

NFL PUNT ANALYTICS COMPETITION

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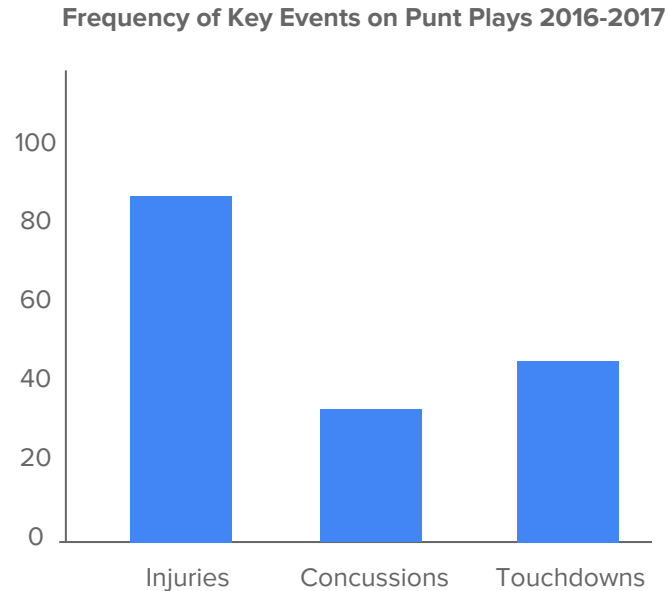


Agenda

- ❖ Executive Summary
- ❖ First Proposed Rule
- ❖ Second Proposed Rule
- ❖ Other Proposed Rules Considered
- ❖ Conclusion

Executive Summary

Punts are among the most dangerous plays in the NFL.



The aim of this study is to analyze league punting data from 2016 and 2017, and recommend rules that will reduce concussions on punting plays while maintaining the integrity of the game.

86%

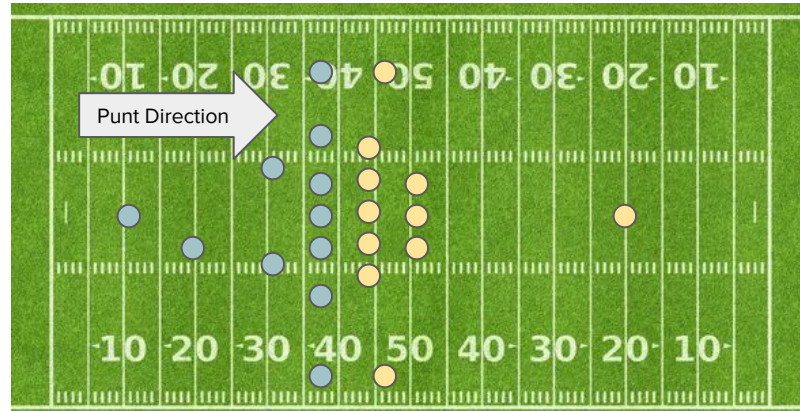
of concussions incurred on punts could be reduced
by adopting two simple and enforceable rules.

Proposed Rule 1

Proposed Rule 1 - Punt Formation

The punting team can have at most 2 gunners lined up on or outside the numbers.

Similarly, the return team can have at most 2 players lined up on or outside the numbers.



The Challenge

A punt that is returned is 6x more likely to result in a concussion than a fair catch

Punt returns are dangerous for four main reasons:

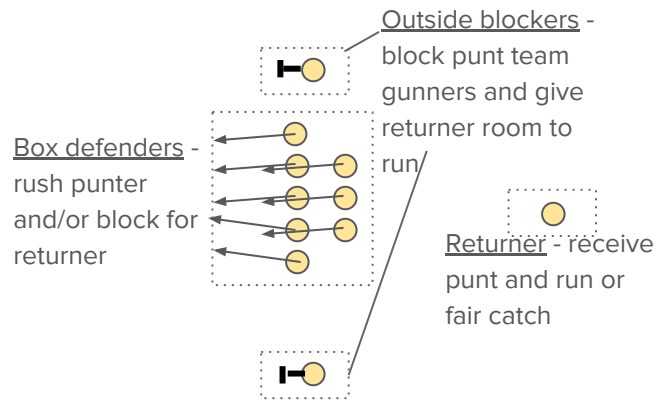
- 1) High velocity collisions
- 2) Poor tackling technique
- 3) Blocks on defenseless defenders
- 4) Hits on defenseless returners

Outcome	Total Punt Results	Concussions
Returns	4,488	32
Fair Catch	1,659	2
Downed	811	3
Out of Bounds	669	0
Touchback	407	0
Returner Muff	203	2

There are three primary punt formations the return team uses

“8-2-1”

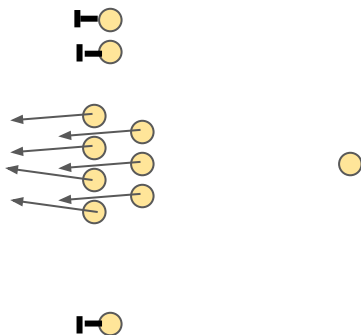
8 box, 2 outside, 1 returner



51% of plays

“7-3-1”

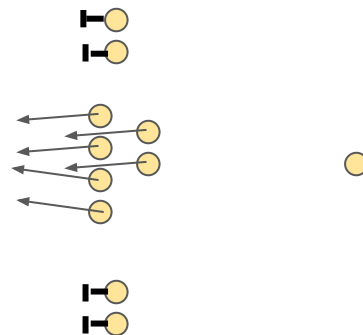
7 box, 3 outside, 1 returner



28% of plays

“6-4-1”

6 box, 4 outside, 1 returner



21% of plays

The 8-2-1 formation leads to shorter punts

Formation	Avg Punt Distance
8-2-1	43.9 yds
7-3-1	47.4 yds
6-4-2	47.2 yds

More defenders rushing forces the punter to get rid of the ball quicker resulting in shorter punt distances.

There are significantly fewer returns when the return team is in the 8-2-1 formation

Formation	Return Percentage	Fair Catch Percentage	Total # of Returns
8-2-1	30%	34%	3,205
7-3-1	57%	20%	1,740
6-4-2	65%	15%	1,284

Shorter punts and fewer blockers leads to more fair catches.

The Impact

There are three main effects of this mandated formation

1) Reduction in punt returns (leading to fewer concussions)

Using machine learning classification algorithms, it is estimated there will be **78% fewer concussions** due to mandating an 8-2-1 formation (all other variables held constant).

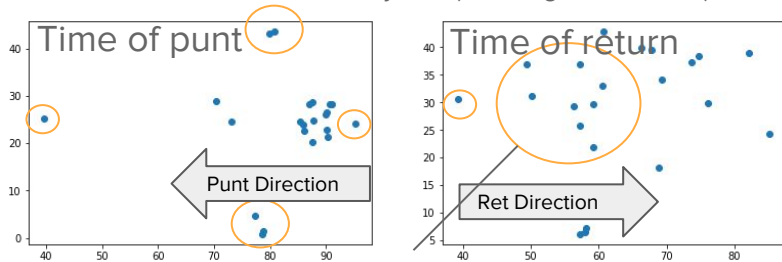
There are three main effects of this mandated formation

- 1) Reduction in punt returns (leading to fewer concussions)
- 2) More long returns (creating more fan excitement)

By making one man miss, the returner is set up for a long return as many of the defenders are further down the field.

7-3-1 formation

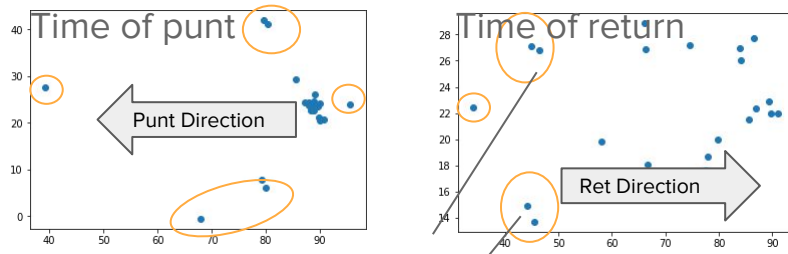
D.Jones punts 45 yards to NYG 30,
D.Harris to NYG 40 for 10 yards (C.Maragos, N.Goode).



It would take a monumental effort for the returner to navigate through the crowd that is 10 yards in front of him.

8-2-1 formation

R.Dixon punts 51 yards to MIA 23,
J.Grant to 50 for 27 yards (J.Simmons, C.Kreiter).



Despite two small crowds around the returner when he fields the punt, he was able to make the initial defenders miss and find space for a 27-yard return.

There are three main effects of this mandated formation

- 1) Reduction in punt returns (leading to fewer concussions)
- 2) More long returns (creating more fan excitement)
- 3) More big hits (without leading to significantly more concussions) because unblocked gunners have potential to injure punt returners due to increased hits on defenseless returners.

Since the NFL's new legislation on hits to the head, players are more aware of how to tackle safely. As long as hits occur as helmet-to-body, there won't be a significant increase in concussions because those plays haven't proven to be dangerous on a relative basis (there were only 2 helmet-to-body concussions on players being tackled).

Projected impact of 8-2-1 formation rule

	2016 - 2017	After Implementation	% Change
Avg Punt Distance	45.5 yds	45.2 yds	-0.65%
Avg Net Punt	41.1 yds	42.2 yds	+2.67%
Return Percentage*	45.0%	27.5%	-38.8%
Concussion Rate**	0.50%	0.11%	-78.0%
Injury Rate	1.3%	1.1%	-15.4%
Penalty Rate	14%	10%	-28.6%

* Total Returns / Total Punts

** Total Concussions / Total Punts

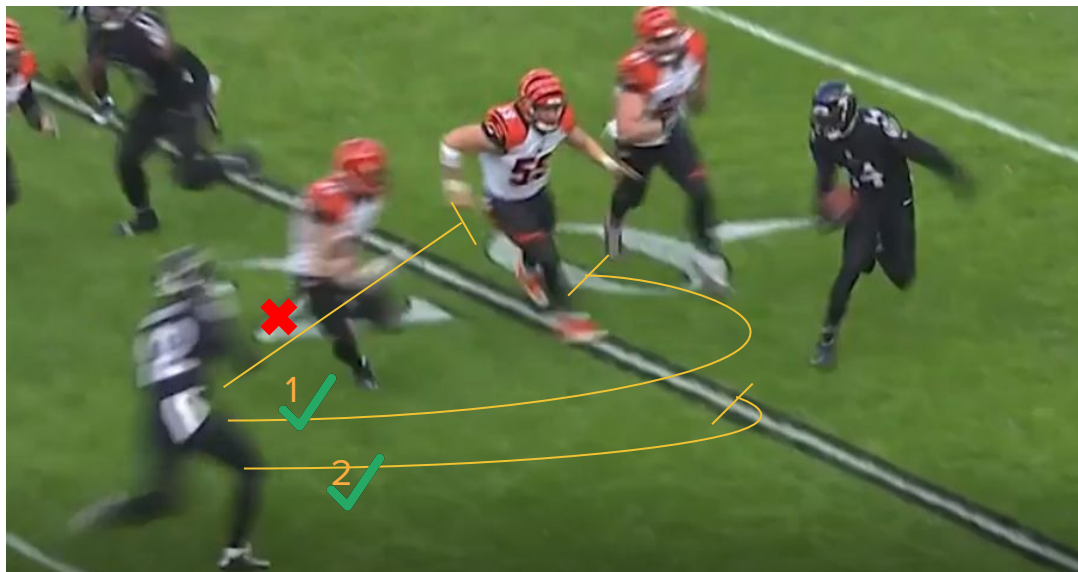
This rule is fair for both sides of the ball and is a good compromise for fans

		Pros	Cons
Punting Team	- More fair catches	- Likely more blocked punts	
	- Fewer injuries and concussions		
Return Team	- Fewer penalties	- More big hits on returner	
	- More long returns	- Worse avg field position	
Fans	- Fewer penalties	- Fewer returns	
	- More exciting returns and likely more blocked punts		

Proposed Rule 2

Proposed Rule 2 - Parallel Forceful Blocking

A return team blocker cannot initiate a forceful block if the player he is blocking is further from the line of scrimmage than the blocker. The player may initiate a forceful block from a parallel yard line or beyond (ex. 1 and ex. 2) or a non-forceful block such as a hand or arm block (e.g., blocks typically performed by offensive linemen)

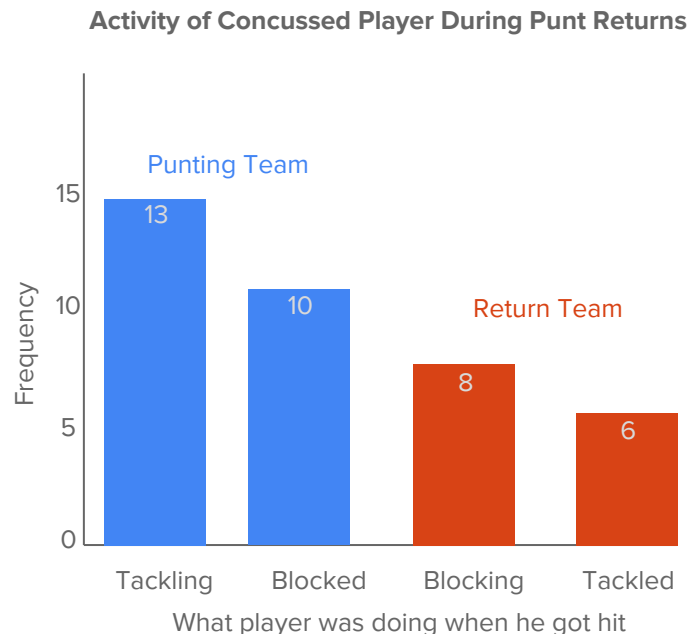


The Challenge

The players on the punting team are more likely to be concussed than the return team

This goes against conventional wisdom, which says to protect the team carrying the ball.

Therefore, this proposed rule is only directed at protecting the players on the punting team.



While tackling is the most dangerous activity, it is too difficult to solve for with one rule



NYJ long snapper tackles DEN returner, however in doing so, gets a hit to the head resulting in a concussion

Special teams tacklers are not starting defenders and therefore are not as skilled as the best defenders. The NFL's emphasis on "Heads Up" football should help improve the concussion rate on tackling.

Some rules are already in place to protect defenseless players on the punting team. The Parallel Forceful Blocking Rule will increase safety even more.

1



TEN defender #48 is chasing down KC punt returner, unaware he is about to be blocked by KC defender

2

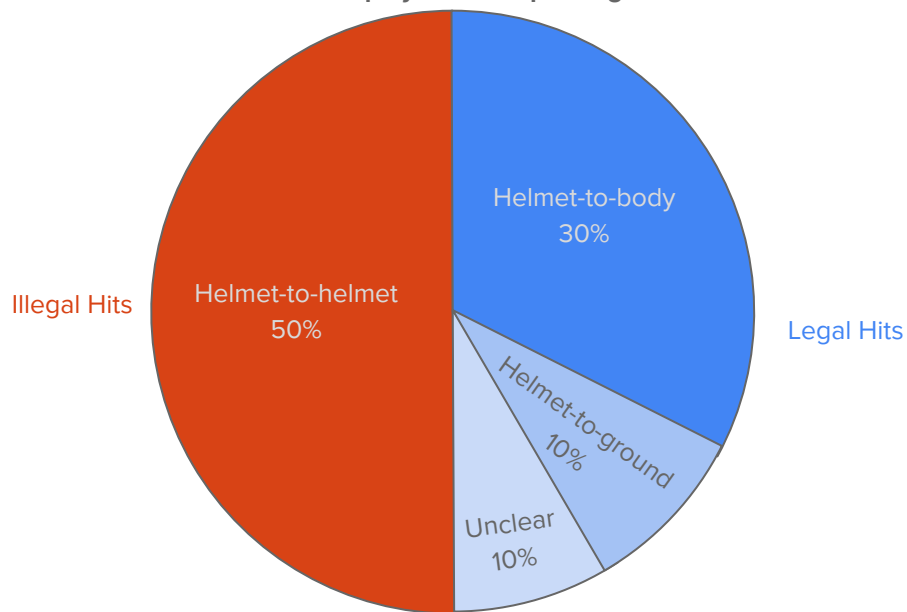


KC blocker initiates contact with TEN defender, resulting in a concussion and springing the returner for a touchdown

NFL rules already prohibit some of these blocks on defenseless players if the defender initiates contact to the head or neck area

Half of the concussions suffered by defenseless players on the punting team were legal hits

Type of hit that resulted in concussion against a defenseless player on the punting team



The Parallel Forceful Blocking Rule is necessary to protect the 50% of players who were injured on legal hits.

The Impact

The Parallel Forceful Blocking Rule will impact both sides of the ball

Pros		Cons	
Punting Team	- Fewer concussions to defenseless players - Easier to tackle	- Relatively steep adoption curve	
	- Likely fewer block in the back penalties - Better form blocking	- Fewer opportunities to “spring” a long return	
Fans	- Likely fewer block in the back penalties	- Subjectivity of officiating	

Projected impact of both rules in tandem

	2016 - 2017	After Implementation	% Change
Avg Punt Distance	45.5 yds	45.2 yds	-0.65%
Avg Net Punt	41.1 yds	42.2 yds	+2.67%
Return Percentage*	45.0%	27.5%	-38.8%
Concussion Rate**	0.50%	0.07%	-86.0%
Injury Rate	1.3%	0.9%	-30.8%
Penalty Rate	14%	8%	-42.9%

* Total Returns / Total Punts

** Total Concussions / Total Punts

Other Rules Considered

The following rules were considered but not recommended at this time

Other Rules Considered	Justification for omitting
Further protection for returners (e.g., 3-yard cushion to receive punt)	No data to show this increases player safety. 2/3 of the concussions to returners were helmet-to-helmet hits, which are already illegal.
No gunners on the punt team	Gunners only suffered 5 concussions in total.
Touchback to the 25-yard line	Only 5% of punts from inside the 50-yard line are returned, and none resulted in concussions.
Ball to be spotted on a hash mark	Punts that originate at the hash mark are no more likely to be punted out of bounds.

Conclusion

Two simple and enforceable rule changes will make a significant impact on protecting players on punt plays

The easiest way to reduce concussions is to reduce punt returns.



Mandating the 8-2-1 return formation is the best solution to do this in a way that makes sense for both teams, while maintaining an exciting product.

During punt returns, it is imperative to protect the players on the punting team who are chasing the returner.



The Parallel Forceful Blocking Rule will accomplish this.