

The NFL's Chop-Block Rule Change

Does It Prevent Knee Injuries in Defensive Players?

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Background: The chop block, a football maneuver in which an offensive player blocks an opponent around the thigh while another offensive player engages the same opponent above the waist, was declared illegal by the National Football League (NFL) before the 2016-2017 season. Chop blocks have been hypothesized to be associated with medial collateral ligament and anterior cruciate ligament injury, especially in offensive/defensive linemen.

Purpose: To quantify the impact that the chop-block rule change had on the incidence of knee injuries to defensive players in the NFL over 4 seasons (2014-2018).

Study Design: Cohort study; Level of evidence, 3.

Methods: NFL injury data for all defensive players from regular-season games played from 2014 through 2018 were collected. For this study, all knee injuries were attributed to competitive game play. Injury rates were reported as the number of injuries per 1000 athletic exposures (with 95% CIs).

Results: A total of 256 games were played during the 2014-2015, 2015-2016, 2016-2017, and 2017-2018 NFL regular seasons, and all were included in this study. Among defensive players, the relative risk for a knee injury per 1000 athletic exposures was 0.84 (95% CI, 0.75-0.96) for the 2 seasons after the chop-block rule change (2016-2017 and 2017-2018) versus the 2 seasons before (2014-2015 and 2015-2016) ($P = .009$). Thus, the relative risk reduction was 16%. The relative risk for a defensive player to be placed on injured reserve per season was 0.90 (95% CI, 0.72-1.13) for the 2 seasons after the rule change versus the 2 seasons before ($P = .39$).

Conclusion: The NFL's recent ruling against in-game chop blocks may have reduced the incidence of knee injuries among defensive players.

Keywords: football; MCL; ACL; chop blocking

In 2015, the legality and usage of the chop block was outlined under rule 12, section 2, article 3, of the National Football League (NFL) handbook. There, a chop block was defined as “a block by the offense in which 1 offensive player blocks a defensive player in the area of the thigh or lower

while another offensive player engages that same defensive player above the waist.” This maneuver, already banned in its entirety from collegiate football since 1980, held situational legality within the NFL on running plays. The 2 legal applications occurred when either 2 adjacent offensive players chopped a defender or 2 nonadjacent players chopped a defender when the flow of play was on their respective side. A change to this rule was made prior to the 2016-2017 season, when the Competition Committee declared all forms of the chop block illegal, resultant in a 15-yd penalty and a personal foul. Personal fouls among all levels of organized football are traditionally reserved for unsportsman-like conduct or unnecessary roughness, which suggests the league's increased concern for, as well as the increased potential for, athlete injury.

The mechanics of the chop block are suggestive of an increased susceptibility to knee and ankle injuries.^{6,20} While not the primary focus of this study, the ensuing inversion or eversion stress on the lateral and medial ligaments of the ankle commonly leads to sprains,

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subtalar dislocations, and fractures.⁶ Knee pathology most frequently comprises injury to the medial collateral ligament (MCL) and anterior cruciate ligament (ACL).^{4,20} The MCL works to prevent valgus laxity by functioning as the primary biomechanical force against valgus stress at 0° and 30° of knee flexion.²⁴ The most common mechanism for injury to the MCL is an acute valgus force that overloads the ligament.²⁴ In football, this may manifest as a lateral blow to the knee during the lower body engagement of the chop block. In contrast with the MCL, the ACL acts as the chief ligament for prevention of anterior tibial translation and rotation.²⁰ Injuries to the ACL often occur through noncontact pivoting mechanisms involving deceleration prior to a change in direction.^{2,9,20}

Contact injuries, such as those occurring during a chop block, are often due to a direct collision with the knee and subsequent valgus collapse.^{2,9,20} Unlike tendencies in other sports and the general population, contact collisions resulting in ACL injury are more common than noncontact injuries among football players.^{2-4,8,10,12} However, injury frequency to the MCL and ACL in defensive players is likely influenced by the use of chop blocks, owing to the inherent lack of awareness of the defensive player to incoming lower body blows. This unforeseen collision prevents the defender from being able to properly adjust prior to contact, leading to a potentially increased risk for injury.

The aim of this study was to quantify the impact that the chop-block rule change had on the incidence of knee injuries to NFL defensive players over 4 seasons (2014-2018). With growing concerns regarding player safety within the sport of football at all levels, it is vital that an attempt be made to objectively measure risk mitigation. We hypothesized that the incidence of knee injuries during the 2 seasons after the chop-block rule change would be significantly lower than that of previous 2 seasons and that the severity of these injuries would also be significantly lessened.

METHODS

Each week during the regular season, official NFL injury reports are published by every team on its website as well as on league-wide websites. These reports include detailed information about each player on the roster who is diagnosed with an injury or illness by the team's athletic training staff. The information published includes the "player name, position, anatomical area injured (ankle, knee, hip, shoulder, toe, head, etc), the practice status of a player during the week (did not practice, limited participation, full participation) and game status (probable, doubtful, out)."¹⁵ NFL teams are "required to report the level of participation in practice of any player hampered by an injury."¹⁵ The regular season in the NFL consists of 16 games but is played over a 17-week period. Because the injury reports are published prior to each game, the information reflects injuries sustained by players in the previous week's game or in practices during the week. Teams may choose to place players who are injured and not able to play onto an injured reserve (IR) list, as opposed to the weekly injury report. IR lists are also available online for each team and are updated daily.¹⁵

TABLE 1
Knee Injuries in NFL Defensive Players Per Year^a

Season	Knee Injuries per 1000 Athletic Exposures, n	IR Placement per Season, n
2014-2015	789	191
2015-2016	621	261
2016-2017	460	253
2017-2018	621	257

^aRegular-season games (athletic exposures) per season, N = 256. IR, injured reserve; NFL, National Football League.

Injury report and IR data were collected for every defensive player on all 32 NFL teams for each week during the regular season, for the entire 2014-2015, 2015-2016, 2016-2017, and 2017-2018 seasons. For the purposes of this study, a knee injury was defined as any reported knee injury not previously documented in an injury report prior to said injury. Recurrent injuries cannot be identified with injury reports because a player's medical history is not listed; however, by applying the definition of injury used in this study, it can be assumed that each injury included in this study had not been listed as an impairment to the subject athlete prior to its identification.

The context in which an injury occurred (ie, whether in game or practice) is not identified by the injury report. Given that most injuries to NFL players happen during games, we assumed, for this study, that all injuries occurred during games; this allowed us to estimate the knee injury incidence among NFL defensive players for the years included in this study.^{5,17,18}

Injury rates were reported as the number of injuries per 1000 athletic exposures with 95% CIs. The number of athletic exposures was equal to the sum of the total number of NFL regular-season games played. Relative risk (with 95% CI) was calculated by using the number of injuries per 1000 athletic exposures for the 2 seasons under the rule change (2016-2017 and 2017-2018) versus the previous 2 seasons (2014-2015 and 2015-2016).

RESULTS

A total of 256 regular-season games were played during the 2014-2015, 2015-2016, 2016-2017, and 2017-2018 NFL regular seasons, and all were included in this study. Table 1 outlines the rate of knee injuries per 1000 athletic exposures and the rate of IR placement per season throughout the study period, for all defensive players. Table 2 presents the number of knee injuries among NFL defensive players by position per year. Table 3 details the number of defensive players put on the IR list for a knee injury.

Among defensive players, the relative risk for a knee injury per 1000 athletic exposures was 0.84 (95% CI, 0.75-0.96) for the 2 seasons after the chop-block rule change

TABLE 2
Knee Injuries Among NFL Defensive Players by Position per Year^a

Season	Knee Injuries by Position, n					Total
	Cornerback	Safety	Defensive Tackle	Defensive End	Linebacker	
2014-2015	40	26	24	43	69	202
2015-2016	24	30	27	23	55	159
2016-2017	26	12	15	21	44	118
2017-2018	33	28	21	34	43	159
Total	123	96	87	121	211	638

^aNFL, National Football League.

TABLE 3
Number of NFL Defensive Players Placed on IR Secondary to a Knee Injury^a

	Players on IR, n			
	2017-2018 (n = 49)	2016-2017 (n = 67)	2015-2016 (n = 65)	2014-2015 (n = 66)
Defensive tackle	7	9	8	9
Defensive end	7	9	10	10
Linebacker	14	20	20	19
Safety	11	12	13	14
Cornerback	10	17	14	14

^aIR, injured reserve; NFL, National Football League.

TABLE 4
Relative Risk of Knee Injury and IR Placement Among NFL Defensive Players Before and After the Chop-Block Rule Change^a

	RR	95% CI	P	
			Value	RRR
Knee injury per athletic exposure	0.84	0.75-0.96	.009	16%
IR placement for knee injury per season	0.90	0.72-1.13	.39	

^a2017-2018 and 2016-2017 vs 2015-2016 and 2014-2015 regular seasons. IR, injured reserve; NFL, National Football League; RR, relative risk; RRR, relative risk reduction.

(2016-2017 and 2017-2018) versus the 2 seasons before (2014-2015 and 2015-2016) ($P = .009$). Thus, the relative risk reduction was 16%. The relative risk for a defensive player to be placed on injured reserve per season was 0.90 (95% CI, 0.72-1.13) for the 2 seasons after the rule change versus the 2 seasons before ($P = .39$).

DISCUSSION

Among popular American sports, the rate of injury is highest in football.¹² When compared with those of other sports, football injuries are more likely to require surgery and end an athlete's season or career, particularly if they concern tears of the ACL and MCL.^{13,19,20,23} Joseph et al¹⁴ found

that ACL injuries are 4 times more likely to occur in football players compared with other sports.

The positions of linebacker and interior lineman were identified by multiple studies as having an increased risk for contact-related ACL tears when compared with other positions.^{3,4,8} The results of our study support these findings and may imply that these positions remain the most vulnerable to injury despite changes in contact rules.

The most common knee injury in professional football is an MCL tear.^{7,10,22} MCL injuries typically arise secondary to contact that applies a valgus force on the knee.¹⁶ Interior linemen were identified by multiple studies as playing the positions at greatest risk for suffering MCL injuries in football.^{1,3,11,21} Bradley et al³ hypothesized the mechanism of MCL injury in linemen to be the result of chop blocks. Regarding knee injuries among NFL defensive players, our study showed a relative risk reduction of 16% when comparing the 2016-2017 and 2017-2018 seasons with the 2014-2015 and 2015-2016 seasons, possibly as a result of the chop-block rule change.

There was a significant reduction in the relative risk of knee injuries in defensive players during the 2 NFL seasons after the rule change compared with the 2 seasons immediately before (Table 4). Thus, the results of this study suggest that the chop-block rule change may have contributed to the measured decrease in the knee injury rate of NFL defensive players over 2 seasons.

The rule change did not have a significant impact on decreasing the total number of athletes placed on the IR list with knee injuries per season. Those who are placed on the list are typically unavailable to play because they must undergo surgery for their injury.²⁰ Since MCL tears are likely to be the most common injury from the mechanism of the chop block, this result is expected, as the standard of care for the majority of MCL injuries is nonsurgical.²⁰ Therefore, the results from this study suggest that the rule change has no significant impact on the number of players placed on the IR list for knee injuries per year, as there was no significant difference between the 2016-2017 and 2017-2018 NFL regular seasons and the 2014-2015 and 2015-2016 seasons in terms of the number of defensive players put on the list.

There are some limitations to this study. NFL injury reports lack data-specific information, such as type of injury and treatment, so we can only make assumptions about the type of injury and management from data on how

many games were missed and whether athletes were placed on the IR list. There is an NFL Injury Surveillance System that records in greater detail the occurrence and mechanism of injury among NFL players; the results of this study encourage those with access to the NFL Injury Surveillance System to restudy this problem and further assess the impact of the chop-block rule change on knee injuries among defensive players. The NFL rule change moving the kickoff yard line from the 30- to 35-yd line has increased the number of touchbacks and may have decreased the number of total injuries suffered on kickoffs. In 2016, the NFL extended the definition of a horse-collar tackle to include below the name plate, which may have also contributed to a lower number of knee injuries.

CONCLUSION

Knee injuries are common among football players. The NFL's recent ruling against in-game chop blocks may have reduced the incidence of knee injuries among defensive players. The results of this study suggest that the rule declaring chop blocks illegal should not be repealed.

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