

Suture Anchor Capsulorrhaphy in the Traumatic Anterior Shoulder Instability: Open Versus Arthroscopic Technique

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— Abstract —

Eighty-nine shoulders in eighty-eight patients with traumatic unilateral anterior shoulder instability were evaluated for Rowe and UCLA scores, recurrence, return to activity, and range of motion by an independent examiner at an average of 39 months after either arthroscopic or open Bankart repair using suture anchors. The arthroscopic technique included a minimum of 3 anchors, and a routine incorporation of capsular plication and proximal shift. Twenty-six shoulders(86.6%) out of thirty in the open Bankart repair group had excellent or good results while fifty-four(91.5%) of the fifty-nine shoulders with arthroscopic Bankart repair had excellent or good results. The arthroscopic group revealed significantly better results in the Rowe($p=.041$) and UCLA scores($p=.026$). Two shoulders in each group developed redislocation. There were no significant differences in the loss of external rotation and return to prior activity between the two groups($p>.05$). The residual instability occurred more frequently in the group of patients with lesser anchors. Arthroscopic suture anchor capsulorrhaphy has results equal to or better than the open Bankart procedure.

Key Words : Shoulder, Anterior instability, Bankart repair, Suture anchor

Bankart repair has been an established procedure for the recurrent traumatic anterior instability of the shoulder by way of reattachment of the failed primary static restraint to the anterior translation of the humeral head. Rowe et al²⁰⁾ reported highly successful results with the modified Bankart procedure in which the lateral capsular flap was repaired directly to the glenoid and the labrum was incorporated into the repair. Recent experience with arthroscopic anterior shoulder stabilization

has been challenging original open reconstruction techniques^{2,5,18,21)}. A variety of arthroscopic techniques for the anterior shoulder reconstruction have been reported. However, the results of arthroscopic shoulder reconstruction is still less satisfactory than open repair^{8,9,13,15,22,23,28)}. Nevertheless, there are still only a few articles addressing the comparative results of the open and arthroscopic Bankart repairs^{6,10,23)}. Furthermore, to our knowledge, the literature that contains the

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comparative results of the open and arthroscopic techniques using suture anchors is not available.

The purpose of the present study is to compare the results of open and arthroscopic Bankart repair using suture anchors in the traumatic unilateral anterior glenohumeral instability in terms of the recurrence rate, range of motion, and functional level of return to the pre-injury activity.

MATERIALS and METHODS

From January 1994 to December 1996, ninety-three anterior shoulder stabilization procedures were performed in 92 patients with traumatic recurrent anterior dislocation of the shoulder. With a minimum follow-up of 26 months, and the average being 39 months(range, 26 to 60 months), 89 shoulders in 88 patients were available for inclusion in a retrospective analysis for this study. Those patients who had a full-thickness rotator cuff tear, greater tuberosity fracture, or capsular tear at the humeral insertion were excluded from this study. Of the 89 shoulders, 30(30 patients) underwent open Bankart repair using the Mitek GII suture anchors(Mitek Surgical Products, Norwood, MA) and 59 shoulders(58 patients) underwent arthroscopic Bankart repair with the suture anchor technique using the mini-Revo screws(Lin-vatec Inc., Largo, FL). Open Bankart repairs were performed during the initial time of the index period while the arthroscopic procedures were performed during the latter time period. The average follow-up was 49 months(range, 41 to 60) in the open repair group and 33 months(range, 26 to 42) in the arthroscopic repair group.

1. Patient Demographics

The average age of the patient was 27.6 years(range, 18 to 47) and 26.7 years(range, 16 to 51) in the open and arthroscopic group respectively. There were 26 men and 4 women in the open group, and 50 men and 8 women in the arthroscopic group. Fourteen(46.7%) out of the 30 patients in the open group and thirty-two(55.2%) out of 58 patients in the arthroscopic repair group, were involved in active sports activities. There were 9 patients involved in overhead sports activity and 5 in contact sports in the open repair group. In the arthroscopic group, twenty-one were involved in overhead sports and 11 in contact sports. Regarding the level of sports activity involved, six were at the collegiate or professional level and 8 at the recreational level in the open repair group, while 10 were at the collegiate or professional level and 22 at the recreational level in the arthroscopic repair group. None of the patients had received any previous surgical procedure for the involved shoulder. Preoperatively, a complete physical examination was carried which included an apprehension-relocation test, biceps load test¹²⁾, and glenohumeral or generalized ligamentous laxity. Six shoulders in the open group and 13 shoulders in the arthroscopic group revealed a more than grade II asymptomatic subacromial sulcus sign. The biceps load test was positive in 10 shoulders in the arthroscopic group, while the test was not carried out for the open group. In regards to the number of anchors, two anchors were used in 12(40%) of the shoulders and three anchors in 18(60%) in the open repair

Table 1. Demographics of the Patients

Variables	Group	
	Open repair	Arthroscopic repair
Number of patients	30	58(59 shoulders)
Average age at initial dislocation(years)	20.3(16-41)	19.5(14-32)
Median number of dislocation	12(3-100)	10(2-100)
Average time from injury to surgery, years	4.9(0.6-16)	5.8(0.3-19)

group, while two screws were used in 2 shoulders (3.4%), three screws in 26 (44.1%), four screws in 22 (37.3%), and 5 screws in 9 (15.2%) in the arthroscopic repair group. The number of dislocations prior to the index surgery, the elapsed time from the first dislocation to the surgery, and the age at the initial dislocation are summarized in Table 1.

2. Operative Technique

The open Bankart repair was carried out with the patient in the beach chair position. Examination under general anesthesia and diagnostic arthroscopic examination was performed initially in all patients. Through the modified deltopectoral approach, the torn labrum was repaired using Mitek anchors with the No-2 nonabsorbable suture (Ethibond, Ethicon, Somerville, NJ) and capsular repair was performed. The suture anchors were inserted at the margin of the glenoid. A pendulum exercise was started after sling immobilization for 2 weeks and external rotation beyond neutral, with the arm either in the dependent position or in elevation, was allowed after 6 weeks. For the arthroscopic Bankart repair, the patients were positioned in the lateral decubitus position, while the standard posterior, anterosuperior, and anteroinferior portals were created. Looking from the anterosuperior portal, the capsulo-

labral tissue was liberated from the anterior glenoid surface and light decortication using a bone rasp or 4.5mm burr was done. With a 2mm pituitary forcep, small pilot markings on the margin of the anterior glenoid rim were created. With a special bone punch (Linvatec Inc., Largo, FL), a hole for the screw was created as vertical to the glenoid margin as possible. This was possible by keeping the tip of the bone punch in the pilot marking and pivoting the shaft of the bone punch inferiorly and laterally (Fig. 1). A mini-Revo screw with a No 2 Ethibond suture was inserted into the hole. Using the suture hook loaded with the Shuttle-Relay (Linvatec Inc., Largo, FL), a capsular suture was created at about 1 cm inferior to the anchor and at the same level as the glenoid surface. The suture hook, with the capsular tissue, was shifted proximally to the point of the suture anchor, and then the suture hook was passed under the labrum (Fig. 2). One end of the suture was engaged into the eyelet of the Shuttle-Relay and then pulled back out. Finally, an arthroscopic knot was made (Fig. 3). We used a minimum of 3 anchors for the majority of the patients, and up to as many as 6, for the anterior labral repair and used an additional 1 to 3 anchors for the superior labral repair when indicated. Postoperatively, a sling with a pillow spacer was applied for 3 weeks and pen-

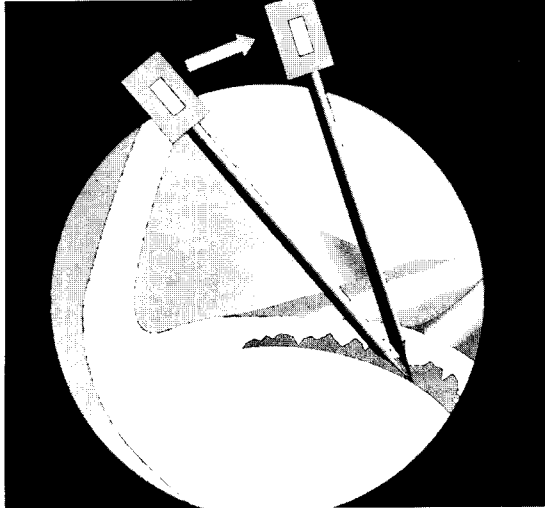


Fig. 1. Pivoting the shaft of the bone punch inferiorly and laterally to create a hole for the screw as vertical to the glenoid margin as possible.



Fig. 3. An arthroscopic finding showing a capsular plication and repair of the anterior labrum using suture anchors and nonabsorbable sutures.

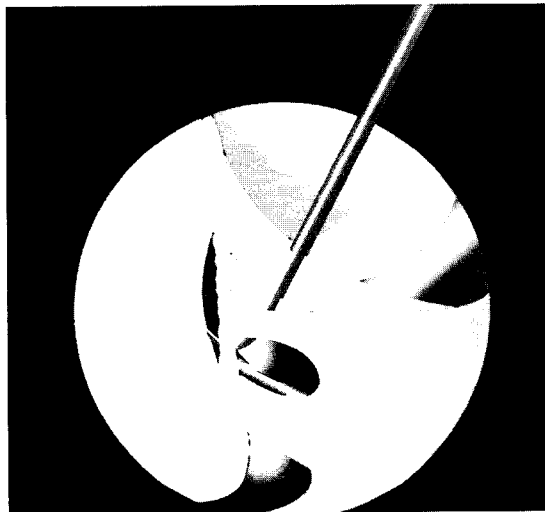


Fig. 2. The capsular suture was shifted proximally to the point of the suture anchor and plicated to the labral repair.

dulum exercise was initiated 2 weeks after the operation. From 3 weeks after the operation, a forward elevation and internal rotation exercise was commenced using the home therapy kit(STK, BREG Inc., Vista, CA). A more aggressive physical therapy was started 6 weeks after the operation.

3. Arthroscopic Findings

According to the grade of the humeral translation by Altchek et al¹¹, anterior translation under general anesthesia revealed a grade 3+ in 22 shoulders(73.3%) and a grade 2+ in 8 shoulders(26.7%) in the open repair group, while there was a grade 3+ in 48 shoulders(81.4%) and a grade 2+ in 11 shoulders(18.6%) in the arthroscopic group. Hill-Sachs lesions were found in all patients. Fourteen shoulders(46.7%) had large defects, 12(40%) had superficial bony injury, and 4(13.3%) had only cartilage scuffing in the open group. In the arthroscopic group, there were 32(54.2%) large defects, 19(32.2%) superficial bony injuries, and 8(13.6%) cartilage scuffing lesions. The superior labrum showed 4(13.3%) type II SLAP lesions and 2(8.7%) type III SLAP lesions in the open group, while eleven shoulders(18.6%) revealed type II SLAP lesions and 4(6.8%) type III SLAP lesions in the arthroscopic

group. No statistical differences were found between the two groups in terms of the grade of the anterior translation, Hill-Sachs lesions and superior labral lesions. Partial-thickness rotator cuff tears on the articular surface were found in 10 of the patients, 3(10%) in the open group(Ellman grade I tear in all patients) and 7(11.9%) in the arthroscopic group(Ellman grade I tear in 6 patients and grade II tear in 2). Of the 30 patients in the open group, 15(50%) had classic Bankart lesions with a robust anterior labrum, and 10(33.3%) had a thinned labrum that was attached to the medial surface of the glenoid neck. Five(16.7%) of the patients did not have any discernable labral tissue. In the arthroscopic group, 38(64.4%) revealed a robust anterior labrum, 14(23.7%) a thinned labrum, and 7(11.9%) shoulders had no discernable labrum. Bony Bankart lesions were found in 4 patients(13.3%) in the open repair group and 9 patients (15.3%) in the arthroscopic repair group. Three out of the 13 patients with bony Bankart lesions revealed a large defect in the anterior glenoid margin, but none severe enough to necessitate fixation to the glenoid.

4. Evaluation

Final evaluations were conducted by an independent reviewer, which included the Rowe score and UCLA shoulder rating scale, and return to prior activity. Return to the previous job or athletic activity was evaluated by the patients' own subjective evaluation using a visual analog scale. Grade 0 represented no limitation of sports activities and a complete return to prior job(100% of pre-injury level). Grade I was mild limitation in sports activities

and return to prior job(more than 90% of pre-injury level). Grade II was rated when the patient had moderate limitation of their sports activities or job even though the patient continued prior job or sports activities(more than 70% of pre-injury level). Grade III represented severe limitation(less than 70% of pre-injury level) or inability to return to prior sports activities or previous job. Grade 0 and I were classified as favorable returns, while grade II and III were classified as unfavorable returns.

5. Statistics

The Rowe and UCLA scores were compared between the two groups using the Mann-Whitney *U* test. Spearman's correlation coefficients were used to identify any significant relationships between the final scores and several variables, including the age at initial episode of dislocation, the elapsed time from injury to surgery, the number of dislocations, repair of the superior labral lesion, sex, rotator cuff tear, grade of anterior translation and the Hill-Sachs lesion. A non-parametric test of Kruskal-Wallis was performed to determine the differences in the follow-up scores between the different conditions of the anterior labrum in both groups. Also, the difference in the functional return between the different pre-injury level of activity groups was evaluated. A Chi-square test was used to evaluate the difference in the residual instability in relation to the number of anchors used in both groups and to evaluate the difference of residual instability between the open and arthroscopic group with the given number of anchor at 2 and 3. The SPSS program(SPSS, Chicago, Illinois)

was used for all analysis, with the statistical significance level set at $p=0.05$.

RESULTS

1. Overall score

At the average follow-up of 39 months, 26 patients(86.6%) had good or excellent results, 2(6.7%) fair, and 2(6.7%) poor in the open Bankart repair group. In the arthroscopic repair group, 54(91.5%) had good or excellent results, 3(5.1%) fair, and 2(3.4%) poor. The average Rowe and UCLA scores were 90.4(range, 30 to 100) and 30.6 points(range, 20 to 35) respectively for the open repair group, and 92.7(range, 40 to 100) and 33.1 points(range, 18 to 35) respectively for the arthroscopic repair group. The arthroscopic group proved to have significantly higher scores than the open group on the Rowe ($p=.041$) and UCLA rating scales($p=.026$). These fair results for both groups were due to mild apprehension and discomfort in overhead activities. The difference in the Rowe score was primarily due to the motion and function subscore.

The final results were not related to variables such as sex, rotator cuff tear, number of dislocations, elapsed time from the initial dislocation, grade of translation under anesthesia, presence of generalized laxity, Hill-Sachs lesion, or bony Bankart lesions. However, in the arthroscopic repair group, Spearman's correlation coefficient revealed a significant positive correlation between the Rowe score and the age at the initial dislocation($r=.807$). Fifteen patients younger than 20 years of age at the initial episode of dislocation demonstrated lower scores(84.9 points, SD:17.7) than 43 patients at 20 years of

age and older(95.7 points, SD: 6.9, $p=.029$). A nonparametric test of Kruskal-Wallis revealed no significant differences in the Rowe and UCLA scores between the different conditions of the anterior labrum in both groups($p>.05$). The UCLA and Rowe scores showed no significant difference for the different types and levels of prior activity($p>.05$).

2. Recurrence

Two patients(6.7%) in the open repair group and another 2(3.4%) in the arthroscopic repair group had experienced at least one episode of redislocation after the surgery. One patient in the open repair group had a redislocation as a result of significant trauma from basketball 3 years after surgery. The other patient had a redislocation 2 years after surgery during skiing. In the arthroscopic repair group, one sustained forceful external rotation injury during basketball 2 years after surgery, while the other patient experienced a redislocation while carelessly attempting to perform a chin-up. All patients underwent reoperation with the arthroscopic suture anchor technique. All patients had Bankart lesions and the failure sites were the same as the previous lesions. The suture materials were pulled out from the anchors or from the capsulolabral tissue. No anchors were pulled out of the glenoid. One patient(3.3%) in the open repair group and 4(6.8%) in the arthroscopic repair group demonstrated mild apprehension with the arm in the elevation and external rotation position. Overall residual instability including mild apprehension was 10% in the open repair group and 10.2% in the arthroscopic repair group.

In the open repair group, all 3 patients with residual instability had 2 screws for the Bankart repair. In the arthroscopic repair group, one patient with redislocation had 2 screws, and the other redislocator had 3. One out of 4 patients with residual anterior apprehension had 2 screws, and the other 3 patients had 3 screws. The Chi-square test revealed that there was a significant difference in the residual instability between the groups with different number of screws in the arthroscopic repair group ($p=.000$). However, in the open repair group, the difference was statistically insignificant, although, the p value was low ($p=.082$). Given the number of anchors, 2 or 3, there was no difference in the residual instability between the open and arthroscopic group. No significant correlation was found between the residual instability and other variables such as the level and type of sports activity, degree of anterior translation under anesthesia, sulcus sign, degree of Hill-Sachs lesion, number of dislocations, age at initial episode of instability, repair of the SLAP lesions, and the elapsed time from initial injury to surgery. The condition of the anterior labrum revealed no significant correlation with the residual instability in our study ($\chi^2=.136$). Three out of 9 patients with residual instability had no discernable anterior labrum during the index surgery, One was a redislocator from the open repair group and the 2 were patients with residual apprehension in the arthroscopic repair group. The two other patients with residual apprehension in the arthroscopic group had a thinned labrum. The remaining 4 patients with residual instability (one redislocator and one patient with residual apprehension in the open group and two

redislocators in the arthroscopic group) had a robust anterior labrum at the time of index operation.

3. Range of Motion

There were no significant differences in the average loss of external rotation between the two groups ($p>.05$). The average loss of external rotation at the side was 4.3° (range, 0° to 20° , SD: 4.2°) and 3.5° (range, 0° to 20° , SD: 5.7°) in the open and arthroscopic group respectively. In 90° of abduction, the average loss of external rotation was 5.7° (range, 0° to 25° , SD: 7.4°) in the open group and 3.6° (range, 0° to 20° , SD: 4.1°) in the arthroscopic group. However, there was a significant difference in the proportion of patients with limitation of external rotation greater than 10° ($p=.027$). Seven (23.3%) shoulders in the open repair group and 4 (6.8%) shoulders in the arthroscopic repair group demonstrated a limitation of more than 10° of external rotation with the arm in 90° of abduction (Table 2).

4. Return to Activity

In regards to return to prior activity, 27 patients (90%) in the open group and 55

Table 2. Loss of external rotation with the arm in 90° of abduction

Loss of ERabd*	Group	
	Open repair	Arthroscopic repair
0°	14	35
$<5^\circ$	6	13
$<10^\circ$	3	7
$<15^\circ$	4	3
$<20^\circ$	2	1
$<25^\circ$	1	0

ERabd*, External rotation with the arm in 90° of abduction.

Table 3. Functional return to the prior level of activity in both groups

Grade of functional return	Group	
	Open repair	Arthroscopic repair
0	23(76.7%)	50(86.2%)
I	4(13.3%)	5(8.6%)
II	2(6.7%)	2(3.5%)
III	1(3.3%)	1(1.7%)

patients(94.8%) in the arthroscopic group returned to the prior level of activity with little or no limitation(Grade 0 or I return). Three patients(10%) in the open repair group and 3(5.2%) in the arthroscopic group revealed unsatisfactory returns(Grade II or III). There were no significant differences in return to activity between the open and arthroscopic group($p=.256$) (Table 3). However, the grade of activity return was different between the different level of sports activity involved prior to injury. The higher level of activity demand demonstrated a lower grade of activity return to the prior level($p=.002$) (Fig. 4). Collegiate or professional athletes evaluated less favorable returns to their pre-injury level of sports activity than a group of patients without regular athletic activity($p=.001$). There were no significant differences in the return to activity between the different type of sports activity($p>0.05$)

5. SLAP lesions

In both groups, the SLAP lesion was unrelated to age at the initial dislocation, the number of dislocations, or the elapsed time from initial dislocation. Also, the repair of the SLAP lesion did not alter the final Rowe or UCLA scores($p>.05$).

6. Complication

Transient paresthesia in the involved upper extremity was noted in 3 patients

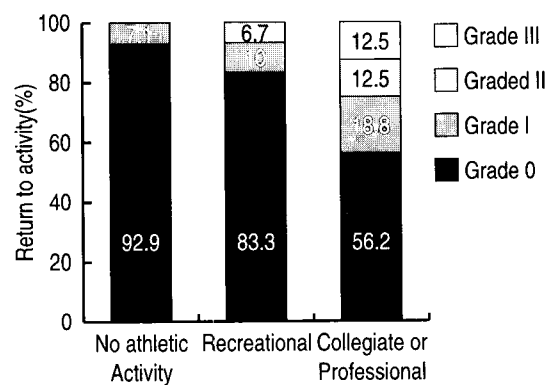


Fig. 4. Functional return to the prior level of activity relative to the level of activity.

in the arthroscopic repair group. There were no major neurovascular complications or infections in both groups.

DISCUSSION

Numerous reports have appeared in the literature on the results of arthroscopic Bankart repair with a various range of recurrence and success rate^{2, 8, 9, 13, 15-18, 21-28}. The most striking feature from previous reports is the high recurrence rate in the arthroscopic reconstruction compared to the uniform low rate of recurrence in open Bankart repair. In the classic report by Rowe et al²⁰ the results of the open Bankart repair recorded a 97% success by the surgeon's rating and 98% success by the patient's evaluations. In subsequent reports on the modified Bankart proce-

dure, the success rate ranged from 86% to 97%^{3,7,11,14,19,24)}. In contrast, the reported success rate for arthroscopic Bankart repair varied from 53% to 100%^{8,9,18,26)}. The results for the transglenoid technique were usually less satisfactory^{8,9,13,15,18,22,23,28)}. Molonge et al¹⁵⁾ reported 47% fair or poor results and Organ et al¹⁸⁾ reviewed those patients who had a 90% success rate in earlier results to conclude that this high success rate deteriorated with time to 60% after a minimum of a 5 year follow-up. Savoie et al²¹⁾ however, reported for his large number of patients who received transglenoid suture technique that the 91% satisfactory results with the Rowe scale were attributed to the use of a minimum of 6 sutures and sometimes as many as 10. He also criticized that the less satisfactory results from other authors were related to many factors, one being the insufficient number of sutures for fixation.

Nevertheless, only a few articles are available dealing with the comparative results between the open and arthroscopic Bankart repair^{6,10,23)}. Guanche et al¹⁰⁾ reported that arthroscopic shoulder stabilization generally produced poorer results than open procedures in regard to the recurrence rate, Rowe score, and patient satisfaction. However, the patients in their study are heterogeneous and small in number, in both the arthroscopic and open repair groups. Furthermore, they did not attempt mobilization and advancement of the capsule or glenohumeral ligaments with arthroscopic Bankart repair. We believe that the poor results in the arthroscopic Bankart repair are related to this lack of capsular advancement. In one prospective analysis of arthroscopic trans-

glenoid technique and open anchor suturing, Steinbeck and Jerosch²³⁾ reported that the arthroscopic transglenoid repair resulted in a higher rate of recurrence, a lower Rowe score, and a lower rate of return to sports activity than the open anchor suture group.

Arthroscopic Bankart repair with the suture anchor technique is a new procedure, and hence in the waiting stage for long-term results. Only a limited number of published papers are available^{13,26,27)}. In an earlier report with arthroscopic Bankart repair using Mitek G II anchors, Wolf et al²⁷⁾ showed promising results. However, Koss et al¹³⁾ reported a 30% failure rate in 27 patients with arthroscopic Bankart repair using Mitek G II anchors. All unsuccessful results were due to recurrent dislocation or subluxation. They described that the number of anchors used did not correlate to the successful result. However, information regarding the number of anchors were available only for 21 of 27 patients. Furthermore, 80.9% out of 21 patients had one or two anchors and only 4 had three or four anchors. The number of patients are too few to reach any significant conclusion regarding the relationship between the number of suture anchors and the recurrence rate. In our study, those who had fewer number of anchors developed greater incidence of residual instability in the arthroscopic group. In the open repair group, although the statistical analysis was insignificant, all residual instability had occurred in patients with 2 anchors.

Arthroscopic Bankart repair using the suture anchor technique is a reproduction of the open Bankart repair in terms of anterior fixation and individual suture

knot on the glenoid margin. To our knowledge, a comparative study between arthroscopic and open Bankart repair using the suture anchor technique has not yet been reported. In the present study, although the number of patients in both groups are not similar, other conditions such as age, sex, athletic activity, and number of dislocations, are. The results of the arthroscopic suture anchoring were not inferior to those of open repair. Rather we found better results in the redislocation rate and in the Rowe and UCLA scores for the arthroscopic group, while there were similar results in return to activity between the two groups. We believe that the comparable results in the arthroscopic suture anchor group are attributable to a number of features in our arthroscopic procedure. Our technique used a minimum of 3 screws in 96.6% of the shoulders for repair of the anterior labrum and incorporated a proximal shift of the anterior capsule as well as a capsular plication as a routine procedure. The capsular suture was level with the glenoid surface, which eliminated a pouch in the anterior capsule. The rationale of this technique is based on Bigliani's study that the elongation of the anterior glenohumeral ligament preceded labral failure during the shoulder dislocation event⁹. Owing to the routine capsular plication and proximal shift, the average loss of external rotation in the arthroscopic repair group was no better than the open repair group. However, the number of patients with a significant loss of external rotation was less common in the arthroscopic repair group. This implies that the arthroscopic repair group had a more uniform degree of loss of external rotation at the lower

level, which was less than 10°. This in turn provided the patient with arthroscopic repair, a more functional range of motion and resulted in better follow-up scores.

Shoulder function after the Bankart repair can be one of the first concerns. However, only few articles address the direct comparisons between the functional return to the pre-injury sports or job. Guanche et al¹⁰ reported that 33% in both the arthroscopic and the open repair groups said their ability to throw was impaired. The patients in their study had participated in sports before injury, although none were professional or collegiate varsity athletes. In our study, subjective evaluations by patients were similar in both groups. However, return to their pre-injury sports activity or job were best in patients without regular sports activity, and worst in collegiate or professional athletes. These elite athletes in both groups stated that they still had some discomfort while they were performing at their maximum.

Another important point involves the step making the hole for the screw. We used a bone punch to create a hole instead of a drill. The small level arm of the bone punch provided easier handling in maintaining the direction of the bone punch near perpendicular to the glenoid rim by pushing the bone punch toward inferiorly and laterally as much as possible. Due to the perpendicular angle of the bone punch, the anchors can successfully be inserted into the most inferior portion of the glenoid without penetration of the anchor beyond the bony glenoid. With the bone punch technique, a drill guide was not needed to keep the tip of the bone

punch on the pilot marking in the glenoid rim, which negated the need for an additional surgeon's hand.

The condition of the anterior capsule and labrum may affect the results of the Bankart repair. Green et al⁹⁾ reported a high recurrence rate in shoulders with a poor capsulolabral condition. Many authors recommended that proper selection of patients is essential for successful capsulolabral reconstruction^{9,13,15,17,22,23)}. In contrast, we could not find any significant differences of recurrence rates between the different conditions of the labrum despite the fact that no pre-selection of optimal patients took place for arthroscopic repair. We believe that capsular plication and proximal shift played a role in the shoulders with a thin or no anterior labral structure as well as the number of screws used for fixation.

In conclusion, arthroscopic Bankart repair using the suture anchor technique, which includes a minimum of 3 anchors, a routine incorporation of capsular plication, and proximal shift together, has results that are competitive to, or better than the open Bankart repair using suture anchors in terms of recurrence rate, Rowe and UCLA scores, and the level of return to the prior activity.

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— 국문초록 —

봉합나사를 이용한 Bankart 봉합술의 관절경적 및 개방적 수술의 비교

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외상성 전방 견관절 불안정성을 가진 88명의 환자의 견관절 89례에 대해 봉합나사를 이용한 관절경적 또는 개방적 Bankart 봉합술을 시행하고 평균 39개월 후에 Rowe와 UCLA 점수, 재발율, 일상 생활로의 복귀, 그리고 운동 범위 등을 평가하였다. 관절경적 수기는 최소한 3개의 봉합나사를 이용하였고, 관절낭의 중첩과 상방 이동술을 동시에 실시하였다. 개방적 Bankart 봉합술을 시행 받은 견관절 30례 중 26례(86.6%)에서, 관절경적 Bankart 봉합술을 시행한 견관절 49례 중 44례(91.5%)에서 매우 우수(excellent) 또는 우수(good)을 나타내었다.

관절경적 시술을 받은 그룹에서 Rowe($P=0.041$)와 UCLA 점수($P=0.026$)는 더 좋은 결과를 보였다. 각각의 그룹에서 재탈구는 2례가 발생했다. 두 그룹사이에 외회전 소실이나 이전 생활로의 복귀에서는 의미 있는 차이를 보이지 않았다($P>0.05$). 수술 후 불안정은 봉합나사의 수가 적었던 환자들의 그룹에서 훨씬 더 많이 나타났다. 봉합나사를 이용한 관절경적 관절낭 봉합술은 개방적 Bankart 봉합술에 비해 같거나 또는 더 좋은 결과를 보였다.

색인단어 : 견관절 불안정성, 봉합나사