Dear Professor Hooker:

I have attached my report titled “The NFL’s Big Problem: Conussions and What We Can Do To Prevent Them.” It synthesizes a lot of data regarding concussions in the National Football League (NFL), and provides background on concussions and the dangers that accompany them. It then describes why concussions are such a big problem in the NFL and what has been done by the NFL and others to try and prevent them. Finally, it details steps that I believe the NFL needs to take in order to improve their concussion prevention.

This report will be of much use to football players, coaches, parents, and fans. Many are unaware of the risks involved with concussions, or the frequency with which concussions occur during football games. In my paper, I have synthesized research from many different sources to provide background information on concussions and why they are dangerous, as well as the steps that have been taken, and the steps that still need to be taken to solve this problem. This paper is designed to reach those who do not have a scientific background on the risks of concussions. It will hopefully serve as a warning that football is dangerous, and a reminder that even with the measures taken, concussions are still quite present in football.

I look forward to your comments and questions regarding my report. I can be reached by email at naomiebstein@gmail.com, or by phone at 617-308-9299.

Sincerely,

Naomi Ebstein
The NFL’s Big Problem: Concussions and What We Can Do To Prevent Them

Naomi Ebstein
12/15/2011
Summary:

For decades, the National Football League (NFL) has ignored the great number of concussions suffered by players each year, and the side effects that accompany them. In the past decade, with more scientific awareness regarding the long term effects of concussions, the media has paid more attention to the growing number of concussions. After initial reluctance, the NFL has begun to address the issue. While they have taken some actions to try and prevent concussions, they are still seeing 10% of their players get concussed each season.

Concussions are mild traumatic brain injuries that cause many symptoms ranging from nausea and headaches, to loss of consciousness. In the long term, repeated concussions have been linked to dementia, Parkinson’s, and Alzheimer’s, in addition to depression, loss of memory, and other decrease in cerebral functions. More than one concussion puts players at much greater risk for depression and neurological disorders.

The NFL has changed some rules to increase player safety and tried to increase player awareness regarding the risks of concussions, but it has yet to see great improvement. They have seen an increased number of concussions, likely due to increased awareness and reporting of concussions. Despite their efforts, the NFL is still seeing far too many concussions. Players place themselves at way too high of a health risk to play in the NFL, and the rule changes, increased awareness, and fines are not enough to solve the problem.

The NFL needs to keep up its efforts in preventing concussions. Better rules can reduce the hits which have sufficient force that they cause concussions. Furthermore, the NFL needs to continue increasing player awareness, and encourage its players to report their concussions. Creating a concussion list would allow players to safely declare themselves unable to play while allowing their teams to replace their roster spot and not suffer as a result of their injury. Furthermore, the NFL must enforce stricter penalties on repeat offenders. Finally, the NFL needs to use the technology and information obtained from scientific studies to improve helmet safety. They can rid the league of helmets that do not provide enough protection, and place sensors in helmets that can detect the changes in forces causing concussions.

Other football leagues such as high school and college take their cues from the NFL in terms of football rules and player safety. The NFL has the money to correct the problem. If the NFL takes these additional actions, they can know that they are doing their part to protect football players at all levels from concussions.
Introduction:

Including all levels, there are over 100,000 people that play football every year. These range from kids ages seven or eight years old to grown adults who make their living playing football. The NFL consists of 1,696 players on teams’ active rosters, and more on the practice squads. Every Sunday, millions of Americans spend their day sitting in front of the television watching football. The NFL is a nine billion dollar industry, yet it still has one major problem. Broken bones and pulled muscles are to be expected in a sport that is so physical, but concussions have been occurring far too frequently and gone unnoticed for far too long. In 2010 alone, 167, or about 10% of all players, were concussed.

For years, health risks in the NFL were ignored. Recently, as its popularity has grown and our society has paid more attention to health and safety, concerns for the players have been raised. Past players have experienced lasting health effects from their concussions ranging from headaches to dementia, Alzheimer’s, Parkinson’s disease, and depression. Some former players are currently suing the NFL claiming that the NFL knew the risks of neurological disorders associated with concussions, but did not disclose these risks to the players who subjected themselves to concussions each week. In light of this lawsuit, scientific studies, and scrutiny from current players, media members, and fans, the NFL has taken some measures to try and reduce concussions, but they still have a ways to go before they can claim their sport is safe for the players.

In response to data showing that 10% of all NFL players are concussed each year and new studies showing the long term health risks of concussions, the NFL increased player awareness and changed some rules in an attempt to make their game safer. The NFL added a concussion policy for teams to follow should a player of theirs get injured. They tried to reduce hard hits to defenseless receivers, and other hits known to cause a lot of concussions. The NFL even moved up the kick off, in a game changing effort to reduce collisions at such high speeds that they often cause severe concussions. The NFL has progressed in their efforts to reduce concussions.

Players, too, need to take a stance to protect themselves. While they want the NFL to help improve their health, players need to make their coaches and medical staff aware of their concussions. For this to happen, players need to be educated on the full effects of concussions, and the long term side effects they may suffer as a result of playing through a concussion and sustaining another one. Only when players fully understand these effects can we truly progress in eliminating concussions all together.

Finally, while the NFL has started taking steps, there are more to be taken. In a time when science and technology are valued more than ever, the NFL needs to adapt all the new technology in order to protect its players. This means using scientific studies to understand the players who are most at risk and how that risk can be eliminated and also educating players,
officials, coaches, and medical staff to recognize signs of a concussion. Then players can be removed from a practice or a game before they suffer greater effects. Lastly, this means adapting new helmet technology. Regulations need to be set for minimum helmet safety, and sensors need to be installed to aid everyone in detecting concussions. When player awareness is increased and the above actions are taken, then concussions and their ramifications can be greatly reduced.

Concussions: A Big Safety Issue in Football

What is a Concussion?

A concussion is a traumatic brain injury that results when a violent blow is delivered to the head. This blow causes the brain to slam against the skull without anything to cushion it. This causes damage to the brain cells which causes them to depolarize all at once. The degree of the concussion depends on how many cells are affected by this depolarization. It takes the cells at least 3-4 minutes to recover and return to their normal chemical balance. During this period, the brain uses glucose to try and recover, but this produces a large amount of lactic acid, which further inhibits normal brain function. The use of glucose would normally cause the body to send more blood to the brain, but for reasons still unknown, after a concussion, the brain receives up to 50% less blood than normal. It can take up to 10 days to return to normal blood flow levels. When the brain experiences this traumatic injury, it does not have blood flow that it desperately needs to repair itself.

The severe cellular damage described above is responsible for the vast majority of symptoms experienced from a concussion. Symptoms can vary greatly based on the degree of the concussion and cellular damage. Common immediate symptoms include loss of consciousness, confusion, nausea, and vomiting. Long term symptoms, which are more of a concern with concussions, can include long and short term memory problems that can last for a year, or sometimes longer. Additional long term symptoms include irritability, depression, sleep disorders, inability to focus, and increased sensitivity to light and noise, among others. Furthermore, many neurologists believe that suffering one concussion can make you up to four
times more like to suffer another concussion.\textsuperscript{10} In a physical sport such as football, this is incredibly dangerous because the players continue to subject themselves to repeated hard hits.

**Concussions Specifically Related to Football**

In NFL games, players are at such high fitness levels that concussions are often caused by collisions at speeds close to 25 miles per hour (MPH). Players are required to wear helmets, but it is unclear whether the helmets worn by many players today provide them with adequate cushioning. According to ESPN Sports Science, concussions resulting from helmet-to-helmet hits create forces up to 90 times the force of gravity. They equated this force to being hit in the head by a sledge hammer. These helmet-to-helmet hits account for approximately 60\% of all concussions in the NFL. They explain that on special teams, when one player stands alone waiting to receive the ball with players sprinting towards him from at least 40 yards away, the force of concussion can increase up to 180 times the force of gravity.\textsuperscript{21} These forces are so great, that the concussions are often severe.

**How Big of a Problem are Concussions?**

According to the *New York Times*, in 2000, a study surveyed 1,090 former NFL players about concussions suffered during their playing time. 60\% of the players responded that they had suffered at least one concussion, and 26\% had suffered three or more concussions. The survey also found that those players who had suffered concussions struggled more with memory, concentration, headaches, and other neurological disorders. A similar study conducted by the University of North Carolina in 2007 found that of 595 retired NFL players who had suffered three or more concussions, 20\% of them suffered from depression. That is at least three times the rate of someone who has not suffered a concussion. Other studies have linked higher rates of Alzheimer’s, dementia, and Parkinson’s to retired NFL players.\textsuperscript{10} These concussion symptoms are life altering. Though for years the NFL could claim innocence of the effects of concussions, there is now too much scientific evidence showing the correlation between these neurological disorders and concussions to ignore the severity of concussions.

The NFL employs 1,696 players on active rosters each week. *Pacific Northwest-Coast Bias Blog* reports that in 2000, there were a mere 36 concussions reported during the NFL season. According to data compiled by *The Concussion Blog*, in 2010, that number increased to 167 total reported concussions from the pre-season through the post-season. The jump is largely due to increased awareness in recognizing and reporting concussions. Regardless, in 2010, the most recently completed season, approximately 10\% of all players suffered a concussion.\textsuperscript{4} 10\% if far too high a percentage of players to suffer concussions and place themselves in danger of long-term health risks. Furthermore, through just 13 games in the current 2011 NFL season, the total number of concussions from 2010 has been surpassed and is currently at 168.\textsuperscript{6} Through a little more than 75\% of the season, have already been more concussions than there were
It is concerning that after a summer spent working on a new collective bargaining agreement that addressed increased player safety there have been more concussions through about 75% of the season than there were the previous year. Concussions are the most concerning injury plaguing the NFL.

Who is Most at Risk?

![NFL Concussions by Position](image)

Players who have suffered more than one concussion are at a much higher risk for another one. Especially if many concussions have been suffered between the middle school and college football years, a player will be more at risk for concussions in the NFL. Though these specific players are more at risk, there are also positions that are more likely to suffer concussions. The Figure to the left is data compiled by Pacific Northwest-Coast Bias Blog. It shows concussions by position during the years 2000, and 2010. Wide receivers are the position that suffered the most concussions, with cornerbacks, linebackers, and safeties also suffering a great amount of concussions. Cornerbacks, linebackers, and safeties make up the secondary. They play further down the field and all have responsibilities guarding and tackling the wide receivers. Wide receivers and players in the secondary are matched up against each other. The players in the secondary have to tackle the wide receivers, often in an open field and gaining momentum while running at high speeds. This leads to many helmet-to-helmet hits which are effective in tackling the wide receiver, but lead to too many concussions. In trying to prevent concussions, this is an area that the NFL has targeted, and needs to continue to target in order to reduce concussions.4

Another group of players who are at high risk for concussions are those who play on special teams. This is not displayed on the chart because often special teams consists of players of various offensive and defensive positions. Special teams is largely responsible for kickoffs and punts, and thus, also kick returns and punt returns. In both of these plays, the kicking team’s players have often run at least 40 yards before they reach the punt or kick returner. This allows them to build up momentum, that can cause collisions of double the force of a helmet-to-helmet tackle. This has been targeted by the NFL as an area for improvement.
The NFL is a Model for All Other Levels of Football

From youth peewee football to the NCAA college level football, all football leagues look up to the NFL. When the NFL eliminates a certain illegal hit, college and lower levels usually quickly adapt the same changes. It is very important that the NFL tackle this concussion issue so that football becomes safer in all levels of the game. If the NFL is able to successfully decrease concussions, the lower levels will also be able to prevent concussions and the sport will remain safe for kids to play. The NFL has the most money and resources and they need to use them to take the initiative to make all levels of the game safer.

The NFL’s Response to Concussions

For many years, the NFL was unaware of the gravity of the concussion issue. When the New York Times began investigating the issue, it was brought to the attention of the NFL and became something that they could no longer ignore. Over the past few years, they have focused attention and money to trying to reduce the problem in a variety of ways. The NFL has created and modified a league wide concussion policy in attempt to better address the concussion issue. They have also modified the rules for tackling in attempt to eliminate concussion causing hits.

Concussion Policy

Beginning in 2005, independent scientific studies were presented that showed a clear link between depression and early onset dementia and concussions. The NFL initially wanted one scientist to retract his paper, and preferred to ignore the issue all together. With mounting pressure from media members and congress, in 2007, the NFL finally held their first league wide concussion summit. There, scientists presented their findings to the NFL Players Association (NFLPA) and medical directors. After the summit, the NFL issued a pamphlet to players that included the following quotation: “there is no magic number for how many concussions is too many.” Scientists had just presented data to contradict that statement, but the NFL once again chose to ignore it. In 2009, the NFL commissioner, Roger Goodell, was brought before congress on the matter of long term health effects in players from concussions, and the NFL’s negligence on the matter. After the hearing, during which the NFL was shed in a horrible light, the NFL medical directors resigned from the jobs and were replaced with credible neurologists. It appeared the NFL was finally going to take a stand to try and prevent these concussions. They donated a large sum of money to the scientific study of concussions, and announced that teams must hire an independent doctor to be on the sidelines during games. If a concussion is suspected, the independent doctor would evaluate the player and determine if he was allowed to return to the game.
While the NFL finally instituted a policy of sorts in 2009, the policy contained many loopholes. It failed to specify symptoms requiring removal from the game including dizziness and headaches, two of the most common concussions symptoms. There was no accountability for recognizing that a player suffered a concussion, but rather, just a protocol for what happens if a player is suspected of a concussion. It was a good first effort by the NFL to finally take a stand, but it was not strong enough to make a significant impact. There were too many loopholes. In 2010, the NFL updated their policy and required all players to take a baseline concussion test prior to the start of the season. There was no standard baseline test for teams to use. If a player suffered a concussion, he could not return to action until he passed the concussion test, but since it was not standardized, some teams could have asked easier questions that did not accurately represent the player’s brain function. While this was slightly more effective, there was still not enough accountability from the teams to care for their players. Players still slipped through the cracks and continued to play through concussions.

This past summer, the NFL and the players could not agree on a collective bargaining agreement under which to operate the league. Aside for revenue sharing, the other major issue was safety of the players. As former players began to sue the league over lasting health effects suffered from concussions, current players sought to further protect their health and safety. When an agreement was finally reached, it included new concussion management mandates. The baseline concussion test given to players after it was believed they suffered a concussion was now standardized. Players were given lists of words and pictures and tested to on their memory of the words and images. With the test’s standardization, it became a reliable tool to tell if a player was ready to return to practice or a game. When coaching or medical staff believes that a player has suffered a concussion, the same test is issued by every team. A player must pass this test before being allowed to return to practice or games. The standardization of this test is a big step because it takes away a team’s ability to allow their players to return to practice before their concussion is fully healed.

This test has had some success, but recently the policy has been called into question. Colt McCoy, the quarterback for the Cleveland Browns’, was recently struck hard by a helmet-to-helmet hit and remained down on the field. McCoy did not specifically complain of concussion symptoms; rather he just mentioned a hand injury. The medical staff treated him for his hand injury and never performed the concussion test on him. The next day, after coming under scrutiny from the media, the Browns’ medical staff performed a concussion test on McCoy and the results turned out abnormal. The policy failed in this instance, and McCoy remained in the game and subjected himself to more hits that could have significantly worsened his concussion. The NFL needs to continue to address this policy until it is completely successful.
Rule Changes

Aside from the new concussion policy, the NFL’s other main initiative to prevent concussions has been in addressing improper tackling and hits to defenseless receivers. With unnecessary roughness already a 15 yard penalty, the NFL added specific penalties for helmet-to-helmet hits and for hits to defenseless receivers. They also decided that all plays flagged for those penalties will be reviewed by the NFL and fines would be handed out from anywhere between $5,000, and $75,000. Players may also be fined for hits that are not called for penalties during the game. This increased awareness, particularly among players. Each week, the NFL releases a list of players who are fined for illegal hits and the amount they are being fined. These lists are available to the public. The media tries to hold players accountable for their actions.

A helmet-to-helmet hit is particularly dangerous. Although helmets are in place to protect players’ heads, they are made of very hard and strong material. The force caused from a helmet to helmet hit is usually great enough to cause a concussion. This rule has been a largely successful one. During its first season, it was not called very frequently because officials were unclear of its exact definition. Now, officials are much more likely to flag a player for an illegal helmet-to-helmet hit, and players are often fined hefty amounts for these hits. With increased awareness and pressure, particularly from the media, players have responded well to this rule, and many have eliminated helmet-to-helmet tackles. Many players also apologize after committing such a hit. A few players have not responded well to this new rule and claim that this rule, among others, is changing the game of football for the worse because it eliminates the roughness of the game. These players, some of whom are outspoken in their vows to continue their dangerous hits, need to be punished more severely and suspended for their repeated offenses.

The NFL also added a penalty for hits to a defenseless receiver. This is particularly important because a defenseless receiver often times does not see the hit coming and can do nothing about it. This penalty is also 15 yards, and the players are often fined for these hits as well. This rule has not had quite the success that the helmet-to-helmet hits have. Officials have a more difficult time calling these hits because it is difficult to define a defenseless receiver. Hopefully overtime the definition of a defenseless
receiver will become clearer and officials can start to call this penalty in the same way that they now call illegal helmet-to-helmet hits.

Some players have not bought into the NFL’s increased awareness in player’s safety. James Harrison, a linebacker for the Pittsburgh Steelers, is one such player. In 2010, the NFL fined Harrison $125,000 for illegal hits, including one fine up $75,000 for a particularly illegal hit. Harrison continues to claim that he is not a dirty player, but he recently just illegally hit the Cleveland Browns quarterback Colt McCoy with a helmet-to-helmet hit that shook up McCoy, and may have concussed him. This hit was the same type of hit that yielded a $75,000 fine last season. Harrison is not learning from his fines. The NFL has yet to suspend any player for violating the new player safety rules, but is considering suspending Harrison. The NFL needs to take strict actions against players like Harrison who refuse to abide by their new rules, and suspending players is the most effective way to send a clear message.  

Finally, the most recently implemented rule by the NFL, in August 2011, was one to protect the safety of special teams players. The NFL moved the kickoff forward 15 yards to the 35 yard line. This was an attempt to increase the number of touchbacks, in which there is no kickoff return because the ball lands in or past the end zone. There is also now less yardage for players on the kicking team to run and gain momentum should they collide with the kick returner. The rule has not been in effect long enough to know its results, but it certainly has raised awareness about concussions. Many fans initially grumbled that this rule would put kick returners out of a job and take away some of the excitement from the game. Players who excel at returning kicks have still had success this year despite the rules change, but the rule change definitely caught the attention of fans and alerted the world that the NFL is serious about protecting players.
Increasing Awareness

In July 2010, the NFL created a poster, shown in Figure 5 to the left, to educate players about the risks of concussions. They have also established a safety panel specifically to work on concussion problems. The NFL has been the face of the campaign to reduce concussions in all levels of football. Though they initially ignored the concussion problem, in the past few years, in addition to trying to improve the safety of players, the NFL has also done a decent job educating the public on the health and safety risks associated with concussions. Past players have discussed their long-term battles with post-concussion symptoms, and the NFL has helped other professional sports, such as baseball and hockey, to consider the issue as well.

Measures are also being taken to alert fans to the gravity of the issue. Many young kids play the most popular football video game, Madden Football. Madden Football releases a new game every year with updates from the previous season. In this past update, Madden Football addressed concussions with the hopes of changing the football culture. Kids playing the game will be unable to insert players who have had enough damage that they could have been concussed if it was a real game. If a player is hit extremely hard, he is unavailable for play in the rest of the game. Hopefully this will
teach kids that football players should not return to a game if they have suffered any head or concussion damage. By instilling this message in kids at a young through video games, hopefully it will change the way they approach the game of football, and maybe then there will be a cultural change in football. 

Are Players Hurting Themselves?

The NFL has increased their efforts to protect players against concussions, but the players themselves are not necessarily protecting themselves. There is a culture in football that players should play through significant injuries. There is only so much the NFL can do to protect the players. The rest must come from the players alerting team personnel when they feel concussion symptoms.

Do Players Hide Concussions Symptoms?

An average NFL player’s career lasts 3-4 years. Injuries, such as concussions, are often the cause for many players to retire. While star players receive contracts for millions of dollars, there are many players who struggle to stay on a roster and make a living on which they can survive. Players’ contracts are not guaranteed and some players are cut on a weekly basis. This has created a culture in the NFL that encourages players to keep playing through injury. With the physicality of football, teams often use all allotted 53 roster spots. Alerting the medical staff to an injury could threaten some players’ roster security. As such, football breeds a culture where if possible, players hide their injuries. Concussion numbers have increased in the past decade, but that is mostly due to an increased awareness by coaches and training staff to concussions.

Many players who have concussions hide them from the medical and coaching staffs. They would rather play through the concussion and earn a paycheck than protect their health and safety. They play in a culture that encourages them to continue playing through injury, and neglected to share the effects of concussions until very recently. As such, many players are hurting themselves by not reporting their symptoms to the medical staff. Instead, they continue to play, and subject themselves to the same hard and physical hits. Except this time, they have already suffered a concussion, so now they are more likely to suffer another concussion before the first one has even healed. The players are unaware of how much damage they are doing to themselves until they can no longer function in their daily lives.

Peyton Manning, an elite multimillionaire quarterback for the Indianapolis Colts and a member of a prodigious NFL family mentioned in an ESPN interview that he would purposely fail his NFL baseline test. This way, if he suffered a concussion during the season, it would be easier for him to pass the test, and he could return to playing sooner. Manning, a prominent figure in the league, was criticized for his remarks, and claimed that he was just joking. But
Manning’s quote is proof that even with the increased safety precautions taken by the league, the players are more concerned with playing in the next game than their health 10 years later. In trying to properly address concussions, players must be educated about the long term risk and effects of concussions, and in turn, be encouraged, rather than discouraged, to report their concussion symptoms. While the NFL needs to continue doing their part in the fight against concussions, players also need to help with the cultural shift, and need to be held accountable for alerting team personnel to concussion symptoms.

**Kris Dielman**

On October 23, 2011, Kris Dielman, pictured below, an offensive lineman for the San Diego Chargers was playing in a nationally televised game. During one play, he appeared to suffer a concussion. On the same play, another Charger was injured, and the medical staff was tending to him. They did not notice that Dielman was slow to get up, and stumbled, unable to get his balance. The television announcers noticed, and mentioned that they believed Dielman suffered a concussion. The referees noticed, and they tried to help Dielman off the field, but Dielman refused the help and continued to play. A fellow teammate noticed, and he tended to Dielman on the sideline. The medical staff thought he may have rolled his ankle, but nothing serious could have been wrong with him. Dielman finished the game, subjecting himself to many more hard hits by the nature of the game and his position, and thus subjected himself to worsening his concussion.\(^\text{15}\)

After the game, the anonymous player from the Chargers told the medical staff that he thought Dielman should be checked for a concussion before they flew. Flying causes changes in pressure, which can be unsafe after suffering concussions. Dielman was checked out by the medical staff and declared to be ok to fly. Upon landing, Dielman suffered a grand mal seizure, the type typically only suffered by epileptics. Grand mal seizures carry many negative side effects of their own, further complicating his concussion.\(^\text{15}\)

The Chargers were heavily criticized for the way they handled the situation and their neglect to properly evaluate Dielman during the game. When asked about the situation, head coach Norv Turner said that “Everything was handled extremely well... All the proper precautions were taken.”\(^\text{17}\) Turner was unable to own up to his and his medical staff’s mistake. The NFL, on the other hand, handled the situation as well as they could. In addition to calling...
out the Chargers for mishandling the situation, the NFL took immediate actions to use this as a learning experience. They told the officials that they could call an injury time-out and alert the coaches should they believe a player sustained a concussion. The NFL also decided to train the officials this coming offseason so that they can better recognize concussions. This adds an independent party looking for a concussion with the sole motive of improving player health. Furthermore, the NFL panel on safety and concussions met on the matter, and they are contemplating adding someone to the upstairs booth who will be responsible for looking at the game film for potential concussions. They can communicate with the coaching and medical staff on the sidelines and a player can undergo a precautionary concussion test. In the worst case scenario, the player takes an unnecessary concussion test and misses a few plays, but in the best case, a player can be taken off the field before suffering further damage.¹⁵

Kris Dileman’s concussion and seizure were an unfortunate event. They highlighted some of the problems that remain regarding concussions. Awareness appears to be one of the biggest remaining issues. Luckily, the NFL learned from this mistake, and hopefully the changes being made will prevent another playing from suffering a seizure like Kris Dielman.

What More Can be Done?

The NFL has taken some steps, but more steps can be taken. I suggest the following:

- **Concussion List**: The NFL allows teams to place concussed players on a list where they cannot practice or play in a game, but the team is allowed to fill the player’s roster spot with another player
- **Rule Changes**: The NFL buckles down further on dangerous hits and amends its concussion policy
- **Harsher Punishment**: The NFL suspends players for repeat offenses on dangerous hits that lead to concussions.
- **Helmets**: The NFL adopts helmet technology that further cushions the blow and tracks changes in forces that can alert teams of a potential concussion
- **Increase Awareness**: The NFL continues to increase awareness and alert players to the vast dangers of concussions

Concussion List

One of the big problems with football players not wanting to admit they have a concussion is placing their roster spot in jeopardy. Football teams often need all the roster spots for players because injuries are so prevalent. The NFL should create a disabled list of sorts for concussed players. Currently, a player must be placed on injured reserve to be able to reuse his roster spot. If a player is placed on injured reserve, he cannot play for the rest of the season. If there was a concussion list, players could remain on that list, unable to practice or play, but their teams would not lose their roster spot. This could encourage players to admit to their
symptoms because their teams would not lose a roster spot, and their job security would not be at risk.

Rule Changes

As highlighted above, the NFL has already changed some of their rules in an attempt to reduce concussions. While these rule changes may have prevented some concussions, there is still more that can be changed. A big area for concern is with wide receivers and defensive players in the secondary. While the NFL has attempted to remove helmet-to-helmet hits and hits to defenseless receivers, offensive players should also be held more accountable for their hits on defensive players. Furthermore, the rules regarding a defenseless receiver seem to be vague, and this penalty is rarely called. The NFL safety panel needs to meet and come up with rules that will strictly prevent these unsafe tackles.

Punishing Repeat Offenders

James Harrison was fined $125,000 in one season for illegal hits. He continues to produce the same dangerous hits and is unwilling to change his playing style. For a player making millions of dollars, he will not miss the money. Ndamukong Suh, the former rookie of the year and defensive player for the Detroit Lions, has been fined $42,500 in just less than two years in the league. The NFL needs to crack down harder on these players who are repeat offenders. At the beginning of the 2011 season, the NFL said they would consider suspensions for illegal hits. Just recently, the NFL suspended Suh for unnecessary roughness. Suh slammed a Green Bay Packer’s head into the ground at the end of the play and then stomped on his forearm. He was ejected from the game and suspended for 2 games. It has yet to be seen if this will deter Suh from continuing with his illegal hits. However, it became clear that merely fining a player making more than $40 million over the duration of his contract did not have enough of an impact. The NFL is finally considering acting on its threat to suspend a player for consistently violating the player safety rules. If the NFL cracked down harsher and handed out more suspensions, players would take the NFL more seriously and change their playing styles.

Helmets

Helmets are a complicated issue in the NFL. This paper will not go into great detail about the safety of helmets in the NFL, but will just touch upon a few important notes regarding helmets in the NFL:

- Play without helmets?
- Players are particular about which helmets they want, but the NFL needs to set minimum safety standards to be met
- Insert sensors into the helmets that can detect changes in force and acceleration that may indicate concussions
Some say that players would be better off without helmets. They believe players use their helmets as a weapon, causing harder hits which lead to concussions. While it is very possible that if kids learn to play football without a helmet, they will be able to play safely, for players in the NFL who have played their entire lives with helmets, this change would be too drastic. Players already have learned to hit a certain way, and taking away their helmet would not change the way they instinctively tackle. Removing helmets from the game would need to be a gradual process starting with a group of kids at a very young age. This realistically is not a viable option.

Players are particular about which helmets they wear, but players can have overall safer helmets. Different universities have now produced studies regarding the safety of different helmets used by players. The studies are designed to rate how good a helmet is at preventing a concussion. Players are particular about the brand and make of helmet that they wear. The Virginia Tech study was the first study and quickly got the attention of the media and the NFL. Their test measured the acceleration of the helmet from different locations and different angles to determine whether they could prevent a concussion if hit with great force. They used this to develop a rating system that found that the helmet most common in the NFL and also largely popular in high school and college football, the Riddell VSR4, was the second lowest rated helmet. Riddell, which manufactures the helmet, immediately began advising teams not to use that helmet, their best-selling helmet. The NFL should set standards that require a minimum safety standard is met. This would ensure that all players are wearing helmets capable of softening a hard blow and preventing concussions to some extent. The VSR4 should certainly not meet these standards.

The factors involved in determining the safety of a helmet are complicated. Some important factors are:

- **Material chosen for the cushioning system:** A top-rated helmet used Thermoplastic Urethane which was found to provide better impact absorption than foam padding, and it did not break down. The top-rated helmet, the Riddell Revolution Speed, features concussion reducing technology developed with the aid of the NFL which includes an increased shell offset which is said to help reduce the impact when hit.

- **Comfort**
- **Heat management**
Finally, there is new technology the NFL needs to rapidly implement. There are sensors that can be placed in helmets that detect changes in force and acceleration. When these forces are known, it can be determined whether a concussion likely occurred. These sensors need to be placed in all NFL helmets as soon as possible. Currently, the NFL wants to ensure that measurements taken by these sensors are perfect before they perform a trial on some NFL helmets next season. This process needs to be expedited. Even if the system is not perfect, this will allow teams to know when a player has been struck by a unusually large force. The player can take the concussion test on the sideline to see if he sustained a concussion. No harm can be done from this extra testing, but many benefits can be gained. Some colleges have already begun using them. The NFL needed to be ahead of the colleges, and implement these sensors in all helmets by the beginning of next season, if not sooner.¹⁴

Increase Awareness

Players are the only ones who truly know how they feel. While certain symptoms are visible, others such as headaches, dizziness, and nausea can only be truly known by the player himself. The NFL needs to work to increase player awareness about the risks of concussions. Instead of players such as Kris Dielman hiding their concussions, players need to be honest with the medical staff about their symptoms. Significant cell damage occurs during a concussion, and failure to allow these cells the time they need to heal leads to worse long term symptoms. When players start taking care of themselves and allowing their concussions to fully heal, the NFL will not have nearly as big a problem as they currently do. Part of this can be solved with the concussion list previously discussed. The other part will only come when players fully understand the consequences of suffering a concussion.

The NFL has many resources at its disposal, the greatest of which are former players. Many former players have sued the NFL over repeated concussions causing them long term health issues.¹³ The NFL should utilize former players who have suffered greatly as a result of their concussion to demonstrate the side effects of concussions to current players. Maybe then, the current players will understand why they need to be open about their concussions, and take all the possible precautions. The NFL should also bring in researchers to discuss the specific long term effects of concussions. With repeated talks about the dangers of concussions, hopefully players will become fully aware of the risks they are subjecting themselves to.

Finally, since players are not open enough about their symptoms now, officials, coaches, and medical staff need to be trained and alert to recognize even the mildest of concussion symptoms. While there were 167 reported concussions in 2010, the number of actual
concussions was most definitely larger than that. Concussions go unnoticed, and players continue to play until they are physically unable to.\textsuperscript{5} By that point, they have caused themselves lifelong harm. If a $9 billion cannot increase awareness and recognize every concussion suffered by one of their players, then who can?

**Conclusion**

The NFL is a nine billion dollar industry with one serious problem. Players are suffering concussions at far too high of a rate. Concussions, or mild traumatic brain injuries, are in simplified terms, brain bruises which can cause bleeding and swelling. They come with short term and long term symptoms, both of which are unpleasant. Many concussion sufferers complain of loss of quality in their life after a concussion due to a variety of the symptoms, especially those who suffer from depression.

The NFL has tried to correct this problem, but so far they have not succeeded. They have tried to:

- Change rules of the game to improve player safety
- Tighten the concussion protocol to forbid players from returning to games until they can prove that their concussion has healed
- Increase player awareness regarding the severity and side effects of concussions

Despite all of these efforts, there has still been an increasingly large number of concussions each season. The NFL needs to continue to address these problems.

To further their efforts, The NFL needs to continue its focus on reducing concussions and take the following actions:

- **Improve Helmet Safety**: Set minimum standards for safety requirements and install sensors in the helmets by the beginning of the 2012 season.
- **Tighten the concussion policy**: Players are continually slipping through the cracks and playing with unnoticed concussions. The league needs to further revise the policy.
- **Encourage players to speak up about their concussions**: Players are the only ones who truly know how they feel, so they must help the NFL in identifying concussions. The NFL must help them by making players aware of the risks associated with concussions.
- **Create a concussion List**: A way for players to safely alert their team that they are suffering concussions symptoms and cannot practice. The team is not harmed because it is allowed to fill the player’s roster spot.
• **Continue to make better rules:** Focus on further preventing illegal hits and protecting players, particularly wide receivers and defensive secondary players who have higher incidence of concussions.

• **Punish players who don’t follow the rules:** Suspensions are the most effective punishment and should make players more aware of their actions, and discourage them from dangerous tackling. This will help eliminate the rough culture of the game that encourages hard hits.

If the proper measures are taken, football can remain a popular safe American sport played by tens of thousands of kids. Concussions are serious injuries, and need to be treated as such by players and coaches alike. It took the NFL a long time to realize they had an issue with concussions in the first place. As the NFL is the face of all levels of football, they must act quickly in continuing their efforts to make football a safe sport for all.

**Sources**


**Figures**


Figure 1: Halpern, Audrey. "The NFL’s New Rules." In *Dr. Audrey Halpern’s Blog.* http://audreyhalpernmmd.com/blog/?p=61/, 2010

Figure 2: Taken from Source 4 above


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Figure 6: Taken from Source 7 above

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