RESEARCH ARTICLE

Outcomes of Open Bankart Repair Plus Inferior Capsular Shift Compared with Latarjet Procedure in Contact Athletes with Recurrent Anterior Shoulder Instability

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Abstract

Background: Open Bankart repair plus inferior capsular shift (OBICS) and Latarjet procedure (LA) are considered appropriate treatment alternatives for high-performance athletes. The purpose of this study was to evaluate the functional outcomes and recurrence rate of each surgery. Our hypothesis: there were no differences between the two treatments.

Methods: A prospective cohort study was conducted with n=90 contact athletes divided into two groups of 45 patients. One group was treated with OBICS, and the other one with LA. The mean follow-up period was 25 (24-32) months for the OBICS group and 26 (24-31) months for the LA group. Primary functional outcomes of each group were assessed at baseline, six months, one year, and two years after surgery. The functional outcomes were also compared between the groups. The evaluation tools used were the Western Ontario Shoulder Instability score (WOSI) and the American Shoulder and Elbow Surgeons scale (ASES). In addition, recurrent instability and range of motion (ROM) were also evaluated.

Results: In each group, significant changes were found in the WOSI score and ASES scale from pre-op to postop. However, there were no significant differences between the functional outcomes of the groups at the final follow-up (P-values 0.73 and 0.19). Three dislocations and one subluxation (8.8%) were reported in the OBICS group, and three subluxations were reported in the LA group (6.6%), revealing no significant differences between the groups (*P=0.37*). Moreover, there were no significant differences between preoperative and postoperative ROM in each group or in terms of external rotation (ER) and ER in 90º abduction between the groups.

Conclusion: No differences were found between OBICS and LA surgery. Both procedures can be indicated according to the surgeon's preference to reduce recurrence rates in contact athletes with recurrent anterior shoulder instability.

Level of evidence: II

Keywords: Inferior capsular shift, Glenoid bone defect, Open Bankart repair, Recurrent anterior shoulder dislocation

Introduction

Contact athletes with anterior shoulder instability constitute a high-risk group of patients for whom the choice of surgical treatment is quite controversial.[1] The essential lesion is the avulsion of the glenoid labrum from the 2 to 6 o'clock position and the irreversible stretching of the anteroinferior capsuloligamentous system, an entity known as the Bankart lesion.[2] The surgical treatment, which can be an open or arthroscopic procedure, is the best option for those patients who want to continue playing sports. However, the ideal surgical procedure remains a controversial issue.[3] The Bankart repair was described in 1923, and its purpose is to reinsert the anteroinferior glenoid labrum to its bone margin using anchors.[4] Neer and Foster described

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the open inferior capsular shift (ICS), later modified by Altchek et al.[5] For many years, the open Bankart repair was considered the gold standard procedure for contact athletes with recurrence rates under 11%.[6] With the advent of new arthroscopic techniques, open procedures were progressively replaced for many reasons.[7] However, the current literature reports a higher recurrence rate in patients treated with isolated arthroscopic Bankart repair (IABR), particularly in the long term.[8] In this sense, an at-risk population can probably explain the increased recurrence.[9] Different algorithms have been recently developed to facilitate the ideal treatment choice.[10] OBICS surgery is a reliable treatment alternative for contact athletes, although it is not always included in these algorithms. With recurrence rates between 0% and 11%, its excellent indication is male collision athletes, under 20 years old, with glenoid bone defect below 20%, multiple dislocations (>5), poor capsulolabral tissue, revision of correctly performed arthroscopic procedures, and patients who report instability in activities of daily living or during sleep.[11] LA surgery reports better results in terms of recurrence rates, which range from 0 to 9.9%.[10] This procedure may be indicated in patients with glenoid bone defect greater than 25% or as an alternative to remplissage in bipolar bone lesions with glenoid bone defect less than 25% and Hill-Sachs "off track". It is also considered the ideal procedure for revisions. In some European countries, LA is the first line of treatment in contact athletes with or without bone defects who report a failure with conservative treatment.[12] However, some concern exists about this procedure due to the higher rate of complications.[13] Therefore, treating this at-risk group with any of the two alternatives proposed would seem reasonable. To our knowledge, in this context, OBICS and LA surgery have never been compared. Hence, this study aimed to evaluate the functional outcomes and recurrence rate of each surgery. Our hypothesis: there were no differences between the two treatments.

Materials and Methods

A prospective cohort study included n=130 contact sports with recurrent anterior shoulder instability who gave their informed consent. The minimum follow-up was 24 months. Only ninety patients completed the study. The surgeries were performed by four surgeons with more than ten years experience. There were two groups: OBICS n=45 and LA n=45. The allocation of patients to each group was performed according to the surgeon's preference. Recurrent anterior shoulder dislocation was defined as the presence of two or more dislocation and/or subluxation episodes. Sports such as rugby, soccer, basketball, volleyball, handball, martial arts, and boxing were considered contact sports. All patients were high-performance athletes, who practiced eight or more hours per week. They underwent anteroposterior X-rays in a neutral position, ER, and internal rotation (IR), as well as MRI and 3D CT scan. This study included contact athletes aged>18 years with recurrent anterior shoulder instability, whose only symptoms were at least two or more dislocation and/or subluxation episodes. All patients had a Hill-Sachs lesion smaller than 25% measured using a 3D CT scan. All Hill-Sachs lesions were on-track. Patients with SLAP and posterior labral lesions without pain on physical examination were also included. None of these lesions were treated surgically. The exclusion criteria were: patients > 40 years of age, glenoid bone defects, Hill-Sachs lesions greater than 25%, non-contact sports, previous shoulder surgeries, degenerative changes, rotator cuff tears, pain as the main symptom, multidirectional instability or voluntary instability [Figure 1].

Surgical Techniques

Open Bankart Repair Plus Inferior Capsular Shift

OBICS was performed as described by Neer and Foster (1980). The patient was positioned in a beach chair with a slight interscapular elevation. A mini deltopectoral subaxillary approach was chosen, and the subscapularis muscle tendon was split horizontally. In patients with hyperlaxity, a tenotomy was performed 1.5 cm medial to the bicipital groove. In both cases, the tendon was separated from the anterior capsule. Then, a "T" capsulotomy was performed, creating a superior and inferior flap, the latter being obtained by raising the flap from the humeral neck with the arm in external rotation to achieve greater release of the inferior capsule. The Bankart repair was conducted by releasing the anteroinferior glenoid labrum with a periosteal elevator. Debridement of the bone bed was performed with a curette, and 3 or 4 anchors were placed. The inferior capsular flap was displaced upwards and fixed with non-absorbable sutures in the area inferior to the humeral neck with the arm placed at more than 30º ER. In those cases where the rotator interval was open, it was decided that it should be closed with two sutures. After this, the superior flap was placed to overlap with the inferior flap and fixed to the soft tissue of the lesser tuberosity with non-absorbable sutures. The subscapularis tendon was anatomically repaired.

Latarjet Surgery

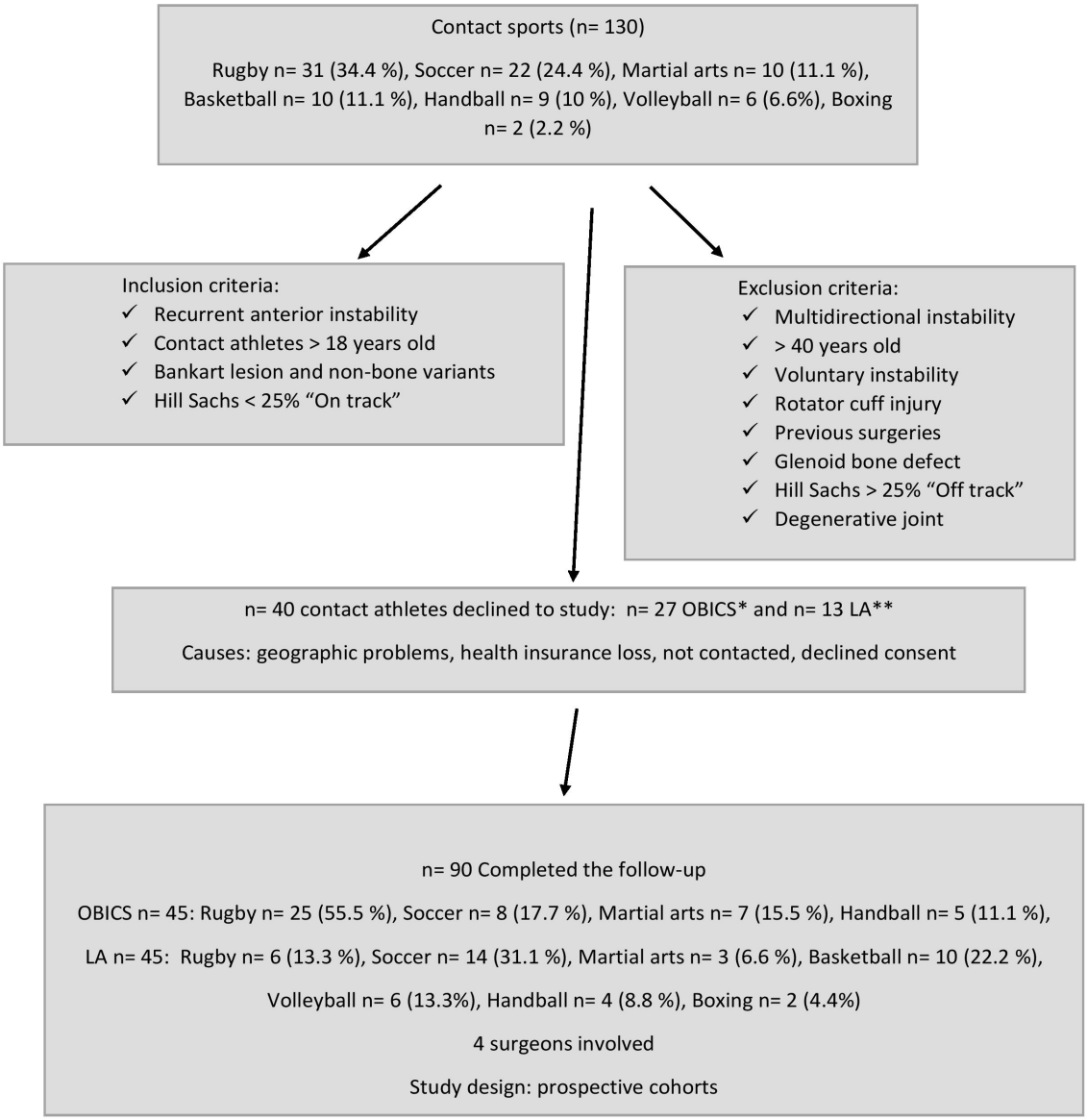
The procedure was carried out with the patient seated in a beach chair with interscapular elevation. A 5 cm incision was made on the deltopectoral groove from the coracoid apophysis to the axillary fold. Once the coracoid apophysis was isolated from its soft tissues, it was osteotomized at its base with a manual saw at a 90º angle. A coracoid with a length of no less than 1.5 cm was obtained in all cases. The subscapularis tendon was split horizontally between the two upper thirds and the lower third of the muscle. The articular capsule was opened horizontally in an area close to the glenoid margin, and the glenoid bone edge was correctly isolated with retractors. The labrum was lifted by debriding the bone margin, and the coracoid was positioned and fixed to the glenoid margin with one or two 3.5 mm cannulated screws, the main one being placed at the 5'clock position. Capsular repair of the coracoacromial ligament was performed at 30º ER to finish the third component of the triple effect.

Postoperative rehabilitation

The rehabilitation protocol was the same for both groups. A protective sling was worn for six weeks. Active flexion and extension movements of the elbow were allowed immediately. From week 3: pendulum exercises and active ER assisted by the patient up to 30º. As from week 6: assisted passive and active movements including elevation, IR, and ER. As from week 10: muscle strengthening exercises and ROM improvement. After week 14, and depending on the evolution of each patient, sports rehabilitation and improvement of muscle strength was allowed. Return to the sport was enabled after six months, depending on the individual patient.

Functional and Clinical Evaluation

The WOSI score and the ASES scale were used to measure the primary functional outcomes. They were both translated into Spanish and adapted. The WOSI score is a valid and reliable tool that is specifically used to measure the quality of life, while the ASES scale is a tool used to measure function specifically. All patients were evaluated pre and postoperatively and then between



*OBICS, Open Bankart Repair Inferior Capsular Shift; **LA, Open Latarjet.

Figure 1. Methodological diagram showing the types of contact sports, groups and inclusion and exclusion criteria

groups. Recurrent instability was evaluated between the two groups without considering the intensity of the traumatic event. The pre and postoperative ROM of each group, as well as between groups, was also assessed using a manual goniometer. The complications inherent to each surgical procedure were documented. All the evaluations were conducted at six months, one year, and two years.

Statistical Analysis

SPSS for Windows 7 version 18.0 was used for data analysis. A P value below 0.05 was considered significant. A Student's t-test was carried out for independent samples to evaluate the difference between preoperative and postoperative longitudinal measurements of range of motion and functional scores. The χ^2 test was used to compare the recurrence rates between the groups.

Results

Baseline Characteristics and Primary Functional Outcomes

There were no significant differences between the demographic characteristics of the two groups [Table 1]. The mean preoperative WOSI score was 41.2 ± 18.0 for the OBICS group and 40.8 ± 19.2 for the LA group. Concluded the follow-up, the mean score was 85.2 ± 18.4 for the OBICS group and 83.5 ± 19.8 for the LA group. The mean preoperative ASES scores for OBICS and LA groups were 66.8 ± 18.4 and 64.6 ± 21.6, respectively. The mean score was 91.5 ± 11.5 for the OBICS group and 91.9 ± 12.3 for the LA group. The mean values at the end of follow-up improved significantly compared to the preoperative values of both groups, all being statistically significant (*P< 0.05*). However, there were no significant differences in WOSI and ASES scores between the groups at the end of follow-up (*P values* 0.73 and 0.19). [Tables 2; 3].

Recurrent Instability

There were no significant differences between the groups regarding recurrence, *P=0.37*. Four patients (8.8%) of the OBICS group reported recurrences. All were rugby players, two under 20 years of age with hyperlaxity; three had more than six episodes of previous dislocations, and the size of the Hill-Sachs lesion ranged between 20% and 25%. All recurrences were traumatic during sports activities. No dislocations were recorded in the LA group; three patients (6.6%) had episodes of subluxation and pain before the end of follow-up. All of them were under 25 years of age, had hyperlaxity, and more than six episodes of the previous dislocation. Two of them reported a Hill Sachs lesion of 25%. All recurrences occurred after a traumatic event. The rugby player made a tackle 8 months after the surgery; a patient doing judo

Table 1. Baseline demographic characteristics of included patients

Variables		OBICS*	LA**	*P value*
Patients (nº)	90	45	45	-
Sex (nº)				0.42
- Male		42	45	
- Female		3		
Average age (min- max)		26.5 (18-38)	25.5 (18-35)	0.91
Mean time from consultation to repair (mo)		65 (52-81)	59 (48-75)	
Involved dominant shoulder (nº)		33	36	0.80
Dislocations (nº of patients)				0.50
- 1 Dislocation / multiple subluxatios		4	6	
- 2-6 dislocations		26	28	
- > 6 dislocations		15	11	
Nº of patients / nºanchors -screws		33 (4 anchors)	30 (2 screws)	
Follow up (mo)		25.2 (24-32)	26.2 (24-31)	0.07
Images (nº of patients)				0.32
- SLAP /posterior labrum	18	10	8	
- Classic Bankart	39	19	20	
- Alpsa	22	12	10	
- Perthes	20	11	9	
- Glad	9	3	6	
- Hill Sachs	90	45	45	

*OBICS, Open Bankart Repair Inferior Capsular Shift; **LA, Open Latarjet

Table 2. WOSI score and ASES scale at final follow up evaluation*

	OBICS		*P value*	LA		*P value*
	Baseline	2 years		Baseline	2 years	
WOSI	41.2 ± 18.0	85.2 ± 18.4	< 0.001	40.8 ± 19.2	83.5 ± 19.8	< 0.001
ASES	66.8 ± 18.4	91.5 ± 11.5	< 0.001	64.6 ± 21.6	91.9 ± 12.3	< 0.001

*Values are presented as the mean ± SD. WOSI, Western Ontario Shoulder Instability Index; ASES, American Shoulder and Elbow Surgeons; OBICS, Open Bankart Repair Inferior Capsular Shift; LA, Open Latarjet.

Table 3. WOSI score and ASES scale. Comparison between groups at final follow up*

	OBICS	LA	*P value*
WOSI media ± SD	85.2 ± 18.4	83.5 ± 19.8	0.73
ASES media ± SD	91.5 ± 11.5	91.9 ± 12.3	0.19

*Values are presented as the mean ± SD. WOSI, Western Ontario Shoulder Instability
Index; ASES, American Shoulder and Elbow Surgeons; OBICS, Open Bankart Repair
Inferior Capsular Shift; LA, Open Latarjet.

in a tournament had a forced fall on his arm in abduction 15 months after the surgery, and a goalkeeper had a high-energy accident on a quadricycle [Table 4].

Range of Motion

No significant differences were reported between the pre-and postoperative ROM of each group. In addition, no differences were found in ER at the end of follow-up between the groups (*P values* 0.65 and 0.47). [Tables 5; 6].

Table 4. Recurrent instability at final follow-up evaluation

	OBICS*	LA**	*P value*
Recurrence nº (%)	4 (8.8%)	3 (6.6%)	0.37
Recurrence type	3 dislocations 1 subluxation	3 sublux-ations	
Risk factors			
Sport (nº)	4 rugbier	rugbier, Judo, goalkeeper	
Age < 25 (nº)	2 < de 20	3 < de 25	
Hyperlaxity (nº)	2	3	
Previous episodes (nº)	3 > de 6	3 > de 6	
Hill Sachs 25 % size (nº)	3	2	
Traumatic recurrence (nº)	4	3	
Rescue surgery	2 Latarjet	2 Eden Hybinette	
	2 Physician change	1 Change sport	

*OBICS, Open Bankart Repair Inferior Capsular Shift; **LA, Open Latarjet.

Tabla 5. Range of motion at final follow up evaluation*

ROM	OBICS		*P* value	LA		*P value*
	Baseline	years 2		Baseline	years 2	
FF	13.2º ± 160.2	10.3 ± 161.3	0.13	7.5 ± 155.6	14.5 ± 160.8	0.11
IR 90º	9.8 ± 67.8	10.6 ± 66.7	0.62	14.6 ± 66.8	11.2 ± 62.6	0.48
ER elbow	7.9 ± 55.1	8.93 ± 54.9	0.23	12.2 ± 58.9	12.8 ± 57.5	0.45
ER 90º	6.3 ± 74.5	7.6 ± 73.2	0.56	10.6 ± 75.7	13.6 ± 74.6	0.87

*Values are presented as the mean ± SD. OBICS, Open Bankar Repair Inferior Capsular Shift; LA, Open Latarjet; ROM, Range of motion; FF, Forward flexion; IR 90º, Internal rotation 90º; ER elbow, External rotation at the side; ER 90º, External rotation abduction 90º.

Table 6. External rotation. Comparison between groups at final follow up*

External rotation	OBICS	LA	*P value*
ER elbow media ± SD	54.9 ± 8.93	57.5 ± 12.8	0.65
ER 90º media ± SD	73.2 ± 7.6	74.6 ± 13.6	0.47

*Values are presented as the mean ± SD. OBICS, Open Bankar Repair Inferior Capsular Shift; LA, Open Latarjet; ER elbow, External rotation at the side; ER 90º, External rotation abduction 90º.

Complications

Superficial infection was reported in the OBICS group. A motor-sensory paralysis of the radial nerve and a motor paralysis of the musculocutaneous nerve were reported in the LA group. Five patients developed hematomas immediately after surgery. Ten patients reabsorbed the superior pole of the coracoid, while there was no bone consolidation at the anteroinferior glenoid margin in eight patients.

Discussion

To our knowledge, this is the first research work making a direct prospective comparison between OBICS and LA surgery in contact athletes with recurrent anterior shoulder instability. The most relevant finding is the absence of significant differences between the main variables. In the OBICS group, three patients reported recurrence in the form of dislocation, and one patient had subluxation episodes (8.8%), while in the LA group, three patients (6.6%) had subluxation episodes. This nonsignificant difference might be explained as follows. First, neither of the groups included patients with substantial glenoid bone loss. Recent publications have reported the importance of glenoid bone defect as a major risk factor in the recurrence of instability.[14] Burkhart and De Beer reported that a glenoid bone defect greater than 25% is associated with a high recurrence rate with IABR, which decreases to 4% in the absence of the former.[15] Although OBICS has been used by some surgeons in cases of significant glenoid bone loss, the ideal indication is when there is no glenoid bone defect.[16] The exclusion from this study of patients with glenoid bone defect placed OBICS in a better position for comparisons. Second, ICS has shown to be a surgical tool that increases the stability obtained by the Bankart repair alone, making this surgery one of the procedures with the lowest recurrence rates in contact athletes.[17,18] Compared to IABR, this procedure has reported better results in terms of recurrence, particularly in the long term.18 Few studies report recurrence outcomes comparing ICS and LA surgery.[19] In a meta-analysis comparing LA versus Bankart repair procedures, An et al. found a higher rate of recurrence in anatomic repairs (open and arthroscopic Bankart repair). However, no significant differences were found when only comparing LA and OBICS.[20] Rollick et al. analyzed the long-term repair results of IABR, OBICS, and LA surgery. The recurrence rates were 15.1%, 7.7%, and 2.7%, respectively. Although a significant difference was reported between IABR and LA, no differences were found between the open procedures.[13] The ICS might be considered another factor that leveled the field for comparisons in this study. No differences were found between the two groups about WOSI score and ASES scale. Some scores report less pain and better function with the arthroscopic procedures compared to the open ones during the first three months. After these, results improve, achieving full recovery at one year follow-up.[21] In this study, the absence of such difference is probably explained by the fact that the comparison was made between open procedures only. No significant differences were reported pre and postoperatively in terms of ER in each group or between them. There is only one retrospective study comparing ICS with LA surgery. The authors did not report any significant differences in ROM, particularly ER.[22] Recent meta-analyses and systematic reviews show controversial results. An et al. report a loss of ER of 11.5º with LA while the loss of ER with Bankart repair was 20.9º. However, the authors consider no difference between the open and arthroscopic Bankart procedures.[20] This is an important point if we consider the results by Mohtadi et al., who reported no significant differences in ER between OBICS and IABR. Surprisingly, the authors reported a loss of ER between the pre and postoperative in the arthroscopic group.[22] Some studies have associated articular stiffness and loss of ER with the tenotomy and subsequent repair of the subscapularis tendon; to avoid this complication, authors suggest performing a horizontal split of the subscapularis tendon, capsular reinsertion with the arm in ER, and early rehabilitation.[23] All LA group patients and some OBICS group patients underwent horizontal division of the subscapularis tendon. Nevertheless, in a smaller group of patients in the OBICS group, who required a broader ICS, we preferred to perform the tenotomy of the subscapularis tendon with subsequent We preferred to perform tenotomy of the subscapularis tendon with posterior anatomical reinsertion of the tendon. Similarly, Mohtadi et al. reported that although most of their patients underwent a horizontal split of the subscapularis tendon, in some cases, it was split vertically. The authors did not report any loss in ER between the open and arthroscopic groups.[22] Xu et al. did not report any differences in ER between ICS and LA. When conducting the OBICS, the authors performed the tenotomy of the subscapularis tendon at 1 cm of the lesser tuberosity.[19] Some studies have reported that the degree of ER at which the ICS is performed is directly related to postoperative loss of ER. Uchiyama et al. suggest that, to prevent ER limitations in OBICS repair, the ICS must be performed with the arm at 45º ER. They conclude that if the ICS is performed at less than 30º, the loss of ER will be greater.[17] In our study, the ICS was performed with the arm at more than 30º ER in all patients. Probably, the ICS performed at more than 30º ER and the rotator interval closure in patients who required this may have been the main reason this group of patients achieved acceptable stability while keeping ER unaffected. All LA group patients, the reinsertion of the coracoacromial ligament with the capsule was performed at 30º ER. A larger number of complications in our study was reported with the LA procedure. Studies report a complication rate of 15% with LA and even up to 25%.[24] In our study, there was one case of radial nerve palsy and one of musculocutaneous nerve palsy (4.4%). Both cases resolved spontaneously before three months. Most cases consist of neuropraxia occurring due to traction of the retractors during surgery and spontaneously recovering before 3 months.[23,24] Ten patients (22.2%) had coracoid osteolysis, and one reported subluxation episodes. Di Giacomo reported a coracoid osteolysis rate of 59.5%. However, this finding had no direct correlation with recurrence in his patients. The authors concluded that in cases of coracoid bone resorption, the stabilizing effect of LA remains without clinical relevance for the patient.[25] Bone consolidation was not achieved in eight patients

(17.7%). None of these patients had subluxation episodes. Walch et al. reported a fibrous union of 1.5% with no consequences in instability.[26] This study had limitations; a) It is not randomized. The allocation of patients to each group was biased by the surgeon's surgical preference. b) The loss to follow-up was 30.7%. The main causes were geographic problems and health insurance loss. c) The results of our study were obtained from a sample in which collision and contact athletes were grouped into the same category. Rossi et al. found high variability in functional outcomes and recurrence among contact athletes treated with arthroscopic Bankart repair.[27] In future works, it will be necessary to differentiate collision athletes from contact athletes as well as sports performance level.

No differences were found between OBICS and LA surgery. Both procedures can be indicated according to the surgeon's preference to reduce recurrence rates in contact athletes with recurrent anterior shoulder instability.

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References

1. Yamamoto N, Kijima H, Nagamoto H, et al. Outcome of Bankart repair in contact versus non-contact athletes. Orthop Traumatol Surg Res. 2015; 101(4):415-9. doi:10.1016/j.otsr.2015.03.008.
2. Sanborn L, Arciero RA, Yang JS. Don't forget the open Bankart. Look at the evidence. Ann Joint. 2017; 2:67. doi:10.21037/aoj.2017.10.10.
3. Murphy AI, Hurley ET, Hurley DJ, Pauzenberger L, Mullett H. Long-term outcomes of the arthroscopic Bankart repair: a systematic review of studies at 10-year follow-up. J Shoulder Elbow Surg. 2019; 28(11):2084-2089. doi: 10.1016/j.jse.2019.04.057.
4. Bankart AS, Cantab MC. Recurrent or habitual dislocation of the shoulder-joint.1923. Clin Orthop Rel Res. 1993: (291):3-6.
5. Altchek DW, Warren RF, Skyhar MJ, Ortiz G. T-plasty modification of the Bankart procedure for multidirectional instability of the anterior and inferior types. J Bone Joint Surg Am. 1991; 73(1):105-112.
6. Mohtadi NGH, Bitar IJ, Sasyniuk TM, Hollinshead RM, Harper WP. Arthroscopic versus open repair for traumatic anterior shoulder instability: A meta-analysis. Arthroscopy. 2005; 21(6):652-8. doi:10.1016/j.arthro.2005.02.021.
7. Chen L, Xu Z, Peng J, Xing F, Wang H, Xiang Z. Effectiveness and safety of arthroscopic versus open Bankart repair for recurrent anterior shoulder dislocation: a meta-analysis of clinical trial data. Arch Orthop Trauma Surg 2015; 135(4):529-38. doi:10.1007/s00402-015-2175-0.
8. Berendes TD, Wolterbeek R, Pilot P, Verburg H, Slaa RL. The open modified Bankart procedure: outcome at follow-up of 10 to 15 years. J Bone Joint Surg Br 2007; 89(8):1064-8. doi:10.1302/0301-620X.89B8.19280.
9. Balg F, Boileau P. The instability severity index score. A simple pre-operative score to select patients for arthroscopic or open shoulder stabilisation. J Bone Joint Surg Br. 2007; 89(11):1470-7. doi:10.1302/0301-620X.89B11.18962.
10. White AE, Patel NK, Hadley CJ, Dodson CC. An Algorithmic Approach to the Management of Shoulder Instability. J Am Acad Orthop Surg Glob Res Rev 2019; 23;3(12):e19.00168. doi:10.5435/JAAOSGlobal-D-19-00168.
11. Merrill CA, Arciero R. Open Bankart Repair: A Reproducible Technique. Operative Techniques in Sports Medicine. 2019; (27), 1:42-48. doi:10.1053/j.otsm.2019.01.007.
12. Wong SE, MD, Friedman LG, Garrigues GE. Arthroscopic Latarjet: Indications, Techniques, and Results. Arthroscopy. 2020; 36(8):2044-2046. doi: 10.1016/j.arthro.2020.06.002.
13. Rollick NC; Ono Y, Kurji HM, et al. Long-term outcomes of the Bankart and Latarjet repairs: a systematic review. Open Access J Sports Med. 2017; 15; 8:97-105. doi:10.2147/OAJSM.S106983.
14. Wellmann M, De Ferrari H, Smith T, et al. Biomechanical investigation of the stabilization principle of the Latarjet procedure. Arch Orthop Trauma Surg. 2012; 132(3):377-86. doi:10.1007/s00402-011-1425-z.
15. Burkhart SS, De Beer JF. Traumatic glenohumeral bone defects and their relationship to failure of arthroscopic Bankart repairs: significance of the inverted-pear glenoid and the humeral engaging Hill-Sachs lesion. Arthroscopy 2000; 16(7):677-94. doi:10.1053/jars.2000.17715.
16. Moroder P, Odorizzi M, Pizzinini S, Demetz E, Resch H, Moroder P. Open Bankart repair for the treatment of anterior shoulder instability without substantial osseous glenoid defects: results after a minimum follow-up of twenty years. J Bone Joint Surg Am. 2015; 2, 97(17):1398-405. doi: 10.2106/JBJS.N.01214.
17. Uchiyama Y, Handa A, Shimpuku E, et al. Open Bankart repair plus inferior capsular shift versus arthroscopic Bankart repair without augmentations for traumatic anterior shoulder instability: A prospective study. J Orthop Surg (Hong Kong). 2017; 25(3):2309499017727947.
18. Fabre T, Abi-Chahla ML, Billaud A, Billaud A, Geneste M, Durandeau A. Long-term results with Bankart

procedure: A 26-year follow-up study of 50 cases. J Shoulder Elbow Surg. 2010; 19(2):318-23. doi: 10.1016/j.jse.2009.06.010.
19. Xu Y, Wu K, Ma Q, et al. Comparison of clinical and patient-reported outcomes of three procedures for recurrent anterior shoulder instability: arthroscopic Bankart repair, capsular shift, and open Latarjet. J Orthop Surg Res. 2019; 18, 14(1):326. doi:10.1186/s13018-019-1340-5.
20. An V, Sivakumar B, Phan K, Trantalis J. A systematic review and meta-analysis of clinical and patient-reported outcomes following two procedures for recurrent traumatic anterior instability of the shoulder: Latarjet procedure vs. Bankart repair. J Shoulder Elbow Surg. 2016; 25(5):853-63. doi: 10.1016/j.jse.2015.11.001.
21. Nourissat G, Neyton L, Metais P, et al. Functional outcomes after open versus arthroscopic Latarjet procedure: A prospective comparative study. Orthopaedics & Traumatology: Surgery & Research. Orthop Traumatol Surg Res. Orthop Traumatol Surg Res 2016; 102(8S):S277-S279. doi:10.1016/j.otsr.2016.08.004.
22. Mohtadi NGH, Chan DS, Hollinshead RM, et al. Randomized Clinical Trial Comparing Open and Arthroscopic Stabilization for Recurrent Traumatic Anterior Shoulder Instability Two-Year Follow-up with Disease-Specific Quality-of-Life Outcomes. J Bone Joint Surg Am. 2014; 96(5):353-60. doi: 10.2106/JBJS.L.01656.
23. Domos P, Lunini E, Walch G. Contraindications and complications of the Latarjet procedure. Shoulder Elbow. 2018; 10(1):15-24. doi: 10.1177/1758573217728716.
24. Shah AA, Butler RB, Romanowski J, Goel D, Karadagli D, Warner JJ. Short-term complications of the Latarjet procedure. J Bone Joint Surg Am. 2012; 21; 94(6):495-501. doi:10.2106/JBJS.J.01830.
25. Di Giacomo G, Costantini A, Gasperis N, et al. Coracoid graft osteolysis after the Latarjet procedure for anteroinferior shoulder instability: a computed tomography scan study of twenty-six patients. J Shoulder Elbow Surg. 2011; 20(6):989-95. doi:10.1016/j.jse.2010.11.016.
26. Walch G and Boileau P. Latarjet-Bristow procedure for recurrent anterior instability. Tech Shoulder Elbow Surg. 2000; 1(4):256-261.
27. Rossi LA, Tanoira I, Gorodischer T, Pasqualini I, Ranalletta M. High Variability in Functional Outcomes and Recurrences Between Contact Sports After Arthroscopic Bankart Repair: A Comparative Study of 351 Patients With a Minimum 3-Year Follow-Up. Arthrosc Sports Med Rehabil. 2020; 2(5): e575–e581. doi.org/10.1016/j.asmr.2020.07.004.