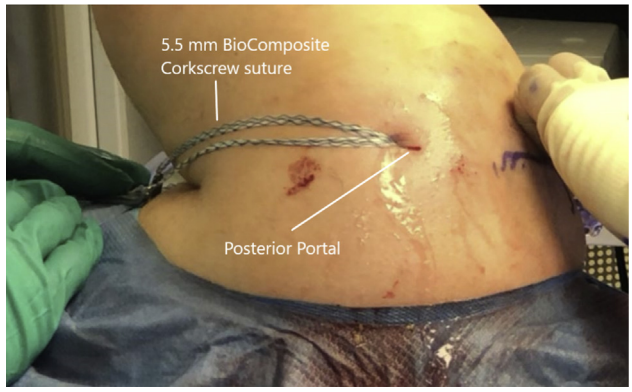

Fig 2. Patient is positioned in the beach chair position with the left shoulder and arm positioned with a Trimano limb positioner. Intraoperative photograph of the percutaneous access placements via needle localization. Viewing from the anterior portal, pilot holes are created for the 5.5 mm BioComposite corkscrews within the Hill-Sachs defect perpendicular to the lesion.

for anchor placement (Fig 2). A punch is used to create a pilot hole (Video 1), and a double-loaded 5.5 BioComposite corkscrew suture anchor from Arthrex is placed within the defect perpendicular to the lesion. A second Arthrex suture anchor of the same type is placed in the same fashion, so that they are spaced evenly within the lesion, sitting in an inferior/superior configuration (Fig 3). Each suture anchor is loaded with a repair suture. Remplissage anchor placement is first completed to avoid Bankart repair disruption.

Bankart Repair

An anterior portal is established in the rotator interval from outside in using a spinal needle localization. An 8.25-diameter corkscrew cannula is placed lower, just superior to the subscapularis tendon. This cannula is placed low in order to reach the most inferior portion of the glenoid. A 4.25-mm shaver is then used to debride the anterior labral tear prior to elevation of the scarred labral tear using a probe. No bony component to the Bankart injury is identified.

A ReelPass from Arthrex is used to pass 0-PDS around the injured anterior labrum (Fig 4). The passed end of this suture is then retrieved through the anterior portal and tied to no. 2 FiberWire. The 0-PDS is then used to shuttle the FiberWire around the labrum in a looped fashion (Video 1). The free ends of the FiberWire suture are retrieved and passed through the looped end, and by doing so, a stitch is established around the damaged labrum (Fig 4). The PushLock drill and drill guide establish a single pilot hole to the adjacent glenoid (Fig 5). The labral FiberWire suture is then loaded into a 2.9 BioComposite PushLock from Arthrex prior to using a mallet to place these into our guide hole under tension (Fig 5). This process is repeated three additional times, stitching and anchoring three additional FiberWire and

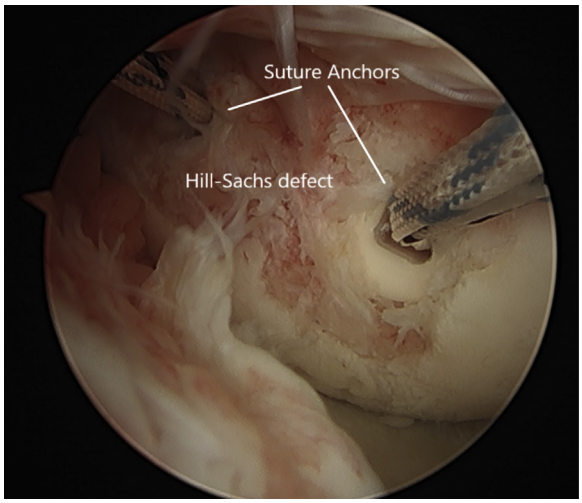

Fig 3. Patient is positioned in the beach chair position with the left shoulder and arm positioned with a Trimano limb positioner. Intraoperative arthroscopic imaging of the Bio-Composite 5.5-mm suture anchors sitting in a broadly placed inferior/superior configuration within the Hill-Sachs lesion, as seen through the anterior portal. Each anchor is loaded with a repair suture in preparation for the remplissage, during which sutures from both anchors will be tied together and tensioned to reduce the infraspinatus into the lesion following the Bankart repair.

PushLock sutures to the anterior inferior labrum for a total of four PushLock suture anchors to complete the Bankart repair (Video 1).

Double-Pulley Remplissage

After completion of the labral repair, the sutures from one of the anchors of the preliminary remplissage sit inferior to the infraspinatus tendon, while the sutures from the second anchor sit superior to the infraspinatus tendon. The repair suture from anchor 1 and the FiberWire sutures from anchor 2 are retrieved through the percutaneous portal. The repair sutures from anchor 1 are then tied to the sutures of anchor 2 in a parallel fashion (Fig 6). This is then tensioned down within the subacromial space, over the infraspinatus tendon, by pulling the excess end of the repair suture that has been pulled through anchor 2 and reducing the infraspinatus down into the Hill-Sachs lesion. The reduction is tensioned and secured by a surgeon's knot with a knot pusher (Fig 6). The excess suture is then cut once adequate tension has been achieved (Fig 7). Pearls and pitfalls of the surgical technique are presented in Table 1.

Postoperative Care

The arthroscopic wounds are closed with 3-0 nylon, covered in xeroform, and dressed in 4×4 abdominal (ABD) pad and Medipore tape. The shoulder is stabilized with an immobilizer sling for 6 weeks. The goal during these 6 weeks is to avoid elevation and lifting with the operative limb. Scapular isokinetic and pendulum exercises are performed in physical therapy. From 6 weeks postoperatively onward, sling use is discontinued, and the patient begins strengthening physical therapy.

Discussion

Various clinical considerations must be considered when choosing between different surgical approaches for anterior shoulder instability. Within the presence of glenohumeral bony lesions, such as the Hill-Sachs defect, an isolated arthroscopic Bankart repair may not be enough to present a suitable long-term solution with other isolated procedures presenting as alternatives. Thus, the addition of the remplissage procedure to address high recurrence rates of shoulder instability has

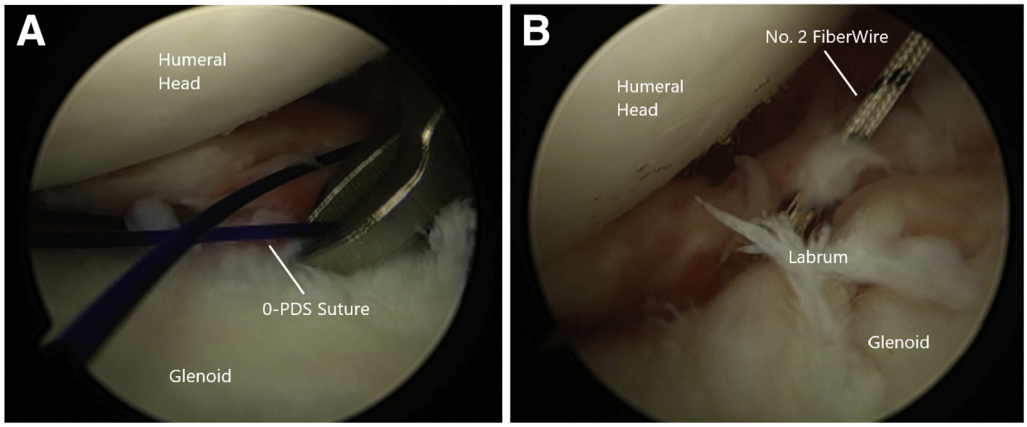

Fig 4. Patient is positioned in the beach chair position with the left shoulder and arm positioned with a Trimano limb positioner. Intraoperative arthroscopic imaging of the left anteroinferior glenoid labrum and humeral head during the Bankart repair. (A) ReelPass from Arthrex is used to pass 0-PDS around the injured labrum. (B) The 0-PDS is retrieved through the anterior portal and tied to a no. 2 FiberWire. The 0-PDS is then used to shuttle the FiberWire around the damaged labrum to establish a stitch.

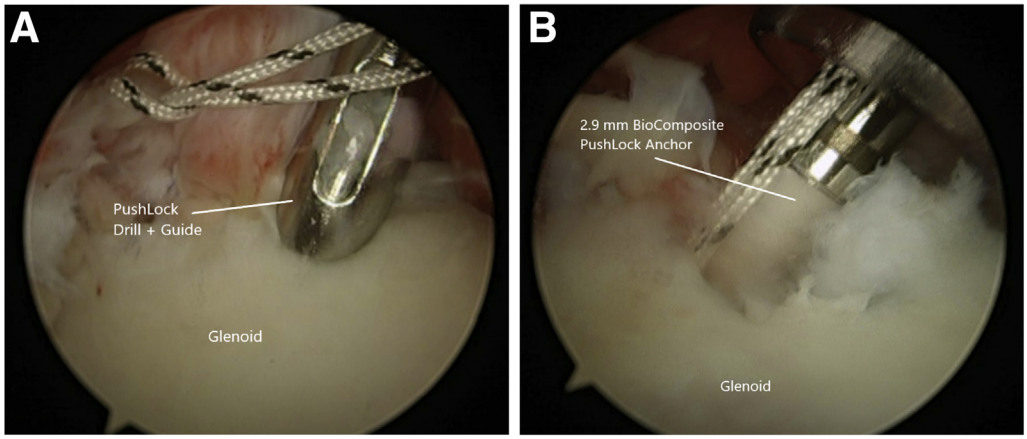

Fig 5. Patient is positioned in the beach chair position with the left shoulder and arm positioned with a Trimano limb positioner. Intraoperative arthroscopic imaging of the left anteroinferior glenoid labrum during the Bankart repair. (A) A PushLock drill and drill guide is used to establish a pilot hole to the adjacent glenoid. (B) The FiberWire suture is subsequently loaded into the 2.9-mm BioComposite PushLock from Arthrex and then implanted with a mallet. The stitching and anchoring process is repeated three times.

been the subject of many studies. A systematic meta-analysis of six studies carried out by Buza et al.[31] displayed reduced failure rates of arthroscopic remplissage following arthroscopic Bankart repairs than those of isolated arthroscopic Bankart repairs done on patients with unsubstantial to no Hill-Sachs lesions, indicating the potential of remplissage in tackling the prominent issue with arthroscopic Bankart repairs in the presence of glenoid bony lesions. Furthermore, in a direct comparison between isolated Bankart repairs and Bankart repairs with added remplissage, Camus et al.[16] noticed through their meta-analysis that there were substantial reductions in recurrent instability in cases with engaging Hill-Sachs lesions, and up to 20-25% glenoid bone loss. Additionally, the study observed no negative shifts in clinical benchmarks, noting insignificant reductions in reoperations and return-to-sport rates. This is further substantiated by additional literature analyses, indicating reduced recurrence rates, lack of additional complications, and comparable postoperative glenohumeral range of motion under similar conditions.[32,33]

When compared to the Latarjet procedure, a popular alternative for treating anterior shoulder instability, combined remplissage and Bankart repairs present statistically comparable recurrence rates of 3.4% to 5.4% versus 3.5% to 5.7%.[7,8,13,27,29,33,34] However, Yang et al. identified sizeable divergences in recurrence rates within revision cases (34.8% for remplissage and Bankart vs 10.3% for Latarjet) and for cases with substantial glenoid bone loss (28.6% for remplissage vs 6.06% for Latarjet).[35] Regarding the latter subfactor, literature is largely undecided on what constitutes the percentage of glenoid bone loss past which the Latarjet procedure would be favored, ranging from 10% to 25%.[35,36] Additionally, multiple studies have found significantly higher complication rates for open and arthroscopic Latarjet procedures (~7.5% to 30%)

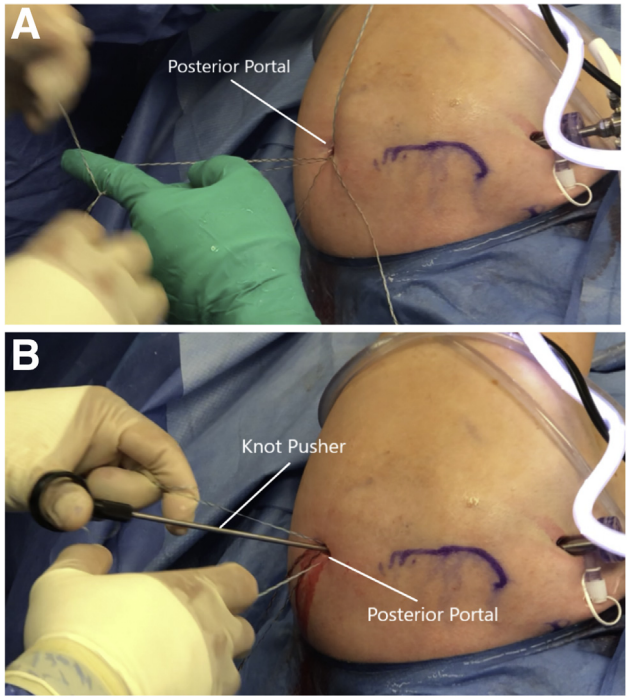

Fig 6. Patient is positioned in the beach chair position with the left shoulder and arm positioned with a Trimano limb positioner. Intraoperative photograph of the left shoulder from a bird's eye view during the remplissage. (A) One suture from each BioComposite corkscrew sitting inferior and superior to the infraspinatus tendon are tied together in a parallel fashion, which is then tensioned down into the double pulley over the infraspinatus tendon by pulling on the other pair. (B) A knot pusher and several half hitches are used to secure the reduction of the infraspinatus into the Hill-Sachs lesion.

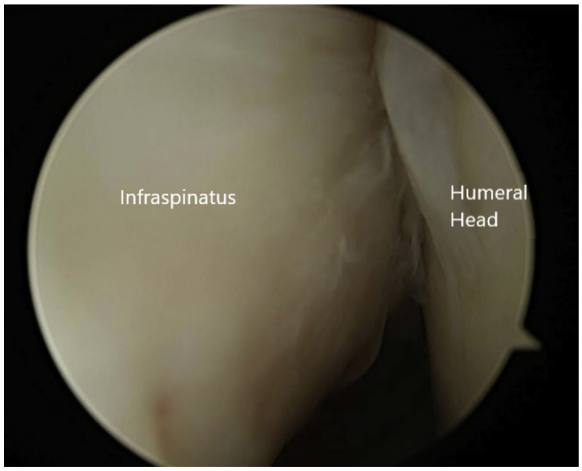

Fig 7. Patient is positioned in the beach chair position with the left shoulder and arm positioned with a Trimano limb positioner. Intraoperative arthroscopic imaging of the posterolateral humeral head, as seen through the anterior portal, confirms the reduction of the infraspinatus into the Hill-Sachs defect, indicating the completion of the remplissage.

compared to arthroscopic remplissage (1.0% to 5.4%).[13,31,34,35,37] The elevated Latarjet procedure complication rates can be attributed to various intraoperative and postoperative factors, namely vascular damage, neurological injuries, and hematoma.[34] Concerning additional clinical benchmarks for remplissage versus Latarjet, literature seems to suggest comparable to marginally higher return-to-sport rates,[7,28] reduced internal rotation motion (40.9° vs 53.2°),[35] increased risk of reduced external rotation motion with abduction,[38,39] and inconclusive results regarding postoperative pain, with a few studies hinting at neutral to higher marks.[13,35,39,40] Currently, a general lack of long-term follow-up studies regarding said clinical evaluations limit discussion specificity.

Our proposed technique of combined arthroscopic Bankart repair with remplissage allows for the use of a minimally invasive procedure with low morbidity and low rates of complications while maintaining success and recurrence rates similar to those of the open Latarjet procedure in cases with subcritical glenoid bone loss.[16,35,36,41,42] Moreover, the proposed double-pulley technique used for the remplissage procedure minimizes the number of portals necessary for the operation (Video 1), thus reducing the operative time and the technical difficulty of the surgical treatment.[43] Such advancements in technical efficiency and success rates of the arthroscopic Bankart repair with remplissage compounded with further research can help guide surgeons to make the correct procedural decision regarding anterior shoulder instability.[9] Advantages and disadvantages are presented in Table 2.

Table 1. Pearls and Pitfalls

Pearls
• Space remplissage anchors adequately for accurate reduction and proper coverage.
• Conduct remplissage anchor placement first to avoid Bankart repair disruption.
• Keep track of sutures from preliminary remplissage for easier suture management.
Pitfalls
• Improper suture management can lead to tying of sutures from same anchors.
• Inefficient portal and subsequent anchor placement can increase risk of anchor failure and impair reduction.

Table 2. Advantages and Disadvantages

Advantages
• Reduces operative time by conducting both procedures a consecutive and organized manner
• Reduces the number of portals required and, thus, postoperative morbidity
• Larger separation of remplissage anchors without tendon bunching in lesion
• Allows for larger lesions to be treated through remplissage
• Knot tying more convenient and accessible outside the shoulder
Disadvantages
• Unable to view subacromial space during knot typing
• Must keep track of suture management during remplissage preparation stage
• Technically challenging to keep attention to both procedures simultaneously
• Can lead to reduction in postoperative external rotation

References

1. Romeo AA, Cohen BS, Carreira DS. Traumatic anterior shoulder instability. *Orthop Clin North Am* 2001;32:399-409.
2. Di Giacomo G, Piscitelli L, Pugliese M. The role of bone in glenohumeral stability. *EFORT Open Rev* 2018;3:632-640.
3. Levy DM, Cole BJ, Bach BR. History of surgical intervention of anterior shoulder instability. *J Should Elbow Surg* 2016;25:e139-e150.
4. Galvin JW, Ernat JJ, Waterman BR, Stadecker MJ, Parada SA. The epidemiology and natural history of anterior shoulder instability. *Curr Rev Musculoskelet Med* 2017;10:411-424.
5. Shields DW, Jefferies JG, Brooksbank AJ, Millar N, Jenkins PJ. Epidemiology of glenohumeral dislocation and subsequent instability in an urban population. *J Shoulder Elbow Surg* 2018;27:189-195.
6. Hurley ET, Manjunath AK, Bloom DA, et al. Arthroscopic Bankart repair versus conservative management for first-time traumatic anterior shoulder instability: A systematic review and meta-analysis. *Arthroscopy* 2020;36:2526-2532.
7. Ialenti MN, Mulvihill JD, Feinstein M, Zhang AL, Feeley BT. Return to play following shoulder stabilization: A systematic review and meta-analysis. *Orthop J Sports Med* 2017;5:232596711772605.
8. Liu JN, Gowd AK, Garcia GH, Cvetanovich GL, Cabarcas BC, Verma NN. Recurrence rate of instability

after remplissage for treatment of traumatic anterior shoulder instability: A systematic review in treatment of subcritical glenoid bone loss. *Arthroscopy* 2018;34:2894-2907.e2.
9. Redfern J, Burks R. 2009 Survey results: Surgeon practice patterns regarding arthroscopic surgery. *Arthroscopy* 2009;25:1447-1452.
10. Brilakis E, Mataragas E, Deligeorgis A, Maniatis V, Antonogiannakis E. Midterm outcomes of arthroscopic remplissage for the management of recurrent anterior shoulder instability. *Knee Surg Sports Traumatol Arthrosc* 2016;24:593-600.
11. Miyamoto R, Yamamoto A, Shitara H, et al. Clinical outcome of arthroscopic remplissage as augmentation during arthroscopic Bankart repair for recurrent anterior shoulder instability. *TOORTHJ* 2017;11:1268-1276.
12. Purchase RJ, Wolf EM, Hobgood ER, Pollock ME, Smalley CC. Hill-Sachs "remplissage": An arthroscopic solution for the engaging Hill-Sachs lesion. *Arthroscopy* 2008;24:723-726.
13. Cho NS, Yoo JH, Rhee YG. Management of an engaging Hill-Sachs lesion: Arthroscopic remplissage with Bankart repair versus Latarjet procedure. *Knee Surg Sports Traumatol Arthrosc* 2016;24:3793-3800.
14. Burkhart SS, De Beer JF. Traumatic glenohumeral bone defects and their relationship to failure of arthroscopic Bankart repairs. *Arthroscopy* 2000;16:677-694.
15. Fox JA, Sanchez A, Zajac TJ, Provencher MT. Understanding the Hill-Sachs lesion in its role in patients with recurrent anterior shoulder instability. *Curr Rev Musculoskelet Med* 2017;10:469-479.
16. Camus D, Domos P, Berard E, Toulemonde J, Mansat P, Bonnevialle N. Isolated arthroscopic Bankart repair vs. Bankart repair with "remplissage" for anterior shoulder instability with engaging Hill-Sachs lesion: A meta-analysis. *Orthop Traumatol Surg Res* 2018;104:803-809.
17. 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.
18. Grimberg J, Diop A, Ghosn RB, Lanari D, Canonne A, Maurel N. Bankart repair versus Bankart repair plus remplissage: An in vitro biomechanical comparative study. *Knee Surg Sports Traumatol Arthrosc* 2016;24:374-380.
19. Camp CL, Dahm DL, Krych AJ. Arthroscopic remplissage for engaging Hill-Sachs lesions in patients with anterior shoulder instability. *Arthrosc Tech* 2015;4:e499-e502.
20. Haviv B, Mayo L, Biggs D. Outcomes of arthroscopic "Remplissage": Capsulotenodesis of the engaging large Hill-Sachs lesion. *J Orthop Surg Res* 2011;6:29.
21. Dyrna FGE, Ludwig M, Imhoff AB, Martetschläger F. Off-track Hill−Sachs lesions predispose to recurrence after nonoperative management of first-time anterior shoulder dislocations. *Knee Surg Sports Traumatol Arthrosc* 2021;29:2289-2296.
22. Amar E, Konstantinidis G, Coady C, Wong IH. Arthroscopic treatment of shoulder instability with glenoid bone loss using distal tibial allograft augmentation: Safety profile and short-term radiological outcomes. *Orthop J Sports Med* 2018;6. 2325967118774507.
23. Moroder P, Schulz E, Wierer G, et al. Neer Award 2019: Latarjet procedure vs. iliac crest bone graft transfer for treatment of anterior shoulder instability with glenoid bone loss: A prospective randomized trial. *J Shoulder Elbow Surg* 2019;28:1298-1307.
24. Riff AJ, Yanke AB, Shin JJ, Romeo AA, Cole BJ. Midterm results of osteochondral allograft transplantation to the humeral head. *J Shoulder Elbow Surg* 2017;26:e207-e215.
25. Zhuo H, Xu Y, Zhu F, Pan L, Li J. Osteochondral allograft transplantation for large Hill-Sachs lesions: A retrospective case series with a minimum 2-year follow-up. *J Orthop Surg Res* 2019;14:344.
26. Ruci V, Duni A, Cake A, Ruci D, Ruci J. Bristow-Latarjet technique: Still a very successful surgery for anterior glenohumeral instability: A forty-year one clinic experience. *Open Access Maced J Med Sci* 2015;3:310-314.
27. Burkhart SS, De Beer JF, Barth JRH, et al. Results of modified Latarjet reconstruction in patients with anteroinferior instability and significant bone loss. *Arthroscopy* 2007;23:1033-1041.
28. Abdul-Rassoul H, Galvin JW, Curry EJ, Simon J, Li X. Return to sport after surgical treatment for anterior shoulder instability: A systematic review. *Am J Sports Med* 2019;47:1507-1515.
29. Wolf EM, Arianjam A. Hill-Sachs remplissage, an arthroscopic solution for the engaging Hill-Sachs lesion: 2- to 10-year follow-up and incidence of recurrence. *J Shoulder Elbow Surg* 2014;23:814-820.
30. Chakrabarti MO, Gwosdz J, Rosinski A, Guzman AJ, McGahan PJ, Chen JL. Arthroscopic double-pulley remplissage using a 2-portal technique for Hill-Sachs lesions in recurrent anterior shoulder instability. *Arthrosc Tech* 2019;8:e527-e533.
31. Buza JA, Iyengar JJ, Anakwenze OA, Ahmad CS, Levine WN. Arthroscopic Hill-Sachs remplissage: A systematic review. *J Bone Joint Surg Am* 2014;96:549-555.
32. Alkaduhimi H, Verweij LPE, Willigenburg NW, van Deurzen DFP, van den Bekerom MPJ. Remplissage with Bankart repair in anterior shoulder instability: A systematic review of the clinical and cadaveric literature. *Arthroscopy* 2019;35:1257-1266.
33. Leroux T, Bhatti A, Khoshbin A, et al. Combined arthroscopic Bankart repair and remplissage for recurrent shoulder instability. *Arthroscopy* 2013;29:1693-1701.
34. Gupta A, Delaney R, Petkin K, Lafosse L. Complications of the Latarjet procedure. *Curr Rev Musculoskelet Med* 2015;8:59-66.
35. Yang JS, Mehran N, Mazzocca AD, Pearl ML, Chen VW, Arciero RA. Remplissage versus modified Latarjet for off-track Hill-Sachs lesions with subcritical glenoid bone loss. *Am J Sports Med* 2018;46:1885-1891.
36. Haroun HK, Sobhy MH, Abdelrahman AA. Arthroscopic Bankart repair with remplissage versus Latarjet procedure for management of engaging Hill-Sachs lesions with subcritical glenoid bone loss in traumatic anterior shoulder instability: A systematic review and meta-analysis. *J Shoulder Elbow Surg* 2020;29:2163-2174.

37. Frank RM, Gregory B, O'Brien M, et al. Ninety-day complications following the Latarjet procedure. *J Shoulder Elbow Sur* 2019;28:88-94.
38. Frantz TL, Everhart JS, Cvetanovich GL, et al. What are the effects of remplissage on 6-month strength and range of motion after arthroscopic Bankart repair? A multicenter cohort study. *Orthop J Sports Med* 2020;8:2325967120903283.
39. Bah A, Lateur GM, Kouevidjin BT, et al. Chronic anterior shoulder instability with significant Hill-Sachs lesion: Arthroscopic Bankart with remplissage versus open Latarjet procedure. *Orthop Traumatol Surg Res* 2018;104:17-22.
40. Jeon YS, Jeong HY, Lee DK, Rhee YG. Borderline glenoid bone defect in anterior shoulder instability: Latarjet procedure versus Bankart repair. *Am J Sports Med* 2018;46:2170-2176.
41. Koo SS, Burkhart SS, Ochoa E. Arthroscopic double-pulley remplissage technique for engaging Hill-Sachs lesions in anterior shoulder instability repairs. *Arthroscopy* 2009;25:1343-1348.
42. Pulatkan A, Kapicioglu M, Ucan V, et al. Do techniques for Hill-Sachs remplissage matter in terms of functional and radiological outcomes? *Orthop J Sports Med* 2021;9:23259671211008150.
43. Woodall BM, Elena N, Paborji D, et al. Arthroscopic remplissage using a double-pulley system for Hill-Sachs lesions for recurrent shoulder instability. *Arthrosc Tech* 2018;7:e773-e777.