

Calling For Change:: A Look into Concussions and Subconcussive Hits in Football

Author: Anthony J. Caruso

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**Calling For Change:
A Look Into Concussions and Subconcussive Hits in Football**

Anthony John Caruso

Boston College
Carroll School of Management Honors Program
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Advisor: Professor Stephanie M. Greene



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HONORS PROGRAM

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Abstract

This paper addresses the recent concerns about concussions in the sport of football and elaborates on the medical findings, litigation, and ethical questions that have surrounded the issue. The goal is to present a compelling case for change in how concussions are viewed and handled in the sport. By using concrete examples to explain the lasting effects concussions have had on players after their careers have ended, I hope to show the need for change. I will explore the most recent developments of chronic traumatic encephalopathy in order to show its harmful reach and will touch upon litigation that has been filed by players who experienced post career problems. In addition, through the insight of current college players as well as referencing my own experience as a Division I College Football player, I wish to establish an emotional connection in the paper and unveil the roots of the problem – the toxic nature of the football culture. I am optimistic that this inquiry will help cultivate a culture change through a variety of approaches. First, I indicate the need for a transformation of the football culture. Second, I suggest a formal, mandatory education to inform players at all levels about concussions, subconcussive hits, and the potential diseases that can stem from. Third, I propose new penalties for players, coaches, support staff, and all involved in player safety in an attempt to further prevent head injuries. This thesis attacks the issue of concussions in football from all angles. It calls for the football community to accept the severity of concussions, educate on concussions, and prevent repeated concussions in order to prompt action.

Introduction

"My quality of living has changed drastically and it deteriorates every day." Behind tearing eyes, Tony Dorsett, the eighth all-time leading rusher in the NFL and a 1976 Heisman Trophy winner, uttered these words. The former Dallas Cowboys running back struggles from symptoms of bipolar disorder, memory loss, severe depression, and thoughts of suicide. Dorsett was interviewed in 2014 on ESPN's "Dan LeBatard Is Highly Questionable" show after being diagnosed with signs of a neurological disease. The suspected cause of the disease – concussions.

After a twelve-year career in the NFL that ended nearly a quarter of a century ago, Dorsett recalled numerous concussions he experienced while playing. In his interview, he explained the consequences that he has been experiencing post-football. Forgetting why he was aboard a plane and getting lost while driving his two young daughters to soccer practices are a few of the many examples Dorsett mentioned. Even more seriously, Dorsett elaborated on his fits of rage and mood swings, describing how "it's painful...[to hear] my daughters say they're scared of me."¹

Now at fifty-nine, Dorsett wants to know if the problems that have surfaced later in his life are a result of playing football. Researchers at Boston University (BU) wanted to know the same thing. In a new study, they discovered evidence of neurological diseases in the brains of 96% of former NFL players. Yet, this disease is apparent not only in the brains of former NFL players, but also in the brains of former collegiate and high school football players. Out of 165

¹ William Weinbaum and Steve Delsohn, *Dorsett, others show signs of CTE*, ESPN (Apr. 5, 2014), http://espn.go.com/espn/otl/story/_/id/9931754/former-nfl-stars-tony-dorsett-leonard-marshall-joe-delameilleure-show-indicators-cte-resulting-football-concussionsmarshall-joe-delameilleure-show-indicators-cte-resulting-football-concussions.

brains studied from all three levels of football, 131, or 79%, showed traces of the same disease as Tony Dorsett.²

Being a former Division I college football player, it is hard to accept the chilling realities of life after football. But even more importantly, it is hard to look back on my experiences with football and to come to terms with all of the downfalls of the sport I love. I started playing full-contact football during my freshman year of high school, and immediately fell in love with the game. The encouraged aggression, the complexity of techniques and schemes, the importance of teamwork, and the demand for perfection are all attributes of football that drove me to pursue an eight-year career. And while I do not regret any of my experiences playing, I understand that there needs to be a bigger push for a change in the game – a change in both the culture and the rules.

Awareness of the dangers of football demands a mandatory educational program for players of all levels. It is essential to inform players of the long-term effects that can stem from concussions. With knowledge of the health risks, players will have the power to make their own, educated decisions on the matter. In terms of when a player should sit himself after a hit or when a player should retire from football all together, the responsibility must fall upon the players themselves. That being said, coaches, trainers, and other supporting staff must give players the necessary tools to make these decisions.

Too many times I have watched my teammates and my friends return to a practice or game after a concussing hit, uninformed about the long-term ramifications. From my experiences, the culture of football is the root of the problem.

² Julie Beck, *The NFL's Continuing Concussion Nightmare*, THE ATLANTIC (Sept. 21, 2015), <http://www.theatlantic.com/health/archive/2015/09/researchers-find-brain-damage-in-96-percent-of-former-nfl-players/406462/>.

Interviews with two of my teammates at Boston College, senior fullbacks Bob Wolford and Sean Burke, are revealing. Both players explained their decorated histories with concussions, each having “too many concussions to count” and up to five severe concussions or “blackouts,” while playing. By blackout, they explained, they meant completely losing consciousness without recall of blows to the head.

According the American Academy of Neurology, a concussion involving loss of consciousness is the worst kind of concussion, known as a “Grade 3” concussion. A Grade 1 concussion is defined as a concussion with no loss of consciousness and no post-concussive symptoms lasting longer than fifteen minutes. A Grade 2 concussion is defined as a concussion with no loss of consciousness but with post-concussive symptoms lasting longer than fifteen minutes.³ In a recent survey of 2500 retired football players, the study found that “those who'd suffered five or more concussions [Grade 1,2, or 3] on the field had depression rates three times higher than the normal rate.”⁴

In many of the Grade 1 or 2 instances, Wolford and Burke continued on the field for several plays after the concussive hit. Burke and Wolford explained some of their experiences with Grade 3 concussions. Burke recalled blacking out after an overwhelming hit on kickoff return against University of Massachusetts. “I don’t even remember taking the concussion test on the sideline because I was so concussed, but, surprisingly, I almost passed.” Adding to that,

³ Kirk Lee, *Head Injury*, American Chiropractor 33 (May 2011): 42-44. *Alt HealthWatch*, EBSCOhost (accessed December 9, 2015).

⁴ Sarí Harrar and Annie Stuart, *Football Injuries Fuel Depression*, Prevention 55 (October 2003): 159. *Alt HealthWatch*, EBSCOhost (accessed December 9, 2015).

Wolford described his body going limp and collapsing in practice after meeting starting linebacker Steven Daniels with a headfirst blow.⁵

When asked about their knowledge of concussions, each had a general sense of the potential damage, but no formal education on the matter. Most of their knowledge has come through first hand experiences with concussions, explanations by training staff after the fact, and witnessing other teammates go through the same process. However, Bob Wolford mentioned how a few of his family members, after playing years of football in college and the NFL, struggle with many of the same diseases as Dorsett, and “it always lingers in the back of my mind” after a big hit.⁶

Even with their general knowledge of concussions and some personal exposure to the effects it can bring, both players agreed they would never sit themselves after a concussion. “The only way I would come off the field is if I had lost control of my actions,” Wolford admitted. Burke agreed, adding, “If you asked sophomore or junior me, someone would have to make me come off. But, now that I am at the end of my career, I would have gone easily off the field.”⁷ It is the feeling of being young and invincible that often leads players to push through head injuries. Many of the times, concussion symptoms can be pushed off. But, just because these symptoms *can be* pushed off does not mean they *should be*; here lies the problem. Formal education on the consequences of repeated concussions as well as a drastic culture change on how concussions are handled are needed not only for the safety of the players, but also for the safety of the sport that I and millions of others have come to love and want to see survive the test of time.

⁵ Interview with Fullback Bob Wolford and Fullback Sean Burke, Members of the Boston College Football Team (Nov. 25, 2015).

⁶ *Id.*

⁷ *Id.*

The Long-Term Consequences of Concussions

A Brief Background on Sports-Related Concussions

Sports-related concussion (SRC), as defined by the Third International Conference on Concussion in Sport, is a “complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces.”⁸ It is caused either by a direct blow to the head or to another body region resulting in an abrupt linear or rotational acceleration or deceleration of the brain within the skull.⁹ The immediate symptoms of concussions include loss of consciousness, headaches, confusion, dizziness, nausea, vomiting, inability to speak, and fatigue. Some symptoms, however, are not immediately apparent and can last for days, weeks, or even longer; these symptoms include lack of concentration and memory, irritability, sensitivity to light and noise, sleep disturbances, physiological adjustment problems, and even depression.¹⁰ Bobby Wolford noted his battles with fatigue and depression after multiple concussions in-season, and how it affected not only his play, but also the disintegration of his social and academic life.¹¹

Wolford’s struggle with concussion-related symptoms behind closed doors leads to one of the most common misconceptions about concussions. Even though Wolford was struggling with serious symptoms of a concussion, it was not evident to the trainers or coaches that he was concussed because he was not knocked unconscious. It is important to note that one can suffer a concussion without losing consciousness. And actually, only about nine percent of all

⁸ Department of Neurosurgery, Louisiana State University Health Sciences Center (Sept. 2012), <http://www.ncbi.nlm.nih.gov/pubmed/23362587>.

⁹ Cameron M. Marshall, *Sports-related concussion: A narrative review of the literature*, Journal Of The Canadian Chiropractic Association 56, (December 2012): 299-310. *Alt HealthWatch*, EBSCOhost (accessed December 9, 2015).

¹⁰ Mayo Clinic Staff, *Diseases and Conditions: Concussions*, MAYO CLINIC (Apr. 2, 2014), <http://www.mayoclinic.org/diseases-conditions/concussion/basics/symptoms/con-20019272>.

¹¹ Wolford and Burke Interview, *supra* note 5.

concussions result in a loss of consciousness.¹² For this reason, concussions often go unnoticed or hidden by the players. And as concussions are disregarded time after time, they can lead to the development of serious brain complications.

What is Chronic Traumatic Encephalopathy?

The symptoms Tony Dorsett was experiencing are characterized as a disease called chronic traumatic encephalopathy (CTE). CTE is indicated by a buildup of tau, an abnormal protein that strangles brain cells in areas that control memory, emotions and other functions.¹³ It is a progressive degenerative disease of the brain found in those with a history of repetitive brain trauma. CTE is closely related to a disease called dementia pugilistica, which was nicknamed the “punch drunk” syndrome due to its association with retired boxers. It has been known to affect boxers since the 1920s.¹⁴ However, recent reports have been published of confirmed CTE in retired professional football players and other athletes who have a history of repetitive brain trauma. CTE leads to the degeneration of the brain and is associated with memory loss, confusion, impaired judgment, impulse control problems, aggression, depression, and, eventually, progressive dementia. These changes in the brain can begin months, years, or even decades after the last brain trauma or end of active athletic involvement.¹⁵

¹² Kirk Lee, *supra* note 3.

¹³ Weinbaum and Delsohn, *supra* note 1.

¹⁴ Lee E. Goldstein, et al., *Chronic Traumatic Encephalopathy in Blast-Exposed Military Veterans and a Blast Neurotrauma Mouse Model*, US NATIONAL LIBRARY OF MEDICINE (May 16, 2012), <http://www.ncbi.nlm.nih.gov/pubmed/22593173>.

¹⁵ *What is CTE?*, BU CTE CENTER (Accessed December 6, 2015), <http://www.bu.edu/cte/about/what-is-cte/>.

Discovery of CTE

Dr. Bennet Omalu discovered CTE while conducting an autopsy on Hall of Fame, Pittsburgh Steeler center Mike Webster.¹⁶ While examining Webster's brain, Omalu described it as looking normal. Because Webster was showing signs of Alzheimer's disease, Omalu expected to see a damaged, "shriveled, ugly-looking brain."¹⁷ Upon further investigation, Omalu discovered a splotchy accumulation of tau protein in Webster's brain. Eventually, Omalu realized he had discovered a new disease. More cases of CTE presented themselves to Omalu in the following years, as former NFL players, including Justin Strzelczyk, Terry Long, and Andre Waters were diagnosed with CTE, after they committed suicide.¹⁸

At the time of discovery, there were many critics of Dr. Omalu's findings. The most vocal critics were the NFL and its Mild Traumatic Brain Injury (MTBI) committee. Shortly after Omalu published his findings in July of 2005, the MTBI members concluded that Omalu used "fallacious reasoning" and demanded a retraction of his findings in May of 2006. Members of the committee wrote: "Omalu et al's description of chronic traumatic encephalopathy is completely wrong."¹⁹ The opposition and lack of acknowledgement of Omalu's findings continued until December of 2009, when the league admitted that concussions can lead to long-term problems."²⁰

¹⁶ Jeanne Marie Laskas, *Bennet Omalu, Concussions, and the NFL: How One Doctor Changed Football Forever*, GQ (Sept. 14, 2009), <http://www.gq.com/story/nfl-players-brain-dementia-study-memory-concussions?printable=true>.

¹⁷ The Frontline Interviews with Dr. Bennet Omalu, Forensic Pathologist of Pittsburgh Steelers Mike Webster, PBS (March 25, 2013), <http://www.pbs.org/wgbh/pages/frontline/sports/league-of-denial/the-frontline-interview-dr-bennet-omalul/>.

¹⁸ Barry Petchesky, *A Timeline of Concussion Science and NFL Denial*, DEADSPIN (Aug. 30, 2013), <http://deadspin.com/a-timeline-of-concussion-science-and-nfl-denial-1222395754>.

¹⁹ Lauren Ezell, *Timeline: The NFL's Concussion Crisis*, PBS (Oct. 8, 2013), <http://www.pbs.org/wgbh/frontline/article/timeline-the-nfls-concussion-crisis/#2006>.

²⁰ *Id.*

Concussion in Pop Culture

Concussion, a major motion picture starring Will Smith, was released in movie theaters December 25, 2015.²¹ The movie is based on the true story of Dr. Bennet Omalu and the NFL's reluctance to accept his findings. Many news specials and sports documentaries have delved into the threatening reality of concussions, but the film *Concussion* was the first mass media event to spread the horrifying story of CTE's discovery in football players – and the NFL's years of inaction in combating head trauma – to such a large audience in such an intense, impactful way.

Many current and former NFL players spoke out about their reactions to the film. Former quarterback Kurt Warner encouraged “all those involved in the game” to view the film, stating “we know we must do more.”²² It is this kind of positive and powerful post that can snowball awareness into action.

The display of raw emotions from masculine figures of the game will only add to the cause. Keith McCants, the fourth pick of the 1990 NFL draft, screened *Concussion* with a worried nature. The movie, in its own way a horror flick for many NFL players, caused McCants extreme discomfort as the former player watched the chilling deaths of former friends on screen. After the showing, tear-soaked, McCants went on to say, “We were paid to give concussions. If we knew that we were killing people, I would have never put on the jersey.”²³ This radical realization shows the power of knowledge. It is essential for the general public to hear the voices of truth in order to support the need for change in a game so many Americans love.

²¹ *Concussion*, MOVIE INSIDER (Sept. 8 2015), <http://www.movieinsider.com/m12723/concussion/releases>.

²² SI Wire, *Current and former NFL players react to Concussion movie*, SPORTS ILLUSTRATED (Dec. 27 2015), <http://www.si.com/nfl/2015/12/26/concussion-movie-will-smith-nfl-players-share-reactions>.

²³ Emily Kaplan, *Paid to Give Concussions*, TIME INC. (Dec. 9, 2015), <http://mmqb.si.com/mmqb/2015/12/09/nfl-retired-players-watch-react-to-concussion-movie-will-smith>.

Continuing Research

In January of 2010, the NFL donated \$1 million towards Boston University's VA-BU-CLF Brain Bank and made the institution its "preferred brain bank."²⁴ Under the umbrella-name of the Boston University CTE Center, the purpose of the VA-BU-CLF Brain Bank is to collect and study post-mortem human brain and spinal cord tissue to better understand the effects of trauma on the human nervous system. The institution acquires tissue samples and clinical information from deceased athletes to better understand the pathology, etiology, and epidemiology of trauma related neurodegenerative disorders. In turn, this research helps establish a diagnostic test for CTE in living persons; it also helps uncover genetic and environmental risk factors. Ultimately, the research works towards a treatment for CTE.²⁵

Eighty-five brains were donated to the CTE Center by the families of deceased veterans and athletes with histories of repeated head trauma. Out of those, thirty-five were professional football players, and only one brain showed no evidence of the disease. In total, the researchers found CTE in sixty-eight of the brains, nine of them from players who played in college, and six players who played only in high school.²⁶

The CTE center has been discovering evidence that leads researchers to believe that this disease can affect players as young as eighteen years old. This realization came first from the case of Owen Thomas – a "pivotal case" in the further understanding of CTE, according to Dr.

²⁴ Ezell, *supra* note 19.

²⁵ BU CTE CENTER (accessed Dec. 12, 2015), <http://www.bu.edu/cte/>.

²⁶ Sydney Lupkin, *CTE, a Degenerative Brain Disease, Found in 34 Pro Football Players*, ABC NEWS (Dec. 3, 2012), <http://abcnews.go.com/Health/cte-degenerative-brain-disease-found-34-pro-football/story?id=17869457>.

Ann Mckee.²⁷ Mckee is a part of the CTE Center research team, and is a professor of Neurology and Pathology at Boston University School of Medicine, and Director of the BU Alzheimer's Disease Center Neuropathology Core.²⁸ Mckee explained, "Here is a 21-year-old, played college football...he dies of suicide. [And] in his brain, he has unmistakable changes of this disorder. And not just in one or two spots...but in like, 20 spots, in a lot of spots in his frontal lobe."²⁹ The case of Owen Thomas goes beyond the discoveries that Dr. Omalu first saw in Webster. It adds a whole new dimension to the disease. First, the amount of damage, the twenty affected spots, which ate away at Thomas's brain at such a young age, is astonishing. A former University of Pennsylvania football captain, the 21-year old Thomas was found dead in April at his off-campus apartment. He had apparently hanged himself.³⁰ Perhaps even more surprising is the fact that Thomas had never been diagnosed with a concussion. As Dr. Mckee stated, "He had never had a concussion, as it turns out. He only played football."³¹ Thomas's mother, Katherine Brearley, confirmed that since her son started playing football at the age of nine, he never was diagnosed with a single concussion and never showed any signs normally associated with brain trauma.³² Thomas's history led investigators to believe that subconcussive hits, those hits that do not even

²⁷ The Frontline Interviewers, *CTE: Discovery of a New Disease*, PBS (accessed December 12, 2015), <http://www.pbs.org/wgbh/pages/frontline/oral-history/league-of-denial/cte-discovery-of-a-new-disease/>.

²⁸ *Leadership*, BU CTE Center (Accessed December 12, 2015), <http://www.bu.edu/cte/about/leadership/>.

²⁹ The Frontline Interviewers, *CTE: Discovery of a New Disease*, PBS (accessed December 12, 2015), <http://www.pbs.org/wgbh/pages/frontline/oral-history/league-of-denial/cte-discovery-of-a-new-disease/>.

³⁰ ESPN.com News Services, *Penn's Owen Thomas had CTE*, ESPN (Sept. 14, 2010), <http://espn.go.com/ncf/news/story?id=5569329>.

³¹ The Frontline Interviewers, *CTE: Discovery of a New Disease*, PBS (accessed December 12, 2015), <http://www.pbs.org/wgbh/pages/frontline/oral-history/league-of-denial/cte-discovery-of-a-new-disease/>.

³² ESPN.com News Services, *supra* note 30.

rise to the level of symptoms of what is considered a concussion, can be dangerous for some people.³³

Even players who may not be exposed to full contact game hits are at risk for CTE. Kosta Karageorge was a reserve defensive lineman who walked on to the Ohio State University football team. He never played in a game and was never on a travel roster, yet he struggled with concussions. It was not clear when or how Karageorge sustained concussions, as coaches declined to discuss Karageorge's medical history. However, it was clear that Karageorge did sustain several concussions, as they weighed heavily on him in the last message he sent his mother from his cell phone: "I am sorry if I am an embarrassment but these concussions have my head all f***ed up."³⁴ In November of 2014, the body of the football player was found with a handgun nearby. Police believed he shot himself.³⁵

Even more alarming, perhaps, is that high school athletes have also been diagnosed with CTE post-death. The BU CTE Center analyzed the brain of eighteen-year old John Doe, revealing the earliest evidence of CTE ever recorded.³⁶ The discovery of the initial stages of CTE in an eighteen-year-old shows the necessity to move the discussion of football's concussion crisis toward youth football. The CTE Center's efforts to educate athletes, coaches, and parents on the need to identify and rest concussions have only been moderately successful. Researchers at the CTE center believe that one of the largest problems is that people have been willing to look the other way when a child suffers a concussion. The discovery of CTE in a child like John

³³ The Frontline Interviewers, *supra* note 27.

³⁴ Ben Brumfield, *Dead Ohio athlete said he struggled with concussions*, CNN (Dec. 1, 2014), <http://www.cnn.com/2014/11/30/us/ohio-state-player-dead/>.

³⁵ *Id.*

³⁶ *18 year old high school football player*, BU CTE CENTER (accessed Dec. 12, 2015), <http://www.bu.edu/cte/our-research/case-studies/18-year-old/>.

Doe should signal the need for urgency. It is morally and ethically wrong to disregard the simple educational steps needed to protect children and allow them to voluntarily suffer brain trauma.³⁷

³⁷ *January 27, 2009 Press Briefing*, BU CTE CENTER (Jan. 27, 2009), <http://www.bu.edu/cte/news/press-releases/january-27-2009/>.

Going a Step Further: The Accountability of Raising Concussion Awareness

Technological Advancements

Concussion awareness needs to go beyond education and policy. Technology is a vital resource that needs to be used to combat the dangers of concussions. More specifically, the power of analytics, the power of turning data into useful information, needs to be applied. The NFL has explored wearable devices in helmets to help monitor and measure concussive hits to the head. It has partnered with General Electric to find new technologies that can help keep its players safe.³⁸ While a concussion oriented wearable chip is in testing with select teams, the possibilities of getting real time data for all players are endless. The most obvious benefit of collecting data on the football field is identifying a dangerous head collision the moment it happens. Similarly, Chief Executive Officer Rick Greenwald of Riddell, a leading football helmet manufacturer, pointed out that the most important application for wearable chip technology is to “better understand when a concussion has occurred.”³⁹ Indeed, the ability to know when a player has sustained a concussion could be key to preventing repeated instances.

From personal experience, I can attest that sometimes players are unaware that they have sustained a minor concussion until after practice or the next day. In addition, sometimes players are unwilling to report concussions, not knowing the potential consequences of their ignorant reluctance. Drew Brees, starting quarterback for the New Orleans Saints, admits that he would be unwilling to pull himself out of the game with a concussion. “If I’m in the Super Bowl, I’m lying

³⁸ Rebecca Borison, *The NFL Is Looking Into Wearables To Help Prevent Concussions And Brain Injuries*, BUSINESS INSIDER (Jul. 11, 2014), <http://www.businessinsider.com/nfl-testing-wearables-to-prevent-concussions-2014-7>.

³⁹ Brittany Sauser, *A Helmet That Detects Hard Hits*, MIT TECHNOLOGY REVIEW (Sept. 10, 2007), <https://www.technologyreview.com/s/408643/a-helmet-that-detects-hard-hits/>.

as best I can to tell them 'I'm fine and I'm staying in.'"⁴⁰ While many may be hesitant to wear a chip that could potentially prohibit them from playing, wearable chips could help players spend less time on the bench and more time on the field by preventing repeated concussions in one given span of time.

Companies like Intel and football helmet maker Riddell are also pairing up in hopes of limiting concussions in the game. Both companies are working together to simulate football collisions in order to analyze the data collected from the wearable chips in hopes of building injury-resistant helmets. When conducting simulations, two helmets are battered together to produce an impact simulation. Then, visualization maps are produced from the impact to show the effects it had on the brain. Within a minute of the hit, dark, circular lines are portrayed to illustrate the response. The magnitude of the hit and the location on the head can be interpreted from these dark, circular maps.⁴¹ This type of initiative could help improve the efficiency of helmets and ultimately protect the brain better.

Raising Awareness – Bell's Example

Better technology can be essential in protecting players against brain diseases like CTE, but awareness is critical to prevention of the risks of concussions. Horror stories of the effects of CTE have continued to permeate the media. Even with the validation of Dr. Omalu's findings, awareness of the harmful effects of concussions needs to be brought to the forefront of the football culture.

⁴⁰ Jon Brodtkin, *Chips in football helmets to monitor for concussions; Drew Brees backs Intel's R&D*, NETWORK WORLD (Nov. 16, 2010), <http://www.networkworld.com/article/2194659/data-center/chips-in-football-helmets-to-monitor-for-concussions--drew-brees-backs-intel-s-r-d.html>.

⁴¹ *Id.*

Jacob Bell, at the age of only thirty-one, decided to retire from football for health concerns. Despite having many years left to physically compete, Bell decided to leave the game he loved not because of any specific, current health concerns, but because of possible future health risks that might arise due to repeated concussions. Triggered by the sudden death of professional linebacker Junior Seau, Bell's decision to retire was based on "quality of life" and a "risk vs. reward factor."⁴² Ultimately, Bell decided, "your health is more important than the game [and] more important than the money."⁴³ Bell spent countless hours researching his potential post-career health status, and thoughtfully concluded that he needed to retire to be an example for all players. Bell explained, "now that I'm retired, maybe it's easier for me to come out and speak [regarding the issue of concussions]."⁴⁴

Bell stressed the need for players to be informed on the issue. I propose a step further and urge the general population to understand the influence coaches can have on players. Players can become engulfed in emotions while playing, feeling pressures from their coaches to push them through any injuries. The problem with concussions is that most of the times they are not visible to others, so the encouragement coaches and teammates give are often not mal-intentioned.

A Flawed Football Culture

Whether due to a lack of knowledge or a lack of education, coaches have pushed players to play through concussions. And in some cases, coaches have knowingly pushed players through a concussion. A Division I football player, John Doe (he has chosen to remain

⁴² Ian Rapoport, *Jacob Bell walks away from NFL to raise player health awareness*, NFL (May 10, 2012), <http://www.nfl.com/news/story/09000d5d828ff4e0/article/jacob-bell-walks-away-from-nfl-to-raise-player-health-awareness>.

⁴³ ESPN.com News Services, *Jacob Bell retires with health intact*, ESPN (May 11, 2012), http://espn.go.com/nfl/story/_/id/7915185/retired-jacob-bell-picks-health-nfl-paycheck.

⁴⁴ Rapoport, *supra* note 42.

anonymous), had an encounter where his position coach knew he had a concussion and advised him to keep playing.⁴⁵ Doe explained that he was in the middle of a game week practice in preparation for a top ranked team when he sustained a noticeable concussion. He lost consciousness, experienced nausea – “it was clear I had gotten a concussion.”⁴⁶ After his brief lapse in consciousness, his coach met him and urged him “not to say anything to the trainers.”⁴⁷ The coach continued to explain how his players “do not get concussions.” John Doe, heeding the oppressive advice of his coach, remained quiet as he continued to practice for the week and played on Saturday.⁴⁸ The blatant disregard of a concussion by a coach cannot go unnoticed. It is this type of behavior that contributes to the self-destructive culture of football.

Placing the importance of one game over one’s health cannot be tolerated. A critical question is: Are players even fully advised about the risk? Jacob Bell explained how his idea of a concussion was far from the actual classification. Bell said “three or four” concussions were documented in his career, but the head trauma that was not documented weighs on him more. “Now we are hearing the doctors...saying, ‘Did you get a ding? Did you see stars? Did you feel hollow for a second? Did your vision go out?’... We did that on probably every series...so if that’s a concussion, have we had three concussions, or have we had 100 concussions?”⁴⁹ Clearly, the identification of concussions is a problem even for players. In my interview with Sean Burke and Bob Wolford, both agreed that they would not consider “getting a ding” or “seeing stars”

⁴⁵ Interview with John Doe, NCAA Division I Football Athlete (Nov. 25, 2015)

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ ESPN.com News Services, *Jacob Bell retires with health intact*, ESPN (May 11, 2012), http://espn.go.com/nfl/story/_/id/7915185/retired-jacob-bell-picks-health-nfl-paycheck.

necessarily a concussion. And if such symptoms were considered evidence of a concussion, then they have both received “too many to count.”⁵⁰

When neither player nor coach can identify or choose to identify a concussion, the responsibility falls upon the training staff. The NCAA has guidelines trainers follow to monitor concussions in players and return them to the field in an appropriate and safe manner. Players must first pass cognitive assessment that compares post-concussion scores to a player’s baseline score.⁵¹ Then, the player is acclimated back into full contact play through incremental increases in physical demand.⁵² However, while on the sideline and immediately following possible concussions, NCAA trainers must rely on their own symptom evaluation and the King-Devick sideline assessment.⁵³ The King–Devick Test (K–D Test) is defined by Mosby’s Medical Dictionary as a “tool for evaluation of saccade [or a rapid movement of the eye between fixation points], consisting of a series of test cards of numbers.”⁵⁴ Through a variability of spacing between the numbers, the test cards become progressively more difficult to read. A score is then derived from both errors in reading and speed of reading.⁵⁵ Yet, as Sean Burke and Bob Wolford explained, no test can detect every concussion. Wolford confessed that the test was not the most accurate and stressed “the need for a better way of testing.”⁵⁶ Burke added that he did not even remember taking the test on the sideline after a concussion, and still almost passed.⁵⁷ Ultimately,

⁵⁰ Wolford and Burke Interview, *supra* note 5.

⁵¹ *Concussion guidelines*, NCAA (accessed Jan. 24, 2016), <http://www.ncaa.org/health-and-safety/concussion-guidelines>.

⁵² *Id.*

⁵³ *Concussion Policy*, UNIVERSITY OF MIAMI DEPT. OF ATHLETICS (June 1, 2015), https://www.ncaa.org/sites/default/files/concussionpolicyMiami_FL2015.pdf.

⁵⁴ *About King-Devick Test*, MAYO CLINIC (accessed Jan. 24, 2016), <http://kingdevicktest.com/about/>.

⁵⁵ *Id.*

⁵⁶ Wolford and Burke Interview, *supra* note 5.

⁵⁷ *Id.*

both players inferred that trainers cannot rely just on the rest, and responsibility needs to fall on a combination of the player, teammates, coaches, and trainers – each component working together to ensure a solution.

A Shared Decision-Making Model

The International Federation of Sports Medicine (FIMS) aims to promote the study and development of sports medicine throughout the world and to ensure the wellbeing of all who are engaged in sports and exercise.⁵⁸ Currently, the FIMS ethics code states: “It is the responsibility of the sports medicine physician to determine whether the injured athletes should continue training or participate in competition”⁵⁹ Yet, as described in the story with John Doe, coaches may interfere with current protocol and advise players against seeking trainers’ assistance.

The culture of playing through injuries is so deeply rooted in the ideals of coaches and players alike that protocol not involving either party is bound to fail. A new protocol needs to be established so that players and coaches are both directly involved with the decision making process. A shared decision making model is a “collaborative process that allows patients and their providers to make health care decisions together, taking into account the best scientific evidence available, as well as the patient’s values and preferences.”⁶⁰ With the training staff acting as the health care experts, players could be informed of their concussion and contribute to the process of recovery. Coaches would also be involved in the process, being educated and empowered to help make the best decision in the interest of the player. From an ethical

⁵⁸ International Federation of Sports Medicine (accessed Jan. 24, 2016), <http://www.fims.org/>.

⁵⁹ *Principles and ethical guidelines for health care for sports medicine*, FIMS (accessed Jan. 24, 2016), <http://www.fims.org/en/general/code-of-ethics/>.

⁶⁰ *What is Shared Decision Making?*, INFORMED MEDICAL DECISION FOUNDATION (accessed Jan. 24, 2016), <http://www.informedmedicaldecisions.org/what-is-shared-decision-making/>.

standpoint, shared decision-making is an imperative. It incorporates four principles of medical ethics – respecting autonomy, beneficence, non-maleficence, and justice – and provides the opportunity to engage in meaningful communication.⁶¹ Ultimately, all three parties – players, coaches, and trainers – could discuss, negotiate, and agree to a decision.

There are problems that arise with a shared decision making model. How much autonomy should the individual player have to return to play when there are serious risks of further injury, particularly if his judgment is impaired after head trauma on the margins of concussion? How much weight should a coach have in the final decision, given that his decision may be influenced by extraneous, competitive factors? As shown, coaches can be swayed into pushing players through concussion protocol to ensure the best players are on the field when it counts. It is also clear that players often neglect their own health to stay in the game. A former NFL player was quoted as saying: “I wasn’t going to let a simple concussion slow me down. So I screwed with my own test results to protect my spot in the lineup.”⁶²

A Gladiator Sport

“I compare us to modern-day gladiators,” Jacob Bell admitted. “We’re giving our lives to the game of football for a price.”⁶³ Some players believe they know the consequences of concussions, and declare that their love of the game, the pressure to keep their starting position, or the money that provides for their families outweighs the potential health risks. Yet, stories like that of Jovan Belcher push members in the football community to question current players’

⁶¹ Karen Kelly-Blake, *Concussion in the NFL: A Case for Shared Decision- Making*, CENTER FOR ETHICS AND HUMANITIES IN THE LIFE SCIENCES AT MICHIGAN STATE UNIVERSITY (July 24, 2014), <http://msubioethics.com/2014/07/24/concussion-in-the-nfl/>.

⁶² Daniela Testoni, *Sports Medicine and Ethics*, US NATIONAL LIBRARY OF MEDICINE (Jan 23, 2014), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3899648/>.

⁶³ Rapoport, *supra* note 42.

acknowledgements of the issue. The twenty-five-year-old former Kansas City Chiefs linebacker shot and killed his girlfriend in 2012 before committing suicide in front of his coaching staff.⁶⁴

Dr. Piotr Kozlowski examined Belcher's brain and detected CTE. Strands of tau protein were distributed throughout Belcher's hippocampus, an area of the brain involved with memory, learning and emotion.⁶⁵

With the increasing prevalence of CTE in young and old players alike, and a growing portion of the audience understanding the destructive nature of recurrent concussions, football is becoming a gladiatorial sport, where fans relish the sight of a big hit while comprehending its implications. How long can football last if it continues on the same path? Will football become extinct and be remembered as a gladiatorial event – as a relic of the inhumanity of the era? Yes, I truly believe it will. Whether it be in this century or the next, football will cease to exist within my children's or my grandchildren's lifetime. The game that I love, that has shaped so much of me, that has forged me both physically and mentally, will be gone, with all its lessons and virtues. The game taught me the importance of mental toughness and the mind's ability to triumph over adversity. It taught me discipline and perseverance. It taught me the power of a team over any individual talent. It taught me to embrace each day, because in an instant, it could be gone. It taught me the importance of emotional connection and how it can instill accountability. And most importantly, it taught me the importance of faith and family. When my body was bruised and my mind was numb, I understood that I could always find more from my faith and find comfort and support from my family.

⁶⁴ Nadia Kounang and Stephanie Smith, *Doctor: NFL player who killed girlfriend, self likely had CTE*, CNN (Sept. 30, 2014), <http://www.cnn.com/2014/09/29/health/jovan-belcher-cte/>.

⁶⁵ Steve Delsohn, *OTL: Belcher's brain had CTE signs*, ESPN (Sept. 30, 2014), http://espn.go.com/espn/otl/story/_id/11612386/jovan-belcher-brain-showed-signs-cte-doctor-says-report.

Even with all its redeeming qualities, football has prompted caution from many of its players. Many professional football players have stated that given what they know now, they would not let their children play football:

- Hall of Fame Cowboys quarterback Troy Aikman stated, “I think that we're at a real crossroads, as it relates to the grassroots of our sport, because if I had a 10-year-old boy, I don't know that I'd be real inclined to encourage him to go play football, in light of what we are learning from head injury.”⁶⁶
- Legendary coach and Hall of Fame tight end Mike Ditka recently admitted he would not want his children playing football. “That’s sad. I wouldn’t. And my whole life was football. I think the risk is worse than the reward. I really do.”⁶⁷
- Terry Bradshaw, the former Steeler and current broadcaster, said, “If I had a son today, and I would say this to all our audience and our viewers out there, I would not let him play football.”⁶⁸
- Pro Bowler Bart Scott acknowledges that football has helped him overcome an upbringing in a violent and drug infested neighborhood, but does not see the risk of playing football worth it for his son. “I don’t want my son to play football. I play football so he won’t have to. With what is going on, I don’t know if it’s really worth it.”⁶⁹

⁶⁶ Joe DeLessio, *9 NFL Players Who Wouldn't Let Their Sons Play Football*, NEW YORK MEIDA LLC. (Nov. 14, 2014), <http://nymag.com/daily/intelligencer/2014/11/9-nflers-who-wont-let-their-sons-play-football.html>.

⁶⁷ Stefano Mocella, *Top 12 NFL Players Who Wouldn't Let Their Kids Play Football*, THE SPORTSTER (Jan. 3, 2016), <http://www.thesportster.com/football/top-12-nfl-players-who-wouldnt-let-their-kids-play-football/?view=all>.

⁶⁸ DeLessio, *supra* note 66.

⁶⁹ Mocella, *supra* note 67.

- Super Bowl-winning quarterback Kurt Warner said in 2012 that the thought of his sons playing football scares him. “It’s different when you put on a parent’s hat... I can’t avoid the fact that it’s a dangerous sport, and it’s a violent sport.”⁷⁰
- Even one of the toughest acknowledged quarterbacks, Brett Favre, would be “real leery of [his son] playing football.”⁷¹ Playing for nearly twenty years, setting countless passing records, Favre played 197 games in a row. Often being banged up, Favre recognizes that if he had a son, he would not want him to sustain the physical toll that football can give.⁷²

Other athletes and public figures have stated they would not let their sons play football. Given the known health risks, LeBron James shocked some when he stated he would not let his son play football. Even President Barack Obama said if he had a son, he would not let him play professional football, but would consider letting him play at the youth level.⁷³

When I asked some of my own football peers the same question, they varied slightly in their responses. Commonly, they all agreed they would let their children ultimately play if they desired it. Bobby Wolford, having sustained his first concussion at the age of nine, would not let his son start as early as he did. He also added, “I would not let him play fullback. I would encourage other positions that do not get hit as brutally.”⁷⁴ Taking this idea a step further, Jake Wilhelm, a kicker for the Boston College football team, joked that he would let his son play only the best, and coincidentally the least contact position in football – kicker. Furthermore, he agreed with many others in saying, “I would encourage other sports first. But, if he really wanted to play

⁷⁰ DeLessio, *supra* note 66.

⁷¹ Mocella, *supra* note 67.

⁷² *Id.*

⁷³ DeLessio, *supra* note 66.

⁷⁴ Wolford and Burke Interview, *supra* note 5.

football, I would pull them after one concussion incident.”⁷⁵ Fullback Sean Burke, similarly, would not let his son play until “he was old enough to properly play.”⁷⁶ He went on to say, though, that he would be happy if his son chose to play. “I feel it is the greatest sport. It has taught me so much and made me the man I am today, so I owe so much to the game. I probably would not want him to play in college, given the physical toll I had to sustain. But, then again, how can you tell your son he can’t play college football?”⁷⁷

Spenser Rositano – Walking Away

Spenser Rositano was the starting defensive back since his 2011 freshman year for the Boston College football team. He was a leader on and off the field, receiving praise from coaches, players, and classmates alike. During my sophomore year, and his junior year, Spenser decided to retire from football after his sixth concussion.⁷⁸

His first experience with concussions was in high school, when he experienced two concussions in the same game. It was not just any game, he explained, but it was the championship game of his senior year. He felt mild depression and lacked focus for weeks following the game.⁷⁹

The effects of his concussions progressively got worse after each incident, as the initial effects of mild depression turned into nausea, losing consciousness and more severe depression. He explained his fifth concussion with a particular story that startles him to this day. He lost

⁷⁵ Interview with Kicker Jake Wilhelm Interview, Member of the Boston College Football Team (Feb. 3, 2015).

⁷⁶ Wolford and Burke Interview, *supra* note 5.

⁷⁷ *Id.*

⁷⁸ Telephone Interview with Spenser Rositano, Former Boston College Defensive Back (Mar. 16, 2016).

⁷⁹ *Id.*

consciousness and was hospitalized for his concussion. A few days passed after his release from the hospital when Spenser realized the full extent of his concussion:

I was walking to class one day when I stepped on a snail. That's right, just a snail. And for some unexplainable, uncontrollable reason, I started to ball my eyes out, as if it were the most devastating event of my life. I was crying for a few minutes as other students passed me by in the quad. Then all of sudden, I snapped back into reality and realized what I was doing. I had no idea why I acted like that. I only remember feeling like I was lost with all of my emotions.⁸⁰

Spenser returned to full speed contact a week after this incident. Spenser admits that he pressured himself to return as quickly as possible, calling it "personal motivation."⁸¹

Spenser's last football game was against Clemson University. He cannot recall the exact hit that ended his career. He can recall, though, the throbbing headache as he sat in the locker room as his teammates continued to play. Spenser was sidelined not for his headache, but for a lung contusion he had received and the blatantly obvious blood bubbling from his mouth. In the following weeks, the normal, twenty-four-hour effects of dizziness and headaches dragged on, leaving him in fear of what concussion number seven could bring.⁸²

After hours of personal research and countless discussions with doctors, Spenser retired just seventeen days short of his twenty-first birthday. Ultimately, his decision came down to his family. He did not want his family to suffer, and he wanted to minimize the effects concussions

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² Brandon Parker, *Spenser Rositano retires at 20: Sixth concussion cuts Boston College safety's career short*, The WASHINGTON POST (Dec. 12, 2013), https://www.washingtonpost.com/sports/highschools/spenser-rositano-retires-at-20-sixth-concussion-cuts-boston-college-safety's-career-short/2013/12/12/994a7c62-620f-11e3-bf45-61f69f54fc5f_story.html

may bring to his future family. Spenser understood the physical effects of concussions and the consequences that may follow, but he was not prepared for the mental and spiritual battle he had in front of him. He understands now why he has some short-term memory lapses at his job, and understands the need to write everything down so he does not forget. Nevertheless, he explained how he felt lost and purposeless after his retirement, football being the only thing he knew. He drank alcohol more and more, hoping to drown the depression and anger he felt. He asked himself questions like, “What else am I good at?” and “where is my place in this world?” These questions haunted him as he watched his best friends continue to play the game he loved. “The mental, emotional, and spiritual journey I had to face in the months following my retirement were the toughest. It took a lot of time and reflection to find myself again.”⁸³

Today, Spenser finds comfort in fate, and all things happening for a reason. When we discussed CTE and its growing diagnoses for past football players, Spenser stoically and admirably rationalized that he “will just have to roll with the punches. I look at it like cancer – I am not planning for it, but if it comes, and it affects me, it is what it is. I just hope I do not hurt the ones I love and others around me.”⁸⁴

Despite Spenser’s history and struggle with concussions in football, he still loves the game that forged him. And if his soon wanted to play football, he would happily let him, with a few conditions of course. He would want his children to wait until high school before undertaking such a physical sport. And if they were faced with a similar multiple concussion scenario as Spenser, he would give full autonomy to them as his parents did to him. “I would only offer my support and love.”⁸⁵

⁸³ Rositano Interview, *supra* note 78.

⁸⁴ *Id.*

⁸⁵ *Id.*

Spenser emphasized that he thinks football is heading in the right direction in how it handles concussions. He noted the increasing frequency of discussions on the topic within the football community, and believes that if it continues, there will be progress.⁸⁶ I agree with Spenser's rationale, but I hope for more. Although discussions will help aid the change, I firmly believe that litigation is needed to jumpstart radical change in such a deep-rooted culture.

⁸⁶ *Id.*

The Need for Litigation To Spark Change

The Law's Role: New Laws to Protect Youth in Sports

Concussions among youth athletes are a serious public health concern in the United States. “In 2011, more than 55,000 high school football players...sustained concussions (a type of traumatic brain injury) during practice or competition.”⁸⁷ Being an avid sports fan as well as a parent, President Obama hosted the Healthy Kids and Safe Sports Concussion Summit at the White House in 2014 to address the growing risk of concussions in youth. He urged for caution in youth sports, highlighting some of the recent findings and statistics about brain injuries in young athletes.⁸⁸ “In fact, the Center for Disease Control reports that in the most recent data that’s available to us, young people made nearly 250,000 emergency room visits with brain injuries from sports and recreation.”⁸⁹ On the heels of the President’s Summit, the NFL committed \$25 million to promote youth sports safety.⁹⁰ The grant funded new, long-overdue programs to place more athletic trainers in high schools nationwide.⁹¹

In addition to raising awareness through government initiatives, legislation has been passed supporting concussion safety. Between 2009 and 2014, fifty states and the District of

⁸⁷ *Traumatic Brain Injuries Among Youth Athletes*, NATIONAL CONFERENCE OF STATE LEGISLATURE (Nov. 18, 2015), <http://www.ncsl.org/research/health/traumatic-brain-injuries-among-youth-athletes.aspx>.

⁸⁸ David Hudson, *President Obama Hosts the Healthy Kids and Safe Sports Concussion Summit*, THE WHITE HOUSE (May 29, 2014), <https://www.whitehouse.gov/blog/2014/05/29/president-obama-hosts-healthy-kids-and-safe-sports-concussion-summit>.

⁸⁹ Remarks by the President at the Healthy Kids and Safe Sports Concussion Summit, THE WHITE HOUSE (May 29, 2014), <https://www.whitehouse.gov/the-press-office/2014/05/29/remarks-president-healthy-kids-and-safe-sports-concussion-summit>.

⁹⁰ David Hudson, *President Obama Hosts the Healthy Kids and Safe Sports Concussion Summit*, THE WHITE HOUSE (May 29, 2014), <https://www.whitehouse.gov/blog/2014/05/29/president-obama-hosts-healthy-kids-and-safe-sports-concussion-summit>.

⁹¹ Anthony R. Caruso, *Collegiate Collisions on the Field and in the Courtroom: Will Labor Peace Save Student-Athletes from Further Injury?*, UNIVERSITY OF MARYLAND JOURNAL OF BUSINESS & TECHNOLOGY (2014), <http://digitalcommons.law.umaryland.edu/cgi/viewcontent.cgi?article=1233&context=jbtl>.

Columbia passed laws to address concussions and other traumatic brain injuries in youth sports.⁹²

The vast amount of these laws share three components:

- They require education or training on concussion recognition and appropriate responses.
- They require removing a youth athlete from play or practice in the event of a suspected concussion.
- They require returning a youth athlete to practice or competition after evaluation and clearance by a designated health care provider.⁹³

These laws now provide a basis for legal action against coaches, athletic trainers and school administration. It is this kind of legal pressure that is needed to hold high school staff members accountable for their decisions impacting their student-athletes. Furthermore, hopefully the new legislation will push all those involved to actively pursue more information on concussions to not only protect their student-athletes, but to protect themselves.

Speaking from personal experience, my high school coaches at a mid-sized New Jersey high school never once brought up concussion safety, giving me no inclination that they even knew how to identify one. Luckily, my high school did have a certified athletic trainer who attended every game, but never watched practices. Given the alarming statistic President Obama provided about the volume of concussion injuries, it can be assumed that a fair amount of concussions went unreported at my own high school practices. I propose new legislation pushing for further surveillance from certified athletic trainers in all full contact practices. In addition, I propose mandatory concussion training for all coaches involved in contact sports. Coaches should be informed in how to prevent, identify, and mitigate concussions that their student-

⁹² *Traumatic Brain Injury Legislation*, NATIONAL CONFERENCE OF STATE LEGISLATURE (Nov. 18, 2015), <http://www.ncsl.org/research/health/traumatic-brain-injury-legislation.aspx>.

⁹³ *Traumatic Brain Injuries Among Youth Athletes*, *supra* note 87.

athletes may receive.

Parents should also be heavily involved in the education process. Nearly all the new statutes require state education departments to provide concussion education not only to coaches and administrators, but to parents as well. Parents are provided with information about the nature and dangers of concussions, and how to recognize symptoms of potential brain trauma.⁹⁴ A new culture of parental involvement in concussion recognition and communication now needs to be integrated into youth football.

In 2014, twenty states enacted education legislation that requires coaches to be trained in youth sports concussion recognition and awareness.⁹⁵ Indeed, my own state of New Jersey is among this group, a notable and worthy change since my senior year in 2012. I urge all states to enact similar legislation and even take it a step further. Out of the twenty states mentioned above, only thirteen state laws extend the law beyond public schools into private schools and youth athletic leagues.⁹⁶ All states should have laws that reach not only public schools, but also private schools and independent youth athletic organizations. Furthermore, Ohio is the only state that requires referees to be trained to recognize and respond to symptoms of concussions on the field.⁹⁷ All states should require referees to be fully trained since they are almost always closest to the collisions.

In addition to laws regarding concussion education, Return to Play laws seek to put appropriate tools in the hands of coaches, referees, and parents in terms of managing concussions

⁹⁴ Douglas E. Abrams, *Confronting the Youth Sports Crisis: A Central Role for Responsible Local Enforcement of Playing Rules*, UNIVERSITY OF MISSOURI SCHOOL OF LAW (2013), <http://scholarship.law.missouri.edu/cgi/viewcontent.cgi?article=1465&context=facpubs>.

⁹⁵ *Traumatic Brain Injuries Among Youth Athletes*, *supra* note 87.

⁹⁶ Joe Frollo, *Comparing All 50 States' Youth-Concussion Law*, USA FOOTBALL (Mar. 18, 2014), <http://usafootball.com/blog/health-and-safety/comparing-all-50-states%E2%80%99-youth-concussion-law>.

⁹⁷ *Traumatic Brain Injuries Among Youth Athletes*, *supra* note 87.

in youth sports. Return to Play laws generally address protocol for concussion management in youth athletics. The first law of its kind was passed after thirteen-year-old middle school football player Zackery Lystedt collapsed from a traumatic brain injury when he was allowed back into a game just fifteen minutes after suffering a concussion.⁹⁸ Named the Zackery Lystedt Law, the State of Washington passed the law in 2009. Now, all fifty states have a Return to Play law.⁹⁹ The requirements of Return to Play laws vary slightly from state to state, but typically include some combination of the following:

- Mandatory removal from play;
- Mandatory bench times;
- Required medical clearance;
- Informed consent of parents and athletes.

In addition to the list above, the Return to Play laws encompass required training and education for coaches, parents and athletes.¹⁰⁰

Despite substantial progress, there is still a need for stricter laws in youth football in order to prevent tragedies such as that involving Joseph Chernach. On March 6, 2016, Pop Warner, the nation's biggest and oldest youth football program, settled a brain-injury lawsuit filed by the family of a twenty-five-year-old man whose suicide in 2012 allegedly resulted from

⁹⁸ *Zack Lystedt's Football Story*, ONE MIND (accessed Mar. 12, 2016), <http://www.onemind.org/TreatBrainsBetter/Zack-Lystedt-Football-Story>.

⁹⁹ *Sports Concussion Policies and Laws*, CENTERS FOR DISEASE CONTROL AND PREVENTION (Feb. 16, 2015), <http://www.cdc.gov/headsup/policy/index.html>.

¹⁰⁰ *Implementing Return to Play: Learning from the Experiences of Early Implementers*, NATIONAL CENTER FOR INJURY PREVENTION AND CONTROL (Feb. 16, 2015), http://www.cdc.gov/headsup/pdfs/policy/rtp_implementation-a.pdf

concussions in league play. Posthumously, Chernach's death was linked to CTE.¹⁰¹

Improvements in youth football need to be continually made in order to prevent future deaths like that of Joseph Chernach.

The Law's Role: Refocusing the NCAA

Sparked by President Obama's Sport Summit, the NCAA and the Department of Defense jointly committed \$30 million to concussion education and the most comprehensive concussion study ever, involving up to 37,000 college athletes.¹⁰² Yet, before the 2014 summit, the NCAA was under fire from a high profile class action lawsuit. Dozens of former NCAA student-athletes claimed that the league was negligent in its handling of brain trauma. The case, *Adrian Arrington, et al. v. National Collegiate Athletic Association*, was a significant milestone for concussion mindfulness in the NCAA.¹⁰³ The class is not limited to football players, as the group of plaintiffs includes collegiate athletes from hockey, lacrosse and soccer.¹⁰⁴

The NCAA Constitution states that: "It is the responsibility of each member institution to protect the health of and provide a safe environment for each of its participating student-

¹⁰¹ Michael Martinez, *Pop Warner settles concussion suit filed by former player who committed suicide*, CNN (Mar. 9, 2016), <http://www.cnn.com/2016/03/09/us/pop-warner-concussion-lawsuit-settlement-player-suicide/>.

¹⁰² Hudson, *supra* note 88.

¹⁰³ Spencer Anderson, *NCAA Institutions and a Duty to Warn Football Student-Athletes: A Look into the Arrington v. NCAA case*, UNIVERSITY OF IOWA (May 2013), <http://nflconcussionlitigation.com/wp-content/uploads/2012/08/NCAA-Institutions-and-a-Duty-to-Warn-copy1.pdf>.

¹⁰⁴ Angel Gustavo Rivera, *The Big Hit: NCAA Concussions Policy a Nightmare for Student-Athletes*, HEALTH LAW & POLICY INSTITUTE AT THE UNIVERSITY OF HOUSTON LAW CENTER (March 2013), https://www.law.uh.edu/healthlaw/perspectives/2013/Rivera_The%20Big%20Hit_NCAA%20Concussions%20Policy%20a%20Nightmare%20for%20Student-Athletes.pdf.

athletes.”¹⁰⁵ The student-athletes claimed the NCAA engaged in consistent patterns of negligence and inaction with respect to concussions and concussion related maladies, all the while profiting immensely from those same student-athletes. The complaint stresses four distinctive theories: fraudulent concealment, medical monitoring, unjust enrichment, and negligence.¹⁰⁶ According to the lawsuit, the NCAA has failed to:

- Address and/or correct the coaching of tackling, checking or other playing methodologies that cause head injuries;
- Educate coaches, trainer and student - athletes as to the symptoms indicating possible concussions;
- Implement system-wide “return to play” guidelines for student - athletes who have sustained concussions;
- Implement system - wide guidelines for the screening and detection of head injuries
- Implement regulations addressing the treatment and eligibility of student - athletes who have sustained multiple concussion in the course of play;
- And implement a support system for student - athletes who, after sustaining concussions, are left unable to either play their sport or even lead a normal life.¹⁰⁷

In 2010, a year before the class action complaint, the NCAA implemented stricter concussion-reduction guidelines. The legislation the NCAA passed requires the following:

- An annual process that ensures student-athletes are educated about the signs and symptoms of concussion;

¹⁰⁵ 2011-12 NCAA Division I Manual, Article 2,
<http://www.ncaapublications.com/productdownloads/D112.pdf>

¹⁰⁶ Angel Gustavo Rivera, *supra* note 104.

¹⁰⁷ Adrian Arrington, Derek Owns, Mark Turner, and Angela Palacios, et al. v. NCAA. No. 1:2011cv06356, Northern Illinois District (Chicago),
<http://www.scribd.com/doc/78428992/NCAA-Complaint>.

- A process that ensures a student-athlete who exhibits signs, symptoms or behaviors consistent with a concussion shall be removed from athletics activities and evaluated by a medical staff member with experience in the evaluation and management of concussion;
- A policy that precludes a student-athlete diagnosed with a concussion from returning to athletic activity for at least the remainder of that calendar day;
- A policy that requires medical clearance for a student-athlete diagnosed with a concussion to return to athletics activity as determined by a physician or the physician's designee.¹⁰⁸

In 2010, the NCAA also started to require student-athletes to sign a statement in which they accept the responsibility for reporting their injuries and illnesses to the medical staff.¹⁰⁹

Essentially, the NCAA puts the burden on the shoulders of concussed student-athletes to decide whether or not to seek medical attention. When the idea of “quitting is not an option” is ingrained in so many NCAA student-athletes, it is simply unrealistic to assume that these competitors will monitor and report their own head injuries. The stubborn mentality that is blatantly evident at this level of competition could be fatal. Institutional oversight is needed. The NCAA needs to put the unchallengeable authority in the healthcare providers and training staff to determine when a player needs to sit and when he is allowed to return to play following a concussion. In 2013, the Chronicle of Higher Education found that “nearly half of the trainers surveyed in major college football said they felt pressure from coaches to return concussed

¹⁰⁸ *Concussion guidelines, supra* note 51

¹⁰⁹ David Klossner, *2012-2013 NCAA Sports Medicine Handbook*, NCAA (August 2012), <http://www.ncaapublications.com/productdownloads/MD12.pdf>.

players to the field before they were medically ready.”¹¹⁰ It is these cultural forces that need to be ended with stricter and more defined regulations in the management of concussions.

A federal judge granted initial approval of a settlement in *Arrington v. NCAA* in January of 2016, bringing the case one step closer to conclusion and ultimately a new national protocol for head injuries. The proposed settlement, which was first submitted in July 2014, calls for a \$70 million monitoring fund for former athletes, which would allow them the opportunity to receive neurological screenings to examine brain functions and any signs of brain damage like CTE. Under the settlement, the NCAA would also prevent athletes who have sustained a concussion from returning to a game or practice that day.¹¹¹ The court outlined some key changes that the NCAA must agree to in regard to concussions policies across all sports:

- Require all athletes to undergo preseason baseline testing for each sport prior to their first practice or competition.
- Revise the NCAA guidelines so an athlete diagnosed with a concussion will be prohibited from returning to play on the same day and must be cleared by a physician before coming back.
- Require medical personnel who are trained in concussions to attend all contact-sport games and practices for Divisions I, II and III. Contact sports are defined as football, lacrosse, wrestling, ice hockey, field hockey, soccer and basketball.

¹¹⁰ Jon Solomon, *Why the NCAA won't adopt concussion penalties – at least no yet*, CBS SPORTS (Feb. 18, 2015), <http://www.cbssports.com/collegefootball/writer/jon-solomon/25073014/why-the-ncaa-wont-adopt-concussion-penalties----at-least-not-yet>.

¹¹¹ Ben Strauss, *Judge Approves Settlement in Head Injuries Suit Against N.C.A.A.*, THE NEW YORK TIMES (Jan. 26, 2016), <http://www.nytimes.com/2016/01/27/sports/ncaafball/judge-approves-settlement-in-head-injuries-suit-against-ncaa.html>.

- Have the NCAA institute ‘a uniform process for schools to report diagnosed concussions and their resolution, and for concerned persons to report potential problems directly to the NCAA.’
- Require NCAA schools to provide approved concussion education and training to athletes, coaches and athletic trainers before each season.
- Have the NCAA provide education for faculty to accommodate students suffering from concussions.¹¹²

The settlement and ensuing NCAA provisions recognize the *need* for concussion safety and awareness for student-athletes. The NCAA and all affiliated universities will also be compelled to exercise more caution to ensure the protection against concussion type injuries in all college sports.

The Law’s Role: Accountability for the NFL

The Healthy Kids and Safe Sports Concussion Summit of 2014 also drew the NFL’s interest. The NFL pledged \$16 million toward tests and studies of the chronic effects of repetitive concussions.¹¹³ The funding was to be put toward the continuing research at the Boston University CTE Center. However, in December of 2015, the NFL rescinded its donation when it learned that Dr. Stern, the director of clinical research for Boston University's Alzheimer's Disease and CTE centers, would be the project’s lead researcher.¹¹⁴ Despite Dr. Stern’s various

¹¹² Solomon, *supra* note 110.

¹¹³ Hudson, *supra* note 88.

¹¹⁴ Michael O’Keeffe, *NFL denies pulling funding for Boston University CTE study*, NEW YORK DAILY NEWS (Dec. 23, 2015), <http://www.nydailynews.com/sports/football/nfl-denies-pulling-funding-boston-university-cte-study-article-1.2473773>.

accolades and achievements in the field as well as approval by the National Institutes of Health (NIH), the NFL raised concerns about Stern's objectivity.¹¹⁵

Dr. Stern and the NFL have a storied history, with Stern causing trouble for the NFL. When the NFL proposed a concussion settlement in 2014, Stern criticized the settlement because it denied compensation to many deserving players, including many who were the most severely disabled from head trauma.¹¹⁶ Stern went on to explain that "that many of the 76 deceased NFL players found to have the brain decay known as CTE would not have qualified for awards under the settlement. Some never developed the dementia, Alzheimer's and neurological problems covered in the minimum \$765 million settlement."¹¹⁷ As Stern observed, CTE would go uncompensated in the entire class action lawsuit because it cannot be diagnosed until after death.

Indeed, CTE did essentially go unnoticed by the NFL until recently. On March 14, 2016, for the first time in league history, the NFL openly acknowledged the link between football-related head trauma and CTE. Jeff Miller, the NFL's senior vice president for health and safety, delivered the announcement during a concussion discussion with the U.S. House of Representatives' Committee on Energy and Commerce.¹¹⁸ He admitted the connection between head trauma and CTE when asked about Dr. McKee's research at BU. Dr. McKee was at the same discussion, urging immediate action to limit the risk to young athletes. McKee reported finding signs of CTE in the brains of ninety out of ninety-four former pro football players and 45

¹¹⁵ Steve Fainaru and Mark Fainaru-Wada, *NFL backs away from funding BU brain study; NIH to fund it instead*, ESPN (Dec. 22, 2015), http://espn.go.com/espn/otl/story/_/id/14417386/nfl-pulls-funding-boston-university-head-trauma-study-concerns-researcher.

¹¹⁶ *Id.*

¹¹⁷ Associated Press, *Brain injury expert critical of deal*, ESPN (Oct. 8, 2014), http://espn.go.com/nfl/story/_/id/11665685/brain-injury-expert-critical-proposed-nfl-concussion-settlement.

¹¹⁸ Steve Fainaru, *NFL acknowledges, for the first time, link between football, brain disease*, ESPN (Mar. 15, 2016), http://espn.go.com/espn/otl/story/_/id/14972296/top-nfl-official-acknowledges-link-football-related-head-trauma-cte-first.

out of 55 former college players. Miller followed by stating, “Well certainly Dr. McKee's research shows that a number of retired NFL players were diagnosed with CTE, so the answer to that question is certainly yes.”¹¹⁹

After years of discounting and denial, the NFL officially admitted to what Dr. Omalu had proposed in 2005 and what Dr. Stern emphasized in his critique of the NFL settlement in 2014. Now, the next question is, how will the NFL legally account for the years of negligence? How much will be enough compensation for the numerous deceased players and their mourning families?

Critics of the NFL have proposed a \$1 billion plan to settle concussion claims given the NFL's sudden acknowledgment of a football-CTE connection.¹²⁰ Previously, a judge approved a settlement between the league and thousands of former players who were suing the NFL for allegedly concealing the link between football and brain disease.¹²¹ On April 18, 2016, a district court judge of the 3rd U.S. Circuit Court of Appeals approved the revised settlement. Thousands of former players who were diagnosed with brain injuries linked to repeated concussions will begin receiving benefits within three or four months.¹²² An estimated \$1 billion plan over the next sixty-five years is in place to settle thousands of concussion lawsuits filed by former players.¹²³

¹¹⁹ Bill Chappell, *In A First, NFL Executive Admits Football Is Linked To Brain Damage*, NPR (Mar. 15, 2016), <http://www.npr.org/sections/thetwo-way/2016/03/15/470513922/in-a-first-nfl-executive-admits-football-is-linked-to-brain-damage>.

¹²⁰ Fainaru, *supra* note 118.

¹²¹ *Id.*

¹²² ESPN.com News Services, *Appeals court upholds \$1 billion concussion settlement*, ESPN (Apr. 18, 2016), http://espn.go.com/nfl/story/_/id/15229132/appeals-court-upholds-1-billion-nfl-concussion-settlement.

¹²³ *Id.*

A roundtable of concussion experts convened after the NFL's announcement to debate the seriousness of the concussion issue and what should be done about it. Some speakers thought the risks of contact sports have been overstated and concussion awareness has been stronger than ever, while others cautioned against associating concussions with CTE.¹²⁴ There is still skepticism about the severity of the football-CTE connection. The next step to solidifying the connection is finding a way to diagnose CTE in living people. Currently, CTE is diagnosed only postmortem. Dr. Walter Koroshetz, director of the National Institute for Neurological Disorders and Stroke, stated, "We don't know how common [CTE] is; we are desperate to find a way to diagnose it in [living] people."¹²⁵

Some players are optimistic about the continuing research. Former NFL defensive end Marvin Washington believes "science will connect the dots at some point. It will change football."¹²⁶ Indeed, when science does connect the dots proving a connection between football and CTE, what legal ramifications may it have on the game? Will a liability waiver need to be required in order to play football? Will players diagnosed with CTE while living be forced to retire? How will the NCAA respond? How will youth football survive?

¹²⁴ Fainaru, *supra* note 118.

¹²⁵ *Id.*

¹²⁶ Jarrett Bell, *What it would mean for the NFL to be able to diagnose CTE in the living*, USA TODAY SPORTS (Apr. 2, 2016), <http://www.usatoday.com/story/sports/nfl/columnist/bell/2016/04/02/cte-concussions-deandre-levy-lions-brain/82563330/>.

Uncovering the Truth Behind the Dangers of Subconcussive Hits

Introduction to Dr. Stern

Dr. Stern agrees that “the ability to diagnose CTE during life is the next critical step in the study of CTE.”¹²⁷ Within the next five to ten years, such could be a reality. In an interview with Dr. Stern in March 2016, I learned that he is driven to discover a method for this next critical step. Dr. Stern not only seeks to bring undeniable truth to the public, but also to unveil the fraudulent concussion front that the NFL has been using to cover up a much larger, deep rooted issue.

My Interview with Dr. Stern: A Narrative

“Yes, you’re all set. I have attached directions again. If you get lost, give my office line a call.” I read this email as I strode out of my 4:30 class. I was on my way to the library. I tried to brainstorm as I walked, but was distracted by friends passing and the constant buzzing of my phone.

I finally plopped down on the third floor of O’Neil Library when it hit me; “What the heck am I going to ask Dr. Stern?” Dr. Stern is a nationally renowned doctor, professor, and researcher of neurology. I had contacted him because he is the Director of Clinical Research for the BU CTE Center. Of all the contributions he could be making to his research on CTE, he granted me an hour time slot. Me...Me... Me? He granted ME an hour time slot? He granted a naïve, lowly informed, undergraduate-thesis-writing senior an hour? I was in shock. I was both honored and mortified by the opportunity.

¹²⁷ Robert A. Stern, Boston University School of Medicine, Testimony before the U.S. Senate Special Committee on Aging (June 25, 2014).

“What do you think the biggest problem is...no that’s not right. What forces are working against increasing concussion awareness? Eh still not what I am trying to say.” I battled myself for three hours in the library, trying to construct the perfect questions to ask. I would write a three questions down, browse the web for additional information, then delete two of them and edit the third. I eventually settled on seven or eight questions and went to bed. Well, I tried going to bed.

In the Uber the next morning, I reviewed my questions furiously and tried to perfect my delivery in silence. I would mouth the words and gesture with my hands at the trees that passed by on Commonwealth Avenue. The trees shook their branches as if to signal, “you could do better, AJ.”

I arrived at the Boston University School of Medicine and was immediately taken with the beauty of the South End area. It almost looked too manicured for Boston. Where am I? I felt my pulse pump as I entered the building. I pulled out my phone and followed the directions to locate the CTE center inside the building. “Take a right, walk to the end of the corridor and make a left just before the emergency exit sign, skip the first set of elevators....” What then? Take a loop-d-loop to the 7th floor, zig zag past the wooden doors, then take a left at the fork in the road? Oh, I’m here.

Nicole from the email I received the day before greeted me. We shook hands, went through the formalities that came along with all first-time in-person meetings, and I took a seat. “Dr. Stern will just be a few minutes,” she mentioned. I nodded my head, smiled, and looked around the room. Nicole and I exchanged conversation about our backgrounds, my thesis, her school and career experience – the small talk calmed my nerves and warmed me up like a pitcher’s pre-inning practice throws.

The door opened and Dr. Stern swung out. “Come on in AJ.” We shook hands and proceeded into his office. I awkwardly made small talk about the helmets I saw outside his office, trying to transition into the meat of the interview as quickly as possible – I knew my time was limited.

He made the first move. He brought up Brian Hainline, a friend of his, a fellow neurologist, and a “good guy.” He explained how Hainline was named the NCAA’s first chief medical officer in 2012 and then pointed out the now apparent paradox. The NCAA, which was founded to ensure the safety of college athletes, just recently assigned its first chief medical officer; and coincidentally, in the wake of growing concussion safety pressure, he is a neurologist.¹²⁸

Dr. Stern went on to admit that things have changed dramatically and are getting better, but pointed out some major obstacles in the way. As Dr. Stern delved into the politics and bureaucracy of the NCAA and its conferences, I was astonished to hear the inner-workings of an organization I had been involved in for four years. He spoke of the inability of the NCAA to make policies for all schools unanimously, and spoke of the underlying powers that many conferences, some more than others, wielded over the NCAA for their own unique interests.¹²⁹

According to Dr. Stern, one change that needs to be made and adapted by all schools is the removal of coaches’ decision-making power with respect to the health of their players. Dr. Stern pointed out the conflict between coaches’ and players’ interests and stressed the need for trained healthcare professionals who are independent of the school to be given decision-making

¹²⁸ Interview with Dr. Robert Stern, Co-Founder of the Center for the Study of Traumatic Encephalopathy, Boston University School of Medicine (Apr. 6, 2016).

¹²⁹ *Id.*

power.¹³⁰ I agreed about the misappropriation of power in these issues, noting that even though trainers are the designated healthcare supervisors, coaches can often influence the time of return for players.

Dr. Stern asked if I had heard about the new development within the Ivy League. I bashfully shook my head, eager to hear what he had to say on the topic. He explained that Ivy League football coaches decided to take the extraordinary step of eliminating all full-contact hitting from practices during the regular season. This dramatic change is such a huge step because it will reduce players' exposure to hits to the head.¹³¹

I ferociously scribbled on my pad as I tried to catch all the information bouncing around the room. As I was finishing, I asked Dr. Stern to clarify: "So less tackling in practice will result in less concussions which will ultimately result in a healthier brain for student athletes." To my amazement, Dr. Stern explained that concussions are not the problem, but subconcussive hits, or normal football hits, are the actual problem.¹³² I paused as I tried to comprehend what I just heard. "So you are saying that normal football hits, not concussions, are contributing to CTE?" He shook his head affirmatively and responded that exposure to repetitive, normal football hits is the problem. Obviously concussions that go undiagnosed are dangerous to a player's health, but when concussions are diagnosed properly and players are given ample time to rest, recovery is possible. Throughout a game or practice, it is the repetitive subconcussive hits that football players experience that are so dangerous.¹³³

He turned to his computer and asked for my email. Dr. Stern sent me his latest research – I could not wait to return to campus to read it. I felt like I was on the forefront of groundbreaking

¹³⁰ *Id.*

¹³¹ *Id.*

¹³² *Id.*

¹³³ *Id.*

news. But, when I thought back to the dense medical reports I read before, I did recall the mentioning of “subconcussive” hits. I simply did not internalize what that actually meant and what it entailed. The game of football at its simplest core is dangerous.

But how could I have overlooked this crucial piece of the puzzle? Mid-revelation, Dr. Stern added that the issue of concussions linked to CTE was a front for a larger issue. Dr. Stern believes that the NFL wants the public to believe that concussions are the main issue. The NFL wants the public to believe that it is working vigorously to monitor concussions better. The NFL wants the public to believe that awareness of concussions is the first major step toward an imminent solution. The longer the NFL can keep this façade intact, the longer it can continue to generate mass amounts of revenue.¹³⁴

“So what you are saying, Dr. Stern, is that football is a dying sport? Given that subconcussive hits are at the center of the game, the game cannot continue if what you are saying is proven undeniably.” He responded as if he had heard this question many times before. He rationalized that football is not a dying sport, but it will follow a path similar to boxing. Boxing was at its height in the 1920s, but soon after, it declined in participation and popularity due to its inherent health risks.¹³⁵ Eventually, boxing became a sport for poor, underprivileged kids to make it out of their current situation. Similarly, football will become increasingly played by the underprivileged and will essentially turn into a gladiator sport. The rich and wealthy will sit and watch, captivated by the brutality of those beneath them. The trend will start when fewer and fewer parents allow their sons to play football. Then, schools will start dropping football programs as participation decreases.¹³⁶

¹³⁴ *Id.*

¹³⁵ *Id.*

¹³⁶ *Id.*

Sparked by Dr. Stern's comments, I foresee universities eventually feeling the ripples of pushback against football. What will replace football in terms of revenue stream for many of these universities in the future? What will replace football in a cultural sense throughout college? How can universities prepare for such a huge change?

I asked Dr. Stern what the next step was for protecting football. "The way football is right now includes repetitive hits to the head. So anything that can be done to remove those hits is a big help." He mentioned again the importance of the Ivy League decision and the need to start with removing hits in practice. He also emphasized the importance of finding a way to diagnose CTE in living players. The reason many are still skeptical of CTE is because it does not happen to every football player. There is no exact threshold of hits that equates to CTE. There is no genetic factor identified that is linked to CTE. There is no exact amount of force that is needed in each hit.¹³⁷

Dr. Stern checked his phone and stated that was all the time he had. His last statement to me was along the lines of science having an evolving nature, and what may be considered fact now may not be considered fact later.¹³⁸ He had an open-ended grin on his face as I shook his hand, thanked him once again, and showed myself out. I passed by Nicole, thanked her, and entered back into the hallway maze. Only this time, I was not nervous or tense navigating the confusion of the BU School of Medicine. I was passionately driven to run out of the building. I could not wait to contribute to the truth.

¹³⁷ *Id.*

¹³⁸ *Id.*

Latest Research on the Effects of Subconcussive Hits (March 31, 2016)

Dr. Stern was a contributing author to a recent working paper entitled “Cumulative Head Impact Exposure Predicts Later-Life Depression, Apathy, Executive Dysfunction, and Cognitive Impairment in Former High School and College Football Players” along with twelve other authors, each of whom contributed equally to the manuscript. Dr. Stern was responsible for overseeing the study and participated in the study design, analysis, interpretation, and manuscript revision. He also played a role in obtaining funding for this study. The study examined the dangers of exposure to subconcussive hits.

A subconcussive hit can be viewed as a normal football hit; it is defined as the transfer of mechanical energy to the brain at enough force to injure axonal integrity, without resulting in clinical symptoms.¹³⁹ Amateur football players are estimated to experience an average of 600 subconcussive impacts per season while college players average 1000.¹⁴⁰

Repetitive head impacts (RHI) refers to the cumulative exposure to concussive and subconcussive events.¹⁴¹ Quantitative evidence of a definite connection between RHI and CTE has not been examined yet due to a lack of tools to measure lifetime RHI exposure. That being said, RHI is believed to increase the risk of CTE.¹⁴²

¹³⁹ Robert A. Stern, PhD, Philip H. Montenegro, BS, Michael L. Alosco, PhD, Brett M. Martin, MS, Daniel H. Daneshvar, MS, Jesse Mez, MD, MS, Christine E. Chaisson, MPH, Christopher J. Nowinski, AB, Rhoda Au, PhD, Ann C. McKee, MD, Robert C. Cantu, MD, Michael D. McClean, ScD, & Yorghos Tripodis, PhD, *Cumulative Head Impact Exposure Predicts Later-Life Depression, Apathy, Executive Dysfunction, and Cognitive Impairment in Former High School and College Football Players*, Boston University CTE Center (Mar. 31, 2016).

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Id.*

Cumulative head impact index (CHII) was a metric defined in the latest study to quantify cumulative RHI exposure from football.¹⁴³ It was computed for ninety-three former high school and collegiate football players from a combination of self-reported athletic history (i.e., number of seasons, position(s), levels played, and impact frequencies reported in helmet accelerometer studies), as well as various objective cognitive and behavioral/mood tests.¹⁴⁴ The CHII was then evaluated for its predictive properties relative to other exposure metrics such as duration of play, age of first exposure, and concussion history. At the conclusion of the testing, CHII demonstrated greater predictive validity relative to the other exposure metrics. There was a significant relationship between CHII and risk for later-life cognitive impairment ($p<0.0019$), self-reported executive dysfunction ($p<0.0003$), depression ($p<0.0009$), apathy ($p<0.0040$), and behavioral dysregulation ($p<0.0001$).¹⁴⁵

This research is not meant to overlook the importance of concussion safety. Concussions that are not treated properly can still contribute to CTE. It is important to note, though, that 16% of pathologically confirmed cases of CTE have no reported history of concussion, highlighting the potential long-term risks of subconcussive injury.¹⁴⁶

There were obvious limitations to the study. The minimum cutoff point for subconcussive hits was set at a force of 10g. G-force, or gravitational force, is force acting on a body as a result of acceleration or gravity, informally described in units of acceleration equal to one g.¹⁴⁷ The exact g-force necessary to trigger this potential neuronal damage, however, is not known. The study also noted that it might not accurately reflect differences in long-term consequences

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

¹⁴⁷ *G-Force definition*, DICTIONARY.COM (accessed Apr. 28, 2016), <http://www.dictionary.com/browse/g-force>.

between starters and reserve players. When CHII is calculated, it is assumed that players are active in both games and practice. While both active and reserve players are involved in practices, reserve players are limited in their exposure to hits during games. In addition, the study generalized impacts and did not take into account linear and rotational accelerations.¹⁴⁸

Future studies will need a larger sample size to increase validity. A larger sample is needed to investigate the effect of CHI exposure by age and level. Future studies must also improve accelerometer-measuring devices and incorporate “objective fluid and neuroimaging biomarkers [to] allow for a better understanding of the underlying etiology associated with CHI exposure.”¹⁴⁹ Case-controlled postmortem studies will also be necessary to examine the connection between the CHII and CTE.¹⁵⁰ There is also a need to account for and examine additional potential risk factors that may modify the relationship between RHI exposure and CTE. Some additional risks include, and not limited to, genetics, diet, exercise, substance use, and cardiovascular risk.¹⁵¹

¹⁴⁸ Stern et al., *supra* note 139.

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*

¹⁵¹ *Id.*

Recommendations and Conclusion

Will I let my son play football? My peers, my classmates, and my professors have been asking me this question throughout the course of my thesis. It started as a definite, confident yes. “Of course I would let my son play football. The game has taught me so much about life, hard work, and overcoming adversity.” Then it turned into a curious, half-hearted yes. “If he wanted to play, I would let him.” Then it turned into uncertainty. Now, at the concluding thoughts of my paper, I can say that I will encourage my son to play other sports before football. It would be extremely hard for me to say I will forbid my son from playing football. If he has a burning passion for the game, why would I deny him the right to play?

There would be certain conditions, however. He would not play until high school. I recommend that all youth football should be disbanded. Dr. Stern explained the serious, crucial maturation process that happens in young brains between the ages of nine and twelve. If a young boy has exposure to repetitive hits to the head at such an age, there is a great chance of long-term health consequences.¹⁵²

My son would also be educated on all the ramifications of repetitive hits to the head. I suggest a formal, mandatory education to inform players at all levels about concussions, subconcussive hits and the potential diseases that can stem from exposure. It is essential to inform players of the long-term effects that can stem from concussions. With knowledge of the health risks, players will have the power to make their own, educated decisions on the matter. In terms of when a player should sit himself after a hit or when a player should retire from football all together, a share of the responsibility must fall upon the players themselves. I propose that all states enact legislation similar to that adopted by Florida. The Florida High School Athletic

¹⁵² Dr. Robert Stern Interview, *supra* note 128.

Association passed a new rule this summer requiring all athletes to watch a video about concussions and sign a form saying they understand concussion risks.¹⁵³ Florida was the first state in the nation to take this step, and I believe all states and football programs should follow.

My son will also play only on a football team with coaches that are thoroughly educated. All coaches should be required to pass a standardized concussion awareness test. It should be mandatory to have a concussion awareness certification to coach football. Coaches should be informed about how to prevent, identify, and mitigate concussions that their student-athletes may receive. This certification requirement should extend across public and private schools at all levels of the game. In addition, there should be legal consequences for coaches who blatantly ignore the signs of a concussion or try to conceal a player's concussion from a trainer.

Furthermore, I recommend more education and more surveillance for those involved in the game. All states should require referees to be fully educated on the issue since they are almost always closest to the collisions. Legislation also should be passed pushing for further surveillance from certified athletic trainers in all full contact practices.

Parental involvement is also necessary for the safety of football players. There should be a requirement for state education departments to provide concussion education to parents. A new culture of parental involvement in concussion recognition and communication now needs to be integrated into football. With all parties informed, coaches, players, parents, and trainers can collectively contribute to the rehabilitation timeline and recovery process of concussions.

In regards to tensions between coaches and trainers, where coaches will use their influence to sway trainers' medical opinions about players, I recommend separating the health

¹⁵³ *Florida leads the way on concussion issue*, Health Reference Center Academic (Nov. 2015), http://proxy.bc.edu/login?url=http://go.galegroup.com/ps/i.do?id=GALE%7CA435542920&v=2.1&u=mlln_m_bostcoll&it=r&p=HRCA&sw=w&asid=a82039d35bbb0ac45ade87722251c8df.

care training staff from athletic programs. When the jobs of coaches may rest in the hands of their players and their performance, it is naïve to believe coaches will meticulously report concussions or other head trauma. Additionally, when the idea of “quitting is not an option” is ingrained in so many athletes, it is simply unrealistic to assume that these competitors will monitor and report their own head injuries. Teams need to put the unchallengeable authority in the healthcare providers and training staff.

In order to accomplish this change, the training staff needs to be a separate entity from the team. Athletic trainers should no longer answer to coaches or athletic directors, but to a designated head healthcare official linked to high school football associations, the NCAA, the NFL, or any other football organization that oversees individual teams.

Monitoring and managing concussions are important, and education of their long-term effects is essential to protecting players, but the developing research on cumulative exposure of subconcussive hits is troubling. Butting heads is at the center of the game. There is no education program that can improve it, and no legislation that can be passed to prevent it. There is nothing coaches can do about it and nothing trainers can properly rest and heal. It is the game. I think discussion is key. Players need to know that subconcussive hits can lead to long-term problems. It needs to be a topic in the educational process of players, coaches, and parents. Perhaps discussion of the topic is the first step to changing how players approach a hit. Players might feel more inclined to lead with their shoulder. Discussion can help, but not solve, the issue.

Coaches can play an important role on the issue of subconcussive hits. While little about the game can be changed, coaches can control how they practice. I recommend that all coaches work toward limiting impacts on the head in practice. Taking measures similar to the Ivy League is a safe and reasonable proposal to combat the developing issue of the effects of repetitive

subconcussive hits. The Ivy League's collective bargaining agreement limits full-contact practices during the season to fourteen.¹⁵⁴ All leagues should follow suit and endorse limiting full contact practices. In addition, further measures can be taken, like using technology to limit contact. The Dartmouth University football team has utilized a robotic tackling dummy to limit subconcussive impacts in their practices. The dummy moves and gets tackled, just like a real player, while significantly reducing exposure.¹⁵⁵ Teams that invest in this technology also invest in their player's long-term health.

To summarize, I propose the following recommendations:

- The disbandment of contact youth football leagues. High school football should be the first opportunity for full contact football. Youth football should be limited to flag football;
- A formal, mandatory education program to inform players at all levels about concussions, subconcussive hits and the potential diseases that can stem from exposure;
- A standardized concussion awareness test that all coaches must pass in order to be certified in football coaching;
- Legal ramifications for coaches who ignore the signs of a concussion or try to conceal a player's concussion from a trainer;
- A formal, mandatory concussion awareness training for referees;
- Increased surveillance by certified athletic trainers in all full contact practices;
- A requirement that state education departments provide concussion education to parents;

¹⁵⁴ *Ivy League's move latest in trend toward less tackling in practice*, ESPN (Mar. 3, 2016), http://espn.go.com/college-football/story/_/id/14888322/ivy-league-move-latest-trend-less-tackling-practice

¹⁵⁵ *Robot helps football players avoid concussions*, CNN (Sept. 18, 2015), <http://www.cnn.com/videos/us/2015/09/18/robot-football-players-concussions-orig.cnn>

- The separation of the medical staff from the athletic program;
- Giving unchallengeable authority to the healthcare providers and training staff;
- Limiting full contact practices and investing in technology that can help reduce head-impact exposure.

Investing in player's health in football has been done before. President Theodore Roosevelt, in the wake of eighteen deaths in the 1905 college football season, advocated for player safety and invested in the future of the game.¹⁵⁶ Roosevelt invited the college coaches to the White House to discuss the brutality of the game. He told them, "Football is on trial...[and]...because I believe in the game, I want to do all I can to save it."¹⁵⁷ Roosevelt asked that they adjust the rules to minimize injuries. Several meetings of college presidents followed, important rule changes were implemented, and the Intercollegiate Athletic Association of the United States (renamed the National Collegiate Athletic Association in 1910) was founded.¹⁵⁸

Football was tested, and men who loved the game responded to protect it. In order to protect it, they had to change it, adapt it, and force it to evolve. Football is being tested once again with concussion management and subconcussive hits. Who will spark change this time? How imminent is adaptation? How will football evolve? We, the millions of Americans who love the game of football, are the change we seek. The football community must accept that change is inevitable. Football is indeed on trail and will not survive without change.

¹⁵⁶ James L. Stone, Vimal Patel & Julian Bailes, *The History of Neurosurgical Treatment of Sports Concussion*, NEUROSURGERY (Oct. 2014), http://journals.lww.com/neurosurgery/_layouts/15/oaks.journals.mobile/articleviewer.aspx?year=2014&issue=10001&article=00002#P34

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*