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Introduction: A Hill-Sachs lesion (HSL) is a common concomitant lesion found in anterior shoulder instability at the rate of 71% for first-time dislocations and 85% for recurrent dislocations and is a reported risk factor for postoperative recurrent instability after anterior Bankart repair (ABR).[1] Remplissage has demonstrated improved outcomes in patients specifically with off-track lesions, reducing postoperative recurrence rates to 8.7%.[2] While evidence supports the use of remplissage with medially extended (wide) HSLs, its role in treating inferiorly extended (lengthwise) HSLs is less understood. Inferior craniocaudal Hill-Sachs extension (IC-HSE) describes the vertical length of an HSL, measured relative to the humeral head apex. Cong et al.[4] introduced a method using the lower-edge angle (LEA) and upper-edge angle (UEA) to quantify IC-HSE. HSLs extending below the humeral head equator indicate critical bone loss. Remplissage may be particularly beneficial when the LEA exceeds 90° as it allows the infraspinatus and posterior capsule to provide additional coverage. The main purpose of this study was to compare ABR with and without remplissage with respect to postoperative recurrent instability and clinical outcomes in each group in those with lower-edge angle (LEA) greater than 90°.

Materials & Methods: Data for the present study were collected as part of a previous randomized clinical trial comparing ABR (NO REMP) versus ABR with remplissage (REMP) in the treatment of anterior shoulder instability with HSL.[3] The original trial was double-blinded with two parallel groups at 2 centres involving 6 surgeons. Patients were 14 years and older with recurrent traumatic anterior shoulder instability with an engaging HSL of any size with an available preoperative MRI or CT. IC-HSE was based on measuring the lower-edge angle (LEA) at the border of 90° and patients were categorized as having LEA greater than or less than 90° (Figure 1). Preoperative and postoperative clinical scores at 24 months were extracted from the original data. Recurrent instability rate determined at medium term follow-up (mean 4 years) was used as the primary outcome measure, defined as at least 1 episode of redislocation after surgery or a minimum of 2 subluxations occurring at least 12 weeks postoperative. Frequency distributions were generated, and logistic regression was conducted to generate odds ratios for postoperative recurrent instability based on LEA less than or greater than 90°, stratified by REMP/NO REMP.

Results: One hundred two patients (50 patients in NO REMP and 52 patients in REMP) were included in the original randomized controlled trial of which 95 (47 patients in NO REMP, 48 in REMP) had preoperative MRI (n=94) or CT (n=1) available for measurement of IC-HSE. Thirteen of 58 patients (22.4%) with LEA greater than 90° had medium-term postoperative recurrent instability compared to 6 of 37 patients (16.2%) with LEA less than 90°. In those patients with LEA less than 90°, the odds of recurrent instability in the NO REMP (n=3/17; 17.6%) group were 1.21 (95%CI 0.211, 6.985; p=0.828) compared to the REMP group (n=3/20; 15.0%). In those patients with LEA greater than 90°, the odds of recurrent instability if in the NO REMP group (n=11/30; 36.7%) were 7.53 (95% CI 1.492, 37.978; p=0.015) compared to the REMP group (n=2/28; 7.1%). No differences were found between LEA greater and less than 90° stratified by REMP and NO REMP with respect to 24-month postoperative patient reported outcomes (WOSI, SST, ASES), or active range of motion.

Discussion: In cases with inferiorly longer HSL, where LEA is greater than 90°, remplissage significantly reduced postoperative recurrent instability when compared to isolated ABR, whereas remplissage did not significantly impact the rate of recurrent instability if LEA was less than 90°. This study supports the recommendation that surgeons add a remplissage in patients with critical humeral bone loss where the HSL extends below the humeral head equator (LEA greater than 90°).

1 Cong T, Charles S, Reddy RP, et al. Defining Critical Humeral Bone Loss: Inferior Craniocaudal Hill-Sachs Extension as Predictor of Recurrent Instability After Primary Arthroscopic Bankart Repair. *Am J Sports Med*. 2024;52(1):181-189.

2 Kim JH, Kwon YU, Lee CR, Kim DY, Jung SH, Hwang JW. Longer peripheral-track lesions are associated with instability after arthroscopic Bankart repair. *J Shoulder Elbow Surg*. 2024;33(8):1724-1732.

3 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(6):1288-1298.

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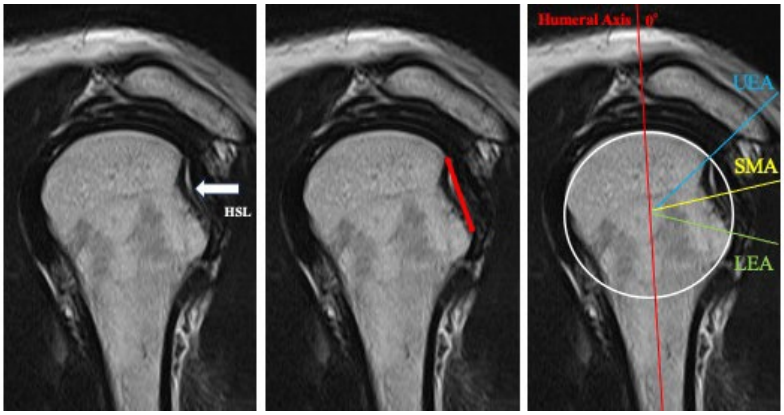

Figure 1. The measurements of craniocaudal HSL extension. UEA-Upper edge angle; SMA-Sagittal midpoint angle; LEA-Lower edge angle