An Epidemiologic Analysis of Shoulder Dislocation and Instability in Collegiate Athletes

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INTRODUCTION:

Shoulder dislocation is a common injury among athletes, often necessitating long amounts of time spent away from sport for rehabilitation. Little data exists detailing the epidemiology of shoulder instability in college athletes in the United States. This study aimed to describe the epidemiology of shoulder dislocation and instability suffered by NCAA athletes in the Pac-12 conference using injury surveillance data from 2017 to 2022 obtained from the Pac-12 Health Analytics Program (HAP). By shedding light on shoulder instability, more informed practices for the prevention, diagnosis, and treatment can be developed with the intent of decreasing the incidence and improving the clinical outcomes for traumatic shoulder instability.

METHODS:

This study of prospectively collected de-identified injury and illness data from NCAA Division I collegiate athletes in the Pac-12 included academic years 2017-2018 through 2021-2022. Athletes who experienced shoulder dislocation or instability were analyzed. Injuries were stratified by anatomic location, time missed, recurrence, proportion treated with surgery, and timing of injury during competition. Injury rates (IR) per 100,000 athlete exposure hours (AEH) were calculated.

RESULTS:

Shoulder injuries were reported across nine sports. A total of 134 shoulder dislocations and 302 events of shoulder instability were reported. The highest rates of dislocation per 100,000 AEH were among football (2.12), baseball (1.44), basketball (1.10), and softball (1.06) athletes. The highest rates of instability were among softball (6.39), football (4.45), gymnastics (3.06), and basketball (2.60) athletes. Across all sports, with the exception of baseball, a majority of injuries occurred in the second half of competition, with basketball and track and field having the highest percentage of injuries occurring in the second half (70.8% and 71.4% of injuries, respectively). Among baseball athletes, a strong majority (61.9%) of injuries occurred in the first half of competition.

The overall proportion of athletes receiving surgery for shoulder dislocations was 47.7%. Non-dislocation events of shoulder instability were treated surgically only 25.9% of the time, with most sports being more likely to opt for nonsurgical treatment. Sports such as gymnastics and swimming and diving, were very unlikely to use surgical treatment for dislocations and instability events. In football, 96.6 and 92.9 percent of athletes were able to return to their previous activity level after suffering a shoulder dislocation or instability event, respectively. No significant difference in the percentage of football players returning to their previous activity level was observed between surgical and nonsurgical treatments with both seeing very high rates of athletes successfully returning to sport. Specifically, 97.3% of athletes receiving surgical treatment and 95.5% of athletes receiving nonsurgical treatment for their dislocation returning to their previous activity level. Baseball and basketball players, however, had a markedly lower percentage of athletes able to return to their previous activity level after receiving surgery for a dislocation or instability event. For dislocations treated surgically, 60% of baseball players and 66.7% of basketball players were able to return to their previous activity level, while 100% of baseball and basketball players who did not have surgery for their shoulder injuries were able to return to their previous activity level. On average, football players receiving surgery for a shoulder dislocation missed 181 days before returning to competition, while those without surgery only missed 22 days. Baseball players receiving surgery missed 171 days of competition on average, while those treated nonsurgically missed 90 days. Basketball players receiving surgery missed 425 days, while those without surgery missed 32 days.

DISCUSSION AND CONCLUSION:

Shoulder dislocations are common injuries among collegiate athletes, with the highest rates of dislocation and instability in football players and softball players respectively. Roughly half of dislocations are treated surgically. Though many athletes receiving surgery for their shoulder injury can return to their previous activity level, baseball and basketball athletes tended to have a lower percentage of athletes able to do so in our series. There was high variability among sports regarding time missed due to injury after a shoulder instability episode, however, in general, nonsurgical management leads to quicker return to play. Awareness of the incidence and outcome of injuries that affect collegiate athletes and their interventions may allow for improved strategies to prevent and treat injuries.

Table 1: Rate of Shoulder Injuries by Sport

	Dislocation		Instability	
	Events, n	Incidence Rate (95% CI)*	Events, n	Incidence Rate (95% CI)*
Football	84	2.12 (1.67,2.58)	176	4.45 (3.79,5.11)
Baseball	12	1.44 (0.63,2.26)	15	1.81 (0.89,2.72)
Basketball	11	1.10 (0.45,1.75)	26	2.60 (1.60,3.60)
Soccer	10	0.76 (0.29,1.23)	21	1.59 (0.91,2.28)
Track and Field	7	0.32 (0.08,0.56)	13	0.60 (0.27,0.92)
Softball	4	1.06 (0.02,2.11)	24	6.39 (3.83,8.94)
Gymnastics	3	0.57 (0,1.22)**	16	3.06 (1.56,4.56)
Swimming & Diving	3	0.17 (0,0.36)**	11	0.62 (0.25,0.99)
Total	134	1.44 (1.21,1.44)	302	2.85 (2.58,3.02)

*Incidence Rate per 100,000 Athlete Exposure Hours (AEH)

** Confidence Intervals Capped at 0

Table 2: Percentage of Athletes Undergoing Surgery for Shoulder Injury and Return to Sport.

	Dislocation			Instability		
		Time Missed Due to Injury			Time Missed Due to Injury	
	Percent Undergoing Surgery	Surgery	Nonoperative	Percent Undergoing Surgery	Surgery	Nonoperative
Baseball	50.0%	171	90	20.0%	239	90
Basketball	45.5%	425	32	11.5%	101	22
Football	52.4%	181	22	31.3%	207	34
Soccer	30.0%	113	72	9.5%	201	26
Softball	50.0%	278	110	16.7%	469	147
Track and Field	42.9%	214	61	53.8%	66	68
Gymnastics	33%	734	17	6%	148	56
Swimming & Diving	0%	-	87	18%	431	21

Table 3: Percentage of Injuries by Timing in Competition

	Events, n	First Half of Competition	Events, n	Second Half of Competition
Baseball	13	61.9%	8	38.1
Basketball	7	29.2%	17	70.8
Football	83	43.5%	108	56.5
Soccer	10	41.7%	14	58.3
Softball	7	38.9%	11	61.1
Track and Field	2	28.6%	5	71.4
Gymnastics	4	44.4%	5	55.6
Swimming & Diving	2	40.0%	3	60.0
Total	128	42.8%	171	57.2%

Table 4: Percent of Athletes Able to Return to their Previous Activity Level per Sports and Treatment.

	Dislocation		Instability	
	Surgery	Non-Operative	Surgery	Non-Operative
Baseball	60.0%	100.0%	71.4%	100.0%
Basketball	66.7%	100.0%	75.0%	100.0%
Football	97.3%	95.5%	96.0%	96.2%
Soccer	-	100.0%	100.0%	94.7%
Softball	100.0%	100.0%	80.0%	92.3%
Track and Field	100.0%	100.0%	100.0%	75.0%
Gymnastics	100.0%	-	50.0%	90.9%
Swimming & Diving	-	-	-	100.0%