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Original article

## Outcome of Bankart repair in contact versus non-contact athletes



N. Yamamoto<sup>a</sup>, H. Kijima<sup>b</sup>, H. Nagamoto<sup>a</sup>, D. Kurokawa<sup>a</sup>, H. Takahashi<sup>a</sup>,  
 H. Sano<sup>a</sup>, E. Itoi<sup>a,\*</sup>

<sup>a</sup> Department of Orthopaedic Surgery, Tohoku University School of Medicine, Sendai, Japan

<sup>b</sup> Department of Orthopaedic Surgery, Akita University School of Medicine, Akita, Japan

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### ABSTRACT

**Background:** The clinical results of arthroscopic Bankart repair for contact athletes varies according to published reports. The purposes of this study were to analyze the clinical outcome of open or arthroscopic Bankart repair and to investigate the results in contact and non-contact athletes.

**Hypothesis:** Clinical outcome of arthroscopic Bankart repair is similar to that of open procedure.

**Patients and methods:** One hundred patients with recurrent anterior shoulder dislocation without a large bony defect were retrospectively reviewed. Fifty-one contact and 49 non-contact athletes were found with a mean follow-up of 17 months. Forty-nine shoulders underwent arthroscopic Bankart repairs; 51 shoulders had open Bankart repairs.

**Results:** In non-contact athletes, there was a 5% (1/22 cases) recurrence rate in the open group and 4% (1/27 cases) in the arthroscopic group. In contrast, in contact athletes, there was a 10% (3/29 cases) recurrence rate in the open group and 14% (3/22 cases) in the arthroscopic group. There was no significant difference in the recurrence rate between contact and non-contact athletes, although contact athletes showed two to three times a higher recurrence rate than that of non-contact athletes. The Rowe score and Constant score showed no significant difference between the two procedures and between the contact and non-contact athletes. The rate of the complete return to sports showed no significant difference between contact and non-contact athletes.

**Conclusion:** The recurrence rate of Bankart repair in the contact athletes was 2 times higher in the open group and 3 times higher in the arthroscopic group than in the non-contact athletes. Clinical outcome of arthroscopic Bankart repair was similar to that of open procedure.

**Level of evidence:** Level IV, retrospective study.

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## 1. Introduction

Treatment of recurrent anterior dislocation of the shoulder with arthroscopic Bankart repair is being increasingly used as the gold standard procedure. In the literature, there have been many reports describing the excellent clinical outcomes after arthroscopic Bankart repair [1–5]. Some authors have suggested that arthroscopic stabilization produces results similar to those of open stabilization. On the other hand, some pointed out that those patients who had a large glenoid or humeral defect had a high recurrence rate after arthroscopic Bankart repair [6–9]. There are some studies reporting high recurrence rates in contact or

collision athletes and participation in contact athletics is a contraindication for arthroscopic shoulder stabilization [7,8,10,11]. In contrast, some described that no difference in recurrence rate after arthroscopic Bankart repair was found between contact and non-contact athletes [2,4]. Thus, the clinical results of arthroscopic Bankart repair for contact athletes varied based on reports. In order to obtain better clinical outcome after arthroscopic Bankart repair, we need to know the adequate surgical indication: which cases are indicated or contraindicated for arthroscopic Bankart repair? The purposes of this study were to analyze clinical outcomes of arthroscopic Bankart repair comparing with that of open procedure and to compare the outcome between contact and non-contact athletes.

## 2. Subjects and methods

One hundred and eighty-two consecutive patients with clinical evidence of recurrent anterior dislocation of the shoulder underwent Bankart repair in our institute and related hospitals between

\* Corresponding author. Department of Orthopaedic Surgery, Tohoku University School of Medicine, 1-1, Seiryō-machi, Aoba-ku, Sendai 980-8574, Japan.

Tel.: +81 22 717 7245; fax: +81 22 717 7248.

E-mail address: [itoi-eiji@med.tohoku.ac.jp](mailto:itoi-eiji@med.tohoku.ac.jp) (E. Itoi).

1995 and 2010. Of these, 100 patients who met the following inclusion criteria were retrospectively reviewed:

- those with repeated anterior shoulder dislocations after an initial episode;
- the first episode was caused by a traumatic event;
- a Bankart lesion or its variants, such as Perthes lesion, anterior labroligamentous periosteal sleeve avulsion (ALPSA) lesion, or glenoid labral articular defect (GLAD) lesion was confirmed during surgery;
- they were involved in athletics;
- a minimum follow-up of 1 year.

Between January 1995 and December 2000, 41 out of 100 shoulders underwent open Bankart repairs, and between January 2001 and January 2011, 59 out of 100 shoulders had arthroscopic Bankart repairs using suture anchors. Arthroscopic Bankart repair was performed since January 2001 in our institute or related hospitals. Exclusion criteria were as follows:

- patients with a glenoid defect of greater than 21% of the glenoid length [12];
- patients with a large Hill–Sachs lesion which engages with the glenoid [13];
- revision Bankart repairs;
- patients with full-thickness rotator cuff tears;
- patients with tears on the capsule at the humeral insertion on arthroscopy.

Before surgery, X-ray, CT, and MR arthrogram were routinely taken. We evaluated the capsular lesions, such as HAGL or capsular tear before surgery and during surgery. The size of the glenoid defect was evaluated comparing the width of the glenoid of the contralateral side in the 3D-CT images. We evaluated the risk of engagement of the Hill–Sachs lesion using the glenoid track concept [13]. When a Hill–Sachs lesion was outside of the glenoid track, we judged that there was risk of engagement with the glenoid before surgery. In that case, we added bone grafting to the Hill–Sachs lesion in addition to Bankart repair.

Forty-nine contact and 51 non-contact cases were found with a 17 months (range, 12–96 months) follow-up (Table 1). The mean age at the time of surgery was 24 years (range, 14–54). There were 81 males and 19 females. Collision or contact sports included the following sports: boxing, football, wrestling, basketball, ice hockey, rugby, soccer, weight lifting, judo, and karate. The selection of collision or contact athletes was made modifying the classification system of the American Academy of Pediatrics Committee on Sports Medicine [14]. The present study was approved by the Institutional Review Board of our hospital.

## 2.1. Surgical techniques

All operations were performed with the patient under general anesthesia by a single surgeon (EI).

### 2.1.1. Open Bankart repair

Open Bankart repair was performed with the patient in the semi-Fowler position. The incision was vertical from the coracoid process and was 4 to 5 cm long. The deltopectoral approach was used. The upper two-thirds of the subscapularis tendon was elevated from the underlying capsule and retracted medially to expose the anterior capsule. The capsule was incised vertically at the level approximately 5 mm lateral to the glenoid rim. The Bankart lesion was elevated from the glenoid neck with the use of an elevator. After the scapular neck was freshened, the capsulolabral structures were reattached to the glenoid rim using three to five suture anchors

**Table 1**  
Patient demographic.

	Open group	Arthroscopic group
Number of subjects	51	49
Mean age (range)	24.6 (15–59)	24.1 (14–54)
Sex		
Male	40	36
Female	11	13
Side		
Dominat	26	26
Non-dominat	25	23
Sports		
Contact sports		
Rugby	12	7
Judo	6	3
Ice Hockey	2	0
Wrestling	2	2
Karate	0	1
American football	0	1
Basketball	7	3
Soccer	0	5
Non-contact sports		
Baseball	5	5
Skiing	6	3
Volleyball	1	2
Snowboarding	3	5
Tennis	1	2
Handball	0	2
Others	6	8

(2.8-mm ROC fastener, Innovasive Devices, Inc., Marlborough, MA). With the arm in 30° of abduction and neutral rotation, the capsule was repaired. The rotator interval capsule was always closed with two or three interrupted sutures.

### 2.1.2. Arthroscopic Bankart repair

Arthroscopic Bankart repair was performed with the patient in the beach chair position. A standard posterior portal was created approximately 2 cm medial and 2 cm distal to the acromial angle. After the inspection of the glenohumeral joint, two portals (antero-superior and antero-inferior) were established. The antero-inferior portal was placed just superior to the superior edge of the subscapularis tendon. The inferior glenohumeral ligament-labrum complex was mobilized from the glenoid neck as far inferiorly as the 6 to 7 O'clock position in the right shoulder with use of an elevator. We used a bioabsorbable suture anchor (Panalok Loop anchor, DePuy Mitek, Norwood, MA). A soft tissue penetrator (Suture Hook; Linvatec, Largo, FL) or an arthroscopic suture passer (Accu-Pass, Smith & Nephew, Andover, MA) was passed through the detached labrum. The arthroscopic technique included a minimum of 3 anchors (mean: 3.9) in all patients and a routine incorporation of capsular plication and proximal shift as previously reported [6,15]. An SMC sliding knot was tied on the soft tissue capsulolabral side of the repair. When there was anterior laxity of the glenohumeral joint under anaesthesia compared with the contralateral side (17 of 59 shoulders), the rotator interval closure was done with two interrupted sutures with #2 Ethibond (Ethicon Somerville, NJ); imbrication between the superior glenohumeral ligament and subscapularis tendon as previously reported [16,17]. We evaluated anterior laxity with arm in adduction and abduction, and when the humeral head rode over the glenoid rim, anterior laxity was thought to be positive. SLAP repair was performed in 7 of 24 shoulders. Other treatments for intra-articular lesions were done in 5 shoulders: osteosynthesis in 4 shoulders and removal of the bony fragment in 1 shoulder. We did not perform remplissage procedure for a large Hill–Sachs lesion.

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