Dan Gastin

Professor Thomas Denton

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The Dangers of Head Trauma

Have you ever watched an NFL game where there was a devastating hit between two players? In most cases, the answer is and it may be a thrill for the fan, but for the player it has a detrimental effect on his cerebrum. Even though the players who were both involved in the collision get back on their feet, it does not mean that they did not sustain any injuries internally and that they are concussion free. Ultimately, prolonged head trauma will result in concussions, Chronic Traumatic Encephalopathy, and Second Impact syndrome that will affect a person later in life, particularly, the development of certain diseases such as Alzheimer's and depression that will have short-term and long-term effects in an individual's life.

Concussions in the sports world are very common, due to the fast paced and aggressive atmosphere that the games are played in. There are a lot of people who may be wondering what a concussion actual is.  According to the Centers for Disease Control and Prevention, “A concussion is a type of [traumatic brain injury (TBI)](http://www.cdc.gov/TraumaticBrainInjury/get_the_facts.html) caused by a bump, blow, or jolt to the head that can change the way your brain normally works. Concussions can also occur from a fall or a blow to the body that causes the head and brain to move quickly back and forth” (CDC, par. 2). Here, the CDC expresses that when an individual suffers a blow to the head they can cause the brain to change chemically, resulting in hormonal differences that lead to the brain reacting more sensitively than it would. This is a huge problem because now an individual is more susceptible to even more brain trauma, which can occur more easily than it did the first time due to the brain being more fragile while having a concussion.

When an athlete has sustained a concussion, there was more that happened besides absorbing a blow to the head. Our brain is not on a fixed base inside of our skull, this allows the brain to move a little bit when we receive trauma to the head. As Dr. Richard Smayda says, “Such movement makes the brain bump into the interior of the skull at the point of impact, as well as on the opposite side of the skull, resulting in contusions (bruises) that damage two sites in the brain, called the coup and contrecoup injuries” (Smayda).  To make the image more clear, when an individual gets struck in the head the brain is getting tossed around inside the skull like a ball on a spring, which leads to contusions that can cause brain defects and diseases. At the end of the explanation given by Dr.Smayda, he mentions the “coup” and “contrecoup.” These two terms are given due to the actual movement of the brain. According to the University of Northern Iowa, an injury to the “Coup” occurs when “the head is stopped suddenly and the brain rushes forward” (Univeristy of Northern Iowa). This movement of the brain can result in bruising on the frontal lobe, which can cause difficulties later in life that can cause deterioration of the brain. Now if the brain suffers a violent impact it can lead that motion of the brain to knock against the front of the skull, as well as hitting against the rear of the skull, which is know as a contrecoup injury. According to the University of Northern Iowa, a contrcoup injury occurs when “the brain bounces off the primary surface and impacts against the opposing side” (University of Northern Iowa). This injury is even more hazardous to the individual who sustains it due to the force that the brain in getting put under. This movement is like a whiplash motion that causes the brain to swing and hit the front and the back of the skull.

In today’s modern era, especially in football, there is a mentality that is shared amongst players that is almost “war-like”. According to Head Case, “47% of all reported sport related concussions occur in high school football”(Head Case). This statistic is shocking because of how likely it is for a high school player to suffer brain trauma, which is almost half of the time. But the players who sustain the concussions do not tell their coach or athletic trainer-this a serious problem. According to the article “Silence on Concussions Raises Risks of Injury”, Alan Schwarz presents the evidence that many high school players across the nation “have a blind eye to pain.” For instance, Matt Selvaggio, a football player in Springfield, Illinois revealed to Schwarz that many most of his teammates have the mentality of not telling the coaches when they feel that they suffered a concussion, “our coaches would take us out in a second, so why would we tell them?” (Schwarz, par. 5). Of course a player wants to be out there with his team doing everything he can to help the team win. But by doing this, players can be suffering from a concussion, which they will not know due to the ignorance of not telling a coach and not getting examined, but they can suffer a second concussion while they still have the first one not being fully healed. This is known as, “second impact syndrome.” According to Tareg Bay and Brian Ostick, second impact syndrome is when  “an athlete suffering post-concussive symptoms following a head injury. If, within several weeks, the athlete returns to play and sustains a second head injury, diffuse cerebral swelling, brain herniation, and death can occur” (Bay & Ostick, par. 1). Second Impact Syndrome can be fatal within minutes when an individual receives the second concussion. When sustained, there is only a 10 percent chance of living, which is extremely low.

With the above in mind, with constant trauma to the head, a football player is then likely to develop "Chronic Traumatic Encephalopathy (CTE).  According to Boston University, “Chronic Traumatic Encephalopathy is a progressive degenerative disease of the brain found in athletes (and others) with a history of repetitive brain trauma, including symptomatic concussions as well as asymptomatic sub-concussive hits to the head” (Boston University). What researchers at Boston University are expressing is that when a player is subjected to constant head trauma over a period of time their brain starts to deteriorate, which leads to the unusual creation of the protein Tau in the brain.

Unfortunately, CTE cannot be detected right away, “These changes in the brain can begin months, years, or even decades after the last brain trauma or end of active athletic involvement” (Boston University). This is a huge problem, let’s say that a football player who suffers a concussion, sits out, and goes through the protocol of what to do when there is a concussion, but if he felt fine after that they will not think of anything going wrong with his health. If he returns to play and then suffer another concussion, their brain will be slowly but surely breaking down over a period of time, which they cannot detect because CTE symptoms begin long after a player stops playing. Along with this brain deterioration comes symptoms such as “memory loss, impulse control problems, and depression” (Boston University).

Now to understand how serious this disease is we can examine the recent death of former N.F.L Linebacker Junior Seau. Seau committed suicide last year due to the constant trauma he suffered during his seventeen-year career as a pro-football player. After his autopsy report, it was concluded by the National Institute of Health, “The findings were consistent with chronic traumatic encephalopathy, a degenerative brain disease widely connected to athletes who have absorbed frequent blows to the head” (Pilion & Belson, par. 2).  As stated earlier by Boston University, two of the side effects of CTE are depression and aggression, which Seau was suffering from when he took his own life.

CTE is not the only disease that is brought about due to prolonged head trauma. One of the most popular diseases that NFL players will suffer after they stop playing football is Alzheimer’s. According to the Alzheimer’s association,  “Alzheimer’s is a type of dementia that causes problems with memory, thinking, and behavior” (Alzheimer’s association). This disease brings about a troubled lifestyle to the many who suffer from it, which leads to depression and sometimes suicide.  Again, like CTE, Alzheimer's is one of those diseases that does not just bring about itself right away. This disease will be present in former players who are in their late 50s and early 60s. Another way to put this in perspective is to realize how abnormal the formation of Alzheimer’s for former players is. In the article, “Brain Impairment Begins Younger” by Steven Fainaru and Mark Fainaru-Wada, the idea that is being expressed is that, “former players between 50 and 59 years old develop Alzheimer's disease and dementia at rates 14 to 23 times higher than the general population of the same age range” (Fainaru & Fainaru-Wada, par. 2). This data that is presented is astonishing, for an individual to develop a disease twenty times faster than the average human being is abnormal. Well one may say that their job was abnormal, which was ultimately smashing their head against someone else’s for a long period of their life.

If you still think that football is not as dangerous as the data says it is, prepare to be proven wrong.  In September of 2014, The Brain Bank conducted research on 79 deceased N.F.L players, and “76 out of those 79 players had CTE” (Breslow, par. 1). Now if we were going to look at this data from a statistical standpoint, we would conclude that, if you play football you would have a 96.2% of developing CTE. Thus, this means that it is almost unavoidable to form CTE several years after an individual stopped playing football.

With the formation of CTE, there is a common variable always present. Which is known as tau.  The protein tau “works to essentially form tangles around the brain’s blood vessels, interrupting normal functioning and eventually killing nerve cells themselves” (Breslow, par. 8). We can compare this action of the tau to a snake killing a mouse to eat as a meal. In this instance, the snake is the tau and the brain in the mouse, the tau suffocates the brain until it cannot function as efficiently as it is suppose to. Therefore, this suffocation results in a blocked neurological pathway that leads to complications in brain function such as loss of motor function and delayed reflexes throughout the body.

In today’s world, we view sports, football more specifically, as a thrill seeking excitement in our daily lives, but the devastating hits that players sustain may be enjoyable for you and hazardous to the player. The player may not feel the impact of the brain at that moment of the hit, but later in life he will due to the movement of the brain that causes chemical imbalances and bruising. When an individual straps up his helmet and goes out to participate in a game or a practice, they are putting themselves at a tremendous risk. When this individual suffers constant trauma to the head, they will not think anything of it. But if he keeps sustaining this trauma, he is walking down the road of a life that includes short-term and long-term changes that will bring about adverse conditions for himself and the individuals around him.

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