

Does addition of Remplissage procedure cause external rotation deficit in the patient undergoing standard Bankart repair for recurrent shoulder dislocation with engaging Hill-Sach's lesions ?

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Abstract

Background: To determine the effect of Remplissage procedure with Bankart repair compared to standard Bankart repair alone on resultant external rotation of the shoulder in patients of anterior shoulder instability with engaging Hill-Sach's lesion.

Methods: Out of 46 patients, 18 patients underwent arthroscopic Remplissage combined with Bankart repair (group I) and the other 28 patients underwent arthroscopic standard Bankart repair alone (group II). Clinical outcomes were retrospectively evaluated by assessing the range of motion, complications, recurrence rates, and functional results were assessed utilizing the UCLA and ROWE score.

Results: Average follow-up period of 23.88 ± 5.26 (range, 12-48) months. Average external rotation loss compared to normal side in group I was of $5.00^\circ \pm 0.44^\circ$ (range, 70° - 90°) ($p=0.031$) in external rotation in abduction and $1.67^\circ \pm 0.18^\circ$ (range, 75° - 90°) ($p=0.36$) in external rotation in neutral at the last follow up and in group II it was $0.86^\circ \pm 0.35^\circ$ (range, 70° - 90°) ($p=0.559$) in external rotation in abduction and $0.89^\circ \pm 0.38^\circ$ (range, 70° - 90°) ($p=0.646$) in external rotation in neutral at the last follow-up. The average UCLA score was 34.00 ± 1.46 (range, 32-35) in group I and 33.29 ± 1.86 (range, 30-35) in group II ($p=0.154$). Average Rowe score was 92.22 ± 6.24 (range, 95-100) in the group I and 96.55 ± 5.99 (range, 90-100) in the group II ($p=0.025$).

Conclusion: The addition of Remplissage procedure with standard Bankart repair causes significant loss of external rotation in abduction in patients of engaging Hill-Sach's lesion compared to standard Bankart repair alone.

Level of Evidence: Level III

Keywords: Anterior shoulder instability, Remplissage procedure, Bankart's repair, External rotation, Hill-Sach's lesion

Introduction

An engaging Hill-Sach's lesion was described by Burkhart et al [3,10], as a defect that becomes symptomatic in a functional range of motion, mainly in the functional position of abduction and external rotation [3]. Isolated arthroscopic standard Bankart repair has been reported to fail in 22% of cases [1]. The Hill-Sach's lesion has been mentioned as a common cause of failure of arthroscopic Bankart repair [3]. Different surgical procedures have been proposed [8] for dealing with engaging Hill-Sach's lesions. These solutions vary from soft tissue transfers [11] to bony reconstructions such as humeral osteotomy [18], structural

osteochondral allografts [13], and transhumeral impaction grafting [9]. Others have advocated Hemi arthroplasty [14] as a definitive treatment. Arthroscopic Remplissage procedure has been suggested as a solution for preventing failure by Purchase et al [17]. This procedure was modified by Burkhart allows arthroscopic management of these lesions by transposing the posterior aspect of the capsule and the infraspinatus tendon into the Hill-Sach's lesion [7]. However clinical results and biomechanical studies showed that arthroscopic Remplissage might compromise a glenohumeral range of motion [6]. Though there has been acceptance of the Remplissage

with Bankart repair procedure, there is limited data comparing patients treated with an arthroscopic Remplissage with Bankart repair and arthroscopic standard Bankart repair alone for recurrent anterior shoulder instability and Hill-Sach's lesions. The comparison is necessary to assess the effect of the Remplissage in improving shoulder stability and range of motion in the patients with engaging Hill Sach's lesion patients.

In our study, we planned to study the effect of arthroscopic Remplissage procedure with Bankart repair on patients having engaging Hill-Sach's lesion (group I- 18 patients) on shoulder functional outcome, mainly on postoperative external rotation, compared to

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arthroscopic standard Bankart repair alone (Group II- 28 patients).

Our hypothesis was that arthroscopic Remplissage combined with Bankart repair does not have any negative effect on shoulder range of motion and gives better stability and satisfaction as compared to patients of arthroscopic standard Bankart repair for patients with engaging Hill-Sach's lesion.

Materials and Methods

This is a retrospective analysis of patients undergoing arthroscopic management from 2014 to 2018 for anterior shoulder instability resulting in Bankart's and engaging Hill-Sach's lesion. After institutional review board approval, we identified 46 patients (group I- 18, group II- 28 patients) who met with the inclusion criteria of 1) Recurrent anterior shoulder instability with engaging Hill-Sach's lesion at any degree of abduction and external rotation on imaging studies, 2) Minor but substantial glenoid bone loss (<25%) and 3) Patients of shoulder instability to be operated arthroscopically (standard Bankart's repair with or without Remplissage procedure). And exclusion criteria of 1) Recurrent anterior shoulder instability with only soft tissue pathologies, 2) Glenoid bone loss of >25%, 3) Recurrent anterior shoulder instability associated with rotator cuff tear and 4) pre-existing severe shoulder arthritis, with the help of preoperative 3T MRI as well as clinical evaluation.

Of the total of 46 patients, 18 patients underwent Remplissage with Bankart repair and 28 patients underwent standard Bankart repair. All patients were provided formally informed consent for participation in this study. With average follow up of 23.48±5.26

(range, 12-48) months.

The decision to carry out a Remplissage procedure was made before surgery or intraoperatively on the basis of preoperative MRI, x-ray findings and arthroscopic findings intraoperatively, and engaging aspect of Hill-Sach's lesion.

An evaluation was performed pre and postoperatively for both groups according to Rowe score, University of California at Los Angeles Shoulder Score (UCLA), and clinical examination. These questionnaires have been validated for the assessment of instability as well as future predictors of dislocation [17]. Patients were offered the right to refuse on all voicemails and conversations.

For standard Bankart repair lateral decubitus position used. And a minimum of 3 anchors was used with repair starting from 5 or 6 o'clock position. For Remplissage procedure in addition to the standard Bankart repair a single double-loaded anchor was used and infraspinatus and capsular plication were done percutaneously through metrous bites along with standard Bankart repair in all patients (Fig. a-e).

Postoperatively an arm pouch was applied. Wrist and elbow range of motion with scapular sets started as soon as comfort level allowed. After one month, an active-assisted range of motion of shoulder was started. The mobilization progressed to Theraband exercise and patients were allowed to resume full-blown daily activities by the end of six months and return to active sports by the end of nine months.

Patients were called at 3, 6, and 9 months for follow up and clinical examination, UCLA Score, Rowe score were assessed at each

follow-up.

Results

Average follow up period of 23.88±5.26 (range, 12-48) months. No patient lost to follow up. No patient had dislocations and subluxation at the final follow up. None of our patients (18 in group I and 28 in group II) had previous surgery. Very few patients in both groups experienced pain at early follow-up. The average UCLA score was 34.00±1.46 (range, 32-35) in group I and 33.29±1.86 (range, 30-35) in group II (p=0.154). The average ROWE score was 92.22±6.24 (range, 95-100) in group II and 96.55±5.99 (range, 90-100) in the group I (p=0.025). (Table 1). 18 out of 18 (100%) patients in the Remplissage with Bankart repair group participated actively in Recreational sports, 2 patients in competitive sport and others doing their respective jobs and daily activities, as well as 28 out of 28 (92.9%) patients in the group II. These activities include playing cricket, lifting weights, swimming and overhead activities. Postoperative shoulder mobility was compared between the two groups at the last follow-up. Compared with the normal (contralateral) side, the mobility of the affected side in group I average external rotation loss of 5.00°±0.44° (range, 70°-90°) (p=0.031) in abduction and 1.67°±0.18° (range, 75°-90°) (p=0.36) in neutral at the last follow up. And in group II, average external rotation loss of 0.86°±0.35° (range, 70°-90°) (p=0.559) in the abduction and 0.89°±0.38° (range, 70°-90°) (p=0.646) in neutral at the last follow-up (Table 2). None of the patients in group II expressed dissatisfaction with regard to the slight loss in



Figure A: Arthroscopic view of Bankart lesion

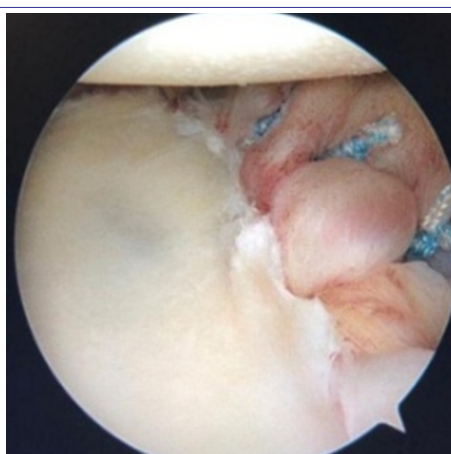
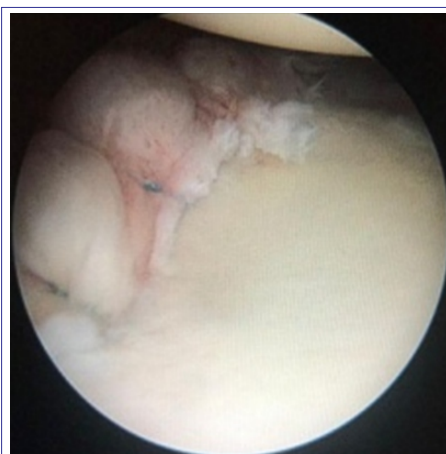


Figure B-C: Standard Arthroscopic Repair of Bankart lesion

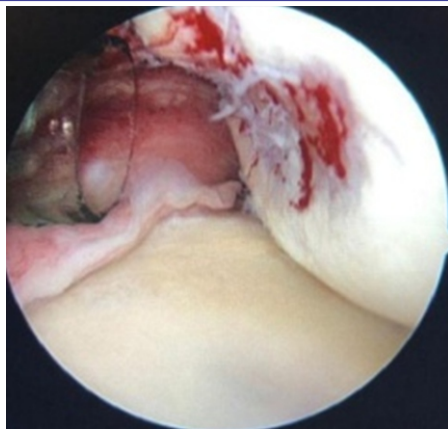


Figure D: Arthroscopic view of Hill Sachs lesion on Humeral head

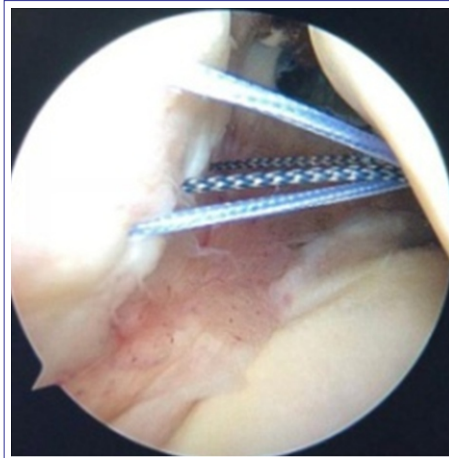


Figure E: Remplissage procedure

Our results are comparable with the study of Purchase et al [17], Nourissat et al [15], Park et al [16]. The higher amount of loss of external rotation has been reported by Boileau et al [2] (8° in external rotation restriction in neutral and 9° in external rotation restriction in abduction). Deutsch and Kroll [5] reported the case of a patient who had significant loss of external rotation after the Remplissage procedure. There is potential with the Remplissage technique to cause a disabling lack of external rotation. This could ultimately require infraspinatus release to correct. After the Remplissage procedure, we have observed there was a loss of external rotation in abduction which was significant as compared to the normal side (p=0.031). None of them required surgical correction.

In our study, neither recurrence nor instability was not noted at the final follow up in both groups, which is comparable with Franceschi et al [7], Park et al [16].

The majority of patients in our series achieved excellent ROWE and UCLA scores, which evaluate shoulder external rotation with several activities. Patients experienced a slight problem in throwing capabilities in the Remplissage group especially in young athletes only and not in sedentary lifestyle patients. Our study limitations are as follows - 1) Convenient sampling and not required sampling, 2) Retrospective study with its own inherent bias and 3) Will require longer follow up for making a further valid conclusion.

Conclusion

Addition of Remplissage procedure with standard Bankart repair causes significant loss of external rotation in abduction in patients of engaging Hill-Sach's lesion compared to standard Bankart repair alone.

external rotation in neutral and external rotation in abduction when compared to the unaffected side, but in group I few patients experienced difficulty in throwing movement. This suggests that group I as compared to group II results in significant loss of external rotation in the abduction.

In our study, we tried to find out whether additional Remplissage procedure in patients undergoing standard Bankart repair in patients of engaging Hill-Sach's lesion affects external rotation or not? We found that Group I had a significant loss of external rotation in the abduction and non-significant loss of external rotation in neutral compared to the normal side compared to group I.

Discussion

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Table I: Comparison between group I and group II

Score	GROUP I I (Remplissage+Bankart repair)	Group II (Bankart group)	P value
Age	28.22 ± 5.81	29.03 ± 7.08	0.67
Dominant side involvement	61.11%	64.18%	-
ROWES	92.22 ± 6.24	96.55 ± 6.24	0.025*
UCLA	34.00 ± 1.46	33.29 ± 1.86	0.154
Post op External rotation	81.11 ± 5.30	83.97 ± 5.30	0.093
Post op External rotation in abduction	81.22 ± 6.91	87.24 ± 5.76	0.015*

p-value > 0.05 (Not significant) Unpaired t-test used, *Significant (p-value < 0.05) Unpaired t-test used

Table II - Loss of range of motion compared to normal side in each group

Range of motion	GROUP I (Remplissage+ Bankart repair)	Group II (Bankart group)
External rotation	1.67 ± 0.18 (p value = 0.36)	0.89 ± 0.38 (p value = 0.646)
External rotation in abduction	5.0 ± 0.44 (p value = 0.031*)	0.86 ± 0.35 (p value = 0.551)

p-value > 0.05 (Not significant) Unpaired t-test used, *Significant (p-value < 0.05) Unpaired t-test used

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