Editorial Commentary: Free Bone Block With Remplissage Provides Less Translation Than Free Bone Block Alone in Shoulder Instability Patients With Bipolar Bone Loss

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Abstract: It would stand to reason that, in shoulder instability patients with bipolar bone loss, the combination of a bone block procedure and a remplissage procedure would provide better results than each one alone. Why would this be the case? When performing these procedures in the lateral decubitus position for patients with critical bipolar bone loss, the humeral head is anteriorly and inferiorly subluxed. This is most likely due to the incompetent restraints when in traction. A bone block procedure alone doesn't necessarily reduce the glenohumeral center of rotation; rather, it increases the "jump distance," making it more difficult for the humerus to dislocate over the bone block. However, the remplissage procedure not only makes the Hill-Sachs lesion extra-articular and prevents the defect from levering out the humerus, but also seems to pull the humeral head posteriorly centering it in the glenoid. This provides a posterior tether to the humeral head while increasing the jump distance over the bone block even further. In the future, one can anticipate a significant increase in remplissage-augmented bone block procedures in patients with bipolar bone loss.

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We know that a bone block augmentation procedure (e.g., distal tibial allograft/Latarjet) provides excellent results for those patients with recurrent shoulder instability and critical glenoid bone loss.[1-6] We also know that the addition of a remplissage procedure to a Bankart repair provides good results for those unstable shoulders with an engaging Hill-Sachs or off-track lesion.[7-10] But what about those patients with critical bipolar bone loss. It would seem to reason that, in those patients, the combination of a bone block procedure and a remplissage procedure would provide better results than each one alone.

Now we have biomechanical proof! Thanks to Denard, Callegari, McGarry, Crook, Adamson, Fraipont, Provencher, and Lee with their study "The Addition of Remplissage to Free Bone Block Restores Translation and Stiffness Compared to Bone Block Alone or Latarjet in a Bipolar Bone Loss Model", they have shown that the free bone block with remplissage had the lowest degree of anterior inferior translation at 90° of external rotation, increased stiffness and the highest amount of force required to dislocate the humeral head when compared to the free bone block alone and Latarjet groups.[11]

Why would this be the case? My personal observation when performing these procedures in the lateral decubitus position for patients with critical bipolar bone loss is that the humeral head is anteriorly and inferiorly subluxed. This is most likely due to the incompetent restraints when in traction. A bone block procedure alone doesn't necessarily reduce the glenohumeral center of rotation; rather it increases the "jump distance," making it more difficult for the humerus to dislocate over the bone block. However, the remplissage procedure not only makes the Hill-Sachs lesion extra-articular and prevents the defect from levering out the humerus, but also seems to pull the humeral head posteriorly, centering it in the glenoid. This provides a posterior tether to the humeral head while increasing the "jump distance" over the bone block even further.

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So why haven't we seen the combined bone block/Latarjet and the remplissage procedure performed more commonly? Traditionally, the bone block procedure/Latarjet procedures have been performed in an open fashion, while the remplissage procedure has been performed arthroscopically. Additionally, since current literature reports acceptable results with an anterior procedure alone, there hasn't been a significant push toward a combined approach. However, with more surgeons performing the arthroscopic bone block procedures and with the results of the current biomechanical study, one can anticipate a significant increase in remplissage augmented bone block procedures in patients with bipolar bone loss. But questions still remain. Do the current biomechanical results translate to clinical outcomes? Will the clinical results actually confirm basic science conclusions or will the combined procedure fade away like the double bundle ACL reconstruction? Although my sample size over the last 3 years has been small, I have been extremely pleased with the results of an arthroscopic free bone block (distal tibial allograft) and remplissage for patients with critical bipolar bone loss. However, only time (and a larger sample size) will tell.

References

1. Provencher MT, Frank RM, Golijanin P, et al. Distal tibia allograft glenoid reconstruction in recurrent anterior shoulder instability: Clinical and radiographic outcomes. *Arthroscopy* 2017;33:891-897. Erratum in: *Arthroscopy* 2018;34:1000.
2. Burkhart SS, De Beer JF, Barth JR, Cresswell T, Roberts C, Richards DP. Results of modified Latarjet reconstruction in patients with anteroinferior instability and significant bone loss. *Arthroscopy* 2007;23:1033-1041. Erratum in: *Arthroscopy* 2007;23:A16. Criswell, Tim [corrected to Cresswell, Tim].
3. Frank RM, Romeo AA, Richardson C, et al. Outcomes of Latarjet versus distal tibia allograft for anterior shoulder instability repair: A matched cohort analysis. *Am J Sports Med* 2018;46:1030-1038.
4. Mizuno N, Denard PJ, Raiss P, Melis B, Walch G. Long-term results of the Latarjet procedure for anterior instability of the shoulder. *J Shoulder Elbow Surg* 2014;23:1691-1699.
5. Gilat R, Haunschild ED, Lavoie-Gagne OZ, et al. Outcomes of the Latarjet procedure versus free bone block procedures for anterior shoulder instability: A systematic review and meta-analysis. *Am J Sports Med* 2021;49:805-816.
6. Hurley ET, Ben Ari E, Lorentz NA, et al. Both open and arthroscopic Latarjet result in excellent outcomes and low recurrence rates for anterior shoulder instability. *Arthrosc Sports Med Rehabil* 2021;3:e1955-e1960.
7. Zhu YM, Lu Y, Zhang J, Shen JW, Jiang CY. Arthroscopic Bankart repair combined with remplissage technique for the treatment of anterior shoulder instability with engaging Hill-Sachs lesion: a report of 49 cases with a minimum 2-year follow-up. *Am J Sports Med* 2011;39:1640-1647.
8. Hughes JL, Bastrom T, Pennock AT, Edmonds EW. Arthroscopic Bankart repairs with and without remplissage in recurrent adolescent anterior shoulder instability with Hill-Sachs deformity. *Orthop J Sports Med* 2018;6:2325967118813981.
9. Ko SH, Cha JR, Lee CC, Hwang IY, Choe CG, Kim MS. The influence of arthroscopic remplissage for engaging Hill-Sachs lesions combined with Bankart repair on redislocation and shoulder function compared with Bankart repair alone. *Clin Orthop Surg* 2016;8:428-436.
10. MacDonald P, McRae S, Old J, et al. Arthroscopic Bankart repair with and without arthroscopic infraspinatus remplissage in anterior shoulder instability with a Hill-Sachs defect: a randomized controlled trial. *J Shoulder Elbow Surg* 2021;30:1288-1298.
11. Denard PJ, Callegari JJ, McGarry M, et al. The addition of remplissage to free bone block restores translation and stiffness compared to bone block alone or Latarjet in a bipolar bone loss model. *Arthroscopy* 2022;38:2609-2617.