Research Square

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Shoulder Dislocation, Return-to-Sport Timing, and Recurrence in Elite Adolescent Football Players: A Multicenter Cohort Study

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Abstract

Purpose

To evaluate the epidemiology of shoulder dislocations in adolescent football players and to assess factors associated with recurrence and RTP.

Methods

This study was conducted using data from three professional football academies on injuries sustained between 2019 and 2026 among athletes aged 13 to 19. Data about a total of 2,270 males and 1,509 females were collected. 37 shoulder dislocations were identified (27 primary, 10 recurrences). Demographic, injury-related, and treatment variables were collected.

Results

We identified 27 athletes with primary shoulder dislocations, an incidence of 0.71%. Male athletes showed a higher incidence than female athletes. Athletes who experienced recurrence showed shorter RTT and RTP.

Conclusion

The male cohort of players demonstrated a higher incidence than the female cohort. Earlier return to training and sport was observed among athletes who subsequently experienced recurrence; however, the small number of recurrent events and variability in treatment and rehabilitation protocols limit causal interpretation. Club-specific management protocols may further influence recovery and recurrence trajectories

INTRODUCTION

Football is the most popular sport in the world, with a high number of athletes across all age groups (1–6). It is evolving into a higher intensity contact sport with more aggressive tactics, higher speeds, and greater changes of direction. This has led to a more frequent rate of tackling and collisions between players, and as such, a higher risk of trauma.

Although football remains a predominantly lower limb sport, and most injuries do occur in knee ankle and hip in over 80% of cases, with higher prevalence of strain, sprains and contusions (6,12,13) in lower limbs and trunk (3,4,6,9,12,13), upper limb trauma has shown an increase in percentage up to 13% (7,9,10,13,14,15) with higher prevalence in goalkeepers, but with increasing prevalence in outfield players.

Outfield players, in particular, can play even while suffering from an upper-limb injury, which may lead to underestimation of injury severity (10). Moreover, even if the prevalence of lower-limb injuries is higher, upper-limb injuries still have an important impact on players' and teams' performance, with longer absence periods that also depend on treatment (9).

Adolescent athletes historically represent a high-risk population for shoulder instability, with also reported recurrence rates substantially higher than in adults. As previous studies have highlighted, early return to sport, especially contact sport, may be a potential risk factor for recurrence, although evidence remains limited in elite youth football populations. Adolescent males with traumatic shoulder dislocation involved in high-demand sport activity have been traditionally considered at high risk of recurrence, and primary arthroscopic stabilisation has proven to be an effective treatment that may decrease recurrence rates, rehabilitation time, and improve overall outcomes (25, 29)

There is an ongoing debate regarding optimal management, particularly the indications for surgical stabilisation versus conservative treatment, and the criteria defining a safe return to sport. There is a statistically significant correlation between age, sex and time from injury for redislocation after arthroscopic management of shoulder dislocation. A person younger than 22 has double the risk of recurrent dislocation; males are 3,5 more likely to have recurrent dislocation, and patients managed more than 6 months after the injury are 2,6 more likely to have recurrent dislocation (21). Conversely, some studies report that up to 22% of recurrent shoulder dislocations do stabilise with time (3).

It is conventional wisdom that female shoulders demonstrate greater laxity than male shoulders. Still, there is little evidence to support (26) this, and similarly, multidirectional shoulder instability cannot be described as a condition that differentially affects girls. Still, it is common in sports like swimming and gymnastics, which girls often participate in. This seems not to be the case in football (27).

This study aimed to describe the epidemiology of anterior shoulder dislocations in elite youth football players and, if possible, to identify factors associated with recurrence, with a particular focus on return-to-sport timing and sex differences.

MATERIALS AND METHODS

Study design

Retrospective multicenter cohort study. Given the retrospective cohort design and the 2019–2026 study period, follow-up duration was not predetermined and varied according to the date of each athlete’s first shoulder dislocation. Athletes were followed from the date of the first dislocation until the end of the study period. Consequently, athletes sustaining their first dislocation earlier in the study period had a longer observation period than those injured later.

Setting

Elite youth academies of three professional Italian football clubs (Bologna FC, Parma Calcio, US Sassuolo) in the Emilia-Romagna region.

Population

A total of 3,779 athletes (2,270 males and 1,509 females).

Injury definition

Primary shoulder dislocation was defined as a first-time traumatic glenohumeral dislocation requiring reduction. Recurrent episodes were recorded separately as secondary events.

Data collection

- Age
- Sex
- Club affiliation
- Playing position
- Mechanism of injury
- Contact vs non-contact
- Treatment (operative vs non-operative)
- Recurrence
- RTT
- RTP

Outcomes

Primary outcome: incidence of primary shoulder dislocation.
Secondary outcomes: recurrence, RTT, RTP.

Statistical analysis

Continuous variables were compared using mean differences with 95% confidence intervals or parametric/non-parametric tests where appropriate (e.g., t-test, Mann-Whitney U). Categorical variables were analyzed using Chi-square or Fisher's exact tests. Significance was set at $p < 0.05$. Binary logistic regression modeling and Kaplan-Meier survival analyses were planned/recommended to further analyze independent recurrence predictors and time-to-event outcomes.

RESULTS

Epidemiology

A total of 27 unique athletes sustained primary shoulder dislocations among 3,779 athletes, representing an overall athlete risk of 0.71%:

- Males: 25 athletes / 2,270 athletes (1.10%)
- Females: 2 athletes / 1,509 athletes (0.13%)

Male athletes showed approximately an 8-fold higher incidence than female athletes.

Total events Across the entire cohort, a total of 37 dislocation events/episodes were recorded:

- 27 primary dislocation events (25 in males, 2 in females)
- 10 recurrent dislocation events (all occurring among male athletes)

(In outcome data tracking, 27 primary cases presented with 17 cases without further recurrence and 10 recurrent episodes occurring during follow-up).

Treatment

1. Surgical: 13 patients (35.14%)

2. Conservative: 24 patients (64.86%)

Recurrence

Ten recurrent instability events were observed (8 in the conservative group vs 2 in the surgical group).Conservative treatment showed a higher tendency for recurrence compared with surgical stabilisation ($p = 0.070$). In addition, age showed a near-statistically significant relationship with recurrence, with younger athletes experiencing higher recurrence rates (mean age 15.64 ± 2.13 vs 16.95 ± 1.24 years; $p = 0.052$).

Return to sport

Athletes with recurrence demonstrated significantly earlier return:

- RTT: 25.10 vs 52.18 days ($p = 0.018$)
- RTP: 43 vs 91.55 days ($p = 0.022$)

Club and position

No significant association was found between recurrence and sex, playing position, mechanism of injury, or dominant arm. However, a statistically significant difference was observed between clubs regarding Days of Stop ($p = 0.002$) and RTT ($p = 0.032$), with Bologna FC exhibiting longer recovery periods compared to Parma Calcio and US Sassuolo.

Table 1. Characteristics of shoulder dislocation events according to recurrence status

Variable	Category	Whole Cohort (N=37 events) Freq. (n, %)	No Recurrence (N=27 events) Freq. (n, %)	Recurrence (N=10 events) Freq. (n, %)	p-value
Club	Bologna	13 (35.14%)	10 (37.04%)	3 (30.00%)	0.424
	Parma	13 (35.14%)	8 (29.63%)	5 (50.00%)	0.424
	Sassuolo	11 (29.73%)	9 (33.33%)	2 (20.00%)	0.424
Sex	Female (2 athletes)	2 (5.41%)	2 (7.41%)	0 (0.00%)	1.000
	Male (25 athletes, 35 events)	35 (94.59%)	25 (92.59%)	10 (100.0%)	1.000
Match	No	10 (33.33%)	7 (30.43%)	3 (30.00%)	0.698
	Yes	20 (66.67%)	16 (69.57%)	4 (40.00%)	0.698
Training	No	16 (48.48%)	11 (47.83%)	5 (50.00%)	0.964
	Yes	17 (51.52%)	12 (52.17%)	5 (50.00%)	0.964
Side	Right	15 (40.54%)	12 (44.44%)	3 (30.00%)	0.311
	Left	22 (59.46%)	15 (55.56%)	7 (70.00%)	0.311
Position	Attacker	6 (16.22%)	4 (14.81%)	2 (20.00%)	0.679
	Midfielder	17 (45.95%)	12 (44.44%)	5 (50.00%)	0.679
	Defender	11 (29.73%)	8 (29.63%)	3 (30.00%)	0.679
	Goalkeeper	3 (8.11%)	3 (11.11%)	0 (0.00%)	0.679
Contact	No	22 (59.46%)	16 (59.26%)	6 (60.00%)	1.000
	Yes	15 (40.54%)	11 (40.74%)	4 (40.00%)	1.000
Treatment	Surgical	13 (35.14%)	11 (40.74%)	2 (20.00%)	0.070
	Conservative	24 (64.86%)	16 (59.26%)	8 (80.00%)	0.070
Dominant Arm	Right	20 (86.96%)	12 (85.71%)	8 (88.89%)	1.000
	Left	3 (13.04%)	2 (14.29%)	1 (11.11%)	1.000

Table 2. Treatment and club outcomes

Outcome	Surgical	Conservative	Mean Difference / Contrast	p-value
Days of Stop	72.08 ± 40.42	28.84 ± 27.46	+43.24 days	0.002
RTT (days)	69.14 ± 25.36	28.74 ± 22.20	+40.40 days	0.001
RTP (days)	126.71 ± 32.18	34.66 ± 31.72	+92.05 days	< 0.001
Recurrence Rate	2 cases (20.0%)	8 cases (80.0%)	Lower trend	0.070
Days of Stop by Club	Bologna: 78.92	Parma: 18.85 / Sassuolo: 41.09	Significant variance	0.002
RTT by Club	Bologna: 72.20	Parma: 24.42 / Sassuolo: 37.00	Significant variance	0.032

DISCUSSION

The main finding of this multicenter study was that athletes who subsequently experienced recurrent shoulder instability returned to training and sport significantly earlier than those who did not experience recurrence, however, this association should be interpreted cautiously, given the small number of recurrent events and the substantial differences in treatment and rehabilitation timelines across management strategies and clubs. Athletes with recurrence returned to training and competition significantly earlier than those without recurrence. Furthermore, male players showed an 8-fold higher risk of primary shoulder dislocation compared with female players (1.10% vs 0.13%). Across the cohort, 27 unique athletes sustained primary dislocations, and 10 recurrent dislocation events occurred exclusively within the male subgroup, reaching a total of 37 analyzed events.

Adolescent athletes are known to be at high risk of recurrent instability following primary shoulder dislocation [25,28,30,18]. Deitch et al. reported high recurrence rates in adolescents [20], while Hovelius confirmed that young male athletes represent the highest-risk subgroup [23]. Robinson et al. further demonstrated that recurrence is particularly frequent within the first two years after injury [35].

Biological and structural factors may contribute. Castagna et al. demonstrated capsular changes in younger patients that may predispose to instability [36]. Porcellini et al. also identified age and sex as key prognostic factors for recurrence [21]. In line with these observations, our statistical data demonstrated a near-significant age effect ($p = 0.052$), where younger athletes (mean age 15.64) suffered a higher rate of recurrence than older adolescents (mean age 16.95).

From an epidemiological perspective, shoulder injuries remain uncommon in football compared with lower limb injuries [7,10,13]. However, upper-extremity injuries have been consistently reported as relevant in elite football populations.

Although literature suggests that goalkeepers are at higher risk of shoulder injury [10,15], our findings did not confirm this trend because contrary to previous reports identifying goalkeepers as a high-risk subgroup, the incidence observed in goalkeepers was similar to that observed in outfield players.

Surgical stabilisation showed a lower tendency for recurrence but required longer rehabilitation. This finding is consistent with previous studies supporting surgical stabilisation in high-risk young athletes [21,25,28,29,31,33].

An interesting finding of our multicenter study is the statistically significant variability observed among clubs regarding recovery times, with Bologna FC exhibiting longer Days of Stop and RTT compared to Parma Calcio and US Sassuolo ($p = 0.002$ and $p = 0.032$, respectively). Because all three clubs operate within elite youth standards in the same geographic region, this variance likely reflects institutional differences in internal rehabilitation pathways, conservative management philosophies, and criteria-based progression thresholds rather than underlying epidemiological differences. While standardizing these protocols across professional academies remains a challenge, this inter-club divergence highlights the diversity of real-world rehabilitation management in adolescent shoulder instability.

The findings of our study and those of Boufadel et al. [48] share several important similarities. First, younger age appears to be a major risk factor for recurrent shoulder instability. Boufadel et al. reported a higher recurrence rate in players aged ≤25 years (26% vs 12%), consistent with the high-risk profile of the adolescent population in our study. Both studies also emphasize the importance of return to sport after shoulder dislocation and suggest that time alone should not be used as the sole criterion for clearance. Surgical treatment was associated with a longer rehabilitation period in both studies, while appearing to provide greater stability over time. However, Boufadel et al.[39] found no significant difference in overall recurrence rates between operative and nonoperative treatment, although recurrence occurred later in surgically treated players.

The main difference between the two studies concerns the relationship between return-to-sport timing and recurrence. In our adolescent cohort, athletes who developed recurrent instability returned significantly earlier to training (25.10 vs 52.18 days; $p=0.018$) and competition (43 vs 91.55 days; $p=0.022$). Furthermore, the time to recurrence varied among athletes, ranging from a minimum of 2 months to a maximum of 3 years following the primary dislocation, with all recurrent episodes occurring in association with a return to sport. Rather than implying a simple chronological cause-effect relationship, this finding highlights that premature clearance—often driven by competitive pressures in youth academies before complete neuromuscular and capsular healing—exposes the unstable adolescent shoulder to early mechanical failure upon high-intensity contact. In contrast, Boufadel et al. [39] focused primarily on long-term player availability and performance and did not identify a similar association between return-play timing and recurrence. Despite reduced playing time for up to two seasons after injury, professional players who returned to competition maintained performance levels comparable with matched controls.

Another relevant difference concerns goalkeepers. Boufadel et al.[39] found that professional goalkeepers had longer recovery times and were more frequently treated surgically, whereas our study did not identify a higher incidence of shoulder dislocation among adolescent goalkeepers. This may suggest that the goalkeeper position does not necessarily increase the risk of primary dislocation in youth players, but may have a greater influence on treatment decisions and recovery time once the injury occurs.

Overall, these findings may reflect differences related to age and competitive level. In adolescent athletes, the priority appears to be minimizing recurrent instability through a cautious, criteria-based return-to-sport strategy, whereas in professional adult players, the main concern may be restoring player availability and maintaining performance after return to competition.

Table 3. Comparison between our study and Boufadel et al.

Variable	Our study	Boufadel et al.
Population	Adolescents (13–19 yr; N=27 athletes, 37 events)	Professionals
Recurrence	10 recurrent events (37.0% of primary cases)	18%
Age	High-risk adolescent population (**p = 0.052**)	≤25 yr: 26% vs 12%
RTP	Earlier RTP associated with recurrence (**p = 0.022**)	No clear association
Surgery	Longer rehab (**p < 0.001**); lower recurrence trend (**p = 0.070**)	Longer absence; similar recurrence
Goalkeepers	No higher incidence	Longer recovery

Clinical implications

Return-to-sport decisions should not be based solely on time. Functional testing and sport-specific stability assessment are essential in adolescent athletes.

Strengths

The main strength of our study is the rigorous and systematic collection of injury data from the youth academies of all three Serie A professional football clubs in the Emilia-Romagna region, using standardized reporting protocols. By focusing exclusively on shoulder dislocations within a homogeneous geographic and competitive environment, our findings offer unique insight into the incidence and risk factors specific to elite youth football.

Limitations

Retrospective design, small sample size, male predominance, lack of exposure data, and variability in rehabilitation protocols limit generalizability. The statistically significant variations observed between clubs regarding Days of Stop ($p = 0.002$) and RTT ($p = 0.032$) further highlight potential heterogeneity in institutional rehabilitation guidelines.

CONCLUSION

Early return to training and sport was observed among adolescent football players who subsequently experienced recurrent shoulder dislocation. Surgical stabilisation may reduce the risk of recurrence but prolong recovery time. Younger age shows a strong trend toward higher recurrence risk ($p = 0.052$). Prospective studies are needed to define optimal return-to-sport criteria. Targeted prevention programs such as FIFA 11 + S [40] may also represent a promising strategy to reduce upper-extremity injuries in soccer players

Declarations

Author Contribution

N. F.: Methodology, Investigation, Data Curation, Writing – Original Draft Writing – Review & Editing A. C.: Investigation, Data Curation Writing – Original Draft.R. D.: Resources, Data curationG. N.: Resources, Data curationG. Pa.: Resources, Data curation G. Po.: Conceptualization, Supervision, Validation, Writing – Review & EditingAll authors reviewed the manuscript

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Figures

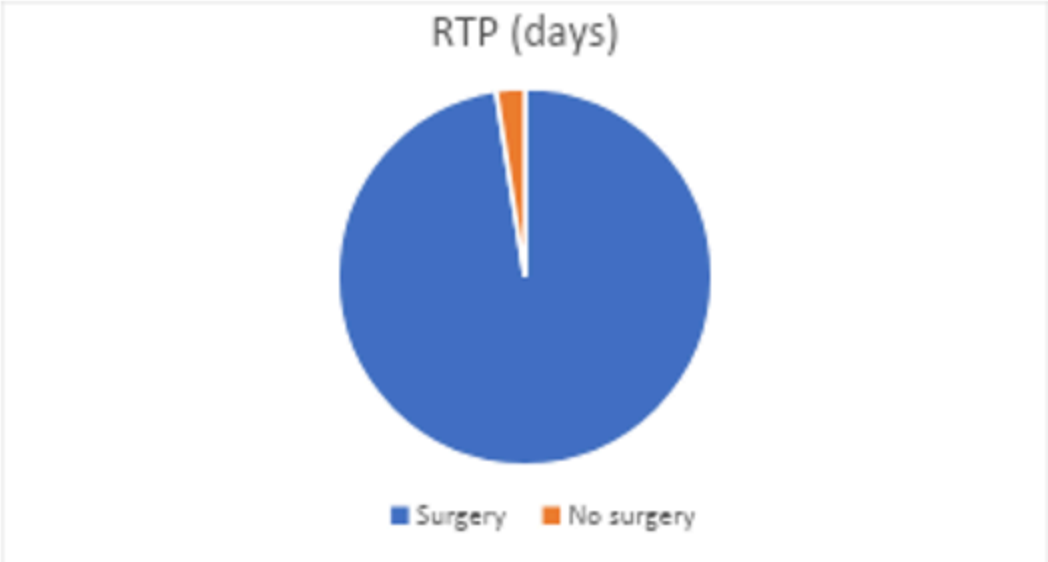






Figure 1

Unnumbered image in Results section.