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Return to Sport After Anterior Shoulder Stabilization of NCAA Football and NFL Athletes – A Systematic Review

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Abstract

Background: Anterior shoulder instability is an injury prevalent in contact and non-contact athletes and can result in limited movement, increased recurrence of dislocation, and decreased quality of sports activity. Notable sports that present with frequent anterior shoulder instability include wrestling, hockey, basketball, baseball, and most commonly, football. Athletes may undergo surgical management of anterior shoulder instability via arthroscopic repair, remplissage, Laterjet, or glenoid bone grafting procedures. This review aims to evaluate the return-to-sport rates among elite football athletes in the NCAA and NFL following surgical stabilization, assess post-surgical performance, and analyze the recurrence of instability or complications. **Methods:** This systematic review was conducted in accordance with the preferred reporting items for systematic reviews and meta-analyses (PRISMA). The initial search was conducted in November 2024. Three databases were utilized: PubMed, The Journal of Shoulder and Elbow Surgery, and SPORTdiscus using the Boolean operators - Football AND shoulder AND anterior AND arthroscopic AND ((labral repair) OR (labrum repair) OR stabilization) AND (college OR collegiate OR national OR NFL). **Results:** The initial search identified 85 articles, of which 10 met eligibility criteria, with 7 providing data on return to sport rates for elite football athletes. Time to return to sport ranged from 4.7 to 8.6 months. Return to sport rates varied between 82.4% and 100%, while recurrence rates of shoulder instability post-surgery ranged from 3% to 27%. One study reported that 93.3% of players maintained or exceeded their pre-injury performance level. Among starters, 91% returned to their starting roles post-surgery, while 47% of utilized and 27% of rarely used players were promoted to starters. Conversely, 2% of utilized players were demoted to rarely used. **Conclusion:** This systematic review highlights the return to sport rates in NCAA football and NFL athletes after anterior shoulder stabilization surgery. The data available demonstrated an increased proportion of both NCAA football and NFL athletes returning to sport with the highest reported proportions of athletes returning to sport at 100% and the lowest proportions at 82.4%. Patients with recurrence are recommended to undergo revision surgery with the Laterjet procedure to improve stabilization. With this systematic review, we aim to expand awareness of the notable success of anterior shoulder stabilization while analyzing the risks that come along with it in elite football athletes.

Keywords: NCAA; Football; NFL; Anterior shoulder instability; Bankart repair; Return to sport

Introduction

Anterior shoulder instability is an injury prevalent in contact and non-contact athletes and can result in limited movement, increased recurrence of dislocation, and decreased quality of sport activity [1,2]. Notable sports that present with frequent anterior shoulder instability include wrestling, hockey, basketball, baseball, and most commonly, football [3]. Management of anterior shoulder instability can be managed nonoperatively through immobilization of the joint followed by range of motion and strength exercises [4]. In athletes, this mode of management may be used typically after first time dislocations to allow players an in-season return to sport. However, literature has demonstrated that non-surgical management has exceptionally high rates of recurrent instability leading to decreased likelihood of successful return to sport [5,6]. Alternatively, athletes may undergo surgical management of anterior shoulder instability via arthroscopic repair, remplissage, Laterjet, or glenoid bone grafting procedures. In fact, studies point to arthroscopic labral repairs of the anterior shoulder being one of the most common surgeries performed on football players [3,7,8].

A common lesion that accompanies anterior shoulder dislocation, thereby contributing to instability, is the Bankart lesion. It can be characterized as the detachment of the capsulolabral complex from anterior and inferior portions of the glenoid rim [9]. Studies mention that the Bankart lesion is observed in around 97% of anterior shoulder instability cases that undergo surgical management [10]. This lesion is repaired surgically by the Bankart repair, which was termed by Dr. Arthur Sidney Blundell Bankart in 1923 [11].

Over time, the Bankart repair has evolved and is now performed arthroscopically, also known as an arthroscopic Bankart repair, arthroscopic labral repair, and arthroscopic anterior shoulder stabilization; however, there is still debate on whether the Bankart repair is the best option for patients that have bone loss on the glenoid or humeral side to prevent recurrence [12,13]. Patients that have underwent a failed

Bankart repair benefited from a Laterjet procedure, which provided increased stability and higher rates of return to sport in those patients; however, it is important to note that the patients experienced more post operative pain and decreased external rotation [14].

While several studies have explored surgical outcomes of athletes undergoing arthroscopic labral repair, they have often included athletes from multiple sports, varied ages, and/or different league standards. Recognizing the unique sport dynamics of American football, elite-level players in the NCAA and NFL represent a distinct subset of collision athletes who are exposed to heightened speeds and repetitive forces, translating into greater stress on their bodies and testing the durability of surgical repairs [15]. The purpose of this study is to conduct a systematic review of the literature on athletes at this level who have undergone anterior shoulder stabilization. This review aims to determine the proportion of athletes that return to sport, assess their performance post-surgery, and examine if there is any recurrence of post-surgical instability or complications.

Methods

This systematic review was conducted in accordance with the preferred reporting items for systematic reviews and meta-analyses (PRISMA) and the guidelines written by Harris et al. for writing a systematic review specifically for sports medicine and orthopedic surgery and Smitkumar et al. [16] [17].

Outcome measures

Our primary outcome measure is the proportion of athletes returning to sport after anterior shoulder instability surgical repair. Our secondary outcome measure is the timing of returning to sport, the athlete's level of performance after returning to sport, and recurrence of shoulder instability.

Inclusion criteria

Case series, Descriptive epidemiological studies, Case control studies, Cohort study, Retrospective cohort studies, Retrospective Cohort designs, Retrospective case control studies, and Retrospective observational cohort studies about NCAA football and NFL athletes returning to sport after anterior labral surgery were included. The study was not limited to the year the articles were published or the type of surgical procedure that was conducted.

Exclusion criteria

Articles that included animal studies, laboratory studies and studies that were not in English were excluded in addition to studies that included high school football athletes and other sports.

Search methods

The initial search was conducted in November 2024. Three databases were utilized: PubMed, The Journal of Shoulder and Elbow Surgery, and SPORTdiscus, using the Boolean operators - Football AND shoulder AND anterior AND arthroscopic AND ((labral repair) OR (labrum repair) OR stabilization) AND (college OR collegiate OR national OR NFL).

Data collection

Articles were first assessed based on the title, and then further examined by reading the abstract. After the assessment of the title and abstract, the full text was read. The removal of duplicated and studies that did not conform with the inclusion criteria were excluded. The following data was extracted from the text: type of study, classification of NCAA/NFL, time to return to sport, proportion returning to sport, incidence of recurrence, and method of repair. Two authors independently conducted the search, extracted the data and discussed upon completion to prevent the occurrence of bias.

Results

Our initial search included 85 studies, and 7 studies were eligible for review upon the satisfaction of the inclusion criteria.

Two of the studies included in the review were case series [17,18]. Also included in the review was one case control study [19], cohort study [20], retrospective cohort design [21], descriptive epidemiological study [22], and retrospective case control [23]. In total there were 417 elite football athletes, which are further divided into 192 NCAA football athletes and 225 NFL athletes. Out of 417 athletes, only 281 underwent surgical management.

Return to Sport Proportion and Timeline

The duration for returning to sport was mentioned in studies [18,21,22], with reported times of 6.3 months, 8.6 months, and 4.7 months, respectively. The proportion of athletes that returned to sport ranged from 82.4% to 100%. The lowest proportion of athletes that returned to sport was seen in [18,19,21,22] all had 100% of athletes return to sport. The highest incidence of recurrence post-surgical intervention was observed in [23] at 27% (9 patients). The lowest incidence of recurrence was seen in [17] at 3% (1 patient).

Secondary Outcomes: Performance and Recurrence of Instability after Return to Sport

The post-surgical performance of athletes after returning to play was explored in several studies included within the review [17-19,21 23]. Different metrics were used between the studies, with some comparing post-surgical level of play to pre-surgical level of play, to which 93.3% of players demonstrated no difference or higher levels of play [17]. Another study mapped the identification of athletes before and after surgery as starting, utilized, and rarely used players; they found that 91% athletes who were starters on the team continued as starters after surgery, 47% of utilized and 27% of rarely players used were promoted to starters after surgery, and 2% of utilized players before surgery were demoted to rarely

used [18]. Other studies measured performance by Pro-Bowl selections post-surgery and demonstrated a similar number of selections before and after surgery [21,23]. Finally, one study assessed a similar level or higher post-surgical performance of at least 54% of athletes due to their receipt of a varsity letter for their level of play. Recurrence of shoulder instability was documented in several of the studies included in the review [17] [18-20,21-23]. Rates among athletes varied from 3% [17] to 27% [23] and all studies excluded athletes who did not return to sport in calculations of recurrent instability.

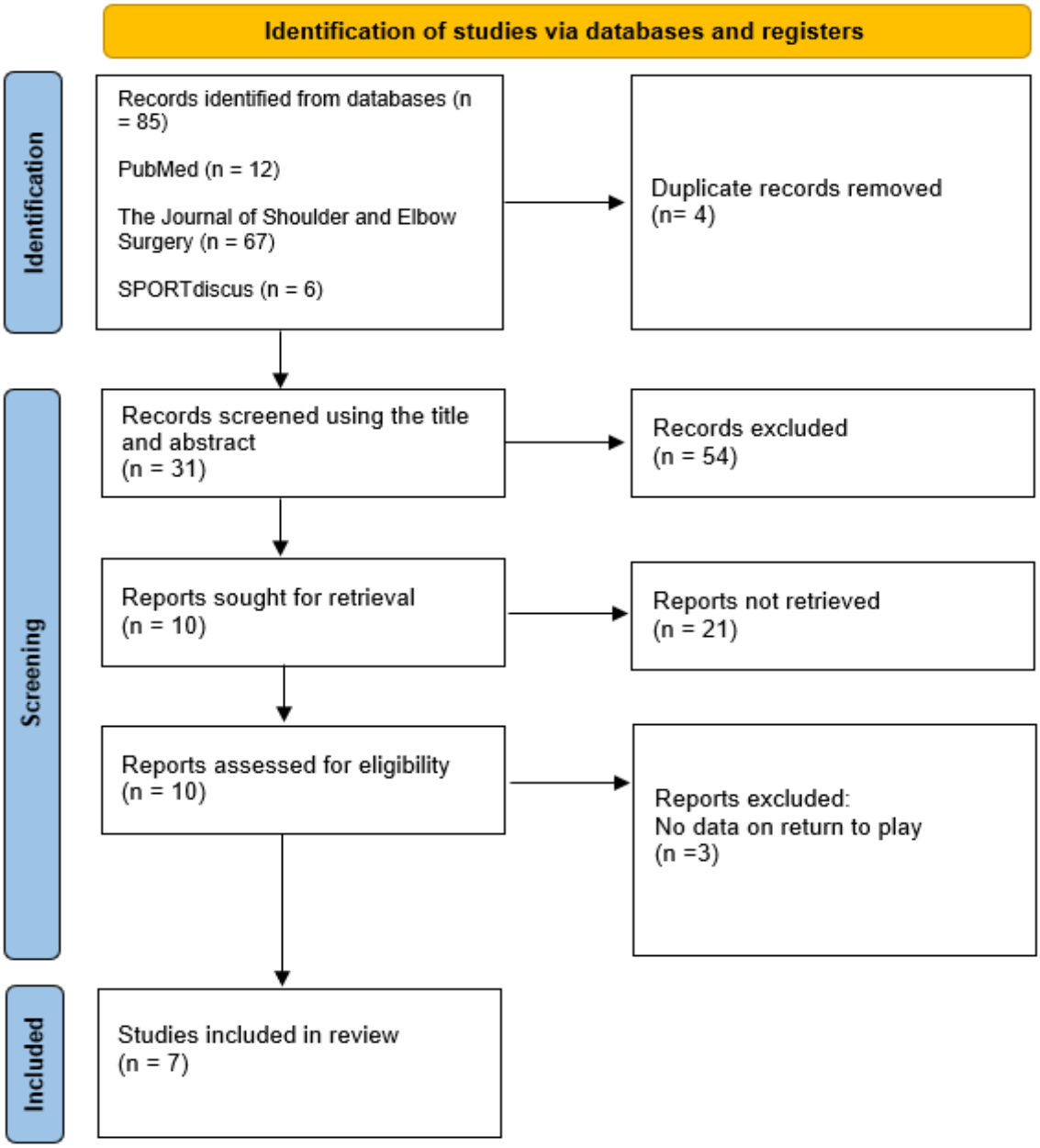

Figure 1: PRISMA flow chart depicting the results from searches conducted across PubMed, The Journal of Shoulder and Elbow Surgery, and SPORTdiscus.

Reference	Type of study	Patient (n)	Patients undergoing surgical management (n)	Classification	Time returning to sport	Proportion returning to sport	Incidence of recurrence	Method of repair
Saper et al. (2022) [17]	Case series	33	33	16 NCAA football 17 NFL	Not specified	93%	3% (1)	Arthroscopic Bankart repair

Robins et al. (2017) [18]	Case series; Level of evidence, 4	81	81	NCAA football	6.3 months	82.4%	10.3%	8 arthroscopic 73 open
Dickens et al. (2017) [19]	Case-control study; Level of evidence, 3	50	50	NCAA football	Not specified	100%	6% (3)	Arthroscopic Bankart repair
Dickens et al. (2017) [20]	Cohort study; Level of evidence, 2	45	29	NCAA football	Not specified	90% (26)	10% (3)	Arthroscopic Bankart repair
Okoroha et al. (2017) [21]	Retrospective Cohort design; Treatment study; Level of evidence, 3	83	26	NFL	8.6 months	100%	Not specified	Not specified
Chambers et al . (2017) [22]	Descriptive epidemiology study.	65	25	NFL	4.7 months	100%	Not Specified	Not Specified
Khalil et al. (2021) [23]	Retrospective case-control study; Level of evidence, 3	60	37	NFL	Not specified	89% (33)	27% (9)	Not Specified

Table 1: Key findings from articles included in this review.

Discussion

Anterior shoulder instability is a common injury observed in the sport industry, with the highest prevalence observed in football athletes, leading to missed playing time due to recovery [24]. Treatments in shoulder stabilization can be conducted operatively or non-operatively, with non-operative managements demonstrating the lowest rates of success [25]. Surgical interventions have a higher rate of success; however, there is also an increasing rate of revision surgery needed in patients that return to sport [26].

Return to sport proportion and timeline

Although the time to return to sport was only reported in [18,21,22], it can be observed how the time varies for each. Return in 8.6 months [21] was the longest time to return to sport while 4.7 months was the shortest time. Variations on the time to return to sport could be due to different reasons, one of them being the type of surgical procedure that is conducted. It is difficult to determine whether there was an increased time to return to sport [21] since the type of procedure conducted is not specified. However, research has demonstrated that arthroscopic repairs are associated with decreased recovery time and faster return to sport due to smaller incision sites, increased mobilization post-surgery, and earlier rehabilitation protocols [27]. It is also important to note that open surgery could be preferred in patients that have increased bone loss which have a high risk of failure with arthroscopic methods [27]. Although arthroscopic surgery demonstrates promising results, there is also a learning curve associated with it [28]. Due to this, each patient should be taken into special consideration to determine which surgical intervention would have the most promising results.

The proportion of athletes that returned to sport were all greater than 80%, with [18] having the lowest proportion at 82.4%. And the highest proportion of return to sport was 100% in [19,21,22]. Although there is a high proportion of patients returning to sport, risk factors for not returning to sport include bone loss, position play demands, and rehabilitation techniques [19,29]. For instance, in [29], line players had a higher incidence of injury and increased likelihood of not returning to sport. This is inferred since linemen position their arm in abduction and external rotation during pass rushing [29]. These findings highlight the importance of customized rehabilitation techniques to ensure a successful return to sport.

Recurrence of shoulder instability

Of all the studies, the one with the highest rate of shoulder instability was observed in [23], with 9 out of 37 patients having an incidence of recurrence. The lowest incidence of recurrence was observed in [17] with only 1 out of 33 patients having recurrence. One risk factor for recurrence of shoulder instability is subcritical bone loss on the glenoid. As seen in [19], all patients that presented with >13.5% glenoid bone loss had recurrent shoulder instability after the procedure.

Other risk factors for recurrence of anterior shoulder instability include joint hypermobility, <20 years of age, and Hill Sachs lesions [30]. Age and joint hypermobility could be interrelated, due to the fact that younger patients are more active, have more space in the glenohumeral joint, and are possibly less compliant with following rehabilitation protocols [30,31]. There is ongoing debate on whether the presence of a Hill Sachs lesion increases the likelihood of recurrence, many articles such as [32] mention increased recurrence, while [33] states Hill Sachs lesions have no correlation with increased recurrence. Patients that undergo recurrence after a Bankart repair often undergo Laterjet a procedure. In [19], of the 3 patients that experienced recurrence, 2 patients had Laterjet revision surgery. This surgical procedure provides patients with increased external rotation, decreased rates of recurrence, and higher rates of returning to sport [34]. Patients with these risk factors, before undergoing the Bankart repair, might benefit from receiving a Laterjet procedure instead to prevent further surgical revision.

Non-operative *vs.* Operative management

Several of the studies in this review elucidated differences in return to play timelines, recurrence of instability, and even career longevity between athletes treated operatively and non-operatively for anterior shoulder instability [20-23]. Recurrent instability rates among athletes treated nonoperatively varied from 50 to 60% [20,23], compared to significantly lower ranges of 3 to 27% [17,23] in patients treated operatively. This trend is consistent in athletes of other sports as well [35], suggesting a strong preference for operative management in athletes who want decreased recurrence of instability. Another consideration that this review raises for athletes is the time until returning to play and overall career length that may be affected by non-operative versus operative treatment modalities. While the studies in our review suggest a quicker time to return to play in patients treated non-operatively (5.43 weeks *vs.* 36.6 weeks), patients treated operatively have a larger number of seasons played [23]. However, even with surgical stabilization, elite football athletes with a history of shoulder instability have significantly reduced career lengths compared to controls without shoulder instability, documented by a cohort study published in 2011 [36]. Since then, epidemiological studies have observed a significant shift in preferred surgical techniques within the NCAA, with the proportion of team physicians performing anterior shoulder stabilization arthroscopically increasing significantly from 69% in 2008 to 93% in 2016 [8]. Further novel research on the impact, if any, of arthroscopic management is needed to elucidate effects it may have on elite football athletes' career longevity.

Limitations

Several limitations for this study should be considered. One of them being the limited amount of published data of anterior shoulder stabilization in NCAA football and NFL athletes specifically. The small amount of data available limits the conclusions that could be made. Additionally, much of the published data has small sample sizes which limits the generalizability of the study for other football athletes. Another limitation is the variability in categorizations of studies, which causes discrepancies in the way return to sport metrics is measured and variability in long term follow up. Lastly, this study does not include high school athletes, which was done to narrow the scope of the study, but it can exclude certain surgical outcomes that could be beneficial to younger patients.

Conclusion

This systematic review highlights the return to sport rates in NCAA football and NFL athletes after anterior shoulder stabilization surgery. The data available demonstrated there is an increased proportion of both NCAA football and NFL athletes returning to sport with the highest proportion of athletes returning to sport at 100% and the lowest proportion at 82.4%. However, there is also the risk of recurrence with risk factors such as increased glenoid bone loss, joint hypermobility, and the presence of specific lesions. Patients with recurrence are recommended to undergo revision surgery with the Laterjet procedure to improve stabilization. With this systematic review, we aim to expand awareness of the high success of anterior shoulder stabilization while also highlighting the risks that come along with it.

References

1. Dekker TJ, Goldenberg B, Lacheta L, et al. (2020) Anterior Shoulder Instability in the Professional Athlete: Return to Competition, Time to Return, and Career Length. Orthop J Sports Med 8(11): 2325967120959728.
2. Meller R, Krettek C, Gösling T, et al. (2007) Recurrent shoulder instability among athletes: changes in quality of life, sports activity, and muscle function following open repair. Knee Surg Sports Traumatol Arthrosc 15(3): 295-304.
3. Burra G, Andrews JR (2002) Acute shoulder and elbow dislocations in the athlete. Orthop Clin North Am 33(3): 479-95.
4. Clifford AL, Hurley E, Doyle TR, et al. (2024) Treatment of Anterior Shoulder Instability: A Comprehensive Review. Journal of Hand Surgery Global Online 6(5): 610-613.
5. Chin G, Kraeutler MJ, Batiste A, et al. (2024) Management of the in-season athlete with an anterior shoulder dislocation. J Shoulder Elbow Surg 33(12): 2780-2790.
6. Elsenbeck MJ, Dickens JF (2017) Return to Sports After Shoulder Stabilization Surgery for Anterior Shoulder Instability. Curr Rev Musculoskelet Med 10(4): 491-498.
7. Lintner SA, Speer KP (1997) Traumatic Anterior Glenohumeral Instability: The Role of Arthroscopy. J Am Acad Orthop Surg 5(5): 233-239.
8. Mehran N, Photopoulos CD, Narvy SJ, et al. (2016) Epidemiology of Operative Procedures in an NCAA Division I Football Team Over 10 Seasons. Orthop J Sports Med 4(7): 2325967116657530.
9. Taylor DC, Arciero RA (1997) Pathologic changes associated with shoulder dislocations. Arthroscopic and physical examination findings in first-time, traumatic anterior dislocations. Am J Sports Med 25(3): 306-311.
10. Bankart AS (1923) Recurrent or Habitual Dislocation of the Shoulder-Joint. Br Med J 2(3285): 1132-1133.

11. Rashid, MS, Arner JW, Millett PJ, et al. (2020) The Bankart repair: past, present, and future. J Shoulder Elbow Surg 29(12): e491-e498.
12. Billaud A, Baverel L, Metais P, et al. (2023) Arthroscopic Latarjet yields better union and prevention of instability compared to arthroscopic bony Bankart repair in shoulders with recurrent anterior instability: a systematic review. Knee Surg Sports Traumatol Arthrosc 31(12): 5994-6005.
13. Lho T, Lee J, Oh KS, et al. (2023) Latarjet procedure for failed Bankart repair provides better stability and return to sports, but worse postoperative pain and external rotation limitations with more complications, compared to revision Bankart repair: a systematic review and meta-analysis. Knee Surg Sports Traumatol Arthrosc 31(8): 3541-3558.
14. Vaidya SR, Sharma SC, Jabri TA, et al. (2023) Return to sport after surgical repair of the Achilles tendon. Br J Hosp Med (Lond) 84(5): 1-14.
15. Saper MG, Courson J, Milchteim C, et al. (2022) Successful Outcomes and Return to Sport After Arthroscopic Bankart Repair in National Collegiate Athletic Association and National Football League Football Players. Clin J Sport Med 32(3): e288-e292.
16. Harris JD, Quatman CE, Manring MM, et al. (2014) How to write a systematic review. Am J Sports Med 42(11): 2761-2768.
17. Saper M, Courson J, Milchteim C, et al. (2022) Successful Outcomes and Return to Sport After Arthroscopic Bankart Repair in National Collegiate Athletic Association and National Football League Football Players. Clin J Sport Med 32(3): e288-e292.
18. Robins RJ, Daruwalla JH, Gamradt SC, et al. (2017) Return to Play After Shoulder Instability Surgery in National Collegiate Athletic Association Division I Intercollegiate Football Athletes. Am J Sports Med 45(10): 2329-2335.
19. Dickens JF, Owens BD, Cameron KL, et al. (2017) The Effect of Subcritical Bone Loss and Exposure on Recurrent Instability After Arthroscopic Bankart Repair in Intercollegiate American Football. Am J Sports Med 45(8): 1769-1775.
20. Dickens JF, Rue JP, Cameron KL, et al. (2017) Successful Return to Sport After Arthroscopic Shoulder Stabilization Versus Nonoperative Management in Contact Athletes with Anterior Shoulder Instability: A Prospective Multicenter Study. Am J Sports Med 45(11): 2540-2546.
21. Okoroha KR, Taylor KA, Marshall NE, et al. (2018) Return to play after shoulder instability in National Football League athletes. J Shoulder Elbow Surg 27(1): 17-22.
22. Chambers CC, Lynch TS, Gibbs DB, et al. (2017) Superior Labrum Anterior-Posterior Tears in the National Football League. Am J Sports Med 45(1): 167-172.
23. Khalil LS, Jildeh TR, Abbas MJ, et al. (2021) Career Longevity and Performance After Shoulder Instability in National Football League Athletes. Arthroscopy 37(5): 1437-1445.
24. Anderson MJJ, Mack CD, Herzog MM, et al. (2021) Epidemiology of Shoulder Instability in the National Football League. Orthop J Sports Med 9(5): 23259671211007743.
25. Hurley ET, Colasanti CA, Haskel JD, et al. (2023) Return to Play After Non-Operative Management of Primary Anterior Shoulder Instability A Systematic Review. Bull Hosp Jt Dis (2013) 81(2): 118-124.
26. Blackman AJ, et al. (2014) Results of revision anterior shoulder stabilization surgery in adolescent athletes. Arthroscopy 30(11): 1400-1405.
27. Fares MY, Boufadel P, Daher M, et al. (2023) Anterior Shoulder Instability and Open Procedures: History, Indications, and Clinical Outcomes. Clin Orthop Surg 15(4): 521-533.
28. Hurley ET, Fat DM, Farrington SK, et al. (2019) Open Versus Arthroscopic Latarjet Procedure for Anterior Shoulder Instability: A Systematic Review and Meta-analysis. Am J Sports Med 47(5): 1248-1253.
29. Wagala NN, Winkler PW, Godshaw BM, et al. (2022) Player Position and Labral Tear Location and Size in NCAA Division I Football Players Undergoing Arthroscopic Surgery. Orthop J Sports Med 10(11): 23259671221133134.
30. Zhang M, Liu J, Jia Y, et al. (2022) Risk factors for recurrence after Bankart repair: a systematic review and meta-analysis. J Orthop Surg Res 17(1): 113.
31. Walton J, Paxinos A, Tzannes A, et al. (2002) The unstable shoulder in the adolescent athlete. Am J Sports Med 30(5): 758-767.
32. Burkhart SS, De Beer JF (2000) Traumatic glenohumeral bone defects and their relationship to failure of arthroscopic Bankart repairs: significance of the inverted-pear glenoid and the humeral engaging Hill-Sachs lesion. Arthroscopy16(7): 677-694.
33. Ungersbock A, Michel M, Hertel R (1995) Factors influencing the results of a modified Bankart procedure. J Shoulder Elbow Surg 4(5): 365-369.
34. Bliven KCH, Parr GP (2018) Outcomes of the Latarjet Procedure Compared with Bankart Repair for Recurrent Traumatic Anterior Shoulder Instability. J Athl Train 53(2): 181-183.
35. Albertson BS, Trasolini NA, Rue JH, et al. (2023) In-Season Management of Shoulder Instability: How to Evaluate, Treat, and Safely Return to Sport. Curr Rev Musculoskelet Med 16(7): 295-305.
36. Brophy RH, Gill CS, Lyman S, et al. (2011) Effect of shoulder stabilization on career length in national football league athletes. Am J Sports Med 39(4): 704-709.

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