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Paper 10: Long-Term Outcomes Following Arthroscopic Posterior Shoulder Stabilization: Minimum 10 Year Follow-up

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Objectives:
Posterior shoulder instability accounts for approximately 2-12% of shoulder instability cases and represents a debilitating if not potentially career-ending injury in athletic populations. Arthroscopic posterior shoulder stabilization through capsulolabral reconstruction has been shown to reduce pain and improve function, facilitating return to sport at short- to medium-term follow-up. However, few long-term follow-up studies (exceeding 10 years) have been performed to assess the persistent benefit in shoulder function achieved by surgical intervention. Therefore, the purpose of this study was to investigate the objective and subjective clinical outcome measures of shoulder function in patients who underwent arthroscopic posterior shoulder stabilization with a minimum follow-up time of 10 years. It was hypothesized that current shoulder function would remain statistically superior to preoperative shoulder function, with diminishing benefit for those who required revision surgery.

Methods:
A group of 183 patients (200 shoulders) who underwent arthroscopic capsulolabral reconstruction for isolated posterior shoulder instability between January 1998 and December 2009 were recruited via existing contact information within the electronic medical record at a single academic medical institution. Institutional review board approval was obtained prior to study initiation, and all patients signed informed consent. Patient characteristics including age, gender, hand dominance, sports played, level of participation, and length of follow-up, were obtained. Patients completed an online questionnaire containing the American Shoulder and Elbow (ASES) shoulder score and the Kerlan-Jobe Orthopaedic Clinic (KJOC) shoulder and elbow score. Subjective scores of pain, stability, range of motion (ROM), and strength were also obtained. The level of sporting participation after treatment was determined and patients assessed whether the initial surgery was worthwhile. Current shoulder status, as compared to preoperative (but post-injury) shoulder status, was compared according to the above metrics. Subgroup analyses were performed comparing outcomes between athletes whose primary sport did or did not involve overhead throwing. Subgroup analyses were also performed for patients who underwent revision surgery, as compared to those who did not, including additional evaluation of shoulder function after failure but preceding revision surgery. Group means for continuous variables were compared using ANOVA and student's t tests as appropriate, while ordinal or categorical data were compared with Wilcoxon signed rank tests or Fisher's exact test when suitable.

Results:
53 patients (55 shoulders) with a mean age of 23 years at surgery were included, with an average follow-up time of 15.4 years. 49 of 53 patients were right-hand dominant, with right shoulder injury in 35 cases. Patient characteristics for subgroup analyses based upon position and need for revision surgery are shown in **Table 1**. Across all patients (55 shoulders) there was significant improvement in all outcome measures, including scores of ASES, KJOC, pain, stability, ROM, and strength, comparing current to preoperative shoulder status (**Table 2**). Similar trends were found in subgroup analyses, with throwers and non-throwers demonstrating equivalent improvements.

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In contrast, patients who underwent revision surgery (n=8) possessed a current shoulder status equivalent to preoperative status, across all outcome measures, although significantly improved when compared to shoulder status after initial failure (**Table 2**). Across all patients, 60% returned to sport at any level, with 34.5% returning to sport an the same level as prior to injury. 89% of patients felt the initial surgery was worthwhile. Subgroup analysis demonstrated a trend towards compromised return to sport at pre-injury levels in throwing athletes, but statistical significance was not achieved (p = .09).

Conclusions:
The main finding of this study was that arthroscopic capsulolabral reconstruction produced significant pain relief and improved shoulder function at long-term follow-up, that is, at a mean of 15.4 years following surgery. Of the limited patient population that underwent revision surgery (n=8), current shoulder status did not differ statistically from preoperative status (i.e., no significant improvement compared to preoperative function). Both findings support the hypothesis. No differences in throwing athletes were found in comparison to non-throwing athletes according to the outcome measures explored. The majority of patients were able to return to sport following surgery, but only 64% of non-throwers returned to sport at the same level as prior to injury, with only 21% of throwers returning to pre-injury levels. While some of these findings are attributed to a discontinuation or reduction in sporting activity due to expected life circumstances (e.g. graduation), the results suggest continued opportunity to improve shoulder function following injury entailing a posterior instability event. This study is also limited by the absence of a group that did not undergo operative intervention. While this study is limited by a relatively small sample size, it does represent one of the longest follow-up periods for posterior shoulder stabilization, demonstrating sustained benefit in shoulder pain and function following arthroscopic surgery.

The Orthopaedic Journal of Sports Medicine, 10(5)(suppl 3)
DOI: 10.1177/2325967121S00548
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