

# Outcomes of NCAA Defensive Football Players Following Achilles Tendon Repair

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## Abstract

**Background:** The incidence of Achilles ruptures has been on the rise in National Collegiate Athletic Association (NCAA) football players, but the career impact of this injury is not fully understood. In this study, we analyzed a large series of Achilles tendon injuries in NCAA Football Bowl Subdivision (FBS) defensive football players who required repair in order to determine their return to play, performance, and career outcomes afterward.

**Methods:** FBS defensive football players who required Achilles repair from 2010 to 2016 were identified. The return to play of the eligible underclassmen athletes was then determined and the preinjury and postoperative performances of players who met criteria were compared with matched controls. The number of underclassmen who went on to participate in the National Football League (NFL) Combine or play in at least 1 NFL game was also determined and compared with controls.

**Results:** Fifty-seven total Achilles ruptures were identified, 40 of which occurred in underclassmen, who returned at a rate of 92.5%. Of the players who met performance criteria, only defensive backs differed from matched controls in terms of solo tackling ( $P = .025$ ) and total tackling ( $P = .038$ ), while still increasing compared with preoperative performance. Only 5.0% of underclassmen performed at NFL Combine and only 7.5% competed in at least 1 NFL game (20.0% and 21.3%, respectively, for matched controls).

**Conclusion:** Defensive FBS players returned at a high rate following Achilles rupture and did not seem to experience a significant drop-off in performance upon return. An Achilles rupture did appear to impact their chances of playing professionally in the future, however.

**Level of Evidence:** Level III, retrospective comparative study.

**Keywords:** Achilles rupture, NCAA, FBS

## Introduction

Achilles tendon ruptures are detrimental and season-ending injuries that require athletes to undergo months of recovery and intense rehabilitation in order to return to play following repair. Following repair and rehabilitation, athletes then have a difficult time returning to the sport they play, with reported overall return-to-play (RTP) percentages as low as of 61%, 62%, and 65.6% for professional basketball, baseball, and football players, respectively.<sup>1,4,7</sup> Of the athletes who do return, their performance has been shown to suffer dramatically as well, especially in their initial season back.<sup>1,2,7</sup> Unfortunately, there is currently a paucity of literature regarding the impact Achilles ruptures have on collegiate athletes, despite there being a far greater number of National Collegiate Athletic Association (NCAA) athletes in the United States compared with professional athletes.

With lower extremity injuries (including Achilles tendon ruptures) on the rise in NCAA football players in recent years, it is paramount to determine the impact this

injury has on these specific athletes.<sup>9</sup> As these players differ in age, physical maturity, skill, and financial compensation compared with their National Football League (NFL) counterparts, the findings from the multitude of studies examining the RTP and performance of professional football players following Achilles tendon repair are not necessarily applicable.<sup>2-6</sup> In an effort to determine the impact, we retrospectively reviewed a large series of Achilles tendon ruptures that occurred in NCAA Division I defensive football players who subsequently had Achilles tendon repair.

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The RTP of these athletes was determined, their preinjury and postoperative performances were compared with a group of matched controls, and their career outcomes were examined.

## Methods

Division I Football Bowl Subdivision (FBS) players who had Achilles ruptures that required operative repair were identified from the years 2010 to 2016. There was a limited number of offensive players identified in the preliminary search, so for this study only defensive players were included and analyzed. Public press releases, team sites, biographies, and injury reports were used to compile the list. No prior injuries, prior procedures, or concomitant injuries were used as exclusion criteria. For each of these identified players, the position played at the time of injury and class standing were ascertained. The ability for these underclassmen to record a statistic following RTP after repair was examined.

For performance comparison, an athlete had to play at least 4 games prior to the injury and at least 4 games for the same college team following Achilles repair. This is approximately one-third of a team's games each season and was needed for adequate statistical comparison. The statistics for this cohort were obtained from the NCAA career statistics database.

The performance statistics for each of these players from the season prior to injury and the season after surgery were recorded and compared. Average game performance statistics included for all 3 defensive positions were tackles, tackles for loss (TFLs), sacks, pass breakups (PBUs), interceptions, forced fumbles, and fumble recoveries. Tackles, TFLs, and sacks were divided into assisted, solo, and total for further breakdown.

A matched control group of players was created from members of the same conference (ie, Big Ten, PAC-12, etc) that played during the same seasons and had similar preinjury performances. These athletes, just as the Achilles injury group, had to play at least 4 games for the same team during the seasons being compared. In addition, these controls also had to have no history of Achilles injury during their NCAA playing career. The performance changes experienced by matched controls between seasons were compared with the performance changes of the Achilles group with Student *t* tests. For these comparisons,  $P < .05$  was considered to be significant. Additionally, the number of underclassmen that went on to participate in the NFL Combine or play in at least 1 NFL game was ascertained, and this percentage was compared with that of the same selected underclassmen controls.

## Results

A total of 57 FBS defensive football players who sustained Achilles tears from 2010 to 2016 were identified from

**Table 1.** Achilles Tears and Return to Play by Position.

Position	Defensive Lineman	Linebacker	Defensive Back	Total
Total	20	9	28	57
Seniors	7	1	9	17
Underclassmen	13	8	19	40
Players who recorded stat after injury	12	8	17	37
RTP %	92.3	100	89.5	92.5
Players who met performance comparison criteria	10	7	11	28

Abbreviation: RTP, return to play.

records. Twenty of these players were listed as defensive linemen, while 9 were linebackers and 28 were defensive backs. When exclusively examining underclassmen with remaining eligibility, 92.5% (37 out of 40) of underclassmen were able to record a statistic in a game following their return from injury. The percentage of these eligible players who returned varied slightly by specific position with RTP rates of 92.3% (12 out of 13) for defensive linemen, 100% (8 out of 8) for linebackers, and 89.5% (17 out of 19) for defensive backs (Table 1).

A total of 28 players met performance criteria (10 defensive linemen, 7 linebackers, 11 defensive backs) and were compared with position-matched defensive controls. When examining the performance of defensive linemen, statistical performance improvement similar to the controls was observed in all categories besides force fumbles per game ( $P = .027$ ) (Table 2). With regard to linebackers, statistical performance improvement similar to that of the controls was observed in each category (Table 3). The performance of defensive linemen was only significantly different compared with controls in terms of solo tackles ( $P = .025$ ) and total tackles per game ( $P = .038$ ) (Table 4).

Of the 40 underclassmen that suffered an Achilles injury, only 5.0% (2 out of 40) of them went on to perform at the NFL Combine and only 7.5% (3 of 40) of them ever played in an NFL game. Comparatively, 20.0% (16 out of 80) of the controls performed at the Combine and 21.3% (17 out of 80) played in at least 1 NFL game (Table 5).

## Discussion

Prior to reviewing this series of Achilles ruptures, the authors hypothesized that the Division I NCAA athletes would (1) return at higher rates than their professional counterparts previously studied, (2) demonstrate significantly decreased performance in several statistical categories upon return, and (3) go on to participate in the Combine/

**Table 2.** Defensive Lineman Performance Before Injury and After Surgery.

	Achilles Group (n = 10)		Control Group (n = 29)		P Value <sup>a</sup>
	Before	After	Before	After	
Interceptions/game	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.01	0.00 ± 0.01	.655
Fumble recoveries/game	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	N/A
Forced fumbles/game	0.04 ± 0.04	0.00 ± 0.00	0.03 ± 0.02	0.06 ± 0.04	<b>.027</b>
Solo tackles/game	0.58 ± 0.37	0.90 ± 0.26	0.63 ± 0.14	1.21 ± 0.22	.388
Assisted tackles/game	0.67 ± 0.29	0.95 ± 0.31	0.54 ± 0.16	1.14 ± 0.21	.200
Total tackles/game	1.25 ± 0.56	1.85 ± 0.49	1.17 ± 0.27	2.34 ± 0.37	.239
Solo TFLs/game	0.18 ± 0.17	0.22 ± 0.15	0.15 ± 0.06	0.30 ± 0.09	.416
Assisted tackles/game	0.05 ± 0.04	0.15 ± 0.08	0.06 ± 0.03	0.18 ± 0.06	.846
Total TFLs/game	0.21 ± 0.17	0.30 ± 0.18	0.18 ± 0.07	0.39 ± 0.11	.439
Solo sacks/game	0.09 ± 0.08	0.11 ± 0.07	0.08 ± 0.05	0.18 ± 0.09	.265
Assisted sacks/game	0.02 ± 0.03	0.05 ± 0.05	0.01 ± 0.01	0.07 ± 0.04	.616
Total sacks/game	0.10 ± 0.08	0.14 ± 0.08	0.09 ± 0.05	0.22 ± 0.10	.276
PBUs/game	0.04 ± 0.05	0.07 ± 0.04	0.05 ± 0.03	0.06 ± 0.03	.529

Abbreviations: N/A, not applicable; PBU, pass breakup; TFL, tackle for loss.

<sup>a</sup>Boldface type indicates statistical significance.

**Table 3.** Linebacker Performance Before Injury and After Surgery.

	Achilles Group (n = 7)		Control Group (n = 21)		P Value
	Before	After	Before	After	
Interceptions/game	0.00 ± 0.00	0.05 ± 0.06	0.03 ± 0.03	0.06 ± 0.03	.586
Fumble recoveries/game	0.00 ± 0.00	0.01 ± 0.03	0.01 ± 0.02	0.02 ± 0.02	.873
Forced fumbles/game	0.04 ± 0.05	0.08 ± 0.07	0.03 ± 0.02	0.07 ± 0.03	.936
Solo tackles/game	2.24 ± 1.12	2.77 ± 1.58	2.27 ± 0.65	3.53 ± 0.68	.249
Assisted tackles/game	1.67 ± 0.85	1.99 ± 1.09	1.43 ± 0.42	2.35 ± 0.41	.219
Total tackles/game	3.91 ± 1.93	4.76 ± 2.42	3.70 ± 1.01	5.88 ± 0.66	.187
Solo TFLs/game	0.19 ± 0.15	0.41 ± 0.25	0.31 ± 0.13	0.43 ± 0.16	.406
Assisted tackles/game	0.11 ± 0.07	0.17 ± 0.10	0.16 ± 0.07	0.19 ± 0.08	.806
Total TFLs/game	0.24 ± 0.17	0.49 ± 0.29	0.39 ± 0.15	0.52 ± 0.17	.413
Solo sacks/game	0.05 ± 0.05	0.22 ± 0.14	0.10 ± 0.07	0.16 ± 0.09	.257
Assisted sacks/game	0.02 ± 0.03	0.02 ± 0.03	0.06 ± 0.04	0.03 ± 0.02	.197
Total sacks/game	0.06 ± 0.05	0.23 ± 0.15	0.13 ± 0.08	0.17 ± 0.09	.215
PBUs/game	0.06 ± 0.05	0.10 ± 0.08	0.11 ± 0.05	0.17 ± 0.05	.656

Abbreviations: PBU, pass breakup; TFL, tackle for loss.

play in NFL at lower rates than controls. The first and third hypotheses were confirmed while the second was not.

The majority of the NCAA players in this series who returned following repair as defensive linemen, linebackers, and defensive backs demonstrated RTP rates of 92.3%, 100%, and 89.5%, respectively, and an overall rate of 92.5%. The RTP of these players is higher than those of NFL players in all previous studies. Two studies that looked at NFL players after Achilles repair determined NFL defensive linemen to have RTP rates of 80.1% and 66.7%. NFL linebackers were determined to have RTP rates of 73.7% and 77.8%, while defensive backs had rates of 75.0% and 54%.<sup>3,11</sup> Two

additional studies did not separate players by position but did determine overall RTP rates of 65.6% and 69.9%.<sup>4,5</sup>

Defensive linemen that returned to play in the series did not show a significant change in performance statistics compared with controls other than in forced fumbles per game ( $P = .027$ ). While this was a statistically significant difference, it is not a clinically significant one since it is such a small quantitative difference. Defensive linemen typically have the assignment of rushing the passer or stopping running plays at the line of scrimmage, neither of which appears to be hindered by a past Achilles rupture. Linebackers, in addition to rushing the passer and stopping

**Table 4.** Defensive Back Performance Before Injury and After Surgery.

	Achilles Group (n = 11)		Control Group (n = 30)		P Value <sup>a</sup>
	Before	After	Before	After	
Interceptions/game	0.09 ± 0.08	0.08 ± 0.00	0.06 ± 0.04	0.10 ± 0.04	.571
Fumble recoveries/game	0.02 ± 0.02	0.00 ± 0.00	0.02 ± 0.01	0.02 ± 0.01	.154
Forced fumbles/game	0.01 ± 0.02	0.06 ± 0.04	0.02 ± 0.02	0.05 ± 0.02	.886
Solo tackles/game	1.50 ± 0.57	1.86 ± 0.68	1.72 ± 0.35	2.56 ± 0.38	<b>.025</b>
Assisted tackles/game	1.04 ± 0.43	1.37 ± 0.52	1.04 ± 0.21	1.70 ± 0.35	.130
Total tackles/game	2.54 ± 0.89	3.23 ± 1.18	2.76 ± 0.53	4.25 ± 0.66	<b>.038</b>
Solo TFLs/game	0.04 ± 0.03	0.09 ± 0.09	0.06 ± 0.04	0.11 ± 0.04	.864
Assisted tackles/game	0.11 ± 0.05	0.05 ± 0.05	0.06 ± 0.03	0.07 ± 0.03	.926
Total TFLs/game	0.09 ± 0.05	0.11 ± 0.10	0.08 ± 0.05	0.15 ± 0.05	.903
Solo sacks/game	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.01	0.03 ± 0.02	.057
Assisted sacks/game	0.01 ± 0.01	0.00 ± 0.00	0.01 ± 0.02	0.01 ± 0.01	.566
Total sacks/game	0.10 ± 0.01	0.00 ± 0.00	0.02 ± 0.02	0.03 ± 0.02	.042
PBUs/game	0.13 ± 0.08	0.12 ± 0.14	0.21 ± 0.08	0.25 ± 0.07	.876

Abbreviations: PBU, pass breakup; TFL, tackle for loss.  
<sup>a</sup>Boldface type indicates statistical significance.

**Table 5.** Achilles Tears and Career Outcomes.

Position	Total	Performed at		Played in NFL	
		Combine	Percent-age	Game	Percent-age
Underclassmen Achilles tears	40	2	5.00	3	7.50
Control	80	16	20.00	17	21.25

Abbreviation: NFL, National Football League.

the run near the line of scrimmage, are also tasked with pass coverage. All 3 tasks do not appear to be impeded by a prior Achilles rupture, as the linebackers that returned to play in the series did not show a significant change in performance compared with controls in any category. Defensive backs, while they did improve on their preinjury performance, did so significantly less than their controls in terms of solo tackles per game ( $P = .025$ ) and total tackles per game ( $P = .038$ ). This was both a statistically significant and clinically significant difference. These differences show that while their ability to provide pass coverage was not affected (typically the key role of defensive backs), their ability to tackle in the open field was.

With regard to NFL players, studies have shown that players perform at a level as much as 69.6% lower than that of their preinjury baseline in their first year upon return.<sup>4,8</sup> An additional study demonstrated that there were 95%, 87%, 64%, and 55% reductions in respective power ratings for NFL linebackers, cornerbacks, defensive tackles, and defensive ends upon return.<sup>5</sup> Yet another demonstrated that the postoperative performance of linebackers and defensive backs specifically regressed compared with matched controls.<sup>3</sup> The postoperative performance of NCAA athletes in

this series seems to contradict that of NFL defensive players previously reported. Unfortunately, despite their strong first year postoperative performance, only 2 out of 40 (5%) total players in the series went on to perform at the NFL Combine and only 3 out of 40 (7.5%) went on to compete in at least 1 NFL game. For controls, however, 20% went to the NFL Combine and 21.3% competed in an NFL game. This difference observed between the Achilles group and control group is most likely due to the horrible perception surrounding Achilles ruptures. With a limited number of NFL Combine invitations given out each year, as well as draft picks and roster spots available for each team, a player with a past Achilles injury is unfortunately likely a riskier investment in the eyes of NFL executives and coaches.

Several explanations for why NCAA athletes return at a higher rate than NFL players and perform better upon return exist. One obvious difference is age, as the NCAA players in this study ranged from sophomores to seniors (typically 18-23 years old) at the time of injury, while previous studies conducted all had cohorts of NFL players with average ages of 25 years or older. Additionally, the lower skill level required to compete at the NCAA level compared with the NFL level could allow an easier return for the collegiate athletes. Lastly, contracts, other financial considerations, and free agency interest from teams ultimately impact an NFL player's return but do not impact that of a college player.

The analysis of the athletes in this case series does have some limitations stemming from the method of data collection, as the Achilles ruptures were identified from publicly available media and injury reports rather than operative reports. As a result, concomitant injuries, operative complications, and operative technique (percutaneous repair vs open repair) could not be determined. In addition, it is also important to note that all players who had Achilles ruptures

from 2010 to 2016 might not have been captured by our method because not all NCAA institutions specify exact injuries. Despite the limitations that exist from this method of data collection, it has been used in a variety of studies previously and it is the only method of analysis of NCAA football players for performance following Achilles repair.<sup>2,3,5,6,8,10,11</sup> To date, it is also only the second statistical performance analysis performed on NCAA football players following any injury, and once again demonstrates that NCAA players return at higher rates and perform at a better level following return compared with their professional counterparts.<sup>10</sup>

## Conclusion

In conclusion, the Division I FBS defensive linemen, linebackers, and defensive backs examined in this case series returned to play 92.5% of the time following Achilles repair. Upon return, all defensive positions did not experience a drop-off in performance, but defensive backs did show less improvement with regard to tackling compared with controls. Despite not exhibiting a drop-off in performance, the players analyzed went on to compete at the NFL Combine and in an NFL game at a lower rate compared with controls.


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