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Return to Play and Recurrent Instability After In-Season Anterior Shoulder Instability

A Prospective Multicenter Study

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Investigation performed at the United States Naval Academy, Annapolis, Maryland, USA; the United States Military Academy, West Point, New York, USA; and the United States Air Force Academy, Colorado Springs, Colorado, USA

Background: There is no consensus on the optimal treatment of in-season athletes with anterior shoulder instability, and limited data are available to guide return to play.

Purpose: To examine the likelihood of return to sport and the recurrence of instability after an in-season anterior shoulder instability event based on the type of instability (subluxation vs dislocation). Additionally, injury factors and patient-reported outcome scores administered at the time of injury were evaluated to assess the predictability of eventual successful return to sport and time to return to sport during the competitive season.

Study Design: Cohort study (prognosis); Level of evidence, 2.

Methods: Over 2 academic years, 45 contact intercollegiate athletes were prospectively enrolled in a multicenter observational study to assess return to play after in-season anterior glenohumeral instability. Baseline data collection included shoulder injury characteristics and shoulder-specific patient-reported outcome scores at the time of injury. All athletes underwent an accelerated rehabilitation program without shoulder immobilization and were followed during their competitive season to assess the success of return to play and recurrent instability.

Results: Thirty-three of 45 (73%) athletes returned to sport for either all or part of the season after a median 5 days lost from competition (interquartile range, 13). Twelve athletes (27%) successfully completed the season without recurrence. Twenty-one athletes (64%) returned to in-season play and had subsequent recurrent instability including 11 recurrent dislocations and 10 recurrent subluxations. Of the 33 athletes returning to in-season sport after an instability event, 67% (22/33) completed the season. Athletes with a subluxation were 5.3 times more likely (odds ratio [OR], 5.32; 95% CI, 1.00-28.07; $P = .049$) to return to sport during the same season when compared with those with dislocations. Logistic regression analysis suggests that the Western Ontario Shoulder Instability Index (OR, 1.05; 95% CI, 1.00-1.09; $P = .037$) and Simple Shoulder Test (OR, 1.03; 95% CI, 1.00-1.05; $P = .044$) administered after the initial instability event are predictive of the ability to return to play. Time loss from sport after a shoulder instability event was most strongly and inversely correlated with the Simple Shoulder Test ($P = .007$) at the time of initial injury.

Conclusion: In the largest prospective study evaluating shoulder instability in in-season contact athletes, 27% of athletes returned to play and completed the season without subsequent instability. While the majority of athletes who return to sport complete the season, recurrent instability events are common regardless of whether the initial injury was a subluxation or dislocation.

Keywords: glenohumeral; anterior instability; in season; return

Glenohumeral instability is common in young athletes and often precludes participation from sport for prolonged periods of time.[32] Anterior shoulder instability is most common and generally occurs after a traumatic event in a young athletic population.[35] A review of the National Collegiate Athletic Association (NCAA) Injury Surveillance System[32] found that shoulder instability was reported at a rate of 0.12 per 1000 exposures, with the highest rates in contact sports. Nonoperative management of shoulder

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instability is associated with significant morbidity and lost playing time, leading to more than 10 days of time lost to sport in 45% of events.[32]

There is no consensus on the optimal treatment of young in-season athletes with shoulder instability, and initial treatment may include immobilization, rehabilitation, and return to activity[2,41] or early shoulder stabilization.[1,42] Young athletes in contact sports have the highest risk of initial glenohumeral instability, and nonoperative treatment leads to recurrent instability in 39% to 94% of patients.** While the pathoanatomy of first-time shoulder dislocations and subluxations is well described to include Bankart lesions in 79% to 100% of patients,[1,3,11,23,25,36,46] the pathological lesions of recurrent instability are less well described but likely risk further damage to the glenoid labrum, articular cartilage, capsule, and glenohumeral ligaments. Shoulder stabilization effectively reduces recurrent instability to 5% to 9%[13,14] after open procedures and 5% to 33%†† after arthroscopic stabilization. Immediate surgical stabilization, however, is often not a desirable treatment option for the competitive in-season athlete.

The goal of the team physician is to return the athlete to full function and sport in the safest and most efficient manner possible. However, the optimal treatment of the in-season athlete who sustains a traumatic glenohumeral subluxation or dislocation is not known. There are limited data that guide in-season return to sport after glenohumeral dislocations,[6] and no data exist after return to play of in-season subluxations. We therefore designed a prospective observational study of intercollegiate contact athletes to evaluate the natural history of nonoperative treatment after traumatic anterior shoulder instability.

The purpose of this study was to examine the likelihood of return to sport and recurrence after an in-season shoulder instability event based on the type of instability event (subluxation vs dislocation). To address this aim, we sought to determine if injury factors or patient-reported outcomes at the time of injury were associated with the eventual ability to return to play, time lost from sport during the competitive season, and recurrence. We secondarily sought to characterize in-season shoulder instability events and the success of return to play. We hypothesized that the type of instability (subluxation or dislocation) and better patient-reported outcome scores at the time of injury would be associated with an improved ability to return to play and decreased time lost from sport among in-season intercollegiate athletes.

**References 1, 3, 19, 21, 23, 25, 38, 42, 44.

††References 3, 9, 10, 12, 14, 16, 26, 27, 31, 33, 37.

MATERIALS AND METHODS

Design and Setting

We conducted a prospective observational study to determine the natural history of nonoperatively treated anterior shoulder instability in elite, intercollegiate in-season contact athletes at 3 NCAA Division I programs. Actively monitored sports included men's and women's basketball, soccer, lacrosse, and rugby and men's boxing, baseball, football, martial arts, and wrestling. Athletes who suffered a first-time shoulder instability event at the participating institutions during their competitive season were recruited to participate in this study. The primary outcomes of interest were the ability to return to sport, time lost from sport after an acute anterior shoulder instability event, and recurrence. Baseline data collection at the time of injury included patient-reported outcome measures specific to the shoulder, sport played, previous instability events, direction of instability, and type of instability (subluxation or dislocation). Participants were followed during the course of their competitive season to determine whether they were able to return to play and, if they did, whether they experienced recurrent instability during the remainder of the season. Institutional review board approval was obtained at each participating institution before the initiation of recruitment and data collection.

Participants

The patient population for this study included all in-season, competitive contact intercollegiate athletes at 3 NCAA Division I athletic departments during the 2011 to 2012 academic years. To be eligible for inclusion in the study, a traumatic anterior instability injury had to occur during the athlete's competitive intercollegiate season as defined by the NCAA. The athlete must have desired to pursue initial nonoperative treatment with the goal of returning to play during the current season.

Injury Definitions, Surveillance, and Follow-up

All athletes at the 3 institutions (United States Military Academy, United States Naval Academy, and United States Air Force Academy) receive their medical care through a closed health care system, and all injuries are evaluated through the institutions' associated sports medicine and orthopaedic clinics.[28] All in-season shoulder instability events during the study period were evaluated

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by the senior orthopaedic surgeons at each institution and classified according to the criteria described by Owens et al.[36]

For the current study, anterior instability events were classified as a complete dislocation if it was a traumatic injury requiring manual reduction by a health care provider and there was evidence of a Bankart or Hill-Sachs lesion on radiographs or magnetic resonance imaging (MRI). A subluxation was defined as a transient instability event, not requiring reduction but demonstrating a positive apprehension and relocation sign with radiographic or MRI evidence of a Bankart or Hill-Sachs lesion.[36]

The date of the initial in-season injury was documented, as was the date of return to full sport participation. If athletes returned to participation during the same competitive season, we conducted active surveillance within the study cohort during the remainder of the season to identify all recurrent shoulder instability events that met the criteria described above. Because all students are required to participate in athletics, these injuries are documented in multiple electronic databases that were used for injury surveillance.[43] Because of the closed health care system at each institution and the available injury surveillance resources, our ability to detect any injuries during the follow-up period and complete follow-up assessments was excellent.

Initial Management and Return-to-Play Criteria

All patients underwent an accelerated rehabilitation program after the initial shoulder instability event.[34] No patient was immobilized after the injury, and a supervised rehabilitation program was initiated as tolerated on the first day after injury. Phase 1 consisted of regaining range of motion with high repetition and low-weight rotator cuff strengthening. Once symmetric range of motion was obtained, phase 2 was initiated with periscapular strengthening and resistance exercises.

In this observational study, we followed a previously published protocol for return to play after in-season shoulder instability.[34] If the player was asymptomatic with all rehabilitative exercises, demonstrated symmetric and full strength, was able to perform sport-specific exercises, and had no pain or limitations, they were cleared for full participation. Functional shoulder bracing was used at the discretion of the treating surgeon and the athlete's ability to perform sport-specific tasks. In all cases, when a brace was utilized, a motion-limiting brace with straps to limit abduction and external rotation was used. After return to play, all athletes were prospectively followed to assess the recurrence of instability. Recurrent instability after return to play was not an absolute indication for immediate surgical stabilization.

Outcome Measures

To characterize return to play after in-season shoulder instability, we evaluated all participants to determine the number of days missed from sport after an in-season shoulder instability event. The number of days missed from sport was defined as the number of days from injury until full return to practice or games. The ability to return to sport was considered successful if the athlete returned to competition, completed the season, sustained no recurrent instability events, and did not pursue surgical intervention during the season. Participants not able to return to sport were considered to have failed nonoperative treatment because of either insufficient shoulder function, leading to early elective shoulder stabilization, or an injury at the end of the season, preventing complete rehabilitation and return to play. Recurrent shoulder subluxation and dislocation events sustained during the return-to-play period were documented in all cases.

The primary goal of this study was to identify factors at the time of injury that could predict the ability to return to sport, time lost from sport, and recurrent shoulder instability. In support of this aim, patient-reported outcome questionnaires were completed by all participants at the time of injury upon enrollment into the study. These included the Western Ontario Shoulder Instability Index (WOSI),[22,40] Single Assessment Numeric Evaluation (SANE),[45] Simple Shoulder Test (SST), and American Shoulder and Elbow Surgeons (ASES).[24] The SANE, SST, and ASES are validated outcome instruments with a scale of 0 to 100 (100 = perfect score). The WOSI is a validated outcome tool with a maximum of 2100 points, which is converted to a percentage of normal function to facilitate interpretation (100 = perfect score).[8]

Statistical Analysis

Initially, descriptive statistics were calculated including means ± SDs for continuous variables and frequencies and proportions for categorical variables. For ordinal variables, or continuous variables that were not approximately normally distributed, we calculated medians and interquartile ranges (IQRs). We used 2×2 contingency tables along with the χ^2 statistic, or Fisher exact test where appropriate, to examine associations between categorical variables. Univariate logistic regression models were used to estimate the likelihood of return to sport during the same season based on data collected at the time of injury. For continuous variables, independent t tests were used to evaluate between-group differences for all outcomes of interest. If the assumptions for the independent t test were not met, the nonparametric equivalent, the Kruskal-Wallis test, was used for intergroup comparisons. Univariate linear regression models were used to estimate whether continuous factors, such as patient-reported outcome measures at the time of injury, were associated with time to return to play during the same season after injury. All analyses were performed using Stata SE v10.1 (StataCorp LP), and a type I error rate of $P < .05$ was used for all comparisons.

RESULTS

Forty-five patients experienced an in-season traumatic anterior shoulder instability event during the study period and underwent accelerated rehabilitation and attempted early return to play. The mean age of injured participants

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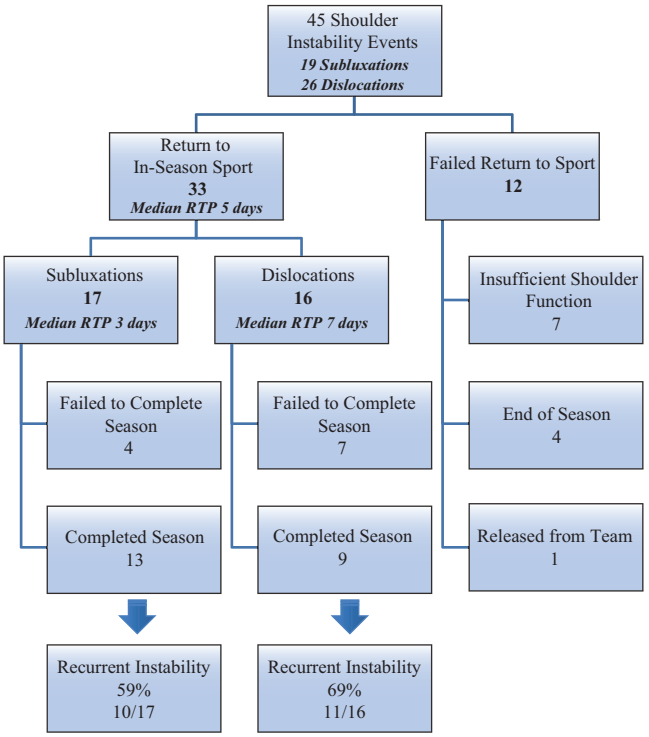

Figure 1. Consolidated diagram of participants with in-season shoulder instability and return to play (RTP).

was 20.7 ± 1.63 years, and 42 (93.3%) were male. Football accounted for 28 injuries, rugby for 6, wrestling for 4, baseball for 2, judo for 2, lacrosse for 2, and boxing for 1. The right shoulder was injured in 26 patients. There was no difference in return to play and recurrence between football and nonfootball sports. The injury was a first-time instability episode in 84% (38/45) of participants (Figure 1). Seven patients reported a history consistent with a possible subluxation event in high school sports but had no physical examination finding of instability and received no operative or nonoperative treatment for shoulder instability before enrollment in the current study.

After an accelerated rehabilitation program, 33 of 45 (73%) athletes returned to sport for either all or part of the season after a median 5 days lost from competition (IQR, 13). Twelve of 45 athletes (27%) did not achieve sufficient shoulder function to return to sport during the season. These included 5 athletes participating in football, 2 participating in rugby, 2 participating in wrestling, and 1 each participating in judo, boxing, and lacrosse. The most common reason that athletes did not return to in-season sport was because of failure to attain sufficient shoulder function, prompting elective early surgical stabilization (7/12 participants). Four patients sustained an injury at the end of the season that prevented sufficient rehabilitation and return to play, and 1 athlete was released from the team after his injury (Figure 1).

Twelve of 45 (27%) athletes successfully returned to sport without experiencing a subsequent instability event in the remainder of the season. Of the 33 athletes returning to in-season sport after an instability event, 67% (22/33) completed the remainder of the season regardless of the recurrence of instability. Recurrent instability after return to in-season competition was observed in 64% (21/33) of athletes. Overall, there were a mean 2.2 ± 2.7 recurrent instability events per athlete per season calculated for athletes who returned to their sport. This included a mean 0.33 ± 0.77 recurrent dislocations and 1.9 ± 2.5 recurrent subluxations. There was no significant difference in recurrent instability between athletes who initially experienced shoulder subluxations (10/17, 59%) compared with those who initially experienced dislocations (11/16, 69%) (P = .554). Athletes with an initial in-season subluxation experienced a recurrent subluxation in 9 extremities and a recurrent dislocation in 1 extremity. Athletes with an initial shoulder dislocation experienced recurrent dislocations in 5 extremities and recurrent subluxations in 6 extremities. Recurrent instability after return to sport was not associated with failure to complete the season (P = .249).

TABLE 1
Univariate Logistic Regression Models Evaluating the Association Between Return to Play and Patient-Reported Outcomes at the Time of Injury[a]

Outcome Measure	Odds Ratio (95% CI)	P Value
WOSI	1.05 (1.00-1.09)	.037
SST	1.03 (1.00-1.05)	.044
ASES	1.03 (0.99-1.06)	.086
SANE	1.03 (0.99-1.08)	.092

[a]Adjusted for the type of instability (subluxation or dislocation). ASES, American Shoulder and Elbow Surgeons; SANE, Single Assessment Numeric Evaluation; SST, Simple Shoulder Test; WOSI, Western Ontario Shoulder Instability Index.

In-season shoulder instability events were classified as subluxations in 19 (42%) shoulders and dislocations in 26 (58%) shoulders. The type of in-season instability event was significantly associated with the ability to return to play during the same season. Athletes with a subluxation were 5.3 times more likely (OR, 5.32; 95% CI, 1.00-28.07; P = .049) to return to sport after an initial in-season shoulder instability event when compared with those with dislocations; however, successful completion of the season after a shoulder instability event did not reach statistical significance between groups (subluxation, 36%; dislocation, 19%; P = .193). Participants with a subluxation returned to sport at a median 3 days (IQR, 7) compared with 7 days (IQR, 13.5) for dislocations (P = .064), but there was much more variability in the time lost to sport after dislocation events.

Shoulder-specific patient-reported outcome measures obtained at the time of injury were predictive of an eventual ability to return to play during the same competitive season (Table 1). Logistic regression results suggest that, on average, for every 1 point higher that the WOSI score was at the time of injury, the athlete was 5% more likely (OR, 1.05; 95% CI, 1.00-1.09; P = .037) to return to play during the same season. Similarly, for every 1 point higher that the SST score was at the time of injury, the athlete was 3% more likely (OR, 1.03; 95% CI, 1.00-1.05; P = .044) to

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TABLE 2
Univariate Linear Regression Models Evaluating the Association Between Patient-Reported Outcome Scores at the Time of Injury and Time Loss[a]

Outcome Measure	β Coefficient	Constant	SE	*t* Value	*P* Value
WOSI	–0.128	13.39	0.052	–2.43	.021
SST	–0.117	14.04	0.037	–3.11	.004
ASES	–0.131	15.16	0.049	–2.64	.013
SANE	–0.063	10.56	0.053	–1.18	.248

[a]Adjusted for the type of instability (subluxation or dislocation). The SST accounted for 24% of the variability in time to return to play, which was the largest of the patient questionnaires. Time to return to play was predicted using the following formula: time loss = (SST score) × (–0.117) + 14.04. ASES, American Shoulder and Elbow Surgeons; SANE, Single Assessment Numeric Evaluation; SST, Simple Shoulder Test; WOSI, Western Ontario Shoulder Instability Index.

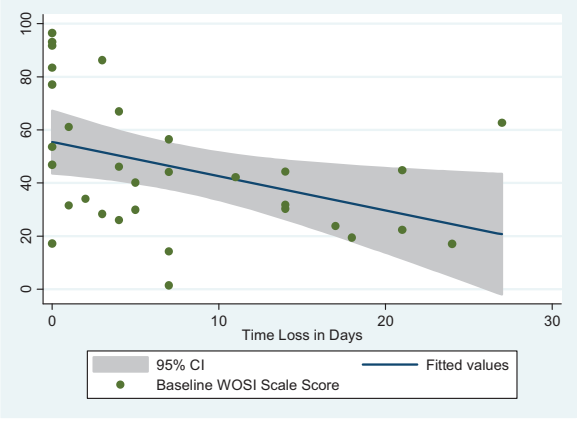

Figure 2. Association between the Western Ontario Shoulder Instability Index (WOSI) score at the time of injury and time loss in days after in-season acute traumatic glenohumeral instability.

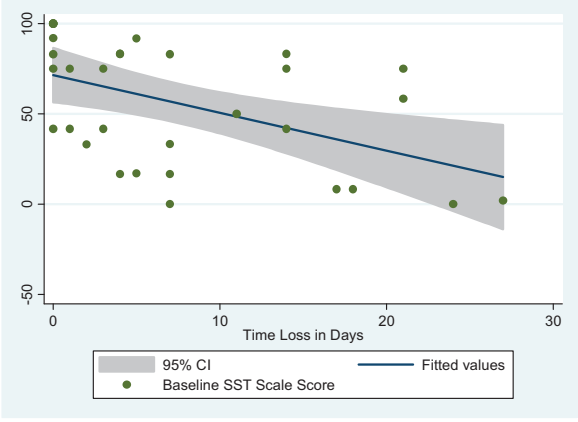

Figure 3. Association between the Simple Shoulder Test (SST) score at the time of injury and time loss in days after in-season acute traumatic glenohumeral instability.

return to play during the season. The SANE and ASES scores at the time of injury were not predictive of the ability to return to play during the same season ($P > .05$) (Table 1).

Shoulder-specific patient-reported outcome measures obtained at the time of injury were also predictive of time to return to sport after injury (Table 2). Time loss from sport after an in-season shoulder instability event correlated inversely with the WOSI ($P = .039$) (Figure 2), SST ($P = .007$) (Figure 3), and ASES ($P = .020$) (Figure 4) scores at the time of initial injury. For every 10 points higher that the WOSI score was at the time of initial injury, an athlete returned to sport 1.3 (95% CI, 0.2-2.4) days sooner ($P = .021$). The WOSI score at the time of injury accounted for 16% of the variability in time to return to sport after an in-season shoulder instability event. Similarly, for every 10 points higher that the SST score was at the time of injury, an athlete returned to sport 1.2 (95% CI, 0.4-1.9) days sooner ($P = .004$). The SST score at the time of injury accounted for 24% of the variability in time to return to sport after an in-season shoulder instability event. Finally, for every 10 points higher that the ASES score was at the time of injury, an athlete also returned to play 1.3 (95% CI, 0.3-2.3) days sooner ($P = .013$). The ASES score at the time

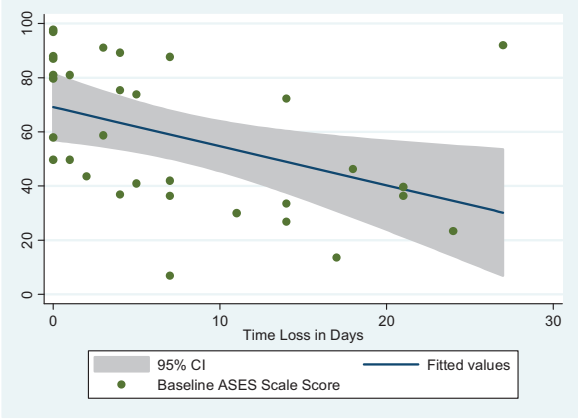

Figure 4. Association between the American Shoulder and Elbow Surgeons (ASES) score at the time of injury and time loss in days after in-season acute traumatic glenohumeral instability.

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TABLE 3
Estimated Time to Return to Sport
Based on the SST at the Time of Injury[a]

SST Score	Time to Return to Play, d
100	2
80	5
60	7
40	9
20	12

[a]The Simple Shoulder Test (SST) is a 12-question test administered at the time of injury. Estimated values for return to play were calculated using the following formula: time loss = (SST score) × (–0.117) + 14.04.

of injury accounted for 19% of the variability in time to return to sport after an in-season shoulder instability event. Recurrent instability could not be predicted from the WOSI (P = .957), SST (P = .403), ASES (P = .164), or SANE (P = .230) scores at the time of injury.

A brace was used in 20 athletes (61%, 20/33) returning to competition after an in-season instability event. There was no association between brace use and the prevention of recurrent glenohumeral instability (P = .092).

DISCUSSION

The initial treatment of young athletes with shoulder instability remains controversial. Prospective studies have demonstrated that nonoperative treatment of first-time anterior shoulder dislocations results in a 39% to 94% incidence of recurrent instability,[1,3,21,23,25] and in patients younger than 20 years, recurrence rates of 72% to 87% have been reported.[17,38] Sachs et al[39] identified young age and participation in contact sports as risk factors for recurrent dislocations, and this is supported by a study of athletes from the United States Military Academy that documented a 92% recurrence rate in young athletes.[44] A recent study suggests that athletes with a history of shoulder instability, treated nonoperatively, are much more likely to experience subsequent instability than those with no history of instability when engaged in activities that place significant demands on the shoulder.[7]

In the only previous study to evaluate return to play in athletes after in-season shoulder instability, Buss et al[6] retrospectively evaluated 30 athletes with anterior dislocations (n = 19) or subluxations (n = 11) and a mean age of 16.5 years. They demonstrated that 90% of athletes returned to sport in the same season after a mean 10 days missed from sport. Recurrent instability was noted in 37% of athletes returning to sport during the same competitive season. The authors of this retrospective study emphasized an accelerated rehabilitation program and return to play after pain-free and symmetrical range of motion. The authors concluded that in-season return to play after traumatic anterior shoulder instability resulted in a high success rate for return to sport with nonoperative treatment in athletes who experienced instability during their competitive season.

The present study characterized return to play and recurrence after traumatic anterior shoulder instability after returning to sport in intercollegiate contact athletes. In this elite-level athletic population, 73% of athletes with an anterior glenohumeral subluxation or dislocation returned to play. Despite the high rate of return to play, only 27% of athletes with nonoperative management of in-season shoulder instability successfully returned to play without experiencing subsequent instability. Patients with subluxations were over 5 times more likely to return to sport when compared with patients with dislocations, and they did so at an earlier time point (median, 3 vs 7 days, respectively). Despite these differences in return to play, the incidence of recurrent instability events and the ability to successfully complete the season were not significantly different between the subluxation and dislocation groups ($P > .05$). These findings highlight the morbidity associated with glenohumeral subluxation in the young contact athlete and may suggest that overall function and recurrence after an anterior shoulder subluxation are similar to a dislocation event.

A specific objective of this prospective study was to identify factors that predict time lost from sport and eventual ability to successfully return to play in the same intercollegiate season. Regardless of the type of injury (subluxation or dislocation), patient-reported outcome scores administered at the time of injury predicted return to play. The WOSI score demonstrated the greatest magnitude in estimating the ability to return to play, and for every 1 point higher that the WOSI score was at baseline injury, the athlete was 5% more likely to return to sport in the same season. The time to return to play was predicted by the SST, WOSI, and ASES scores at the time of injury, but the SST accounted for the greatest amount of variability in estimating the time to return to sport. Based on this study, an athlete who sustains an anterior glenohumeral subluxation or dislocation and scores 100 on the SST at the time of injury is expected to return to play in 2 days, and an athlete with a score of 60 is predicted to return to sport at 7 days after the injury (Table 3). Using the data from this study and the 12-question SST, team physicians can provide important prognostic return-to-play information to the athlete.

In the present study, 64% of athletes returning to sports experienced recurrent instability. The mean number of recurrent instability events was 2.2 per athlete per season and included 1.9 recurrent subluxations and 0.3 recurrent dislocations. The recurrent instability rate in the current study was nearly twice as high as the rate reported previously by Buss et al (37%).[6] The higher recurrence rate observed in the current study likely represents a higher level of competition, primary focus on contact athletes, prospective study design, and active surveillance of injuries within a closed health care system.

Recurrent glenohumeral dislocations are often considered an indication for surgical stabilization of the in-season athlete,[34] although there are limited data to guide treatment of the in-season athlete with recurrent dislocations or subluxations. In this observational study, recurrent instability was common, but we did not attempt to alter the treatment course as determined by the team physician. Consequently, we observed a high rate of recurrent

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subluxation events upon return to sport. While dislocations are more often brought to the attention of the team physicians, recurrent subluxations are more common and have similar effects on return to play.[36] The long-term consequences of returning to sport and experiencing multiple recurrent instability events before initial shoulder stabilization remain unclear. In addition to having high rates of recurrent instability, those with a history of instability are also at an increased risk of having serious damage to the joint capsule,[15] subsequent glenohumeral osteoarthritis,[4,20,30] and increased mortality rates.[18] In a recent study, it was reported that 31.2% of shoulders examined with computed tomography before initial shoulder stabilization had signs of osteoarthritis, with the number of prior instability events being associated with degenerative changes.[29]

The initial treatment of acute anterior shoulder instability in athletes remains controversial. Despite immobilization for 4 weeks after primary glenohumeral dislocations, Bottoni et al[3] reported that 75% of nonoperatively treated patients experience a recurrence. A prolonged period of immobilization for the in-season athlete with shoulder instability is often contrary to the desires of the patient and team. Using an accelerated rehabilitation program,[34] we observed that in-season athletes with shoulder instability returned to sport at a median 5 days. This is consistent with a previous study,[6] which demonstrated that return to play after 7 to 10 days can be anticipated; however, the previous study reported a recurrence rate of 37%, and we found a recurrence rate of 64% among athletes returning to sport.

Motion-limiting braces that prevent abduction, extension, and external rotation are often used in nonthrowing athletes to facilitate return to sport.[5,38] Buss et al[6] encouraged all patients to wear a brace, and athletes with a brace reported a subjective improvement in stability. No previous study, however, has documented the effectiveness or ineffectiveness of brace wear in preventing a recurrence. Although the present study was not designed to evaluate the effectiveness of brace wear, we found no difference in recurrence among athletes who wore a brace and those not wearing a brace. The relatively small cohort size and treatment bias for those wearing a brace likely influence these results, and future prospective studies specifically designed to evaluate the effectiveness of braces in the secondary prevention of shoulder instability injuries are needed.

As with any study, the current study has several notable limitations that should be considered when interpreting the results. First, this study consists of a relatively small sample size, and some cohort comparisons are underpowered. Similarly, the small sample sizes for each sport prevent subgroup analysis for return to play by sport played. Additionally, not all sports are represented in this series, a finding that reflects the relative risk of shoulder instability in various contact sports. Furthermore, this study seeks to determine factors that predict return to play and recurrences in in-season athletes, and we are not able to determine the long-term effects of nonoperative treatment or return to play during the same competitive season after a shoulder instability event. Additionally, while we are able to estimate time to return to play using the SST, we were unable to predict the ability to return to play without recurrence. Finally, our patient population is focused on elite, intercollegiate contact athletes, and these results may not be generalizable to athletes participating at other levels of competition.

Despite these limitations, the current study has several strengths that should be noted as well. The primary strengths of the present study are the prospective design, the size of the patient population, and the number of observed instability events. It is currently the only prospective study that assesses nonoperative treatment of in-season glenohumeral instability, and it represents the largest cohort collected to date. Additionally, a single standardized accelerated rehabilitation program was applied across multiple centers, limiting institutional bias.

CONCLUSION

Athletes with in-season anterior shoulder instability, treated nonoperatively, return to sport in the same season at a rate of 73%, but only 27% of athletes successfully complete the season without subsequent instability events. The majority of athletes who suffer an in-season shoulder instability event can expect to return to sport within 10 days, with athletes sustaining a subluxation event returning more frequently and sooner when compared with those experiencing a dislocation. The majority of athletes who return to participation during the same season experience recurrent instability events, and there is no difference in the recurrence rate regardless of whether the initial injury was a subluxation or dislocation. Shoulder-specific patient-reported outcome measures at the time of initial in-season injury are predictive of the likelihood of return to play and the time required to return to play during the same competitive season. While 73% of college athletes with in-season shoulder instability were able to return to sport during the same competitive season, the long-term outcomes and consequences associated with recurrent instability events in these patients who return to play remain unclear.

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