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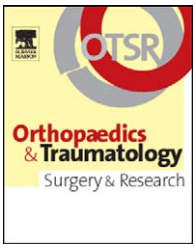

ORIGINAL ARTICLE

Residual inferior glenohumeral instability after arthroscopic Bankart repair: Radiological evaluation and functional results

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KEYWORDS
Shoulder;
Instability;
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SHART

Summary
Introduction: Treatment of anteroinferior shoulder instability by arthroscopy must restore stability while preserving joint motion. Inferior glenohumeral ligament (IGHL) laxity is an important parameter in the pathomechanism of this condition. The goals of this study is to use the Shoulder HyperAbduction Test (SHART) radiological test to quantify the tension in the IGHL following surgery and look for an eventual correlation between ligament tightening and joint motion.
Methods: This was a single-center, retrospective study that included patients with unilateral anteroinferior instability who were treated with an arthroscopic Bankart repair between September 2004 and December 2005. These patients did not experience any recurrence within a follow-up period of at least 2 years. Twenty-three patients were followed-up. This series included 16 men and seven women with an average age of 29.7 ± 12 years. The average Instability Severity Index Score (ISIS) was 1.7 ± 1.3 (from 0 to 3). The main outcome measures were the bilateral SHART test at the last follow-up visit and bilateral joint range of motion, before surgery and at the last follow-up.
Results: The follow-up was 3.3 years on average. The average SHART on the operated side (116.9 ± 11.7°) was lower than the healthy side (121.9 ± 9.6°), $P = 0.01$. A difference of less than 4° was statistically related to loss of external rotation, with an odds ratio of 16, $P = 0.03$. At the last follow-up, the average Walch-Duplay functional score was 72.4 ± 13.8/100 and the Rowe score 90.2 ± 11.6/100.
Discussion: It is difficult to achieve a perfect compromise between shoulder stability and joint motion. Progress in arthroscopy technique has led to a greater demand for the tightening

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of capsulo-labral and ligament structures. An arthroscopic Bankart repair provides IGHL tightening that is quantifiable with the SHART. External rotation is reduced when excessive tightening is made.
Level of evidence: Level IV. Retrospective study.

Introduction

Chronic anterior shoulder instability is a common problem both in the general population and athletes [1,2]. Arthroscopic Bankart repair is a surgical option that has been available for many years. The goal of this repair is to restore shoulder stability while preserving joint motion, and thereby function [3].

The contribution of inferior glenohumeral ligament (IGHL) laxity to the pathophysiology of anteroinferior shoulder instability is well known [4,5]. The incomplete healing of a Bankart lesion can be easily identified with an arthro CT scan, but it is more difficult to evaluate the correction of inferior laxity. Clinically, many tests have been proposed, particularly Gagey's hyperabduction test [6]. This test is considered positive if the passive unilateral amplitude is greater than 105°. Coste et al. [5] compared this clinical test with arthroscopy observations. Starting at 30° of clinical difference, the entire IGHL was stretched and the anterior band was thinner. Vuillemin et al. [7] proposed a radiological version of this test, the Shoulder HyperAbduction Test (SHART). This study showed that the angle formed by the humeral shaft and a line traced between the inferior border of the glenoid and the edge of the tubercle on the lateral border of the scapula is a measure of IGHL laxity. In a group of healthy subjects, the average angular difference between the two shoulders was 4° and never exceeded 14°. More recently, Jouve et al. [8] showed that in a population operated for chronic anterior shoulder instability, the SHART was correlated to the arthroscopic anatomy classification of IGHL injuries proposed by Détrisac and Johnson [9].

Many studies have found that postoperative joint motion is reduced, especially external rotation, after both arthroscopic [10,11] and open repairs [12]. Function and patient satisfaction are affected [13]. The goals of this study were to use the SHART to evaluate the tension in the IGHL after arthroscopic Bankart repair in patients who have not had a recurrence of dislocation and to look for a potential relationship between ligament tightening and the change in joint motion.

Patients and methods

Inclusion and exclusion criteria

This was a single-centre, retrospective study conducted between September 2004 and December 2005. Patients with anteroinferior shoulder instability treated with an arthroscopic Bankart repair were included. Patients with bilateral instability or those who had a recurrence before the cut-off date were excluded. All the patients meeting these criteria were called at least 2 years after the procedure.

Outcome measures

The main endpoints were a bilateral SHART test [7] at least 2 years after the procedure and joint motion in the operated and healthy shoulder, both preoperative and at the last follow-up.

The secondary endpoints were the Walch-Duplay [14] and Rowe [15] functional scores at the last follow-up, along with overall patient satisfaction (yes/no).

Patients

During this period, 65 patients were treated with an arthroscopic Bankart repair in our department. Two patients had chronic bilateral instability and five had a recurrence (7.7%). A written notification was sent to the 58 patients who responded to the study criteria. Twenty-three of them (40%) were available for follow-up.

This series consisted of 16 men and 7 women with an average age of 29.7 ± 12 years (from 16 to 65). The right shoulder was involved in 15 cases. The dominant shoulder was involved in 60% of cases. In 76.4% of cases, the initial trauma occurred during a sporting event. All the patients were involved in sports, but only two competitively. Racket sports and rugby were the most common. On average, there were 4.4 ± 4.6 (from 0 to 20) subluxations and 1.9 ± 2.3 dislocations (from 0 to 10) before the surgery. The average Instability Severity Index Score (ISIS) [16] was 1.7 ± 1.3 (from 0 to 3). Before the surgery, the anterior apprehension sign was present in all cases and the sulcus sign in 41% of cases. Preoperative joint motion was symmetric: average flexion was 179.1 ± 2.3° (from 170 to 180°), abduction was 179.1 ± 2.3° (from 170 to 180°), external rotation with elbow at the body (ER1) was 59.1 ± 14.1° (from 40 to 90°) and external rotation in 90° abduction (ER2) was 58.5 ± 12.9° (from 40 to 85).

IGHL hyper-mobility, defined as ER1 > 85° [5] was present in two cases. Constitutional hyper-mobility (Brighton score) [17] was only present in one patient.

Preoperative radiology

All the patients underwent standard shoulder radiological examinations: AP with neutral/external/internal rotation, lateral and Bernageau views [18], along with a joint CT scan. No significant bone defects were found either on the humerus or glenoid side. All the patients presented with a classic Bankart lesion, either isolated or combined