

Recommendations for Changes to NFL Rules to Reduce Concussions

Jim Kloet

NFL Punt Analytics Kaggle Competition Entry

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Summary Of Recommendations:

1. Add an item to NFL Rule 12 Section 2 Article 7-a which states:

"Punt coverage players pursuing the punt returner, but who are not imminently going to tackle the punt returner, shall not be contacted above the shoulders by players on the punt return team, when the punt coverage player is traveling in a direction parallel to the goal lines or toward their own goal line, and the punt return player is traveling in a direction either perpendicular to the punt coverage player or toward the punt coverage player."

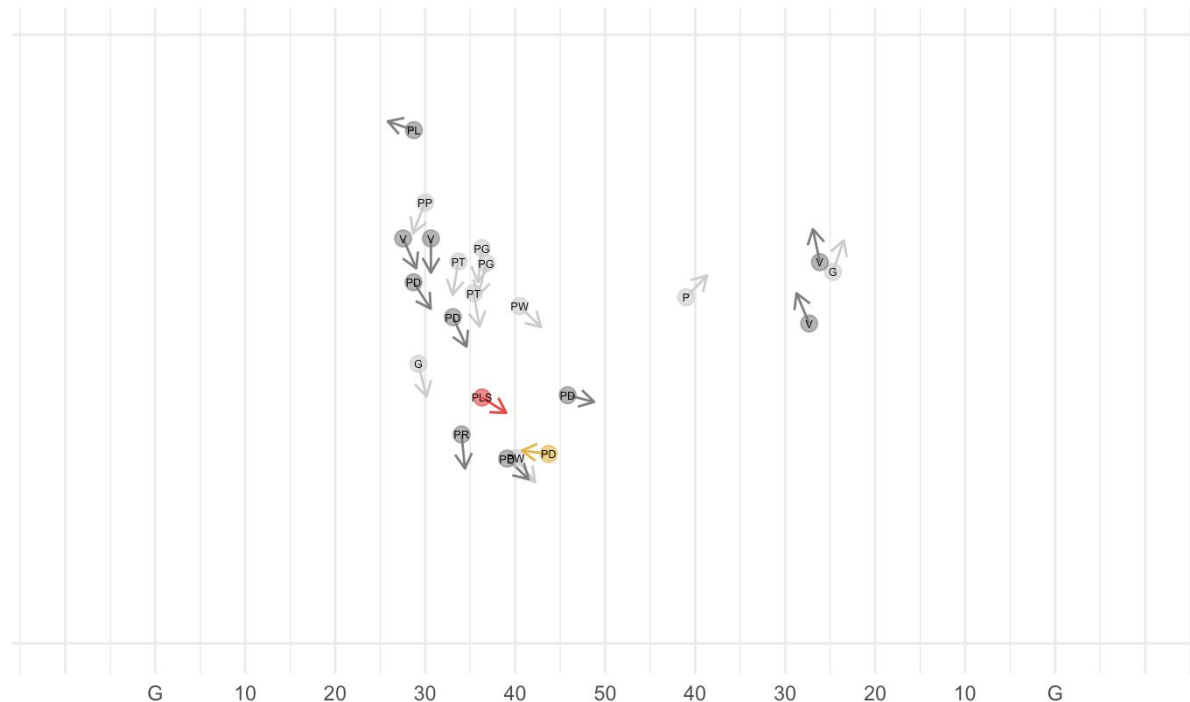
2. Add an item to NFL Rule 12 Section 2 Article 8 which states:

"On punt plays, it is a foul if a player initiates contact with his helmet against an opponent."

Proposal 1: Update definition of players considered to be in a defenseless posture to reduce incidence of concussion-causing downfield blocks by punt return players on punt coverage players.

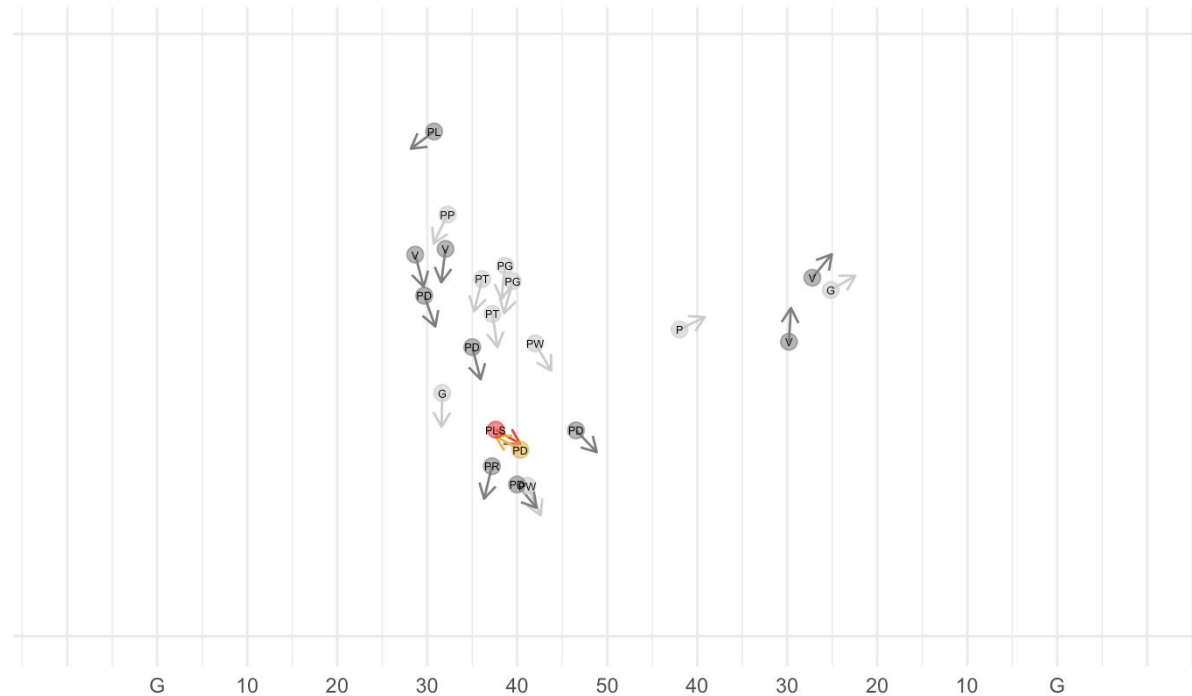
Here's an illustrative example of a play where a punt coverage player is concussed as a result of an unexpected downfield block:

GameKey 392, PlayID 1088, 34.5 sec elapsed



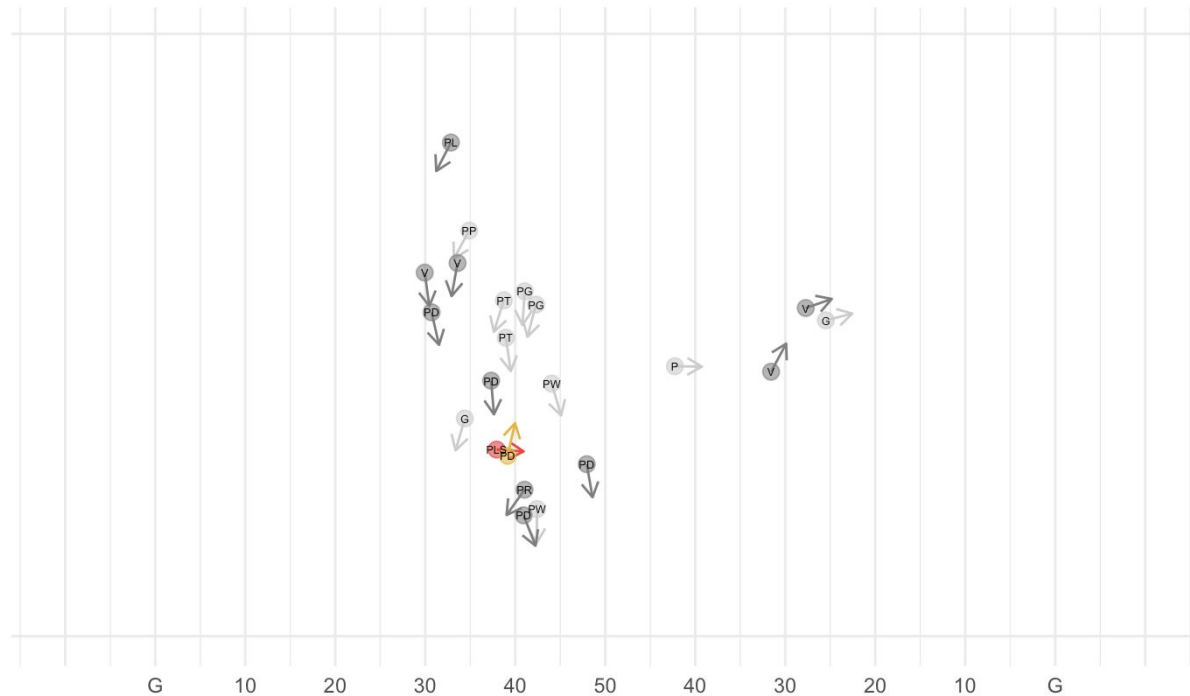
At this point in the play, the LS (concussed player) and PD (primary partner) are approximately 10 yards away; the LS is moving at 16 mph in pursuit of the PR, is not anticipating a block, and is not imminently going to make a tackle; the PD is moving at 16.8 mph toward the LS.

GameKey 392, PlayID 1088, 35 sec elapsed



Within a half second, the LS and PD have converged to less than two yards of each other. On camera, the LS recognizes an impact is imminent and slows down to brace for the hit.

GameKey 392, PlayID 1088, 35.5 sec elapsed



The impact point. The arrows on the graph make it clear that the PD impacts the front and side of the LS. The players involved are now the two slowest moving players on the field.

The PD could've avoided causing a concussion, but still made a block, by targeting his block to the LS's torso.

I observed 12 of 37 concussions in this sample which resulted from blindside blocks at least 10 yards downfield from the line of scrimmage, while a coverage player was in pursuit of the punt returner, but not imminently about to make a tackle.

3 of those 12 concussions were to the player initiating the block.

Reducing the incidence of these blocks can reduce the incidence of concussions on punt plays.

Rule 12 Section 2 Article 7-a specifies situations where a player is considered to be in a defenseless position.

I propose expanding this rule to add punt coverage players, more than 10 yards downfield from original line of scrimmage, who are moving in a direction that is either parallel to the goal lines or in the direction of their own goal line.

There should be a penalty for punt return players, who are moving in a direction that is either parallel to the goal lines or in the direction of their own goal line, who make contact to the head or neck area of these defenseless players.

- **Proposal 1 is a minimal change to an existing rule, to include situations similar to those already codified in the rules.**
- **Proposal 1 does not introduce competitive advantages or disadvantages for any players or teams.**
- **Proposal 1 can be easily piloted during pre-season games.**

Proposal 2: Disallow initiation of contact with the helmet during tackles on punt plays.

Punt coverage players who begin the play in the tackle box (includes roles PG, PT, PW, and LS) experience disproportionate numbers of concussions on punt plays.

In the table to the left, “observed” is the proportion of concussions in the sample associated with the role; “expected” is the proportion of concussions we’d expect based on prevalence of roles; and “diff” is the simple difference.

Roles with positive diffs (in red text) experienced more concussions than expected, whereas roles with negative diffs (in blue text) experienced fewer

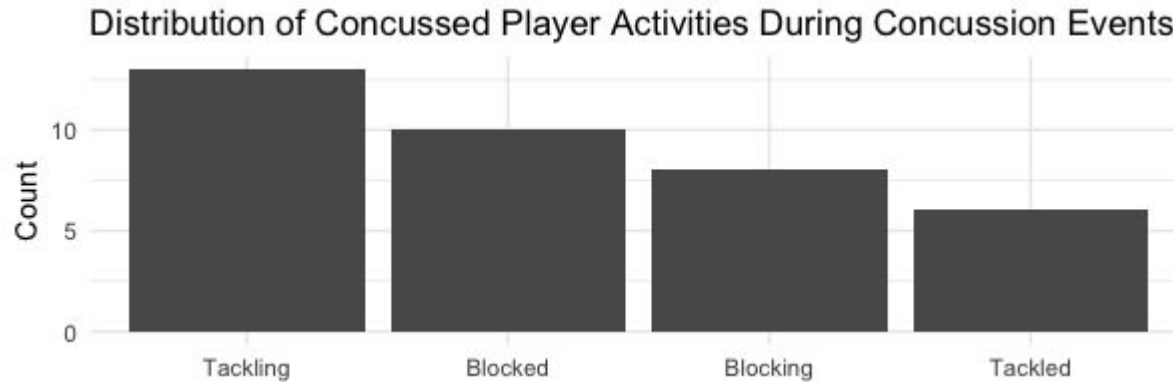
role	observed	expected	diff
PG	0.216	0.091	0.125
PW	0.162	0.091	0.071
PR	0.135	0.045	0.090
G	0.135	0.091	0.044
PT	0.108	0.091	0.017
PLS	0.054	0.045	0.009
PD	0.054	0.269	-0.215
PFB	0.027	0.004	0.023
P	0.027	0.045	-0.018
PP	0.027	0.045	-0.018
PL	0.027	0.053	-0.026
V	0.027	0.127	-0.100

Punt coverage players from the groups who are most frequently concussed more than expected are often offensive skill players.

It is likely that these players have received less instruction in proper tackling technique over their careers than defensive skill players.

Role	Obs	WR	TE
PD	836	0.086	0.108
V	353	0.113	0.000
G	230	0.474	0.009
PW	184	0.038	0.207
PG	182	0.000	0.231
PR	159	0.767	0.000
PT	144	0.000	0.160
PL	138	0.130	0.022
PP	80	0.088	0.025
P	61	0.000	0.000
PLS	55	0.000	0.000

13 of 37 of the concussions in this sample were caused by a player making a tackle, the most of any of the labeled activities.



In 8 of these plays, I observed the player attempting to make the tackle initiated contact with his helmet, to either the helmet or body of the player he was attempting to tackle.

Rule 12 Section 2 Article 8 specifies that *“it is a foul if a player lowers his head to initiate and make contact with his helmet...”*

I propose expanding this rule to state that on punt plays, it is a foul if a player initiates contact with his helmet with an opposing player, in the course of attempting to make a tackle.

It is unlikely that behavioral changes can be made without additional efforts by coaches at all levels to instruct players on proper tackling technique, especially players in positions who do not have to attempt tackles on a regular basis (e.g. WRs and TEs).

- **Proposal 2 is a minimal change to an existing rule, to include a specific situation where additional rules are necessary to promote changes in behavior.**
- **Proposal 2 does not introduce competitive advantages or disadvantages for any players or teams.**
- **Proposal 2 can be easily piloted during pre-season games, but should also be a component of coaching at all levels: players do not need to initiate a tackle attempt with their helmets**

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Thank you!