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Case Report

Outcomes of minimally 1 year follow-up for the arthroscopic Remplissage technique with Hill–Sachs lesion

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ABSTRACT

Purpose: We evaluated minimal 1 year follow-up results for the Remplissage technique to fill a Hill–Sachs lesion with anterior instability.

Methods: The subjects were 12 patients, who could be followed-up for more than 12 months after the "Remplissage" procedures in our hospital from August 2008 to May 2010. Their mean age was 28.6 years old and the mean follow-up was 19 months. The evaluations included the ROM, the ASES score, the KSSI score, the ROWE score and postoperative MRI.

Results: On the postoperative functional evaluation after an average 16 months, the ASES score improved 51.4 in preoperative to 86.6 in postoperatively, the KSSI score improved from 46.6 preoperatively to 84.9 postoperatively and the ROWE score improved from 43.6 preoperatively to 91.4 postoperatively. After an average 14 months for all the cases, the range of movement was nearly in the normal range which is 174.3 ± 5.04 (170–180) degrees in forward flexion, and 56.4 ± 9.60 (50–60) degrees in external rotation.

Conclusion: For recurrent shoulder instability with a large Hill–Sachs lesion, the Remplissage technique has a good outcome after more than 1 year follow-up in terms of shoulder stability, and the clinical and functional results.

Level of evidence: Level IV, therapeutic case series

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1. Introduction

Hill–Sachs lesion is a posterolateral bone defect of humeral head which can be frequently observed in patients with anterior shoulder instability. Generally, Hill–Sachs lesions do not cause clinical problems. But, Hill–Sachs lesions can be engaged within the range of functional motion in the glenoid cavity when they exceed over 30% of articular surfaces head of the humerus. As the treatment of engaging Hill–Sachs lesion, Burkart and De Beer¹ suggested the technique for making

open transference of the infraspinatus tendon and the articular capsule to Hill–Sachs lesions. Since then, there have been proffered new approaches of the engaging Hill–Sachs lesion treatment by some authors.^{2–4}

To fill the Hill–Sachs lesions, Purchase et al⁵ first applied an arthroscopic posterior capsulodesis and infraspinatus tenodesis to the technique of restore Bankart lesions and suggested the Remplissage technique.

Authors think arthroscopic Remplissage technique is an effective method for stabilizing the engaging Hill–Sachs

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lesions and finally to conduct the techniques to restore Hill–Sachs lesions and Bankart lesions. Authors analyzed the results of stability and the clinical, functional results by the retrospective evaluation of patients who could be followed-up for 1 year or more.

2. Method

Authors retrospectively identified total 12 cases from August 2008 to May 2010, the Remplissage technique was applied to anterior shoulder instability accompanying 30% or more of extensive Hill–Sachs lesions. All surgeries were done by the one same surgeon. The mean age of patients was 28.6 year (range: 17–45 years); all of them are male and the mean follow-up period is 19 months (range: 13–23 months).

The patients experienced at least 10 or more of recurrent dislocations history. We adopted as a criteria who had extensive 30–40% or more large Hill–Sachs lesions on the articular surface and less than 20% of bone defect in the glenoid cavity (Fig. 1). We excluded patients who had glenohumeral arthritis or other inflammatory diseases or a fracture around the shoulder joint, or elderly patients with osteoporosis.

All of the arthroscopic cases showed not only Bankart lesions and 30% or more of large Hill–Sachs lesions but also the engaging Hill–Sachs lesions in the glenoid cavity (Fig. 2).

2.1. Surgical technique

Under the general anesthesia, patients changed supine position to lateral decubitus position and leaned 30° posteriorly. Shoulder abducted 30° and 15° forward flexion. The upper limbs tracted and counter-tracted.

Fig. 1 – Arthroscopic finding of large Hill–Sachs lesion in Left humeral head from posterior portal.

Fig. 2 – Arthroscopic view of Huge engaging Hill–Sachs lesion.

Approaching the glenohumeral joint through the posterior portal. Placed the anteroinferior portal with space between rotator interval to use for suturing Bankart lesions. We established the anterosuperior portal at the anterior margin of acromion and established an additional posterior inferior portal through which it was sutured. We shifted the arthroscope from the posterior portal to the anterosuperior portal and placed the cannula at the posterior portal. Made smooth the surface of Hill–Sachs lesions with a motorized-shaver and a ring curette. Ground the posterior capsule and the inferior capsule. Placed the first bio-cork screw suture anchor (5.0 mm, Arthrex, USA) through the posterior portal from the infraspinatus muscle tendon to the posterior articular capsule and placed it in the center of Hill–Sachs lesions (Fig. 3). The cannula placed at the posterior inferior portal backward from the

Fig. 3 – The anchor is placed in the center area of the Hill–Sachs lesion.

Fig. 4 – From anterior portal view of completed Remplissage repair with posterior capsule and infraspinatus tendon well apposed to Hill–Sachs lesion.

posterior articular capsule and the infraspinatus muscle tendon when the arthroscope is placed at the anterosuperior portal, the exit of the cannula is located in the subdeltoid space. Shifting the arthroscope from the anterosuperior portal to the posterior portal. After penetrating through the tendon and the posterior articular capsule 1 cm downward at the posterior inferior portal, The inferior suture done by connecting the suture with a penetrating grasper or a suture hook. We shifted the second bio-cork screw suture anchor with different color 1 cm upward at the posterior inferior portal. After making a knot in the subdeltoid space through the anterosuperior portal, we established the Remplissage technique by the superior suture (Fig. 4).

Postoperatively, immobilization abduction brace applied about 4–6 weeks, but gentle daily living allowed. Start pendulum exercise 2–3 weeks postoperatively, from 6 to 12

weeks passive and active range of motion allowed. 12 weeks after operation, the strengthening exercise started.

The evaluation before and after the surgery was done by determining the motion range of the shoulder joint, ASES score, KSSI score, and ROWE score in the state where the scapula was fixed. All the patients were recommended to receive a magnetic resonance imaging scan during the 3 or 6 months follow-up. The patients of the 10 cases (83.3%) received the follow-up MRI scan.

3. Result

The mean 16 months after surgery, evaluated the function of the shoulder joint. The comparison before and after the surgery was done statistically; the paired t-test with the SPSS 13.0 version and decided as a significant level 0.05 or less of P value. The mean ASES score was 51.4 (44–58) preoperatively, 86.6 (75–96) postoperatively ($P = 0.037$), KSSI score and ROWE score rose from 46.6 (36–52) and 43.6 (34–54) to 84.9 (78–92) ($P = 0.015$) and 91.4 (85–95) ($P = 0.021$) postoperatively. The three scores showed a statistically significant difference ($P < 0.05$). The motion range all patients' shoulder joint was forward flexion 174.3 ± 5.04 degrees (170–180); this was close the normal range. The external rotation was 56.4 ± 9.60 (50–60) without the limitation, and the internal rotation was the height of thoracic vertebra 12 (range: thoracic vertebra 12–10).

The patients of 10 cases of the total 12 cases received a MRI from 3 months to 6 months after the surgery. It was observed that infraspinatus tendon and posterior articular capsule were properly attached to Hill–Sachs lesions (Fig. 5A, B). Clinically, there was no complication for example redislocation, infection etc.

4. Discussion

The glenoid defect can be the cause of the anterior shoulder instability and the failure of arthroscopic surgery.¹ Connolly,⁶

Fig. 5 – (A, B) Postoperative MRI, infraspinatus and posterior capsule are well attached to Hill–Sachs lesion. (A) Axial view image. (B) Oblique sagittal view image.

who performed the tendon transfer to treat extensive Hill–Sachs lesions reported that the technique transferring the infraspinatus muscle tendon to the extensive defect of the humeral head showed a satisfactory result (approximately 94%). In addition, introduced was the technique of fixing the subscapularis to anterior humeral head by Krackhardt et al.²

However, the arthroplasty replacement should be considered when it recurs due to the excessive bone defect of the humeral head although many methods were used.^{7–9}

In addition, the Latarjet procedure is used as the technique of glenoid bone defect, but it is complicated and required a lot of experiences. Latarjet technique shows relatively good results but they can have a limitation of external rotation and 12% recurrence.^{10–12}

The Remplissage technique stands for a technique which eliminates successfully Hill–Sachs lesions by filling them and prevents the engagement of them by changing them to the extra-articular structure. Deutsch and Kroll¹³ reported that the patient shows a decreased external rotation who was treated by the arthroscopic Remplissage technique and that the infraspinatus tendon and the posterior articular capsule which are filled with Hill–Sachs lesions function as a dynamic obstacle of external rotation. The infraspinatus tendon does not extend while the shifted parts of the infraspinatus tendon and muscle are being transferred to the defect part but the external rotation is compensated while some of the infraspinatus muscle is extending. We think this is one of the reasons why there is no obstacle of external rotation during the infraspinatus tendon transfer. As a result of the pendulum exercise following 3 weeks postoperatively, and the active exercise following six weeks postoperatively, the follow-up results which was made for 1 year or more had no occurrence of a relatively severe limitation of external rotation.

Introducing the treatment of the defects of the glenoid and the humeral head, Bollier and Arciero¹⁴ reported that the Remplissage technique or the open bone graft is a proper treatment for patients who had 20% less of glenoid defect and 30% or more of Hill–Sachs lesions. We agree to this in that we accomplished proper results by applying the arthroscopic Remplissage technique to 20% less of glenoid defect and 30% or more of Hill–Sachs lesions. Zhu et al,¹⁵ recently reported that Remplissage with Bankart repair with at least 2 years follow-up show success rates of 91.8% was much.

We conducted the follow-up of patients who were treated by the arthroscopic Remplissage technique. The functional shoulder evaluation showed that the average of ASES score, KSSI score and ROWE score 16 months after the surgery improved significantly, compare to the scores before the surgery (Table 1). All patients' motion range was the mean flexion 174.3 degrees (170–180) and close to the normal range. The mean of external rotation was 56.4 ± 9.60 degrees (50–60). The

internal rotation is the height of thoracic vertebra 12th and close to the normal range. This study shows the result of the follow-up investigation made 1 year or more (13–23 months) after the Remplissage technique which was not applied in Korea. However, this research has to weak points. One is that it did not to make a comparison with the results of other techniques which were applied to the identical disease. The other is that it has few cases. We will leave it for the future study to secure more cases, conduct a long-term follow-up investigation including the functional evaluation of the shoulder joint and make a comparative study with other techniques which were used for the identical disease.

5. Conclusion

Many techniques can be chosen as a treatment method for patients who have 30% or more of extensive Hill–Sachs lesions on the articular surface in the humeral head. However, there is no conclusion of which technique is most proper. We conducted a follow-up 1 year or more after performing the Remplissage technique to patients with anterior shoulder instability accompanied by extensive Hill–Sachs lesions. This investigation showed not only shoulder stability but also clinically and functionally proper results. Therefore, the Remplissage technique can be considered as a treatment for these patients.

Conflicts of interest

All authors have none to declare.

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Table 1 – Patients' preoperative and postoperative functional scores.

Parameter	PreOP.	PostOP.	P-Value
ASES	51.4 (44–58)	86.6 (75–96)	0.037
KSSI	46.6 (36–52)	84.9 (78–92)	0.015
ROWE	43.6 (34–54)	91.4 (85–95)	0.021

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