INTRODUCTION

Since Bankart described recurrent shoulder dislocation in 1952, various treatment options have been proposed to address anterior dislocations and instability. Currently, open and arthroscopic procedures are widely used and considered standard of care as to which one represents the best option for the patient. In recent years, many studies have attempted to address arthroscopic repairs in athletes, in which shoulder instability events have been shown to occur at a rate of 0.5 to 1.2 per 1,000 exposures.1

However, a review of the literature on collision and contact athletes revealed that the majority of these included homogenous patient populations and have combined adult and adolescent athletes.2 In addition, the level of sport involvement and classification in terms of contact sports are not clearly defined. Athletic participation is common among adolescents, with more than half of high school students participating in school-scheduled sports during the 2014-2015 academic year.3 With increasing student participation in high school athletics over the past decade, traumatic anterior shoulder dislocation constitutes to the main problem.4 Improving our knowledge of these common injuries is crucial to help guide- and injury-based evaluation and treatments.

The purpose of this study was to review the clinical outcomes after arthroscopic Bankart repair in a group of adolescent athletes participating in collision and contact sports. We sought to identify any demographic, injury, and surgical factors affecting patient-reported functional outcomes. Subsequently, we sought to characterize recurrence and instability events and the success of return to sport.

METHODS

• Patient Selection
  - Ethical approval was obtained from our local institutional review board prior to initiation of this study.
  - Retrospective review identified a consecutive series of adolescent patients (≤19 years) who underwent primary arthroscopic Bankart repair with a minimum follow-up of 2 years.
  - All surgical procedures were performed by two fellowship-trained sports medicine surgeons between 2004 and 2012.
  - All patients had a history of trauma to their shoulder resulting in an anterior glenohumeral dislocation confirmed on frozen histological, magnetic resonance imaging (MRI) findings.
  - Exclusion criteria
    - Arthroscopic instability
    - Glenohumeral laxity greater than 30 mm as assessed on preoperative MRI
    - Positive ligamentous instability test in the absence of associated anatomic defects
    - Associated full-thickness rotator cuff tear
    - Associated glenohumeral arthritis
  - 37 patients (39 shoulders) met selection criteria.

• Clinical Evaluation
  - Operative and nonoperative data were extracted from medical records.
  - Preoperative assessment included age, mechanism and severity of injury, as well as the number of instability events prior to repair.
  - Sports were classified as collision, contact, or limited contact according to criteria established by the American Academy of Pediatrics.6
  - Postoperative assessment included recurrence of dislocation, and any postoperative complications.
  - Patient-reported outcomes and functional activity levels were evaluated using the American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES), Rowe Score for Instability, and Visual Analog Scale (VAS) for pain.

• Statistical Analyses
  - Normality of distribution of dependent variables (ASES and Rowe scores) was tested using the Shapiro-Wilk test.
  - Patient-reported outcomes and functional activity levels were evaluated using the American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES), Rowe Score for Instability, and Visual Analog Scale (VAS) for pain.
  - The associations between nominal and dichotomous independent variables and clinical outcomes were analyzed using multivariate analyses.
  - The principal findings of this study suggest that arthroscopic Bankart repair is an effective surgical option for traumatically induced shoulder instability in adolescents participating in collision and contact sports. At a minimum of 4-year follow-up, shoulder stability was effectively restored in 90% of cases, 80% satisfied with their postoperative level of sport. Arthroscopic Bankart repair is an excellent subject-oriented functional outcomes. Variables significantly associated with lower ASES and Rowe scores were failure to return to sports and recurrence.

In our study, multiple independent risk factors predicted ASES and Rowe scores. Of these factors, postoperative recurrence was the only that contributed significantly to the prediction. In turn, it makes sense that a recurrent injury would negatively affect the patient’s subjective outcome. To our knowledge, the present study is the first to describe an association between injury to a non-dominant shoulder and subjective outcome after arthroscopic Bankart repair. However, non-dominant shoulder injury should be considered in future studies to further contribute to the regression predictions. Adolescents suffering an injury to their non-dominant shoulder should be counseled regarding a higher risk of a lower functional outcome following surgery, especially when other factors that place them at a higher risk for failing to return to sport are identified.

RESULTS

• Outcomes
  - Multivariate regression analyses were run to evaluate how well independent risk factors predicted ASES and Rowe scores (Table 4). For ASES score, the independent risk factors; injury side, follow-up duration, collision, injury mechanism, number of Bankart anchors, postoperative recurrence, and return to sport significantly predicted score, F(10, 37) = 2.15, F = 0.64. Within this analysis, only postoperative recurrence added significantly to the prediction, P = 0.01. For Rowe score, the independent risk factors; injury side, collision, injury mechanism, slip tear, postoperative recurrence, return to sport, and time to surgery significantly predicted score, F(10, 37) = 3.04, P = 0.01. None of these variables contributed to the regression prediction. The results of these analyses indicate that athletes who have postoperative recurrence tend to have lower ASES and Rowe scores.

  • Table 3. Clinical Outcomes
    | Injury | ASES Mean ± SD | Rowe Mean ± SD | Total (n) |
    |--------|----------------|----------------|----------|
    | No     | 77.8 ± 18.5    | 10.5 ± 4.1     | 37 (39)  |
    | Yes    | 65.8 ± 18.5    | 6.9 ± 4.1      | 9 (10)   |

  • Table 4. Independent Risk Factors Predicting Clinical Outcomes Scores Identified by Multivariate Analyses
    | Variable | ASES R2 | P Value | Rowe R2 | P Value |
    |----------|---------|---------|---------|---------|
    | Injury side | 0.385  | <0.001  | 0.497  | <0.001  |
    | Collision | 0.109  | 0.385  | 0.109  | 0.385  |
    | Postoperative recurrence | 0.741  | <0.001  | 0.741  | <0.001  |
    | Return to sport | 0.454  | 0.109  | 0.454  | 0.109  |

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• Recent Instability
  - Four shoulders (10.1%) had dislocation events postoperatively; all were traumatic.

• Return to Sports
  - Return to sports were available for 36/37 patients (97.3%). A total of 32 patients (88.6%) attempted to return to sports postoperatively. Of those, 25 patients (71.4%) were able to return to sports at the same level for at least one season. Seven patients (21.9%) were unable to return to sports or had to lower their level of competition. Three athletes were unable to return to sports due to recurrent instability; one underwent revision surgery and was able to return to sports. The other two patients refused surgical treatment with soft-tissue procedures for recurrent instability. The remaining athlete who was unable to return underwent revision surgery for persistent shoulder pain. All patients who had undergone subsequent surgical intervention cited shoulder limitations as the reason for inability to continue playing sports.

REFERENCES