Posterior Shoulder Instability Treated with Arthroscopic Bankart and McLaughlin Techniques

Facundo Fazzone, Alejo López, Francisco López Bustos, Carlos E. Martínez, Rufino C. Ruiz
Upper Limb Team, Instituto Dupuytren de Traumatología y Ortopedia, Autonomous City of Buenos Aires, Argentina

ABSTRACT

Introduction: Traumatic posterior shoulder dislocations are uncommon and often produce anterior humeral head defects (reverse Hill–Sachs lesions) and posterior labral injuries (reverse Bankart lesions) due to abrupt posterior translation of the humeral head. These injuries frequently involve engagement between the humeral head and the glenoid. Although nonoperative management is often favorable, recurrent dislocation episodes may persist in 65–80% of patients who do not undergo surgery. Both open and arthroscopic surgical procedures have been described for persistent dislocations. **Objective:** To describe an arthroscopic technique adapted from the open McLaughlin procedure, compare it with approaches reported in the literature, and present outcomes from three consecutive cases. **Materials and Methods:** Three patients (ages 26, 30, and 45) were operated on by the same surgeon. Mean follow-up was 7 months. Outcomes were assessed using the Visual Analog Scale (VAS) for pain and the Western Ontario Shoulder Instability Index (WOSI). **Results:** Shoulder stability was documented at approximately 3 months. No redislocations, subjective instability, or infections were reported during follow-up. **Conclusion:** The arthroscopic technique achieved joint stability with full range of motion while avoiding extensive open approaches and their associated complications. This arthroscopic variant represents a minimally invasive alternative for managing posterior shoulder instability.

Keywords: Posterior instability; reverse Bankart; reverse Hill–Sachs; remplissage; arthroscopic McLaughlin.
Level of Evidence: IV

Inestabilidad posterior de hombro tratada con la técnica de Bankart y McLaughlin artroscópica

RESUMEN

Introducción: La luxación posterior de hombro traumática es una lesión poco frecuente que puede provocar defectos óseos en la cara anterior del húmero (lesión de Hill-Sachs invertida) y lesión del labrum (lesión de Bankart invertida) por la traslación posterior brusca de la cabeza humeral que suele involucrar un enganche entre la cabeza humeral y la glena. Si bien el tratamiento conservador suele ser favorable, en el 65-80% de los pacientes, pueden persistir los episodios de luxaciones, si no se someten a cirugía. Se han descrito tratamientos quirúrgicos, tanto abierto como artroscópicos, para las luxaciones persistentes. **Objetivo:** Describir la técnica artroscópica, una variante de la técnica abierta de McLaughlin, y compararla con otras publicadas, y comunicar el seguimiento de 3 casos tratados. **Materiales y Métodos:** Se incluyó a 3 pacientes operados por el mismo cirujano. El seguimiento promedio fue de 7 meses. Se utilizó la escala analógica visual para dolor y el cuestionario WOSI. **Resultados:** Se constató la estabilidad del hombro en un tiempo variable de 3 meses. No hubo reluxaciones, sensación de inestabilidad ni infecciones. **Conclusiones:** Se obtuvo la estabilidad y la movilidad completa, evitando grandes abordajes y complicaciones asociadas. Esta variante de técnica artroscópica se puede utilizar como opción para evitar técnicas de reparación a cielo abierto.

Palabras clave: Inestabilidad posterior; técnica de Bankart inversa; lesión de Hill-Sachs invertida; *remplissage*; técnica de McLaughlin inversa.
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INTRODUCTION

Posterior shoulder dislocation is a rare injury. Most cases have a traumatic origin, although seizures are another possible etiology.[1]

Traumatic posterior translation of the humeral head often produces associated injuries, such as impaction of the anteromedial humeral head (reverse Hill–Sachs lesion), fracture of the posterior glenoid rim (posterior bony Bankart lesion), and detachment of the posteroinferior capsulolabral complex (reverse Bankart lesion).[1,2]

Up to 86% of patients may sustain a reverse Hill–Sachs lesion that affects joint congruence and can lead to instability.[2,3]

In the Emergency Department, diagnosis may be missed; however, the clinical presentation should raise suspicion—external rotation is limited because the humeral head rests against the posterior glenoid rim, as described by Cicak.[4] Magnetic resonance imaging and computed tomography are useful for diagnosis and for determining the definitive treatment.

Once diagnosed, reduction is usually performed closed, under general anesthesia, although an open approach may be necessary.[4,5]

Dislocation may resolve favorably with conservative treatment; however, 65–80% of cases may remain unstable if not managed surgically. In most patients with posterior dislocation, and those with posterior instability, nonoperative treatment with physical therapy is effective; however, when a bony defect increases instability, surgery is indicated.[1-4]

Surgical repair of isolated capsulolabral lesions yields good outcomes, but when these lesions are associated with a humeral head defect, outcomes are better if the defect is filled.[5,6]

Various treatments have been described and can be divided into anatomic techniques, which restore the native humeral head anatomy, and nonanatomic techniques, which fill the defect.

McLaughlin first described tendon transfer in 1952 as a nonanatomic open technique to fill the humeral head defect.[7] Hawkins later modified the procedure by transferring an osteotomized portion of the lesser tuberosity, and Krackhardt subsequently reported the first arthroscopic variant. Over time, several modifications have been proposed.[7-9]

The objective of this report is to describe an arthroscopic surgical technique— a variant of the McLaughlin procedure—report 9-month outcomes, and compare the approach with previously published techniques.

MATERIALS AND METHODS

Three patients (26, 30, and 45 years old) were operated on by the same surgeon. Follow-up for the first patient was 9 months, and for the other two, 6 months. The Visual Analog Scale (VAS) for pain and the Western Ontario Shoulder Instability Index (WOSI) were used. Details of each patient are given in the Table.

Table. Patient data.

Patient	Sex/Age	Mechanism	Dominant Hand	Treatment of dislocation	Time until surgery	Compromise Reverse Hill-Sach
1	Male/ 26 years	Fall with shoulder internal rotation	Yes	Closed reduction in the ED	10 days	15%
2	Male/ 30 years	Fall with adducted shoulder plus internal rotation	Yes	Closed reduction in the ED	9 days	10%
3	Male/ 45 years	Fall with adducted shoulder plus internal rotation	No	Closed reduction in the ED	12 days	20%

Inclusion criteria were: acute dislocations reduced in the Emergency Department; treatment of instability within the second or third week after the episode; reverse Bankart lesion; and a reverse Hill–Sachs lesion involving up to 30% of the humeral head (Figures 1 and 2).

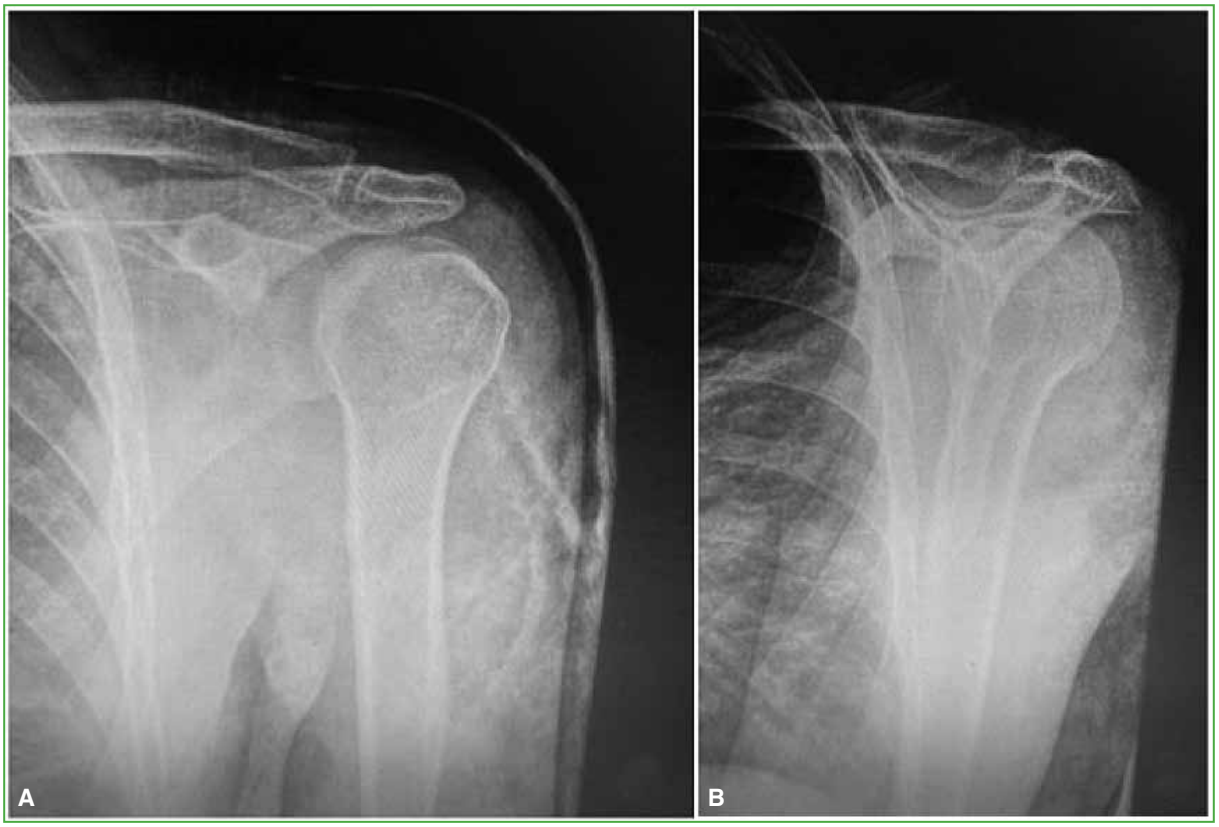

Figure 1. A. Shoulder radiograph, anteroposterior view. Cast immobilization and the light bulb sign are visible. **B.** Scapular radiograph, lateral view, showing posterior subluxation of the humeral head.

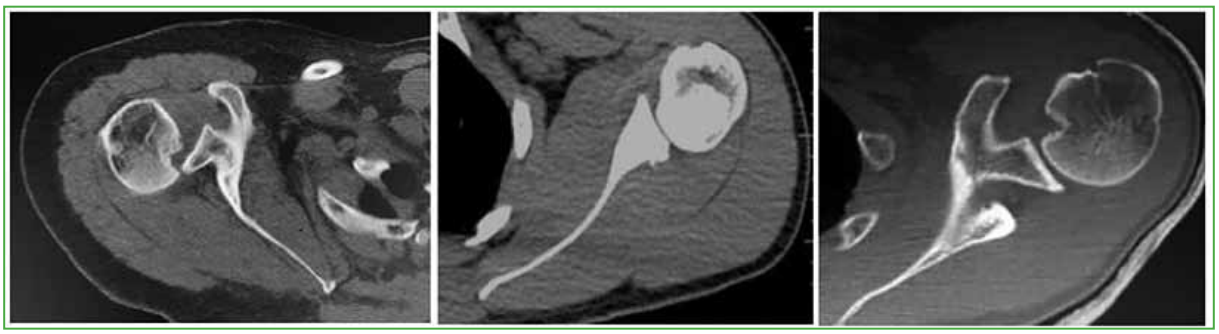

Figure 2. Axial CT scans of the shoulder for the 3 patients: reverse Hill–Sachs lesion involving <30% of the humeral head.

Surgical Technique

The patient was placed in the lateral decubitus position, with 3-kg arm traction, the table tilted 25°, and two anterior bolsters. The usual portals were marked: a posterior viewing portal and an anterior working portal.

The joint was entered through the posterior intra-articular portal with a 30° arthroscope, and an initial diagnostic arthroscopy was performed to identify labral and glenohumeral lesions.

After placing cannulas in the anterosuperior and inferior portals, the anterosuperior portal was used for visualization.

First, we assessed decentering of the humeral head relative to the glenoid axis and the extent of the reverse Hill–Sachs lesion (Figure 3).

Depending on its length, one or two 3.5-mm titanium suture anchors were selected. The subscapularis tendon was then grasped with forceps to pass the sutures, but the knots were not tied at this stage (Figure 4).

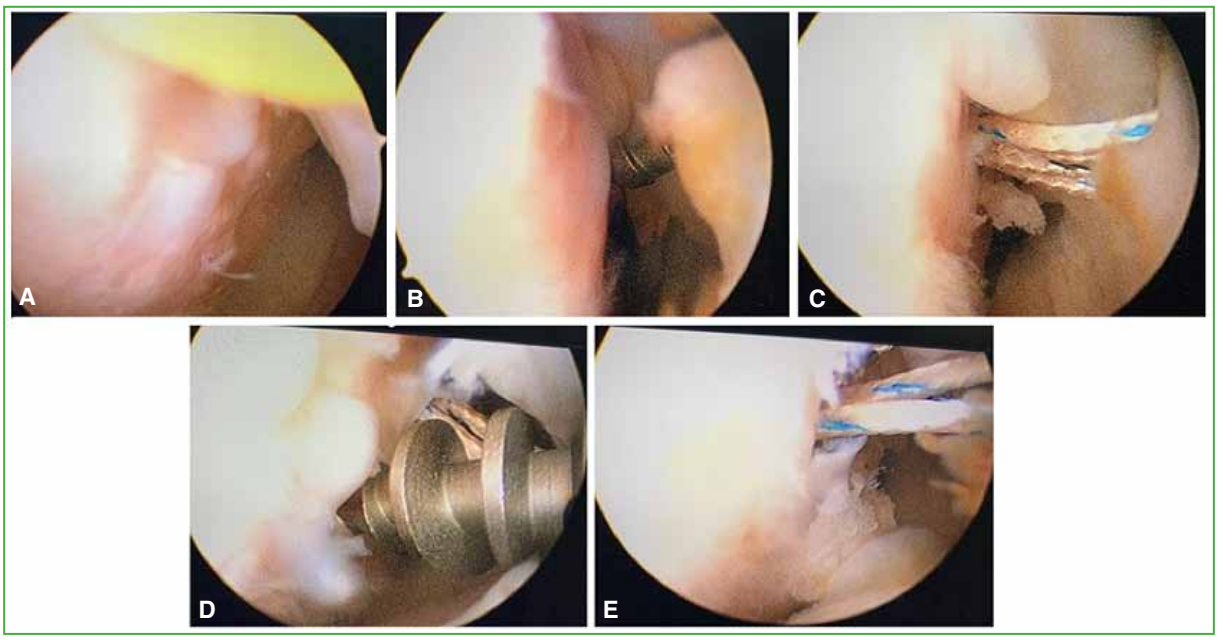

Figure 3. Arthroscopic view. **A.** Reverse Hill-Sachs defect. **B and C.** Placement of the first titanium suture anchor. **D and E.** Placement of the second anchor.

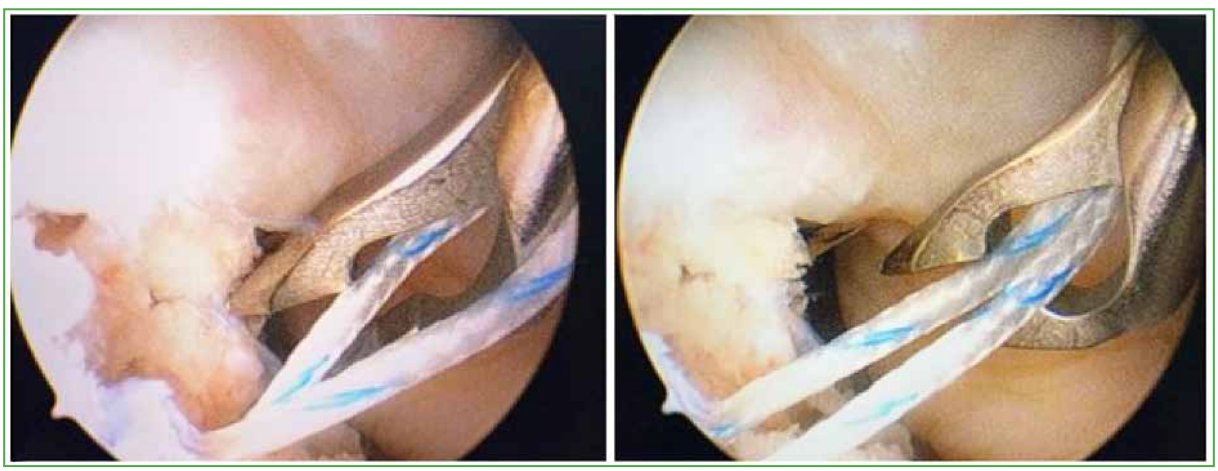

Figure 4. Arthroscopic view. Suture passage through the subscapularis muscle.

Second, posterior labral repair was performed using 3.0-mm PEEK suture anchors, double-loaded, through the same anterosuperior portal (Figure 5).

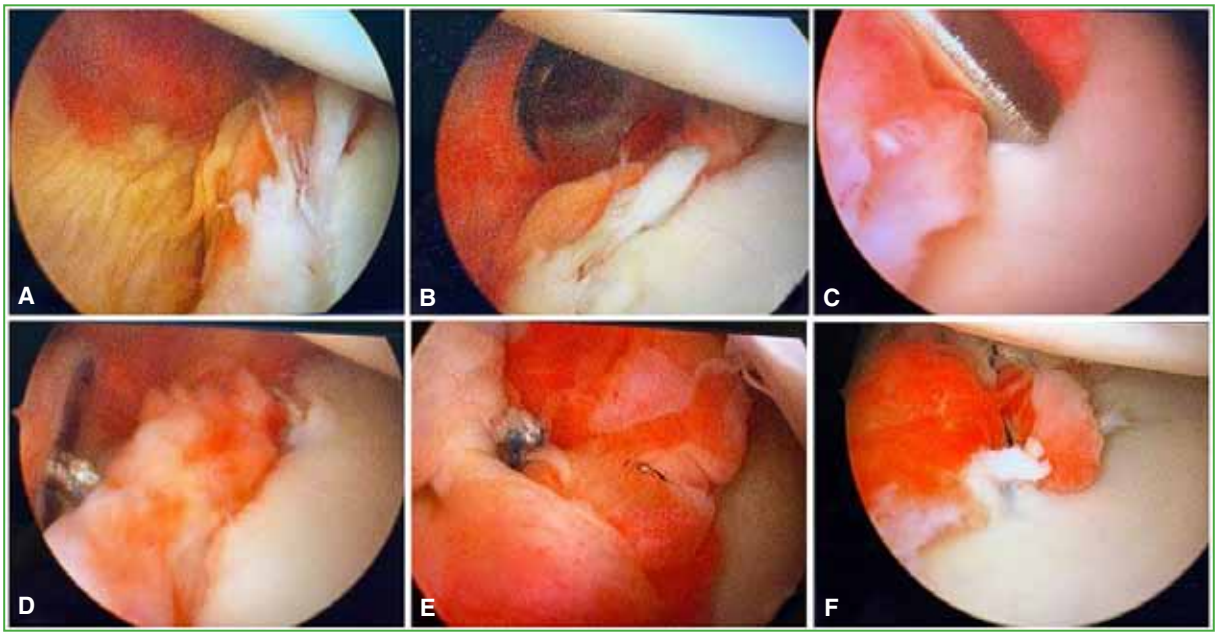

Figure 5. Arthroscopic view. **A.** Reverse Bankart lesion. **B.** Working cannula for anchor placement. **C.** PEEK anchor starter. **D.** Capture of the injured labrum. **E and F.** Labrum repaired with an anchor.

Next, the *remplissage* step was performed to fill the anteromedial humeral head defect using the sutures placed initially together with the subscapularis tendon (we prefer placing these sutures before other steps to avoid damaging the labral repair). The previously placed sutures were then tied. Finally, the alignment of the humeral head relative to the glenoid was reassessed and, after these steps, recentralization was confirmed (Figure 6).

Follow-up Protocol

Over a 9-month period, 3 patients were operated on by the same surgeon. Follow-up visits were scheduled at 2, 4, and 6 weeks, and then monthly.

A sling and arm immobilization were indicated until week 3; thereafter, patients began abduction up to 90° and forward elevation, with unrestricted elbow flexion–extension, while avoiding forced internal rotation or internal rotation >80°.

At week 6, the sling was discontinued and shoulder range of motion was progressively increased.

The first patient completed the WOSI at months 1, 3, and 9, and the other two at months 1 and 6. VAS pain scores were collected monthly through month 6 (patient 1) and through month 3 (patients 2 and 3).

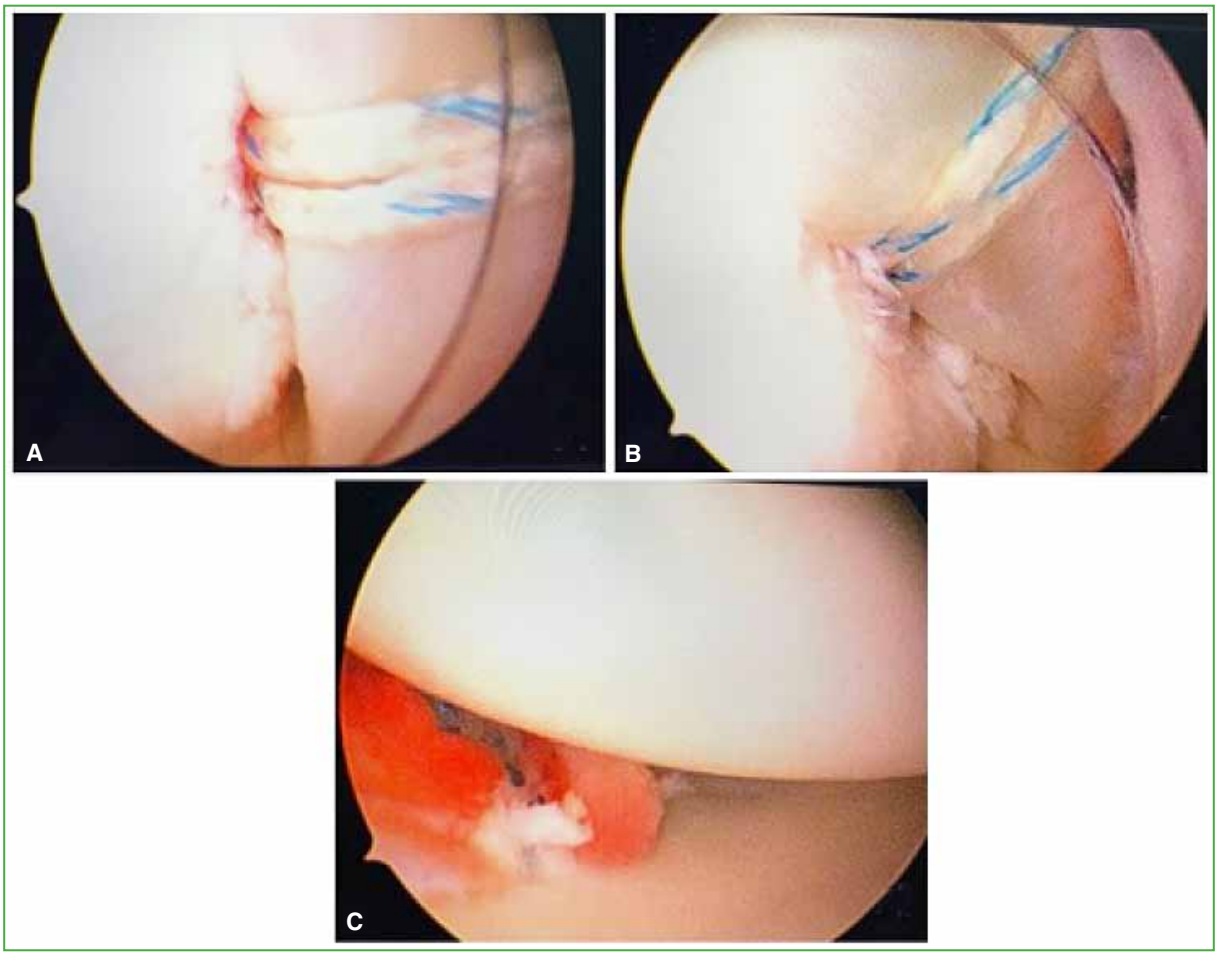

Figure 6. Arthroscopic view. **A and B.** *Remplissage:* filling of the humeral head defect. **C.** Humeral head centered within the glenoid.

RESULTS

Operative time ranged from 80 to 150 minutes (mean, 100). There were no redislocations, infections, or signs of instability in any of the 3 patients (Figure 7).

All patients reported postoperative VAS pain scores between 1 and 3 (mean, 2), managed satisfactorily with oral analgesics.

WOSI scores for the first patient were 82 at month 1, 54 at month 3, and 12 at month 9. Scores for the second patient were 81 at month 1 and 40 at month 6; for the third patient, 81 and 47, respectively.

At 7 months, the first patient was already regularly participating in impact sports.

Figure 7. Radiographs, anteroposterior shoulder **(A)** and lateral scapula (**B**), 6 months after surgery, showing joint congruence.

DISCUSSION

Posterior shoulder dislocation is less common than anterior dislocation. The humeral head defect resulting from a traumatic dislocation can progress to instability if left untreated.[10,11]

The literature describes different treatments based on the percentage of the reverse Hill–Sachs defect, as labral and capsular repair alone is insufficient when this lesion is present.[11,12]

Provencher et al. recommend addressing the defect when it involves ≥10% of the articular surface.[13]

Defects up to 25% can be addressed with a *remplissage* technique using the subscapularis tendon. When the defect is 25–50%, a bone graft is recommended; however, McLaughlin described subscapularis transfer for 20–40% defects, and Neer proposed a modification that included transferring the subscapularis with a small osteotomy of the lesser tuberosity.[14,15]

Rotational osteotomies with graft reconstruction have also been described for 25% and 50% defects. Finally, if the defect is >50%, hemiarthroplasty is recommended, and if there is glenoid erosion, total shoulder arthroplasty may be indicated.[14]

In our cases, we opted for an arthroscopic modification of the McLaughlin technique, which protects the humeral head impaction fracture and helps prevent possible redislocation during internal rotation.

By attaching the subscapularis tendon to the impaction site, we achieved a filling effect of the bony deficit. Our technique also allows repair of the posterior labral lesion when required.

Unlike the approaches proposed by Martetschläger et al. and Arauz et al., we first placed the anchors within the defect and captured the subscapularis, taking advantage of the instability to work more comfortably; we then repaired the labrum and, at the end, only needed to tie the previously placed sutures to complete filling of the defect.[15,16]

Compared with our technique, Besnard and Kelly used two 5.0-mm anchors positioned superiorly and inferiorly, performing filling by first tightening the inferior knot and then the superior knot. We believe that placing the anchors centrally within the defect allows adequate filling without generating a loss of internal rotation.[17]

Duey and Burkhart mentioned the option of using the middle glenohumeral ligament as a substitute for the subscapularis tendon; we consider this an alternative for patients with subscapularis lesions in whom the tendon cannot be used, although recovery time with this technique is longer than with the subscapularis transfer.[18]

Regarding functional outcomes, we believe the WOSI is the instrument of choice, as other scoring systems are less useful for assessing stability.[5]

A limitation of this study is the short follow-up: 9 months (one patient) and 3 months (two patients).

CONCLUSIONS

Although some dislocations may evolve favorably with physical therapy, when a bony defect is present, repair using this technique is indicated.

In these patients, stability was achieved with plication and tension results similar to those obtained with the open technique, thereby avoiding the morbidity associated with large approaches. This arthroscopic variant can be used as an option to avoid open repair techniques.

Conflicts of interest: The authors declare no conflicts of interest.

A. López ORCID ID: https://orcid.org/0009-0000-0357-4403
R. C. Ruiz ORCID ID: https://orcid.org/0000-0002-3300-0141
F. López Bustos ORCID ID: https://orcid.org/0000-0002-2504-2026
C. E. Martínez ORCID ID: https://orcid.org/0000-0002-6031-0532

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