

## The evolution of the most exciting and dangerous play in the NFL. Have recent rule changes made the kickoff safer?

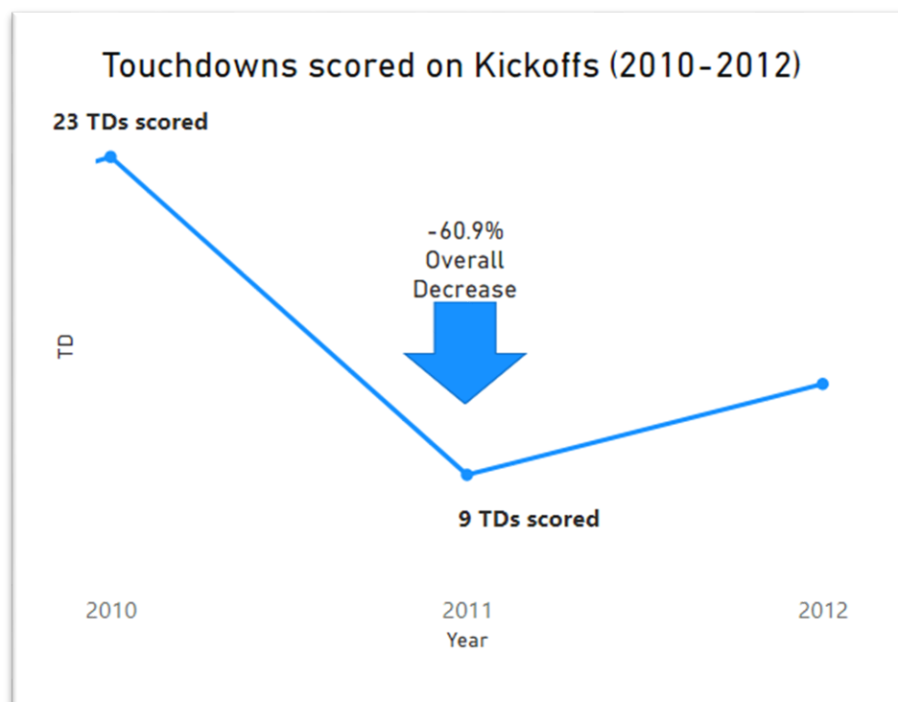
The 2021 NFL draft just finished, and everyone is excited for week 1, except for Green Bay Packer fans (thank you, [Adam Schefter](#)). After a year away, NFL fans return to stadiums on opening day kickoff to cheer for their team to run back the kickoff for a touchdown. Kickoffs are the most exciting play in football, but they are also the most dangerous.

### What makes kickoffs dangerous?

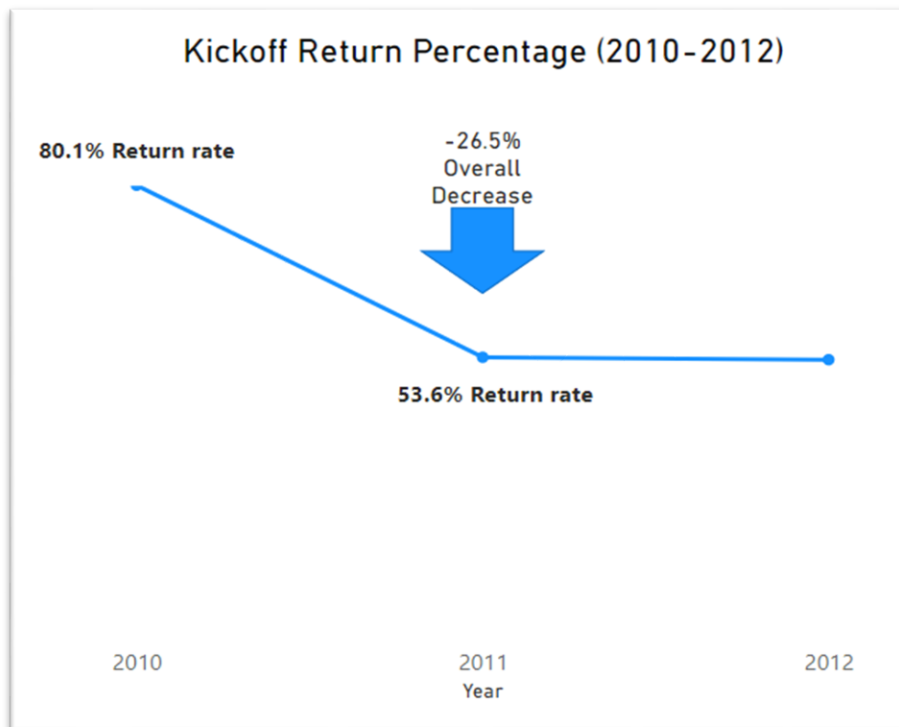
In a word – physics. On kickoffs, players run as fast as possible and hit opposing players as hard as possible. Modern day players are bigger and faster than ever before. Even smaller players on the kicking team can produce up to 1600 pounds of tackling force during a tackle, according to Timothy Gay, a physics professor at the University of Nebraska and author of *The Physics of Football*. The massive amount of force generated is what leads to the bone-crunching hits during the kickoff. In 2011, with public pressure around player safety mounting, the NFL made changes to the kickoff.

### 2011 kickoff rule changes made the play less exciting.

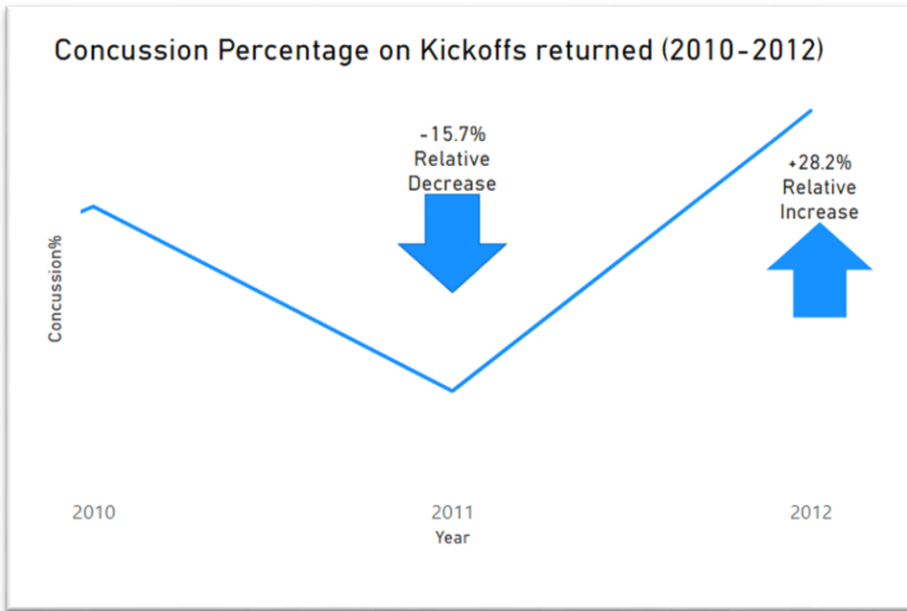
The first change we will look at occurred prior to the 2011 season. The kickoff was moved from the 30-yard line up to the 35-yard line. One immediate effect of the new rule was that touchdowns scored on kickoffs plummeted by 61% to a level seen only once in the previous 15 years. This was in stark contrast to the record-breaking number of touchdowns scored on kickoffs during the 2010 season.



The change led to more kicks going into the end zone and 26.5% fewer kick returns, as both kicking and receiving teams had equal incentives to increase touchbacks.

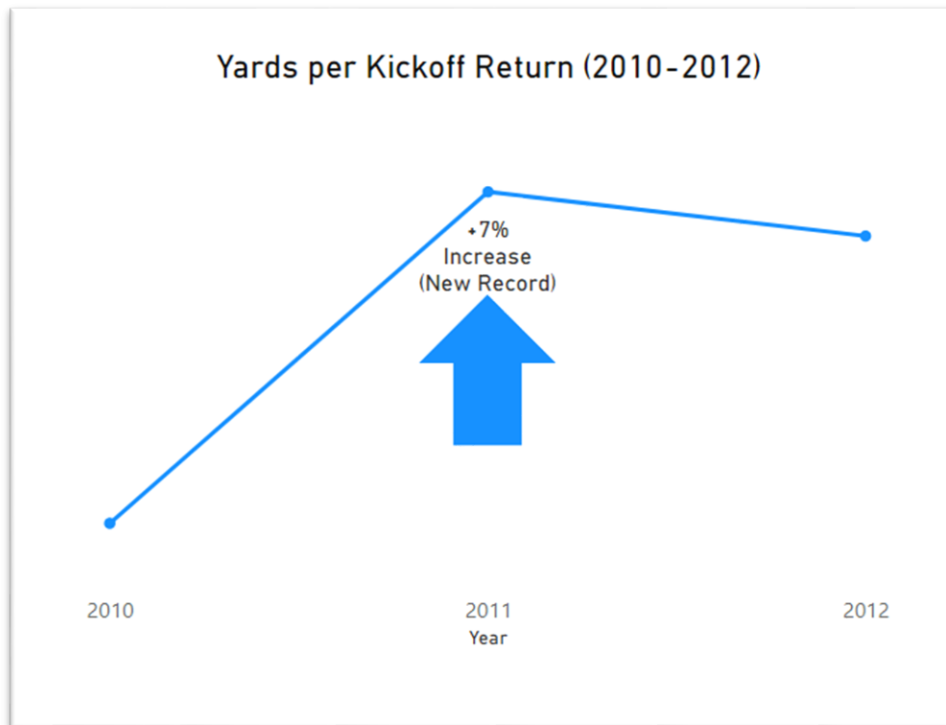


With kickoffs much less exciting, the question then became: were they safer than before? The answer was...maybe. The overall number of concussions on kickoffs was reduced from 35 in 2010 down to 20 in 2011 (a 43% decrease). But there was a more modest relative decrease of 15.7% (from 1.72% down to 1.45%) of concussions during returned kicks. Additionally, in 2012 the rate of concussions on kickoff returns had a relative increase of 28.2% (from 1.45% up to 1.86%). A result which was higher than before the 2011 rules change. The 2012 increase made it unclear if kickoffs were made safer.

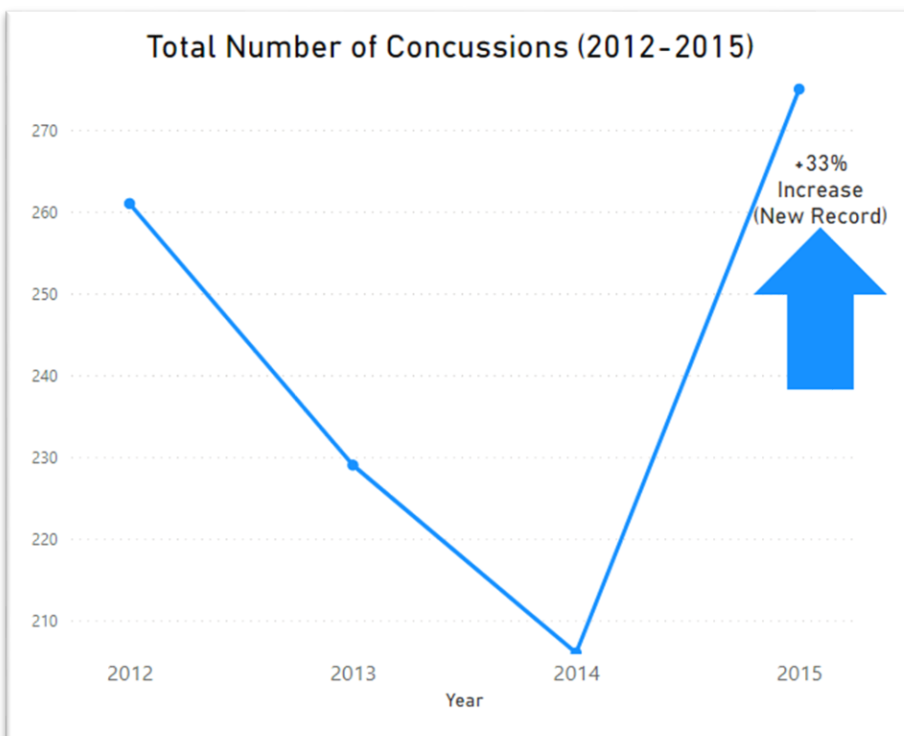


One possible theory for the increase is that skilled returners will run the ball even deep out of the endzone. "I feel like we get past the 20-yard line no matter what," Leon Washington, one of the league's premiere kickoff returners in 2011, [said at the time](#). "We're going to do business as usual."

Fielding the ball deeper in the endzone provides extra space for opposing players to accelerate toward each other. This theory is partially supported by the fact that the 2011 season set a record for kick return average (23.8), and the 2012 season ranked third (23.6). (Stats from [Pro-Football-Reference](#).)



As the NFL continued to grapple with increased public scrutiny over player safety, the league saw a record 275 total concussions documented in 2015. This marked an increase of over 33% from the 2014 season. To help address the rise, the NFL changed kickoff rules before the 2016 season, but the rule had unintended consequences.

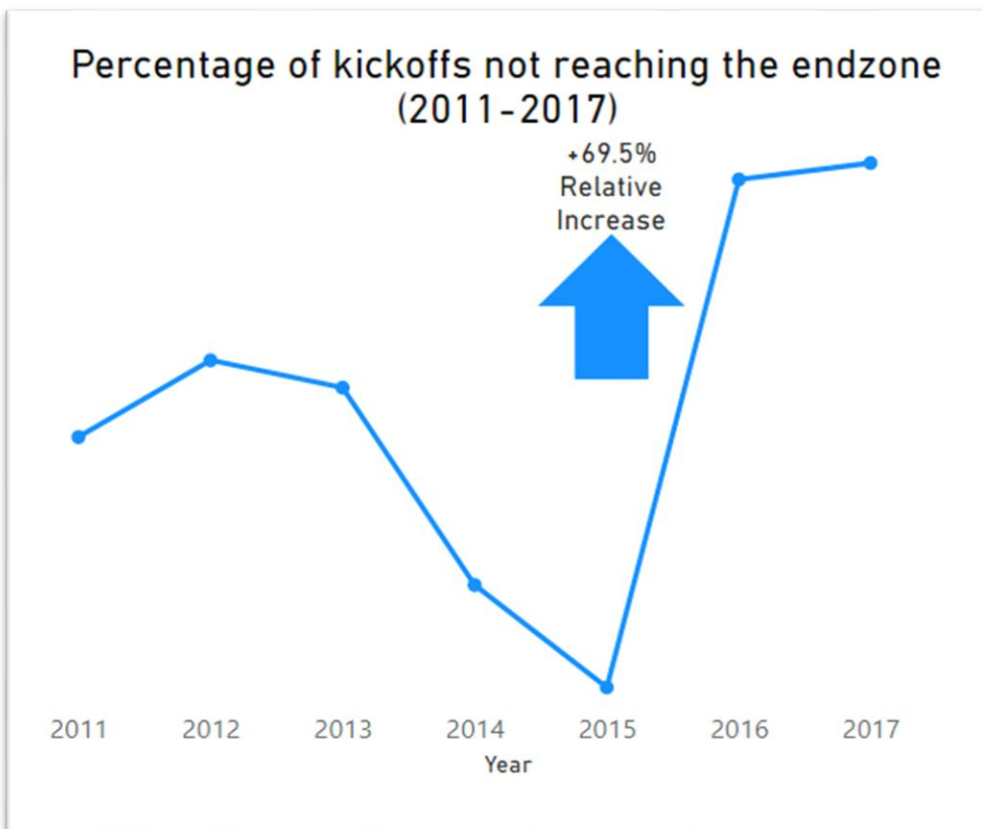


## 2016 kickoff rule changes were one-sided in favor of the receiving team.

The new rule for 2016 gave the receiving team the ball at the 25-yard line instead of the 20-yard line on touchbacks. The idea was to further incentivize receiving teams to take touchbacks, which had already increased after the 2011 rule changes.

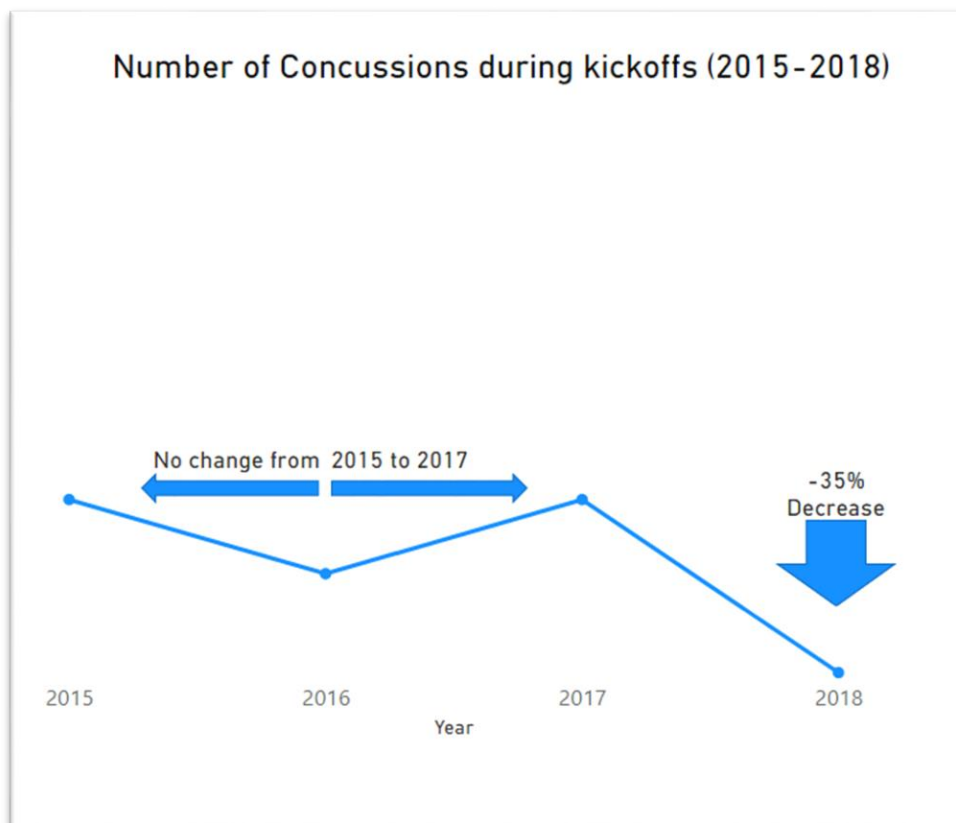
However, the new rule offered no incentive for kicking teams to kick the ball into the endzone, which would cause them to surrender 5 additional yards compared to previous years. Kicking teams were instead incentivized to kick the ball short of the goal line to force opponents to return the ball. Baltimore Ravens head coach John Harbaugh confirmed this idea at the time. "We're going to look at it in a way that we may kick it off at the goal line as high as we can and get the return team at the 12, 15-yard line," Harbaugh said. "It's going to be really hard for us to say, hey we're going to surrender the 25-yard line as a kickoff coverage team."

Kicking teams used "mortar kicks"- high and short kicks with as much hang time as possible to allow the coverage team to run down the field and tackle the returner inside of the 25-yard line. As a result, the number of kickoffs not reaching the end zone increased from 13.3% in 2015 to 22.6% in 2016, which was a 69.5% increase. (Stats from [Stathead.](#))



**2016 kickoff rule change results were another mixed bag, which led to additional rules in 2018.**

Initial results from the 2016 rule change showed a decrease in concussions on kickoffs in 2016, but this number increased in 2017, resulting in no change from 2015 levels. This led to another change to kickoffs in 2018, which resulted in a 35% decrease in concussions on kickoffs.



**2018 kickoff rules were a comprehensive overhaul of formations and blocking rules.**

The 2018 changes fundamentally changed how kickoffs were covered and returned. Kickoff teams were no longer given a running start, and receiving teams could not block until the ball hit the ground or was touched. The 2018 rule change resulted in a 35% decrease of concussions on kickoffs for the 2018 season, and appear to have made kickoffs somewhat safer. One likely explanation is the NFL banning the dangerous double-teaming lineman wedge blocks after they determined that [two out of every three concussions on kickoffs](https://twitter.com/NFLFootballOps/status/999055932360445952) occurred when using a two-man wedge. With the wedge banned, teams have replaced the heavier lineman used in wedge blocks with somewhat lighter players.

<https://twitter.com/NFLFootballOps/status/999055932360445952>

**The results are promising, but it is too early to tell if additional changes are needed.**

If the NFL decides that kickoffs are still too dangerous, it is possible that kickoffs might be scrubbed from the game entirely, which was an idea previously mentioned by NFL Commissioner Roger Goodell. The idea would be to give the ball to the team that would have been kicking off [at its own 30](#), automatically facing a fourth down and 15 yards to go. The team can then choose to punt or go for it, via fake punt or otherwise. In other words, the kickoff would be replaced with the punt, and the onside kick would be replaced with a fourth-down conversion.

What are your thoughts on if or how the kickoff should be changed? Leave a comment below!

**Sources:**

1. Football Outsiders. (n.d.). *The NFL's Battle with Concussions and Severe Injuries*. Football Outsiders. <https://www.footballoutsiders.com/stat-analysis/2013/nfls-battle-concussions-and-severe-injuries>.
2. *Pro Football Statistics and History*. Pro. (n.d.). <https://www.pro-football-reference.com/>.

Open the blog here: <https://nflsafetyrules.wordpress.com/2021/05/05/the-evolution-of-nfl-players-and-the-physics-behind-the-most-dangerous-play-in-football/>