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Arthroscopic Bankart repair and subscapularis augmentation: an alternative technique treating anterior shoulder instability with bone loss

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Background: This study presents the preliminary results of a new arthroscopic technique consisting of the association of 2 procedures, capsulolabral repair and subscapularis augmentation tenodesis, in the treatment of traumatic anterior shoulder instability with both glenoid bone loss and a Hill-Sachs lesion.
Methods: Eighty-nine patients engaged in sports were enrolled in this retrospective case-series study with 2 to 5 years' follow-up. All patients underwent a computed tomography scan to assess the percentage of glenoid bone loss by the Pico method. A prior stabilization procedure had failed in 20 patients, who were then segregated into a different group. Visual analog scale (VAS), Rowe, and American Shoulder and Elbow Surgeons (ASES) scores were used to assess the results.
Results: Only 3 of 89 patients had a post-traumatic redislocation. The mean length of follow-up was 31.5 months (range, 25-60 months). The VAS, Rowe, and ASES scores showed significant improvements: The VAS score decreased from a mean of 3.1 to 0.5 ($P = .0157$), the Rowe score increased from 58.9 to 94.1 ($P = .0215$), and the ASES score increased from 68.5 to 95.5 ($P = .0197$). The mean deficit of external rotation was 6° with the arm at the side of the trunk, and the mean deficit was 3° with the arm in 90° of abduction.
Conclusions: The described procedure is a reproducible and effective technique used to restore joint stability in patients engaged in sports who have incurred anterior recurrent shoulder dislocation associated with glenoid bone loss (<25%) and a Hill-Sachs lesion.

This study was operational and by no means experimental. Therefore it did not require strict selection criteria or rigid actions or envisage violations. In addition, arthroscopic equipment and all devices used for arthroscopic repair and tendon fixation were already CE marked in Europe for orthopedic surgery for the period of the study. Accordingly, ethical approval was waived in light of the observational retrospective design. All patients provided written informed consent for the index procedure, for phone or direct visit follow-up, and for the use of clinical data.

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Level of evidence: Level IV, Case Series, Treatment Study.

Keywords: Traumatic shoulder instability; arthroscopic subscapularis augmentation; glenoid defect; Hill-Sachs lesion

Over the past few decades, arthroscopic anterior capsulolabral repair, which is focused on reconstructing labral and capsular ligamentous structures, has become the most popular method for the treatment of anterior shoulder instability, producing results that are nearly equivalent to open repair.[1,3,4,12,48,60] To obtain the best results, this procedure must achieve an accurate reconstruction of the glenoid labrum with the correct number of anchors and physiological tension of the inferior glenohumeral ligament.[16,42] Furthermore, glenohumeral bone integrity is mandatory.[6]

Burkhart and De Beer[13] highlighted the role of bone defects in their failed cases. Importantly, the high failure rate of 67% was mainly because of significant bone defects such as anterior-inferior glenoid bone loss (GBL) or large engaging Hill-Sachs lesions.

In these cases, different techniques may be used as effective alternatives to anterior capsulolabral repair, ranging from the association of the Bankart repair and posterior remplissage[5,11,59] to the open procedure[1,8,14] or fully arthroscopic Bristow-Latarjet[9,10,15,37,38] and bone graft procedures.[40,46,52,55,58] However, the results of these procedures remain controversial.

The Hill-Sachs remplissage procedure presents its own rationale, whereas the potential for stable healing of the capsule and tendon on the humeral head and its role in the presence of anterior capsular deficiency and GBL has not yet been well defined.[5,59] Moreover, the anatomy and function of the infraspinatus tendon are impaired.[27]

Despite low recurrence rates and good clinical results, the Latarjet procedure is a nonanatomic reconstruction and may limit functionality and increase the rate of secondary osteoarthritis by up to 60%.[1,30] Latarjet arthroscopic versions[37,38,44] still represent highly demanding techniques with a significant number of intraoperative complications.[30,31] Indications for bone graft procedures are not well defined, particularly in the presence of anterior capsulolabral insufficiency,[25,32] and failure could occur because of graft reabsorption.[26] Moreover, to date, no study has shown which arthroscopic technique could be used in cases with bipolar bony defects (GBL and Hill-Sachs lesion) particularly in young active patients engaged in sports or after the failure of capsular and Bankart repairs.

In 1986 Johnson[35] described an arthroscopic technique that addressed recurrent shoulder dislocation in patients with ''virtually nonexistent glenohumeral ligaments'' using the articular portion of the subscapularis tendon; however, this technique was abandoned because of potential complications related to the placement of metal staples for soft-tissue fixation adjacent to the level of the glenoid edge.[22,33] More recently, Denard et al[24] and Chaudhury et al[19] described 2 different procedures involving the subscapularis tendon to augment insufficient anterior capsulolabral tissue.

On the basis of Johnson's concept, we developed a new surgical technique[41] consisting of the combination of Bankart repair and arthroscopic subscapularis augmentation (ASA) with tenodesis of the upper third of the tendon (Fig. 1). Our purpose was to assess the short-term results of this technique to treat anterior shoulder instability in young active patients with a Hill-Sachs lesions, GBL (<25%), and insufficiency of the anterior capsulolabral unit in primary as well as in previous failed surgical procedures.

Methods

Study population

From January 2010 to April 2015, 250 patients were treated for traumatic anterior instability with arthroscopic Bankart repair and ASA by 4 surgeons in different shoulder units (M.M., A.Z., R.R., S.S.). Of these patients, 161 were excluded from this study because they could not fulfill the minimum 2-year follow-up.

Eighty-nine patients were available for follow-up ranging from 25 to 60 months (mean, 31.5 months). All examined patients were treated in the same sports unit from 2010 to 2013 by the same surgeon (M.M.), who is also the developer of the described technique. All patients reported engaging in sports activities (eg, contact and collision sports). The inclusion criteria were as follows: (1) patients with recurrent anterior dislocation (mean, 6 dislocations; range, 2-20 dislocations) and a positive apprehension test at 90° of abduction and (2) patients with a Hill-Sachs lesion (regardless of the size) and anterior GBL of less than 25% (mean, 10.8%; range, 8%-23%) as assessed by computed tomography (CT). The exclusion criteria were as follows: (1) GBL greater than 25%; (2) voluntary anterior, posterior, or multidirectional instability; (3) pre-existing glenohumeral osteoarthritis; and (4) overhead sports activities, assuming that a loss of external rotation might interfere with the sport-specific activities of throwing athletes.

Most of the patients were right hand dominant (70%), and there were 71 men and 18 women included in the study. The mean age was 29 years (minimum, 18 years; maximum, 38 years). Of the patients, 69 had undergone no previous procedures (group A). A prior arthroscopic capsulolabral repair had failed in the 20