LIABILITY ARISING FROM CTE IN HIGH SCHOOL FOOTBALL MAY BECOME A MIGRAINE FOR THE SPORT'S FUTURE

Will Wagner*

Repetitive football collisions can cause neurodegenerative, latent brain diseases—this article will focus on Chronic Traumatic Encephalopathy ("CTE"). Recent evidence suggests that subconcussions (impacts to the head that do not rise to the level of concussions) can cause CTE. Alarmingly, adolescent populations who play football are susceptible to CTE. These findings challenge the dogmatic belief that lengthy, concussion-prone NFL careers are necessary to develop latent neurodegenerative impairments. All levels of football should be concerned about the discovery of CTE in high school populations, because the National Football League ("NFL") and the National Collegiate Athletic Association ("NCAA") rely on high school football to act as a farm system. High school football is particularly vulnerable to liability because most school districts likely lose money by sanctioning football. Conversely, the NFL (projected 2014 revenue of $9 billion[1]) and Division I football ($15.8 million average revenue per school in 2014[2]) have the financial ability to withstand legal liability. The most immediate liability threat to football arises at the high school level. Steps must be taken to put school districts and coaches on notice about

---

* Will Wagner, J.D. Candidate 2015, Sandra Day O'Connor College of Law, Arizona State University. The author would like to acknowledge the support provided by Professors Gary E. Marchant and Rodney K. Smith during the writing of this work.

1. Monte Burke, *How the National Football League can Reach $25 Billion in Annual Revenues*, FORBES (Aug. 17, 2013, 6:30 AM), http://www.forbes.com/sites/monteburke/2013/08/17/how-the-national-football-league-can-reach-25-billion-in-annual-revenues/.

2. *NCAA College Athletics Statistics*, STATISTIC BRAIN (Apr. 26, 2014), http://www.statisticbrain.com/ncaa-college-athletics-statistics/.

the dangers associated with subconcussive impacts. This paper proposes a tiered legal response based upon the disease's prevalence in adolescent football players.

I. INTRODUCTION

Boston University Center for the Study of Traumatic Encephalopathy recently diagnosed a deceased *teenager* with Chronic Traumatic Encephalopathy ("CTE").[3] CTE is a neurodegenerative disease associated with impact sports. The teen was a multisport high school athlete who incurred multiple concussions playing football.[4] Tragically, the teen passed away at 18.[5] At the time, this represented the youngest person diagnosed with CTE.[6]

Unfortunately, this is not the only case of a high school or college football player developing CTE. A study released in 2012 identified six instances where CTE developed in high school football players and nine instances where college players developed the disease.[7] These finding contradict the traditional belief that a long career of repeated head trauma is necessary to develop latent neurodegenerative diseases. CTE-related liability needs to be evaluated at the game's lower levels because of adolescent susceptibility to the disease.

---

3. *18 Year Old High School Football Player*, BOS. U. CTE CENTER, http://www.bu.edu/cste/case-studies/18-year-old/ (last visited Jan. 13, 2014).

4. *Id.*

5. *Id.*

6. *Id.*

7. Anne C. McKee et al., *The Spectrum of Disease in Chronic Traumatic Encephalopathy*, 136 BRAIN 43, 48 (2013); *Brain Damage Found in Veterans, High School, College and Pro Athletes*, SCIENCE BLOG (Dec. 4, 2012), http://scienceblog.com/58237/brain-damage-found-in-veterans-high-school-college-and-pro-athletes/.

Lawmakers must notify school districts about CTE's potential danger to teenagers and implement legislation to reduce the number of mild traumatic brain injuries occurring in football. Section II of this paper discusses CTE's association with subconcussions and adolescent populations, and leagues' responses to the concussion epidemic. Section III argues liability at the high school level poses the greatest immediate threat to football and details CTE's legal framework. Section IV proposes two model statutes—one "proactive" statute meant to put school districts on notice about CTE and a second "reactive" statute for a hypothetical future to substantially decrease the number of mild traumatic brain injuries.

II. BACKGROUND ON MILD TRAUMATIC BRAIN INJURIES, CTE, AND LEAGUES' RESPONSES

Traditionally, scientists and coaches have been concerned about football concussions, not subconcussions. Concussions are caused by impacts to the head or torso.[8] The brain sits in cerebrospinal fluid and is surrounded by the skull. [9] A sudden acceleration or deceleration causes the brain to collide with the skull.[10] Annually, an estimated 1.6 million to 3.8 million reported concussions occur during sports or recreational activities.[11] There are likely many additional unreported concussions.[12] About 1.4 million high school students and 3 million children play football every

8. Steven P. Broglio et al., *The Biomechanical Properties of Concussions in High School Football*, NAT'L CENTER FOR BIOTECHNOLOGY INFO. (Nov. 1, 2011), http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2943536/.

9. *Concussion*, MEDICINENET (Aug. 27, 2012), http://www.medicinenet.com/brain_concussion/article.htm.

10. *Id.*

11. Robert A. Stern et al., *Long-term Consequences of Repetitive Brain Trauma: Chronic Traumatic Encephalopathy*, 3, Issue 10 PHYSICAL MED. & REHABILITATION S460, S460 (Supp. 2 2011).

12. *Id.*

year.[13] Approximately 60,000 concussions are reported annually at the high school level, most attributed to football.[14] Immediate symptoms of concussions include headaches, nausea, dizziness, fatigue, and loss of consciousness.[15] Latent diseases caused by or correlated with concussions include dementia, depression, early-onset Alzheimer's, and CTE.[16]

Concussions, however, are not the only mild traumatic brain injury associated with football; subconcussions are also rampant in the game. Subconcussive impacts occur in the same manner as concussions (the brain collides with the skull), but the impacts do not rise to the level where symptoms are immediately apparent.[17] The distinction between concussions and subconcussions is simple but critical—concussion are immediately diagnosable, but subconcussions lack immediate symptoms. This paper will refer to both concussive and subconcussive impacts as mild traumatic brain injuries.

---

13. Constance Boozer, *CTE Influences Penn Football Player's Death*, IVYGATE (Sept. 16, 2010, 8:21 PM), http://www.ivygateblog.com/2010/09/cte-influences-penn-football-player%e2%80%99s-death/.

14. Cynthia W. Majerske et al., *Concussion in Sports: Postconcussive Activity Levels, Symptoms, and Neurocognitive Performance*, 43 J. ATHLETIC TRAINING 265, 265 (2008).

15. Erika A. Diehl, *What's All the Headache?: Reform Needed to Cope with the Effects of Concussions in Football*, 23 J.L. & HEALTH 83, 89 (2010).

16. Amy L. Bernstein, *Into the Red Zone: How the National Football League's Quest to Curb Concussions and Concussion-Related Injuries Could Affect Players' Legal Recovery*, 22 SETON HALL J. SPORTS & ENT. L. 271, 280 (2012).

17. Christine M. Baugh et al., *Chronic Traumatic Encephalopathy: Neurodegeneration Following Repetitive Concussive and Subconcussive Brain Trauma*, BOS. U. CTE CENTER, 2 (May 3, 2012), http://www.bu.edu/cte/files/2012/08/Baugh_Chronic-Traumatic-Encephalopathy_2012.pdf.

Subconcussive impacts occur often in football. The average high school football player incurs 774 head impacts over the course of a season.[18] What may come as a surprise to casual football fans is the fact that offensive and defensive linemen average the most head impacts at 1,076 per season.[19] Tight ends, linebackers, and running backs are next, averaging 779 impacts.[20] Wide receivers, safeties, and corners average 417 impacts, and quarterbacks average 356 impacts.[21] Importantly, this data indicates that "tackle box"[22] players are the most susceptible to head impacts and therefore the most susceptible to subconcussions.

A. CTE's Development in High School Populations; Diagnosing the Disease

Doctors first discovered CTE in boxers.[23] In the 1920s, it was referred to as "punch drunk" syndrome, because of the "cuckoo" and "goofy" effects it had on prizefighters who took repeated blows to the head.[24] Football was not linked to CTE until 2002.[25] Dr. Bennet Omalu first discovered the connection between CTE and

---

18. Steven P. Broglio et al., *Estimation of Head Impact Exposure in High School Football: Implications for Regulating Contact Practices*, 41 AM. J. SPORTS MED. 2877, 2877 (2013).

19. *Id.*

20. *Id.*

21. *Id.*

22. The tackle box refers to the area on the field between the two offensive tackles, within which linemen, linebackers, and fullbacks primarily play. *What does Tackle Box Mean?*, SPORTING CHARTS, http://www.sportingcharts.com/dictionary/nfl/tackle-box.aspx (last visited Oct. 13, 2014).

23. Harrison S. Martland, *Punch Drunk,* 91 JAMA 1103, 1103 (1928).

24. *Id.*

25. *NFL Concussions Fast Facts*, CNN (Jan. 14, 2014), http://www.cnn.com/2013/08/30/us/nfl-concussions-fast-facts/index.html.

football after performing a series of autopsies on deceased NFL players.[26]

After the autopsies, Dr. Omalu discovered clumped tau proteins throughout their brains—the telltale sign attributed to CTE.[27] CTE results in the progressive degeneration of brain tissue,[28] which in turn leads to depression, dementia, confusion, impulse control problems, and aggression.[29] An alarming number of former NFL players have committed suicide and been diagnosed with CTE postmortem, including future NFL Hall of Famer Junior Seau.[30] The debilitating symptoms caused by CTE pose a major public health risk to contact-sport players.

Boston University Center for the Study of Traumatic Encephalopathy ("CSTE") specializes in studying CTE in football players. CSTE has diagnosed about 70 athletes and military personnel with CTE postmortem[31] and released new data that is extremely troubling for football's future: The threshold for developing CTE may be far lower than previously thought.[32] CTE has recently been diagnosed in high school and college players who do not have a concussion history.[33] The disease can

---

26. *Id.*

27. *What is CTE?*, BOS. U. CTE CENTER, http://www.bu.edu/cste/about/what-is-cte/ (last visited Feb. 17 2014).

28. *Id.*

29. *Id.*

30. Barry Wilner, *Junior Seau Had CTE, NIH Study Finds*, HUFFINGTON POST (Jan. 10, 2013), http://www.huffingtonpost.com/2013/01/10/junior-seau-cte-brain-disease_n_2446930.html.

31. Baugh, *supra* note 17, at 3.

32. *See id.* at 2 (discussing recent developments in the study of CTE, including the discovery that players can be susceptible to the disease even without a history of concussions).

33. *Brain Damage Found in Veterans, High School, College and Pro Athletes*, SCIENCEBLOG (Dec. 4, 2012),

develop over a few years. Additionally, subconcussive impacts may be sufficient to develop CTE.[34]

The importance of these discoveries cannot be overstated. Every position on the football field is subject to subconcussions throughout practices, games, and seasons. If a causal link is proven between subconcussions and CTE, and if CTE can develop during a high school career, liability could be debilitating for the game's lower levels.

Owen Thomas's death provides anecdotal evidence of the connection between subconcussive impacts and CTE. Thomas was a linebacker at the University of Pennsylvania.[35] He had no concussion history.[36] However, a linebacker's job includes tackling, plugging holes, and taking on lead blockers—responsibilities that certainly lead to subconcussions. After Thomas unexpectedly committed suicide,[37] his brain was given to Boston University and the CSTE discovered early signs of CTE.[38] Thomas's suicide has not been definitively linked to CTE, but it is difficult to imagine that the disease did not play a role in his decision to commit suicide.[39] This story illustrates that neither a full career in the NFL nor a concussion history is necessary to develop CTE.

---

http://scienceblog.com/58237/brain-damage-found-in-veterans-high-school-college-and-pro-athletes/.

34. Baugh, *supra* note 17, at 1.

35. Boozer, *supra* note 13.

36. *Id.*

37. *Id.*

38. *Id.*

39. Jordan Gaines Lewis, *From Sacks to Suicidality: Chronic Traumatic Encephalopathy and the NFL*, LIONS TALK SCIENCE (Jan. 6, 2014), http://lions-talk-science.org/2014/01/06/from-sacks-to-suicidality-chronic-traumatic-encephalopathy-and-the-nfl/ (discussing situations where players committed suicide and were subsequently diagnosed with CTE).

Before a scientific consensus can be reached about whether football causes CTE, additional research is needed. The disease has been linked to contact sports, indicating repeated head trauma is necessary for the disease to develop.[40] But many players do not develop CTE from participating in football, so head trauma is not sufficient by itself to develop the disease; other risk factors must contribute to its development.[41] The age a player is exposed to continued head trauma may be a factor in developing CTE.[42] There could also be a genetic component to the disease.[43] Until all risk factors are fully studied, CTE's prevalence and the complete causation will be unknown.

Until recently, CTE's causation and prevalence could not be fully studied, because the disease was only diagnosable postmortem.[44] Scientists could not track the disease's progression through a career and could not determine the number of players developing it. In 2013, scientists from UCLA developed scanning technology that detects the presence of tau protein in living human brains.[45] The methodology for diagnosis includes neuropsychiatric evaluations and injection of the biomarker FDDNP-PET into test subjects.[46] In the preliminary study, five former professional football players were tested for CTE.[47] All five

40. Baugh, *supra* note 17, at 5.

41. *Id.*

42. *Id.*

43. *Id.* at 6.

44. *See* Steve Fainaru & Mark Fainaru-Wada, *CTE Found in Living ex-NFL Players*, ESPN (Jan. 22, 2013), http://espn.go.com/espn/otl/story/_/id/8867972/ucla-study-finds-signs-cte-living-former-nfl-players-first-time.

45. Gary W. Small et al., *PET Scanning of Brain Tau in Retired National Football League Players: Preliminary Findings,* 21:2 AM. J. OF GERIATRIC PSYCHIATRY 138, 138-39 (2013).

46. *Id.*

47. Fainaru & Fainaru-Wada, *supra* note 44.

tested positive for a buildup of tau protein in their brains.[48] Even more recently, NFL Hall of Famer Tony Dorsett was diagnosed with CTE using this technology.[49] The scanning technology will allow scientists to track the progression of players' brains, determining the disease's prevalence and causation.

B. The Concussion Epidemic's History, the Pending Lawsuit, and Leagues' Responses

For two decades, the NFL denied there was a causal link between mild traumatic brain injuries in football and later cognitive impairment.[50] In the early 1990s, concussions to high-profile players like Steve Young and Troy Aikman prompted the NFL to act.[51] In 1994, NFL Commissioner Paul Tagliabue created the Mild Traumatic Brain Injury Committee ("MTBIC").[52] Appointed to lead the committee was the New York Jets team physician, Elliot Pellman.[53] Problematically, Dr. Pellman was a rheumatologist, not an expert in the human brain.[54] Dr. Ira Casson, who has a background in neuroscience, was later

48. *Id.*

49. William Weinbaum & Steve Delsohn, *Dorsett, Others Show Signs of CTE*, ESPN (Nov. 7, 2013), http://espn.go.com/espn/otl/story/_/id/9931754/former-nfl-stars-tony-dorsett-leonard-marshall-joe-delameilleure-show-indicators-cte-resulting-football-concussions.

50. Dan Diamond, *"League Of Denial" Portrays NFL as Villains. But Who will Care?*, FORBES (Oct. 8, 2013), http://www.forbes.com/sites/dandiamond/2013/10/08/league-of-denial-portrays-nfl-as-villains-but-who-will-care/.

51. Lauren Ezell, *Timeline: The NFL's Concussion Crisis*, PBS (Oct. 8, 2013), http://www.pbs.org/wgbh/pages/frontline/sports/league-of-denial/timeline-the-nfls-concussion-crisis/.

52. *Id.*

53. *Id.*

54. Diamond, *supra* note 50.

appointed co-chairman.[55] He, however, continued to deny a causal link.[56]

Starting in 2003, the MTBIC released 16 scientific papers that contradicted the results of studies linking concussions to long-term effects on the brain.[57] After Dr. Amalu published his discovery about CTE in deceased NFL players, the MTBIC called Dr. Amalu's science "voodoo" and publically told him to retract the study.[58] In 2007, the league distributed pamphlets to players stating that concussions were not attributed to long-term cognitive issues if treated properly.[59] In 2009, Dr. Casson denied a causal link at a Congressional hearing.[60] Later in the hearing, a congresswoman from California compared the NFL to the major tobacco companies, who denied a causal link between cigarettes and cancer through the 1980s.[61] In 2013, a Frontline documentary called "League of Denial,"

---

55. *Neurologist Denies Concussion-Disease Link*, CBS NEWS (Jan. 5, 2010), http://www.cbsnews.com/news/neurologist-denies-concussion-disease-link/.

56. Michael O'Keeffe*, Experts: Former NFL Doctor Ira Casson Should Have Head Examined on Brain Disorders Issue*, DAILY NEWS (Jan. 6, 2010),
http://www.nydailynews.com/sports/football/experts-nfl-doctor-ira-casson-head-examined-brain-disorders-issue-article-1.457792.

57. Tyler Conway, *Major Takeaways from "League of Denial: NFL's Concussion Crisis" PBS Documentary*, BLEACHER REP. (Oct. 9, 2013), https://bleacherreport.com/articles/1803977-major-takeaways-from-league-of-denial-nfls-concussion-crisis-pbs-documentary.

58. *Id.*

59. *Id.*

60. O'Keeffe, *supra* note 56.

61. Zach Braziller, *Documentary: NFL Downplayed Concussion Risks for Decades*, N.Y. POST (Oct. 9, 2013),
http://nypost.com/2013/10/09/documentary-nfl-downplayed-concussion-risks-for-decades/.

provided an excellent summary of the NFL's mishandling of the concussion epidemic.[62]

In 2010, the NFL, likely in an attempt to distance itself from the MTBIC, created a new committee—the Head, Neck and Spine Committee.[63] The NFL has changed its tone and policies regarding mild traumatic brain injuries since the new committee's implementation, which may be a signal the NFL is starting to take the mild traumatic brain injury epidemic seriously.

Despite the NFL's change in tone, former players filed a class action suit against the NFL in 2012.[64] The suit claimed the NFL had fraudulently concealed the link between football-related head impacts and long-term effects.[65] The lawsuit attracted 4,500 former players.[66] The lawsuit was initially settled between the parties in 2013 for $765 million dollars,[67] but in early 2014, U.S. District Court Judge Anita Brody rejected the proposed settlement, citing concerns that $675 million earmarked for player payments was not adequate to cover all of the players who

---

62. Tierney Sneed, *PBS's "League of Denial" NFL Concussion Documentary is Chilling but Will Anything Change?*, U.S. NEWS & WORLD REP. (Oct. 9, 2013), http://www.usnews.com/news/articles/2013/10/09/pbss-league-of-denial-nfl-concussion-documentary-is-chilling-but-will-anything-change.

63. Braziller, *supra* note 61.

64. *See* Sam Farmer, *Former Players Consolidate Concussion Lawsuits Against NFL*, L.A. TIMES (Jan. 7, 2012), http://articles.latimes.com/2012/jun/07/sports/la-sp-nfl-concussions-20120608.

65. *Id*.

66. Peter King, *Concussion Lawsuit Settlement a Win for the NFL*, SPORTS ILLUSTRATED (Aug. 29, 2013), http://www.si.com/nfl/2013/08/29/nfl-concussion-lawsuit-settlement.

67. *Id.*

would be eligible for payments.[68] In July of 2014, Judge Brody accepted a revised settlement that removed the cap on the NFL's liability.[69] The revised settlement implemented a formula for compensating former players based on the severity of their cognitive impairment and their age.[70]

The NFL has adopted a number of rules that increase player safety while mitigating liability risk. Rule changes adopted in 2011 included a prohibition on "launching tackles,"[71] and additional protections for defenseless players and quarterbacks.[72] In hopes of seeing fewer returns, kickoffs were moved from the 30-yard line to the 35-yard line.[73] In 2013, rule changes included

---

68. Jason M. Breslow, *Judge Rejects $765 Million NFL Concussion Settlement*, PBS (Jan. 14, 2014), http://www.pbs.org/wgbh/pages/frontline/sports/league-of-denial/judge-rejects-765-million-nfl-concussion-settlement/.

69. *Federal Judge Approves NFL Concussion Settlement*, NFL.COM (July 7, 2014), http://www.nfl.com/news/story/0ap2000000363672/article/federal-judge-approves-nfl-concussion-settlement.

70. *Id.*

71. According to NFL rules, an illegal launching tackle occurs when a player "(i) leaves both feet prior to contact to spring forward and upward into his opponent, and (ii) uses any part of his helmet (including the top/crown and forehead/"hairline" parts) to initiate forcible contact against any part of his opponent's body." 2013 OFFICIAL PLAYING RULES OF THE NATIONAL FOOTBALL LEAGUE, Rule 12 art. 7(b)(3), 68, *available at* http://static.nfl.com/static/content/public/image/rulebook/pdfs/2013%20-%20Rule%20Book.pdf.

72. Gary Fitzgerald, *NFL Emphasizes Player Safety in Rule Changes*, WASH. REDSKINS (May 24, 2011), http://www.redskins.com/news-and-events/article-1/NFL-Emphasizes-Player-Safety-In-Rule-Changes/5e259de0-8307-4b6e-8645-e73d4fa6a728.

73. Tom Lindley, *Kickoff Returns Less Thrilling after NFL Rules Change*, MCALESTER NEWS-CAPITAL (Oct. 12, 2013, last updated Sept. 12, 2014), http://mcalesternews.com/sports/x134979045/Kickoff-

penalties for ball carriers or tacklers who lead with the crown of their helmets, adding field goal snappers to the list of defenseless players, and outlawed peel-back blocks anywhere on the field.[74] Additionally, the NFL expanded its authority to fine or suspend players who violate player safety rules.[75] The NFL has not been afraid to use this power, notably fining Detroit Lions defensive lineman Ndamukong Suh $100,000 for violating player safety rules, the largest on-field fine in NFL history.[76]

Colleges have also adopted a number of player safety rules. Most notably, the NCAA adopted a targeting rule resulting in automatic ejection from the game.[77] If a player targets or initiates contact with the crown of the helmet, or purposely targets a defenseless opponent's head or neck, he will be ejected.[78] If the player commits this foul during the second half, he will also be suspended for the next game.[79] Rule changes at the college level indicate a similar shift toward player safety.

Recently, California reacted to the subconcussive threat by adopting a statute limiting the number of full-

---

returns-less-thrilling-after-NFL-rules-change. Kickoffs were moved back in hopes that fewer returns would lead to fewer injuries. *Id.*

74. Peter Berkes, *NFL Announces Rule Changes for 2013 Season*, SB NATION (Aug. 8, 2013), http://www.sbnation.com/nfl/2013/8/8/4594316/nfl-rule-changes-2013.

75. *Id.*

76. Carlos Monarrez, *NFL Upholds Ndamukong Suh's $100K Fine after Appeal*, USA TODAY (Oct. 12, 2013), http://www.usatoday.com/story/sports/nfl/lions/2013/10/12/detroit-lions-ndamukong-suh-fine-nfl-appeal/2970893/.

77. *Football Rules Changes to Watch for this Fall*, USA TODAY (Aug. 11, 2013), http://www.usatoday.com/story/sports/ncaaf/2013/08/11/college-football-2013-rules-changes-to-watch-for/2640199/.

78. *Id.*

79. *Id.*

contact practices a high school team can hold.[80] Teams are allowed to have two 90-minute full-contact practices a week during the season and preseason and zero full-contact practices during the offseason.[81] This law will undoubtedly cut down on the number of subconcussive impacts occurring during practices, but critics of the law point out that players will be less prepared to take the field.[82]

III. HIGH SCHOOL FOOTBALL LIABILITY POSES THE MOST IMMEDIATE THREAT TO THE FUTURE OF THE GAME

Literature on concussion liability tends to focus on the NFL. However, for a number of reasons, mild traumatic brain injury liability at the high school level may pose a greater threat to the sport's future. This section discusses why high schools may be exposed to liability and provides the legal framework for potential litigation.

A. Assessment of Leagues' Responses to CTE and the Vulnerability of High School Football

The NFL's previous denial of a causal connection between mild traumatic brain injuries and long-term cognitive defect is troubling. These facts, if proven in court, could lead to liability under the doctrines of fraudulent concealment or fraudulent misrepresentation. The NFL dodged immediate liability by settling with players but has done nothing to account for subconcussions. Going forward, the NFL and all other football leagues must confront two issues: (1) how to change the game to reduce

80. Carolyn Jones, *New Law Tackles High School Football Collisions Head-on*, SFGATE (July 22, 2014), http://www.sfgate.com/preps/article/New-California-law-limits-schools-full-contact-5636585.php.

81. *Id.*

82. *Id.*

the risk of subconcussive impacts; and (2) the level of football at which the changes should be implemented.

Regarding the first issue, the NFL and NCAA have changed on-field rules in an attempt to minimize mild traumatic brain injuries. However, the rules fail to prevent most subconcussive blows to the head. The changes are directed toward specific plays where violent impacts often occur—kickoffs, hits to the quarterback, and targeting exposed players who are running in the open field—because the public and media focus their attention on these obviously dangerous situations. The rules will, of course, reduce the number of concussions and are a good first step in curbing the number of mild traumatic brain injuries. But these changes will not prevent most subconcussions, because subconcussive blows are simply incidental to how football is taught. Statistical evidence shows tackle box players, particularly linemen, are subject to the most head impacts.[83] The new rules do almost nothing to protect tackle box players from subconcussions—no penalty can prevent impacts to the head resulting from properly executed blocks. The NFL and NCAA rule changes also do not account for practice. There are many dangerous drills and situations in practices that can lead to mild traumatic brain injuries. The game is currently taught in a way that does not account for subconcussions. For football to remain the premier American sport, the number of subconcussive impacts must be reduced.

California's approach, limiting the number of contact practices high school teams can sanction, will reduce the number of subconcussions more effectively than the NFL or NCAA rule changes, but will have unintended consequences. Limiting contact practices during the season will immediately reduce the number of subconcussions that

83. Broglio, *supra* note 18.

high school players sustain; players will be less exposed to contact. This is certainly the preferred result. However, coaches' ability to teach players proper techniques will be undermined. For example, if coaches do not have adequate time to teach correct tackling techniques, more players are likely to lead with their heads while tackling. An inability to teach correct technique is likely to increase the number of injuries (including mild traumatic brain injuries), because players will be less prepared to play the game safely. The California approach should reduce the number of head impacts, but the law's secondary effects prevent it from being an optimal solution.

Every level's response to mild traumatic brain injuries has been lacking. Later in the paper, a potential solution is proposed that aims to minimize subconcussive impacts while ensuring players are prepared to safely play the game.

The second issue confronting football is at which level reforms should be focused. Legal literature on the subject presupposes that the NFL's potential liability from the concussion epidemic provides the greatest threat to football's future.[84] This view is not unreasonable, but liability at the game's lower levels may actually present a greater risk to the NFL's future than liability at the NFL level. A supply chain of talent fuels the NFL, starting at organized football's lowest levels—youth leagues and high schools. The NFL relies on college football programs to develop the best football players.[85] In turn, college

84. *See, e.g.*, Joseph M. Hanna, *Concussions May Prove to be a Major Headache for the NFL*, 84 N.Y. ST. B.J. 10, 11 (2012); Bernstein, *supra* note 16.

85. The NFL relies mainly on the FBS ("Football Bowl Subdivision") when drafting players. However, the FCS ("Football Championship Series"), Division II, and Division III are a part of the

programs rely on high schools to supply talented players..[86] High schools are the first necessary level to the supply chain of talent. Interference with the necessary supply chain of talent would compromise the NFL's ability to maintain its current competitive level. As detailed in Section II, the dangers associated with CTE, especially to adolescent populations, have the potential to substantially interfere.

The level of football that is least insulated from liability should be the focus of reform efforts. The NFL and NCAA have large revenues, providing protection from CTE-related liability. These leagues can hire the best attorneys to represent their cases. They can settle litigation or pay out large judgments. The relative strength of these leagues in the supply chain is evidenced by the NFL's settlement, which includes no cap on liability payments. This is not to suggest that the NFL or NCAA can function forever under a large liability cloud, but they are certainly not the most vulnerable link in the supply chain.

High school football is different. Most school districts do not profit from sponsoring football.[87] Limited

---

player development process—though probably not an essential to the supply chain of talent.

86. Youth leagues are certainly a component of the supply chain, though not an essential one. Players can begin football in high school without being at a significant competitive disadvantage. For example, New England Patriots quarterback Tom Brady did not play football until high school. Patrick Hruby, Jake Simpson, & Hampton Stevens, *Can Youth Football Be Saved? (And Should It Be?)*, THE ATLANTIC (Nov. 15, 2013), http://www.theatlantic.com/entertainment/archive/2013/11/can-youth-football-be-saved-and-should-it-be/281536/.

87. For example, at Premont Independent School District, located in rural Texas, every football player cost the district $1,300 in 2012. Amanda Ripley, *The Case Against High-School Sports*, THE ATLANTIC (Sept. 18, 2013), http://www.theatlantic.com/magazine/archive/2013/10/the-case-

revenues come from ticket sales and donations. Large costs are associated with running teams. Coaches receive a salary, equipment is purchased and updated, and travel costs can be high. Fields and facilities, including weight rooms and practice areas, must be built and maintained. Many schools have freshman, junior varsity, and varsity rosters, further exacerbating costs. There is no nationwide data available on high school football costs and it is certainly possible that high-profile programs turn a profit, but it is unlikely most school districts profit from football.

There is, of course, subjective value in high school football. The sport teaches its players confidence, perseverance, and character. It often gives schools and communities a shared interest, something everyone can support. Currently, the small revenues and subjective values of football justify the costs expended by school districts. But if additional costs are added to the analysis, school districts may be forced to rethink their football-friendly policies.

The cost-benefit analysis associated with high school football will change if subconcussions cause CTE in adolescent populations—especially if CTE can readily develop in teenage populations. There are a number of parties whose decisions will affect whether high school football continues to exist, including players, families, and school districts. Player and family reactions will vary widely. Some students will continue to play while others will not. Ultimately, their decision is very subjective and difficult to project.

School districts, however, will have a more predictable response. The previously discussed costs and

---

against-high-school-sports/309447/?single_page=true. In fact, on average school districts spend more money per high school athlete than per high school math student. *Id.*

benefits will be weighed with the added effect of CTE. Factors school districts will consider include liability costs and the public policy consideration that schools' primary purpose is education, not sanctioning a sport that debilitates students' brains. These additional costs could fundamentally change school districts' thinking. High school football is the most vulnerable level on the supply chain of talent—potential reforms should focus there..

B. The Legal Framework at the High School Level

Critical to the liability question will be CTE's prevalence in high school football populations. Boston University has shown that high school players are susceptible to CTE, but the frequency of this susceptibility has not been determined. Until the scientific community reaches a consensus on the percentage of high school players developing the disease, liability is impossible to accurately project**.** Needless to say, the greater CTE's prevalence is in adolescent populations, the greater the threat is to football. UCLA's scanning technology will help to determine prevalence, highlighting its importance to the game's future.

The legal framework for CTE liability at the high school level is detailed below. While previous articles have discussed legal claims at the NFL level, they often disregard the effect CTE may have on the high school level.[88] Unlike the NFL, high schools have not fraudulently denied a connection between concussions and cognitive impairments. Therefore, liability should be analyzed under a tortious framework at the high school level. The elements of a tort claim include a legal duty, a breach of that duty, causation, and injury. Tort-based head injury lawsuits in

88. Bernstein, *supra* note 16, at 296; Hanna, *supra* note 84, at 13.

high school football have been filed,[89] but, because the risk from CTE is only now being scrutinized, no cases are based on CTE.

1. Duty

Generally, when a party acts, a duty of care exists to act reasonably. At this time, there is likely no common law duty of care regarding CTE because the prevalence in high school players has not been established. However, if preliminary studies are confirmed and a scientific consensus is established that repeated mild traumatic brain injuries, especially subconcussions, lead to CTE, a common law duty will certainly be placed on school districts.

A statutory duty can proactively be implemented to immediately minimize the number of concussive and subconcussive impacts seen in the game. Many states already have statutory duties regarding concussions in high school sports. These duties typically include three requirements: (1) a duty to inform student athletes about the dangers of concussions; (2) a duty to remove a player from competition if a coach reasonably believes a concussion has been sustained; and (3) a duty to keep a player who has sustained a concussion off the field until he has been cleared by a medical professional.[90]

These three statutory duties cannot simply be extended to CTE to manage liability risk. CTE is a latent disease that takes many years to diagnose and is not apparent when a single concussive impact is sustained. It

89. *See, e.g.*, Cerny v. Cedar Bluffs Junior/Senior Pub. Sch., 679 N.W.2d 198 (Neb. 2004).

90. *See, e.g.,* General Powers and Duties; Immunity; Delegation, ARIZ. REV. STAT. ANN. § 15-341(24)(b) (2013) (West); Concussion or head injury during school-sponsored athletic activity; removal from athletic activity; written clearance to return from licensed health care provider; information sheet; exception, CAL. EDUC. CODE § 49475 (West 2013) (amended 2014).

would be impossible to remove a player from competition after he sustained a subconcussion, because subconcussions cannot be immediately diagnosed. Likewise, clearance by a medical professional would achieve nothing in the context of CTE. The probability of developing CTE does not disappear after removing a player from the field for a week or two. However, it is reasonable to include a duty to inform student athletes about CTE and subconcussion dangers as a part of a statutory duty.

There are a number of actions state legislatures may take in response to the CTE epidemic, depending on what scientific studies conclude about CTE's prevalence. If economically feasible, school districts may have a duty to test student athletes for CTE or a duty to reduce the number of mild traumatic brain injuries. Finally, there is a remote possibility state legislatures could decide the risk of CTE is simply too great for school districts to sanction tackle football. In this situation, leagues would be forced to offer a watered-down version of football and it is possible an independent club model could develop outside of school districts' jurisdiction. Regardless, if scientific studies continue to indicate that CTE is prevalent in adolescent populations, legislatures and courts will be forced to implement duties of care.

2. Breach of Duty

School districts must breach a duty of care to be held liable. If a consensus is reached that CTE is prevalent and dangerous to high school football players, school districts will breach a common law duty of care if they do not act reasonably to mitigate the danger. A statutory duty to reduce mild traumatic brain injuries would work similarly. Action would be required in both instances to reduce the number of mild traumatic brain injuries in football. The specific action required would largely depend on the duty of care that is established. Likely scenarios for

complying with a duty of care would be limiting practice time (like California has), removing dangerous drills from practice, or teaching the game differently so players' heads are less exposed to impact.

3. Causation

Causation is the wild card. Studies indicate that players can develop CTE in high school and that subconcussions are sufficient to cause CTE. However, there is not yet enough evidence or research in the area to prove general causation in court. The UCLA scanning technology will be a critical component in determining general causation. If the scanning technology shows that high school football players develop CTE more prevalently than their counterparts who do not play football, general causation will be proven.

The specific causation question will be complicated and fact dependent. It is not clear exactly what factors lead to CTE, other than repeated mild traumatic brain injuries. There are a number of other risk factors that may contribute to CTE. Examples include the age of first head trauma and genetic susceptibility. Therefore, in court, a plaintiff would need to prove an alternative activity did not cause CTE. A plaintiff's ability to prove causation would depend on scientific study of the other risk factors associated with CTE.

4. Defenses

School districts will mount defenses. They may argue assumption of risk. Players understand a career of 20 or more years will have a detrimental effect on cognitive abilities. Assumption of risk is a legitimate defense for the NFL, but at the high school level, this defense is not likely to succeed. High school players do assume risks regarding knee, leg, arm, and even head injuries. But players who participate in football for only a few years do not expect to

develop a latent, long-term diseases impairing their cognitive abilities for rest of their lives. Schools have also not provided any warning about CTE that the player can choose to voluntarily assume. An assumption of risk defense at the high school level is unlikely to succeed.

School districts can also mount comparative negligence defenses. A player may be partially at fault when sustaining a concussion. For example, a player may tackle without proper technique. But even if a player is at fault for receiving a specific concussion, it would be difficult for a school district to quantify the number of mild traumatic brain injuries incurred throughout a career attributable to the fault of the player. Further, even if a school district succeeds in this defense, only a portion of the liability is assigned to the plaintiff and the rest is still assigned to the school district. Comparative negligence will thus provide relatively little protection to school districts.

5. Liability Mitigation

States often individually implement policies to mitigate liability. State athletic boards can also mandate rules. For example, in Arizona, the Arizona Interscholastic Association requires players to complete an online concussion education program.[91] Athletes and parents also must sign a form stating they are aware of the risks and symptoms of concussions.[92] Both of these policies may ultimately mitigate liability by showing there has been no breach of duty to inform and that players have assumed the risk of head injury. If these educational programs were expanded to teach about subconcussion and CTE, school

91. Sean Peick, *Arizona Proactive on Athletes' Concussions*, AZCENTRAL (June 3, 2013), http://www.azcentral.com/community/phoenix/articles/20130516arizona-proactive-high-school-athletes-concussions.html.

92. *Id.*

districts could potentially stand on an assumption of risk defense.

Other potential mitigation strategies exist. Express assumption of risk contracts relating to CTE can be mandated for any student who wishes to play high school football. State legislatures can indemnify school districts from CTE related liability. Though, indemnification is not particularly likely because legislatures are unlikely to create incentives for a sport that can have serious health consequences to players.

6. Policy Considerations

School districts and legislatures must consider education's role in society. The purpose of public education (or private education, for that matter) is to develop students' minds so they can live successful and fulfilling lives. Exposing students to long-term cognitive defects manifestly impedes the role of schools in America. All parties will need to strongly consider the purpose of education when deciding CTE-related policy.

C. Liability Conclusion

A duty to counteract CTE at the high school level can be mandated through either statute or common law, though there is likely no duty of care at this time. If CTE's prevalence at the high school level is above a nominal threshold, school districts will likely be required by common law to counter dangers posed by CTE. If a CTE statutory duty is adopted, school districts will need to find a way to lower the number of mild traumatic brain injuries players sustain. Whether the duty is breached will largely depend on what kind of duty is imposed. Central to the liability analysis will be the policy consideration that educational institutions should support education and not make students susceptible to a debilitating cognitive defect.

Liability associated with CTE could become a serious threat in the next few years. School districts' future cost-benefit analyses regarding football may change dramatically. A combination of liability and public policy concerns could create a mandate that the game become safer. If high schools fail to turn out talented players, both the NCAA and the NFL will also be dramatically affected. Mild traumatic brain injuries and CTE may pose a significant threat to the future of football if proactive legislation is not implemented.

IV. PROPOSED STATUTORY DUTIES OF CARE

It is essential that preventative measures against mild traumatic brain injuries be the focus of any solution. Minimizing the kinds of contact that lead to concussions and subconcussions is key. However, the legal response's severity should depend largely on what scientists conclude CTE's prevalence is in adolescent football playing populations. At this time, legislatures have three options because of the uncertain prevalence. First, lawmakers can decide that no changes to football are necessary until a scientific consensus is reached about prevalence. Second, lawmakers can decide a proportional response is needed, putting coaches, students, and school districts on notice about the possible dangers of subconcussions without substantially interfering with the competitiveness of football. Third, lawmakers can immediately take drastic steps to curb the number of mild traumatic brain injuries, even if the legislation materially affects competitiveness.

When lawmakers are deciding which option to take, it is important that the dangers associated with CTE are weighed against the effect possible legislation will have on competitiveness. The third option—immediately impeding the game's competitiveness—is not appropriate at this time. Until a consensus is reached on prevalence and causation, football's competitiveness should not be substantially

undermined, because doing so would certainly hurt the sport's commercial success at all levels. Likewise, lawmakers' first option—to do nothing until the danger is adequately studied—is not the proper approach because of public policy concerns. It is clear CTE can develop in adolescent populations and that mild traumatic brain injuries can lead to CTE. Legislatures should not sit on their hands when the potential risk to student-athletes is so high. At this time, a proportional, proactive response is appropriate.

A. Proactive Model Statute

If lawmakers decide option two is best, they should implement a proactive statutory duty of care. Any duty imposed must balance competitiveness against dangers associated with CTE. Because the disease's prevalence has not been determined, a duty should not obliterate football's competitive spirit. The proactive duty's intent would be: (1) to notify school districts and coaches about the dangers of subconcussions and CTE (notice is critical because of how new this problem is); and (2) to mandate the removal of exceedingly dangerous situations. Proposed model language for the duty is:

> *School districts and coaches of high school football have a legal duty to minimize the risk of Mild Traumatic Brain Injuries to players, unless it is reasonably believed a change to comply with that duty would affect the team's competitiveness.*
>
> *a. Mild Traumatic Brain Injury means any impact to a player's head or body that may reasonably result in a Concussion or a Subconcussion.*

Under this statutory scheme, coaches would be given deference. If a coach reasonably believes a change to strategy would affect the team's competitiveness, there is no duty to reduce the risk of subconcussive impacts. This carve-out is meant to balance competitive concerns against the risks posed by subconcussions. Because CTE's prevalence has not been determined, more restrictive language is not appropriate. However, this duty will put coaches and school administrators on notice about the dangers of mild traumatic brain injuries; notice is a primary objective of this statute, because teenage susceptibility to CTE is not common knowledge.

This statute would only place a duty on coaches to remove the most dangerous drills that do nothing for competitiveness. For example, some teams run a "Circle Drill," where an individual player is circled by teammates.[93] A coach calls out the number of a player on the outside, who then runs at the unsuspecting player in the middle of the circle with the intention of leveling him. This drill is typically used to punish particular players or to make players tough. A coach cannot reasonably believe that omitting this drill would affect the team's competitiveness. Coaches would be under a legal duty to omit this drill or any other obviously dangerous drill without a pro-competitive component.

B. Reactive Model Statute

In the future, a scientific consensus may determine CTE's prevalence in high school players is beyond a nominal threshold. Should this happen, the public will demand action because of the scope of the public health concern. A stronger, reactive, statutory duty would be

93. *Football Tackling Drills – The Circle Drill*, FOOTBALL TUTORIALS, http://www.football-tutorials.com/football-tackling-drills-the-circle-drill/417/ (last visited Sept. 7, 2014).

appropriate. If this worst-case scenario comes to pass, I recommend an updated statutory scheme:

> *School districts and coaches of high school football have a legal duty to* ***remove*** *the risk of Mild Traumatic Brain Injuries to players, unless it is reasonably believed the removal of the risk would* ***substantially*** *affect the team's competitiveness.*
>
> *a. Mild Traumatic Brain Injury means any impact to a player's head or body that may reasonably result in a Concussion or a Subconcussion.*

The reactive statute would require coaches to remove many unsafe drills and schemes from their coaching methodologies. This language, once again, contemplates the balance of competitiveness and the risks posed by mild traumatic brain injuries. In this hypothetical situation (where CTE's prevalence in high school football players is determined to be high), the dangers associated with CTE are substantial, so impeding the game's competitiveness is appropriate. Coaches would be required to omit any drills or schemes that reasonably lead to subconcussions, unless the team's ability to compete would be substantially affected. Under this statute, coaches would be required to reexamine how the game is taught.

One example highlights the difference between the proactive and reactive statutes. During an "Oklahoma Drill,"[94] an offensive lineman and defensive lineman line up against each other. A running back lines up behind the offensive lineman. The running back tries to "score" and the defensive lineman attempts to stop him. The drill leads

94. Ron Borges, *Today's Players Don't Know the Drill*, THE BOSTON GLOBE (July 29, 2006), http://www.boston.com/sports/football/patriots/articles/2006/07/29/todays_players_dont_know_the_drill/.

to substantial collisions, likely causing mild traumatic brain injuries, but it also teaches players competitive techniques. Under the proactive statute, this drill is allowed—a team's competitiveness would be affected if the drill was omitted. However, under the reactive statute, the question is whether omitting the drill would *substantially* affect competition. I would suggest competition is substantially affected only when safer competitive drills that teach the same techniques are not available. Here, there are many safer options. Players can practice attacking a football sled, can do three-quarter speed-tackling drills, and can practice full speed against players holding blocking pads. Because safer options teaching the same techniques exist, the drill would not be allowed under the reactive statute.

It is important to note that this article only recommends the reactive statute if CTE's prevalence is substantial in high school football populations. The statute would materially affect how football is coached and played. The change would almost certainly drive people from the game and lead to watered-down football. It would be imprudent to over-regulate an industry before a scientific consensus has been reached about the danger posed. However, in the event CTE's prevalence is high, the statute may help to save football. It will act as a middle ground between parties. Many in society would be calling for a prohibition on high school football because of the dangers posed to the nation's teenagers. This statute could act as a compromise, allowing football to continue, albeit in a watered-down state.

There is one overriding issue with both the proactive and reactive statutes. Because of the subjective language, coaches and school districts will have difficulty determining exactly what is required to fulfill their duty of care. To combat this issue, I recommend states further define the ambiguous language within the statute. For

example, legislatures could define the kind of conduct that "affects the competitiveness" and "substantially affects the competitiveness." This method would also allow each state to individually contour laws and provide guidance to school districts.

Because the ultimate goal of these statutes is to reduce the number of mild traumatic brain injuries, one may ask why California's approach is not the correct course of action. California's law limits the number of full contact practices teams can hold, leading to a reduction in mild traumatic brain injuries. However, the California law does not contemplate players' competitiveness or readiness to take the field—the proposed statutes' hallmark. To varying degrees, both the proactive and reactive statutes reduce subconcussions while ensuring players are ready to take the field. Under the California law, players may not be prepared to safely play the game.

V. CONCLUSION

Subconcussions have been linked to CTE's development. High school players have developed CTE, even without a concussion history. If CTE is prevalent in adolescent populations, the existence of high school football will immediately be threatened. The NCAA and NFL will be relatively insulated from liability, when compared to high school leagues. High school programs act as a farm system for higher levels of football; if high school football falters, all levels of football will be in trouble. Without functioning high school football programs, the supply chain of talent will be broken.

Currently, there is not an adequate legal framework in place to deal with the issues posed by CTE. The two model statutory duties of care are intended to reduce the number of mild traumatic brain injuries seen in the game. The first is directed to the present day—the statute is meant

to put coaches and school districts on notice about the dangers posed by subconcussions but will not seriously affect the sport's competitiveness. The second statute contemplates a hypothetical future where there is consensus on CTE's prevalence in high school players. This statute may lead to reduced competition on the field but will serve as a compromise between proponents and opponents of high school football. Ultimately, I am hopeful the second statute is never necessary—that the game does not pose a major health threat to adolescent populations. However, it is important that leagues and lawmakers be prepared to handle this potential public health risk.