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A Prospective Outcome Evaluation of Arthroscopic Bankart Repairs

Minimum 2-Year Follow-up

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Background: Arthroscopic treatment of anterior shoulder dislocation has become possible through improvements in instruments and techniques.

Objective: To prospectively evaluate results of arthroscopic Bankart repairs at a minimum 2-year follow-up for patients with histories of shoulder dislocation and an anterior-inferior labral tear at the time of diagnostic arthroscopy.

Study Design: Case series; Level of evidence, 4.

Methods: A consecutive series of 85 patients (70 men, 15 women; mean age, 26 years) with Bankart lesions were treated with arthroscopic repair using suture anchors; 18 patients (27%) had extension of the labral injury into the superior labrum affecting some or all of the biceps anchor. Anchors were loaded with no. 2 nonabsorbable braided suture and placed 2 mm into the edge of the glenoid surface. A low anterior (5-o'clock) portal through the subscapularis tendon was used in all patients; 72 patients were evaluated at a minimum of 2 years postoperatively (mean, 46 months).

Results: Seven patients (10%) experienced recurrent instability after repair. Four patients had redislocations; 3 experienced recurrent subluxations. One patient had pain with the apprehension test without a clear history of recurrent instability. Of 18 collision athletes, 2 had dislocations at 22 and 60 months postoperatively. There were no complications, including no neurologic deficits. Clinical strength testing of the subscapularis muscle was normal in all patients. The mean Rowe score was 88 of 100 points, with 90% excellent or good results. Simple Shoulder Test responses improved from 66% positive preoperatively to 88% positive postoperatively. The American Shoulder and Elbow Surgeons scoring index averaged 92 of 100 points postoperatively. Pain analog scales improved from 5.5 preoperatively to 0.35 postoperatively on a 10-point scale. SF-12 scores improved for physical function. Patient satisfaction was rated 8.9 on a 10-point visual analog scale.

Conclusion: Bankart repairs performed arthroscopically using properly implanted suture anchors and nonabsorbable sutures and in which associated pathoanatomy is addressed demonstrate low recurrence rates (10%) similar to historical open controls.

Keywords: Bankart repair; shoulder instability; dislocation; collision sport

Anterior instability is the most common form of shoulder instability.[13] Recurrent anterior shoulder instability results in a functional disability for the patient, in terms of both shoulder function and general health status.[10] Once reserved for cases of recurrent dislocation, stabilization surgery is now being performed after primary dislocation on patients thought to be at high risk for recurrences. In a comparison of patients younger than 30 years with first-time shoulder dislocations treated by immobilization and rehabilitation versus those treated with arthroscopic stabilization followed by an identical immobilization and rehabilitation protocol, a significant improvement in disease-specific quality of life was afforded by early arthroscopic stabilization.[10] In a prospective, randomized evaluation of arthroscopic stabilization versus nonoperative treatment in patients with acute, traumatic, first-time shoulder dislocations, Bottoni et al[2] reported 75% (9 patients) recurrence of instability after a 4-week program of immobilization followed by a supervised rehabilitation program versus an 11% (1 patient) recurrence in those treated with arthroscopic stabilization.

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Surgical stabilization for patients with anterior instability has evolved as our understanding of the pathologic conditions and treatment approaches have improved. More recently, open procedures have focused on an anatomical reconstruction of the labrum and anterior ligaments, resulting in low recurrence rates and minimal limitations in shoulder motion and function.[15] Rowe[16] reported a recurrent instability rate of 3.5% after an open Bankart repair in 124 patients, with good to excellent results in 98%. Thomas and Matsen[18] reported excellent results with their open surgical approach, reporting 1 recurrent dislocation in 37 patients, with 97% good or excellent results.

Arthroscopic anterior stabilization procedures have evolved during the past 20 years, driven by improvements in instrumentation, tissue implants and fixation, and identification of associated injuries. Early results of arthroscopic stabilization procedures were significantly less successful than those of open procedures, with recurrence rates from 15% to 40%. This high failure rate was associated with several factors, including shorter periods of postoperative immobilization, failure to address capsular injury and other concomitant pathologic abnormalities, an inability to anatomically repair the labrum, and poor tissue integrity.[5,7] As a result of modifications that have addressed these issues, more recent reports have shown results comparable to those with open repairs.[1,3,9,20]

We hypothesized that arthroscopic Bankart repairs performed in properly selected patients, in which all associated pathologic abnormalities are treated and in which suture anchors are properly placed using the 5-o'clock portal, would yield results similar to those seen in historic open controls. The purpose of the present study was to prospectively evaluate a consecutive series of patients who had a history of traumatic shoulder dislocation and a Bankart lesion confirmed at the time of arthroscopy and were treated with an arthroscopic repair that mimics the open approach as described by Thomas and Matsen.[18]

MATERIALS AND METHODS

Eighty-five patients (86 shoulders) who underwent an arthroscopic repair using titanium Fastak suture anchors (Arthrex Inc, Naples, Fla) were observed prospectively. Sixty-nine patients were evaluated at a minimum of 2 years postoperatively (mean, 46 months; range, 24-108 months; SD, 16). Sixteen patients did not complete the minimum follow-up for a variety of reasons: 11 were never contacted, 3 did not agree to further follow-up, 1 died, and 1 was terminally ill. Workers' compensation cases (8) were included, despite prior reports of poorer results in this population.[8,12] Institutional review board approval was obtained (#03080601).

Our study consisted of 57 male patients (83%) and 12 female patients (17%). Mean age at the time of surgery was 27 years (range, 13-49 years; SD, 10). Nineteen patients were younger than the age of 20 years, 26 were between the ages of 20 and 29 years, 14 were between the ages of 30 and 39 years, and 10 were 40 years or older. One patient was a semiprofessional athlete. The mean duration between the initial traumatic injury and surgery was 47 months (range, 2 weeks-311 months). Seven patients underwent repair at more than 150 months after injury. Forty-nine percent of patients underwent surgery within 12 months of the initial injury. All patients reported a history of trauma to the involved shoulder. The mean number of dislocations before surgery was 8.3, with 9 patients (15%) experiencing 1 episode and 2 (16%) experiencing 2 episodes. Forty-three percent of the patients experienced 5 or more dislocations. Instability in rest or sleep was reported in 25% of patients. Activities at the time of injury are presented in Table 1. Sixty percent of the study group experienced the initial shoulder trauma during a sports-related activity.

TABLE 1
Activities at Time of Injury

Activity	%
Sports-related injuries	
Football	19
Basketball	9
Baseball	4
Skiing/snowboarding	4
Soccer	3
Rollerblading	3
Other sports	18
Total	60[a]
Non–sports-related injuries	
Falls	23
Lifting	7
Altercations	3
Other activities	6
Total	39[a]

[a]Total does not equal 100% because of rounding.

The operative procedures were performed between 1994 and 1999 by a single orthopaedic surgeon. The data collection period began in 1994 and finished in August 2003.

Inclusion criteria included a preoperative diagnosis of traumatic anteroinferior glenohumeral instability that was confirmed at the time of arthroscopic operation. Preoperative diagnosis was based on the patient's description of shoulder dislocation and/or subluxation, apprehension noted at the time of physical examination, and radiographic evidence. Intraoperatively, all subjects demonstrated a detachment of the capsule labral complex involving the anterior and inferior aspect of the glenohumeral ligament.

Exclusion criteria included multidirectional instability, posterior instability, revision Bankart repairs, and rotator cuff tears. Patients who demonstrated anterior instability without a Bankart lesion were excluded from the study group.

Before surgery, patients completed a series of subjective and objective tests that served as a baseline for comparison postoperatively. Subjective assessments included the Simple Shoulder Test (SST), the American Shoulder and Elbow Surgeons (ASES) subjective score, and the Medical Outcomes SF-12. Patients were asked to rate their shoulder

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pain on a scale of 0 (no pain) to 10 (worst pain imaginable). Patients were also questioned regarding the mechanism of injury and the position of the arm at the time of injury. All patients were questioned regarding the activities or positions that reproduced symptoms, as well as the frequency of slippage or dislocations.

With the use of a handheld goniometer, we measured active range of motion to the nearest 5°, including forward elevation (FE), external rotation in abduction (ERA), external rotation at the side (ERS), and behind-the-back internal rotation. Strength testing was also performed by comparison with the contralateral side using a 5-point strength testing scale. No anesthetics were injected before testing; therefore, limitations in range of motion and strength secondary to pain were not quantified.

Both shoulders were examined for anterior, inferior, and posterior stability. Anterior instability was assessed using the apprehension test and relocation test. Inferior translation was assessed by the sulcus test. Posterior translation was considered abnormal when translation was greater than 2+ using the load and shift test. The anterior test was also performed, and all patients demonstrated 2+ or greater translation. In the contralateral shoulder, the presence or absence of laxity was recorded.

Other sources of shoulder pain, including glenohumeral and acromioclavicular arthritis, rotator cuff lesions, and brachial plexus lesions, were excluded based on a patient's history, physical examination, and radiographic analysis. Anteroposterior glenoid, axillary, and supraspinatus outlet radiographs were made routinely. Other imaging studies were not done routinely.

Surgical Procedure

During the study and beginning in 1999, the senior author (A. A. R.) changed the operative position from the modified beach-chair position to the lateral decubitus position.

Stability testing was performed under anesthesia to confirm the clinical diagnosis before arthroscopy. A standard posterior arthroscopic portal was established, a diagnostic arthroscopy was performed, and the presence of the Bankart lesion was confirmed. An arthroscopic elevator was used to dissect medially 1.5 to 2 cm along the anterior glenoid neck. A motorized shaver was used to remove soft tissue from the glenoid rim and neck and a bur to debride the neck down to bleeding bone.

An anchor-first technique was used, with placement of the first anchor at the 5-o'clock position or lower in a right shoulder. The anchors were placed approximately 2 mm onto the glenoid articular rim, with a medial inclination of 45°. The inferior limb of the 2 sutures was retrieved through the anterosuperior portal using a crochet hook. A suture passing device then was inserted through the capsulolabral tissue at a position 5 to 10 mm inferior and 1 to 1.5 cm lateral to where the anchor was placed, depending on the amount of shift or capsulorrhaphy desired.

A sliding Duncan loop knot was used for suture fixation. However, if difficulty was encountered in sliding the knot, a reversed-direction, switched-post, multiple-half-hitch revo knot was employed.

Patients with a persistent drive-through sign and persistence of pathologic humeral head translation with external rotation beyond 60° after stabilization were treated with thermal energy (Oratec thermal capsulorrhaphy probe, Oratec Interventions, Inc, Menlo Park, Calif).[4] Thermal energy was applied in a grid technique to reduce capsular laxity. The probe was set at 70°C to 75°C, and the extent of application was determined by visual appearance of capsular shrinkage. For 2 patients with an open rotator interval and persistent inferior laxity, the rotator interval was closed by suture plication.

Postoperative Management

Clear guidelines for postoperative rehabilitation were provided orally and on paper. Between weeks 1 and 4, passive to active assisted to active motion progressed as tolerated and was restricted to 90° of forward flexion, 20° of ERS, and 45° of abduction. Isometrics were initiated in a sling. Between weeks 4 and 8, the sling was discontinued, and active motion was increased in forward flexion to 140°, ERS to 40°, and abduction to 60°. Light band strengthening was initiated within active range of motion limitations, and scapular strengthening was initiated. Between weeks 8 and 12, if range of motion was lacking, an increase at end ranges with passive stretching was initiated. Strengthening was advanced as tolerated. Between months 3 and 12, plyometrics, proprioception, and closed chain exercises were initiated. Sports-related rehabilitation was also initiated, including advanced conditioning. Return to throwing was recommended starting at 4½ months, and throwing from the pitcher's mound was started at 6 months. No postoperative radiographic imaging studies were performed routinely.

Data Analysis

All data were analyzed using SPSS 10 software (SPSS Science Inc, Chicago, Ill). Descriptive statistics are reported, and the χ^2 test, Wilcoxon signed rank test, Mann-Whitney test, and Kruskal-Wallis test were used according to the comparisons being conducted. Statistical significance was established at $P < .05$.

RESULTS

Operative Findings

Eighteen patients (27%) had extension of the labral injury into the superior labrum affecting part or all of the biceps anchor. The extent of the tear, measured as an absolute number from the 6-o'clock position, ranged from 1.0 to 8.5 o'clock (mean, 4.5; SD, 1.7), with no patients treated with 1 anchor, 11% of patients requiring 2 anchors, 29% requiring 3 anchors, and 60% requiring 4 or more anchors (up to 8 anchors were used). The number of anchors used averaged 4.0. Thermal capsulorrhaphy was used in 34% of patients. The beach-chair position was used for 82% of the patients in this study, and the remaining 18% were in the lateral decubitus position.

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TABLE 2
Side-to-Side Comparison of Range of Motion (in degrees)

	Affected Side			Opposite Side			
	Mean	Range	SD	Mean	Range	SD	*P*
Preoperative							
Forward elevation	156	60-195	27	167	120-195	15	.000[a]
External rotation at the side	66	24-120	18	71	30-110	16	.001[a]
External rotation in abduction	74	0-105	21	87	60-115	10	.000[a]
Postoperative							
Forward elevation	172	148-195	9	175	150-195	7	.010[a]
External rotation at the side	71	20-90	13	73	45-90	11	.330
External rotation in abduction	85	45-110	11	87	50-115	9	.531

[a]Value is statistically significant.

Physical Examination

Physical examination testing was performed by physician assistants in all cases, except those patients (14) who were evaluated by the lead author at a location outside the clinics. These 14 patients agreed to follow-up but only at their homes or at the airport (2 patients). Active range of motion as compared with the opposite shoulder, as well as provocative testing, including the apprehension and relocation tests, were performed preoperatively and at follow-up. Because the surgical approach employs a transsubscapularis portal, the lift-off test was also performed, and patients were questioned regarding anterior shoulder pain postoperatively.

Range of motion results are presented in Table 2. When comparing preoperative and postoperative range of motion, statistically significant improvements occurred for each motion tested. When comparing side-to-side differences, motion in the affected shoulder was no different from that in the unaffected shoulder for ERS (73° contralateral vs 71° affected) and ERA (87° contralateral vs 85° affected). There was a statistically significant side-to-side difference in FE of 3° (175° contralateral vs 172° affected), which was not clinically significant. Strength was measured on a 5-point scale. At the follow-up visit, 93% of patients had strength ratings of 5 of 5 in FE, 94% were rated 5 of 5 in ERS, and 93% were a 5 of 5 in ERA. Strength in FE and strength in ERS were similar preoperatively and postoperatively; ERA was statistically significantly better postoperatively ($P = .02$).

Preoperatively, the apprehension test had positive results in all patients, whereas the relocation test had positive results in 85% of patients, and the sulcus test had positive results in 29% of patients. At follow-up, patients were once again tested for apprehension and relocation signs. Two patients (3%) had a positive apprehension test result, 2 patients (3%) had a positive relocation test result, and 2 patients had a pathologic sulcus test result.

Seven patients (10%) experienced recurrent instability after repair. Four patients had recurrent dislocations, and 3 experienced recurrent subluxations. One of the patients with recurrent instability had implant failure with loose anchors and early osteoarthritis.

Subjective Assessments

All patients completed a questionnaire consisting of several outcome assessment scales, sports activity ratings, as well as a visual analog scale (VAS) for pain and several satisfaction questions. Standardized assessment tools included the SST, the ASES Shoulder Index, the objective portion of the Rowe score, and the SF-12.

All rating systems demonstrated a statistically significant improvement at follow-up when compared with preoperative scores. The means with SD and range are outlined in Table 3 for all standardized scores and the pain VAS.

Seventy-two percent of the patients reported participating in occasional recreational sports, whereas 17% participated in recreational athletics 20 or more hours per week. The VAS (range, 0 [very poor] to 10 [excellent]) was used to collect subjective data on shoulder motion, stability, strength and endurance, and stability and performance during sports participation. For the entire study group, on average, motion was rated as 8.3 (range, 2-10; SD, 2), strength and endurance as 8.0 (range, 0-10; SD, 2), stability as 8.3 (range, 0-10; SD, 2), and performance and stability as 8.2 (range, 0-10; SD, 2).

Patients rated their levels of overall satisfaction on a 10-point VAS at the time of final follow-up, with 0 being completely unsatisfied and 10 being completely satisfied. Satisfaction averaged 8.6 (range, 0-10; SD, 2). Patients were asked whether they would have the same surgery again based on their functional result, to which 68 responded positively. Furthermore, all patients except 1 said they would recommend the surgery to others experiencing the same shoulder problems.

Concurrent Superior Labral Repairs

Postoperative outcome scores and pain ratings were compared for patients who underwent superior labral repairs that included some or all of the biceps anchor attachment (n = 18; 27%) and those who did not. Results for each group with the level of statistical significance are provided in Table 4. Those patients who did not have a concurrent superior labral repair

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TABLE 3
Rating System Results

	Preoperative Results			Postoperative Results			
	Mean	Range	SD	Mean	Range	SD	*P*
Simple Shoulder Test	7.7	0-12	4	11.5	3-12	1	.000[a]
American Shoulder and Elbow Surgeons subjective score	56	18-93	21	95	65-100	8	.000[a]
Pain visual analog scale	5.0	0-10	3	0.6	0-5	1	.000[a]
SF-12							
Physical	42	27-57	6	50	24-59	7	.000[a]
Mental	51	27-67	9	55	23-68	8	.001[a]
Rowe	—	—		97			—
Forward elevation,[b] deg	156	60-195	27	172	148-195	9	.000[a]
External rotation at the side,[b] deg	66	24-120	18	71	20-90	13	.140
External rotation in abduction,[b] deg	74	0-105	21	85	45-110	11	.000[a]

[a]Value is statistically significant.
[b]Range of motion on affected side.

TABLE 4
Postoperative Results by Subpopulations

	Superior Labral Anterior Posterior Repairs			Thermal Plication			Workers' Compensation			Type of Athlete		
	Yes (n = 18)	No (n = 49)	*P*	Yes (n = 23)	No (n = 45)	*P*	Yes (n = 8)	No (n = 61)	*P*	Collision (n = 16)	Noncontact (n = 27)	*P*
Simple Shoulder Test	10.9	11.7	.03[a]	11.6	11.5	.89	10.6	11.6	.82	11.7	11.6	.82
American Shoulder and Elbow Surgeons subjective score	94	95	.21	96	95	.277	96	95	.53	92	96	.045[a]
Pain visual analog scale	0.8	0.5	.07	0.4	0.7	.53	0.7	0.6	.42	0.7	0.4	.18
SF-12												
Physical	49	51	.59	52	49	.13	46	51	.38	50	52	.13
Mental	56	55	.34	55	55	.89	57	55	.43	57	56	.55
Rowe	98	98	.92	97	98	.34	99	97	.61	97	97	.75
Forward elevation,[b] deg	172	173	.94	174	172	.58	170	173	.27	173	175	.48
External rotation at the side,[b] deg	71	71	.74	73	70	.15	74	70	.57	65	71	.10
External rotation in abduction,[b] deg	85	86	.94	87	85	.55	85	85	.93	82	88	.36

[a]Value is statistically significant.
[b]Range of motion on affected side.

scored almost 1 point higher on average on the SST. This result was a statistically significant result.

Thermal Plication

Twenty-three patients underwent thermal capsulorrhaphy at the time of surgery. When comparing outcome scores and pain ratings of those who underwent thermal capsulorrhaphy and those who did not, the results were nearly identical. No significant differences were found (Table 4).

Workers' Compensation

The 8 workers' compensation patients were similar to those patients without work-related injuries. No significant differences were found between these 2 groups (see Table 4).

Collision Versus Noncontact Athletes

Patients were categorized as to their level of sports participation. Collision athletes (football, hockey, rugby; n = 16) were compared with patients who did not participate in

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collision or contact sports (n = 27). These 2 groups showed similar results in subjective scores and range of motion. The ASES score was significantly different with the group of noncollision and noncontact patients scoring 2 points higher than the collision athletes did (P = .045). However, the mean ASES score for both groups was more than 90, indicating a high degree of function. Recurrence rates including subluxation and dislocation were 12.5% (2/16) for the collision athletes versus 10% (5/53) for those patients who did not participate in collision sports. This was not significantly statistically different (power = .62).

In each of the subgroups, 9 variables were compared for differences: ASES score, SST, pain, Rowe, mental component summary and physical component summary for SF-12, and 3 range of motion variables: FE, ERS, and ERA. For the thermal plication comparison group, 7 of 9 variables had less than 80% power to detect significant differences. In the superior labral repair and workers' compensation subgroups, 8 of 9 and 5 of 9 variables, respectively, also had less than 80% power. Of the variables that were adequately powered to detect a significant difference between groups, only the SST result for the superior labral repair group was statistically different, with the superior labral repair group scoring 0.75 higher.

Age at Time of Operation

Four groups were established according to patient age at time of surgery: younger than 20, 20 to 29, 30 to 39, and 40 years and older. Subjective scores and objective range of motion were compared across all age groups. There were no statistically different results in any of the subjective scores or pain ratings between groups. The FE and ERS were similar in all age groups. The 30-to-39-year-old age group was significantly lower in ERA (P = .02). The 30-to-39-year-old age group on average had 77° ERA, the younger-than-20 age group averaged 90°, those in the 20-to-29-year-old age group had 88°, and the patients 40 years and older at the time of surgery had a mean of 84° ERA.

One case of implant failure was identified in our symptomatic patient group. This case was that of a 43-year-old man who underwent a capsular release 10 months after shoulder stabilization secondary to excessive tightness. He was seen again 50 months after the second operation and after settling workers' compensation with no complaints of instability but with complaints of pain and stiffness. He reported no history of trauma. Radiographs and a CT arthrogram demonstrated 2 loose anchors and moderate to severe glenohumeral arthritis. Seven patients experienced recurrent instability, all of whom had a positive apprehension test result. Four patients with recurrent instability were noted to have glenoid defects on retrospective review of the initial arthroscopic pictures and operative reports.

DISCUSSION

Several studies have compared arthroscopic versus open procedures for posttraumatic instability of the shoulder. A meta-analysis comparing open versus arthroscopic repairs demonstrated recurrent dislocation or subluxation rates of 10% versus 20%.[6] A multicenter study from Sweden comparing the use of arthroscopic biodegradable tacks versus open reconstructions with suture anchors demonstrated recurrences in 15% and 10%, respectively, at a minimum 2-year follow-up.[17] Cole et al[3] found no statistically significant difference in recurrence rates when comparing arthroscopic (24%) versus open (18%) anterior shoulder stabilizations in patients in whom the approach performed was determined on the basis of the pathologic findings at the time of surgery. Kim et al[9] also found no statistically significant difference between groups in nonrandomly selected patients, with redislocation rates of 6.7% in the open repair group versus 3.4% in the arthroscopic repair group.

Loutzenheiser et al[11] have shown that the 2 knots used in our study have the "highest knot-holding capacity when compared with all other knot configurations for braided suture." They also demonstrated "no significant differences in holding capacity between configurations tied by hand compared with those tied with a knot pusher." Thermal energy was applied in a grid technique to reduce capsular laxity. The probe was set at 70°C to 75°C, and the extent of application was determined by visual appearance of capsular shrinkage. The senior author currently does not use thermal capsulorrhaphy as an adjunctive procedure for shoulder stabilizations.

Routine postoperative radiographs were not performed. Those patients who remained asymptomatic throughout their postoperative course were not studied with additional imaging because further imaging was thought not to change management potentially. Only those patients with symptoms of recurrent instability or pain were further studied with radiographs or MRI. The incidence of asymptomatic anchor displacement in this patient group is therefore unknown. We are unable to define the impact of bone lesions involving the glenoid or humeral head, although the majority of our patients demonstrated a bone injury on radiographs or at the time of arthroscopy. These data were not collected prospectively, and the radiographic studies were not adequate for accurate determination of the size of lesions and the percentage loss of articular surface. Despite the use of the 5-o'clock portal in all cases, no clinically significant injuries to the cephalic vein, axillary nerve, or other superficial neurovascular structures were noted. We believe the 5-o'clock portal allowed optimal access to the inferior labrum, which helps to minimize errant anchor placement as a contributing factor to recurrent instability. Although this portal has remained a concern for some surgeons, in our study there was no evidence of any complications related to the development of this portal. The acceptance of this low anterior portal should facilitate the surgeon's ability to place the inferior anchor and suture in the most anatomical position.

The improved recurrence rates noted in our study may have resulted from our approach, which mimics the open approach of Thomas and Matsen[18] and incorporates the following technical points: (1) use of the 5-o'clock portal through the subscapularis muscle for improved access to the inferior labrum, allowing for more precise placement of suture anchors and a more anatomical reconstruction; (2) correction of other

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associated injuries including tears that extend to the superior labrum; and (3) capsular tightening at the time of soft tissue reapproximation, followed by capsular plication or rotator interval closure when necessary.

Looking at collision athletes as a subset, our recurrence rate for subluxation or dislocation (12.5%) was not statistically significant compared with noncollision athletes and patients (9%). To our knowledge, no previous study has compared these subgroups of patients. Uhorchak et al[19] reported a 23% recurrence rate for dislocation (3%) or subluxation (20%) in contact and collision athletes treated with arthroscopic stabilization. Pagnani and Dome[14] reported a 3% subluxation rate in American football players treated with open stabilization. Bacilla et al[1] reported a 5% dislocation rate in football players using an arthroscopic suture anchor technique. Preservation of range of motion using the arthroscopic technique was also noted in our study, with the majority of patients maintaining more than 95% of preoperative motion as compared with the opposite shoulder. The increase in range of motion when compared with preoperative calculations is likely attributed to pain and cannot be attributed to the arthroscopic approach. Not all patients had 90° of external rotation, as this was not possible in many patients even on the normal side.

Rotator interval closure was limited to 2 patients in our study. The majority of patients with persistent laxity after anchor placement were treated with thermal capsulorrhaphy. Since 1999, however, thermal capsulorrhaphy has not been used, and rotator interval closure has been employed routinely. The efficacy of rotator interval closure was not evaluated given the lack of power.

CONCLUSION

In summary, the results of this arthroscopic technique[18] compare favorably with those of previously reported open Bankart repairs. Subjective patient self-assessment tools demonstrated high satisfaction results, and objective outcome analyses likewise further supported the efficacy of this procedure.

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