

Missouri Law Review

Volume 83 | Issue 3

Article 5

Summer 2018

In Search of the Final Head Ball: The Case for Eliminating Heading from Soccer

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N. Jeremi Duru, *In Search of the Final Head Ball: The Case for Eliminating Heading from Soccer*, 83 Mo. L. REV. (2018)

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*N. Jeremi Duru**

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I. INTRODUCTION

Soccer is unquestionably the world's most popular sport.¹ Two hundred and eleven countries have national soccer associations,² hundreds of millions of people across the globe play recreationally,³ and Fédération Internationale de Football Association's ("FIFA") quadrennial World Cup soccer tournament is unchallenged as the highest profile⁴ and highest grossing sporting competition on Earth.⁵ Notwithstanding its popularity, however, soccer sits at a troubling crossroads as the sport's governing bodies grapple with the impact that the risk of brain injury is having on the game.⁶ Soccer is, of course, not alone in this regard. The risk of brain injury exists in all team contact sports, most famously in American football ("football"), which provides a cautionary tale from which soccer could stand to learn.⁷

As evidence reflecting the epidemic of brain injury in football began to pile up in the early 2000s, the National Football League ("NFL"), far and away the world's leading football entity, was slow to react. The NFL initially discounted the connection between football and brain injuries and, in some cases, sought to delegitimize those who challenged the league.⁸ Eventually, the NFL acknowledged the dangers attendant to playing football and has since instituted a bevy of rule changes to protect the players' heads.⁹ Notwithstanding the rule changes, violent collisions causing damage to the head continue at an alarming rate. During the 2017 NFL season, players suffered 281 concussions, up 13.5%

1. Ira Boudway, *Soccer Is the World's Most Popular Sport and Still Growing*, BLOOMBERG (June 12, 2018), <https://www.bloomberg.com/news/articles/2018-06-12/soccer-is-the-world-s-most-popular-sport-and-still-growing>. A recent survey conducted by Nielsen found that more than 43% of individuals indicated interest in the sport. *Id.* The next closest sport was basketball, with 36% of individuals indicating interest. *Id.*

2. *Associations*, FIFA, <https://www.fifa.com/associations/> (last visited Sept. 1, 2018). Some even call FIFA the "United Nations of Football." *Id.*

3. Matthias Kunz, *265 Million Playing Football*, FIFA MAG., July 2007, at 10, https://www.fifa.com/mm/document/fifafacts/bcoffsurv/emage_9384_10704.pdf.

4. Zack Pumerantz, *Ranking the Biggest Events in Sports*, BLEACHER REP. (July 6, 2012), <https://bleacherreport.com/articles/1247928-ranking-the-biggest-events-in-sports#slide0>.

5. Michael Sheetz, *Here's Who is Getting Rich off of the World Cup*, CNBC: SPORTS BUS. (June 14, 2018), <https://www.cnbc.com/2018/06/14/the-business-of-the-world-cup--who-makes-money-and-how-much.html>.

6. *See infra* Part IV.

7. *See infra* Section III.B.

8. Barry Petchesky, *A Timeline of Concussion Science and NFL Denial*, DEADSPIN (Aug. 30, 2013, 11:22 AM), <http://deadspin.com/a-timeline-of-concussion-science-and-nfl-denial-1222395754>.

9. *E.g.*, *New NFL Rules Designed to Limit Head Injuries*, NFL (Aug. 6, 2010, 5:33 PM), <http://www.nfl.com/news/story/09000d5d81990bdf/article/new-nfl-rules-designed-to-limit-head-injuries> (last updated July 26, 2012, 8:40 PM).

from 2016.¹⁰ Indeed, many in the NFL community quietly concede that the violence inherent in football unavoidably risks head trauma.¹¹

Soccer, however, is different. When not challenging for the ball, contact beyond that which is incidental is not permitted; even when challenging for the ball, challenges are to be made with the feet in the area of the ball – generally at another player’s feet.¹² Moreover, to the extent that any pushing, striking, charging, or jumping deemed dangerous by the referee accompanies the challenge, the opposing team will receive the ball.¹³ In contrast, dangerous pushes, strikes, charges, and jumps are part and parcel of football and are generally encouraged and even demanded.¹⁴

Soccer encourages and demands one action, however, that puts the head in consistent danger: heading the ball.¹⁵ Thirty percent (30%) of concussions in soccer occur when two players attempt to head the ball at the same time, resulting in head clashes or heads colliding with other body parts or the ground.¹⁶ The desired outcome of an attempted header – head to ball impact – causes untold damage as well.¹⁷ This Article, therefore, argues that soccer’s governing bodies should eliminate the practice of heading from the game. Doing so would protect generations of soccer players to come and would limit

10. *NFL Releases Injury Data for 2017 Season*, NFL (Jan. 26, 2018, 4:43 PM) <http://www.nfl.com/news/story/0ap3000000911123/article/nfl-releases-injury-data-for-2017-season> (last updated Jan. 26, 2018, 5:48 PM).

11. *See, e.g.*, JACK ROGER, *TRAUMATIC BRAIN INJURY AND THE NFL: A STUDY OF THE CONFLUENCES OF MEDICINE, ETHICS, AND SOCIAL MORES IN PROFESSIONAL FOOTBALL* 37–40 (May 2017) (unpublished honors thesis, Baylor University), https://baylor-ir.tdl.org/baylor-ir/bitstream/handle/2104/9980/Jackson_Rogers_HonorsThesis.pdf?sequence=1&isAllowed=yir/bitstream/handle/2104/9980/Jackson_Rogers_HonorsThesis.pdf?sequence=1.

12. *See* THE INT’L FOOTBALL ASS’N BD., *LAWS OF THE GAME 2017/18* 97 (June 1, 2017), https://resources.fifa.com/mm/document/footballdevelopment/refereeing/02/90/11/67/lawsofthegame2017-2018-en_neutral.pdf.

13. *Id.* at 97, 99.

14. *See* Naveen Jain, *Can We Change the Culture of Violence in Football and Still Retain the Sport We Love?*, FORBES (Mar. 21, 2012, 2:22 PM), <https://www.forbes.com/sites/naveenjain/2012/03/21/can-we-change-the-culture-of-violence-in-football-and-still-retain-the-sport-we-love/#3ad6825d1f19>. It was discovered that at least one NFL team had instituted a “bounty” type program where players would be compensated for injuring members of opposing teams. *Id.*

15. Heading a ball entails hitting the ball with the upper portion of the forehead, near the hairline, to redirect and move the ball. *Heading the Ball in Soccer*, SOCCER TRAINING INFO, http://www.soccer-training-info.com/soccer_heading.asp (last visited Sept. 1, 2018). The move can be used offensively or defensively and from a standing, jumping, or diving position. *Id.*

16. *Mehr v. Fédération Internationale De Football Ass’n*, 115 F. Supp. 3d 1035, 1062–63 (N.D. Cal. 2015); *see also* Mike Woitalla, *Headgear Not Recommended in U.S. Soccer’s Concussion Prevention Campaign*, SOCCER AMERICA (Dec. 3, 2015), <https://www.socceramerica.com/publications/article/66798/headgear-not-recommended-in-ussoccers-concussi.html>.

17. *See infra* Part IV.

potentially wide-spread liability among soccer governing bodies, as well as the ensuing economic consequences, ensuring the continued existence of “The Beautiful Game.”¹⁸

Part II of this Article offers a primer on brain trauma and its incidence in contact sports. Part III details the historical relationship between soccer and football, the ties that bind them, and each game’s position vis-a-vis the other in the pecking order of American sports. Part IV explores the underappreciated danger of brain trauma that playing soccer poses. Part V examines the inefficacy of headgear in protecting soccer players’ brains. Part VI tracks the technological advances in soccer ball development that have led to increased heading and examines the movement to reduce heading in youth, but not adult, soccer. Part VII concludes that for the safety of soccer players and the future of the game, heading should be eliminated from soccer at all levels.

II. A BRAIN TRAUMA PRIMER

The human brain is a wondrous organ. It exercises control over the body’s other organs, and its size and power separate humans from other animals.¹⁹ The brain’s soft gelatinous consistency, however, renders it extremely delicate.²⁰ Although the skull and the fluid in which the brain is suspended protects the brain, a blow to the head or a sudden head movement can send the

18. “The Beautiful Game” is a common nickname for soccer. See Nick Harper, *Interview Stuart Hall*, GUARDIAN (May 2, 2003, 5:05 AM), <https://www.theguardian.com/football/2003/may/02/newsstory.sport11>.

19. See Tanya Lewis, *Human Brain: Facts, Functions & Anatomy*, LIVE SCI. (Mar. 25, 2016, 2:51 PM), <https://www.livescience.com/29365-human-brain.html>. “Humans . . . have more neurons per unit volume than other animals Humans also have the largest frontal lobes of any animal” *Id.*

20. See Jennifer Welsh, *This Incredible Video of a Freshly Harvested Brain Shows How Amazingly Fragile It Really Is*, BUS. INSIDER (Nov. 19, 2013, 6:03 PM), <http://www.businessinsider.com/video-shows-how-amazingly-fragile-the-brain-2013-11>.

brain sloshing in its fluid against the inside of the skull,²¹ causing mild traumatic brain injury commonly known as a concussion.²²

The Center for Disease Control (“CDC”) defines a concussion as “creating chemical changes in the brain and sometimes stretching and damaging brain cells.”²³ Symptoms include headache, confusion, blurred vision, dizziness, nausea, irritability, sensitivity to light, and difficulty sleeping.²⁴ Sometimes symptoms manifest immediately, and sometimes they take days, weeks, or months to develop.²⁵ Through rest and avoiding strenuous physical activity, most people will recover from a concussion.²⁶ But if one sustains a second concussion before the first has healed, the individual could experience second-impact syndrome, which can have catastrophic consequences, including severe

21. See Jeanne Marie Laskas, *Bennet Omalu, Concussions and the NFL: How One Doctor Changed Football Forever*, GQ MAG. (Sept. 14, 2009), <http://www.gq.com/story/nfl-players-brain-dementia-study-memory-concussions> (statements of Julian Bailes). Bailes believes that players helmets do not soften the blow of physical contact made during a play, explaining,

Helmets are not the answer. The brain has a certain amount of play inside the skull. It’s buoyed up in the cerebral spinal fluid. It sits in this fluid, floats. When the head suddenly stops, the brain continues, reverberates back. So [sic] when I hit, *boom*, my skull stops, but my brain continues forward for about a centimeter. *Boom, boom*, it reverberates back. So [sic] you could have padding that’s a foot thick. It’s not going to change the acceleration/deceleration phenomenon.

Id. (alterations in original).

22. DEP’T OF HEALTH & HUM. SERV., HEADS UP: FACTS FOR PHYSICIANS ABOUT MILD TRAUMATIC BRAIN INJURY (MTBI) 2, <https://stacks.cdc.gov/view/cdc/12340> (last visited Sept. 1, 2018) (“[M]ild Traumatic Brain Injury is used interchangeably with the term concussion [and] . . . is caused by a blow or jolt to the head that disrupts the function of the brain.”).

23. *What is a Concussion*, CTR. FOR DISEASE CONTROL AND PREVENTION, https://www.cdc.gov/headsup/basics/concussion_what.html (last updated Jan. 31, 2017).

24. *Concussions: How They Can Affect You Now and Later*, HEALTH UNIV. OF UTAH (Nov. 17, 2016, 12:00 AM), <https://healthcare.utah.edu/healthfeed/postings/2016/11/concussion.php> [hereinafter *Concussions*]; *What Are the Signs and Symptoms of Concussion?*, CTR. FOR DISEASE CONTROL AND PREVENTION, <https://www.cdc.gov/traumaticbraininjury/symptoms.html> (last updated Feb. 16, 2015).

25. *What Are the Signs and Symptoms of Concussion?*, *supra* note 24 (“[S]ymptoms may not show up for hours or days.”); *Post-Concussion Syndrome*, MAYO CLINIC (July 28, 2017), <https://www.mayoclinic.org/diseases-conditions/post-concussion-syndrome/symptoms-causes/syc-20353352> (“[S]ymptoms occur within the first seven to [ten] days and go away within three months. Sometimes, they can persist for a year or more.”).

26. *Recovery from Concussion*, CTR. FOR DISEASE CONTROL AND PREVENTION, https://www.cdc.gov/headsup/basics/concussion_recovery.html (last updated June 26, 2017).

brain swelling and sometimes death.²⁷ Even if a person has not suffered an additional concussion, multiple concussions over time can produce long-term neurological damage and consequent functional deficits.²⁸

Not all blows, of course, are concussive. Sub-concussive impacts are those that cause the brain to bounce against the skull but do not produce concussion symptoms.²⁹ While long deemed to be only minimally damaging, current research suggests that an accumulation of sub-concussive blows, like multiple concussive blows, can be neurodegenerative.³⁰

Both concussive and sub-concussive blows are common in contact sports, with some athletes seemingly more prone to their effects than others, both acutely and in the long term.³¹ Why some athletes are more prone than others is not known,³² but for those who suffer most from the long-term effects of these blows, the consequences can be devastating.³³ While the neurodegeneration can manifest in different ways, it can ultimately result in Chronic Traumatic Encephalopathy (“CTE”), a protein accumulation that interferes with

27. *Second Impact Syndrome*, BRAINANDSPINALCORD.ORG, <http://www.brainandspinalcord.org/second-impact-syndrome/> (last visited Sept. 1, 2018).

28. David Cifu, *Repetitive Head Injury Syndrome*, BRAINLINE, http://www.brainline.org/content/2008/08/repetitive-head-injury-syndrome_page-all.html (last visited Sept. 1, 2018).

29. Emily Boerger, *The Sub-Concussive Impact*, B.U. NEWS SERV. (Feb. 23, 2017), <http://bunewsservice.com/sub-concussions-a-threat-to-brain-health/>.

30. Brian Johnson et al., *Effects of Subconcussive Head Trauma on the Default Mode Network of the Brain*, 31 J. NEUROTRAUMA 1907, 912 (2014), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4238241/>. Neurodegeneration is devastating because the neurons, which are responsible for transmitting and receiving the signals that allow humans to function, cease to function properly. See Serge Przedborski et al., *Neurodegeneration: What is It and Where are We?*, 111 J. CLINICAL INVESTIGATION 3, 3 (2003), <https://doi.org/10.1172/JCI17522>; see also *Types of Neurons*, QUEENSLAND BRAIN INST., <https://qbi.uq.edu.au/brain/brain-anatomy/types-neurons> (last visited Sept. 1, 2018).

31. Michael Saulle & Brian D. Greenwald, *Chronic Traumatic Encephalopathy: A Review*, 2012 REHABILITATION RES. PRAC. 1, 2–4 (2012), <http://dx.doi.org/10.1155/2012/816069>. There are an estimated 1.6–3.8 million reported sport-related concussions in the United States each year. *Id.* at 1.

32. See Eric Niller, *Finding a Link Between Genes and Brain Injury: Are Some People Predisposed to Trauma?*, WASH. POST (May 5, 2014), https://www.washingtonpost.com/national/health-science/finding-a-link-between-genes-and-brain-injury-are-some-people-predisposed-to-trauma/2014/05/05/c2d9dd06-c49e-11e3-bcec-b71ee10e9bc3_story.html?utm_term=.8d78a826aee6. One theory is that a player’s genetics may contribute to susceptibility to concussions. *Id.*

33. See *Concussions*, *supra* note 24. Reported long term effects include memory problems, sensitivity to light, sleep disturbances, smell and taste disorders, concentration problems, irritability, depression, and other personality changes and psychological problems. *Id.* “In fact, [the medical community] think[s] that some suicides may be linked to brain damage that results from multiple concussions.” *Id.*

neuron function and causes the brain to atrophy.³⁴ As the brain atrophies, symptoms progress from those associated with concussion – such as confusion and dizziness – to debilitating dementia and death.³⁵

Once known as *dementia pugilistica*, because it was believed to exist principally in boxers (known also as *pugilists*),³⁶ CTE is now recognized as occurring in athletes who play non-combat contact sports, as well.³⁷ And because there is no way to know which athletes are most likely to develop CTE or other forms of brain trauma, athletes who play contact sports and their loved ones are justified in their concerns regarding blows to the head.

These fears have cast a pall over football's future and, in the views of some, have opened the door for soccer to fill the void. If soccer is able to address its own head trauma concerns and fills that void, it would represent another chapter in the complex, longstanding relationship between these two sports. Moreover, it might take a few steps toward football's current spot atop the professional American sporting hierarchy.

III. SOCCER, FOOTBALL, AND THEIR INTERACTION IN THE UNITED STATES

A. Soccer and Football in the United States: Born of One

Historians regard an athletic contest held on November 6, 1869, between Princeton University and Rutgers University as America's first football game

34. Kara Rogers, *Chronic Traumatic Encephalopathy (CTE)*, ENCYCLOPAEDIA BRITANNICA (June 4, 2014, 8:15 PM), <https://www.britannica.com/science/chronic-traumatic-encephalopathy> (last updated Apr. 21, 2016).

35. P. W. Schofield et al., 62 J. NEUROLOGY, NEUROSURGERY & PSYCHIATRY 119, 122 (1997) (footnote omitted) (“Our results indicate that head injury may be associated with an earlier age at onset of Alzheimer's disease, and are consistent with the results of several previous case-control studies, which suggest that a history of head injury with loss of consciousness may be a significant risk factor for Alzheimer's disease.”); cf. Ike Swetlitz, *Head Trauma Link to ALS Strengthened with Findings of NFL Player Kevin Turner's Autopsy*, STAT NEWS (Nov. 3, 2016), <https://www.statnews.com/2016/11/03/cte-als-kevin-turner-autopsy/> (finding Turner died of a degenerative brain disorder caused by head trauma – ALS); Bob Hohler, *Former Patriot Kevin Turner Died from CTE, Not ALS*, BOSTON GLOBE (Nov. 3, 2016), <https://www.bostonglobe.com/sports/patriots/2016/11/03/former-patriot-kevin-turner-died-from-cte-not-als/vdCA0YQQPINV1oHDfy9liP/story.html>.

36. See David Noonan, *Boxing and the Brain*, N.Y. TIMES MAG. (June 12, 1983), <http://www.nytimes.com/1983/06/12/magazine/boxing-and-the-brain.html?page-wanted=all>. It is also known as “punch drunk syndrome.” *Id.*

37. See Saulle & Greenwald, *supra* note 31, at 2; see also Stephanie Smith & Dan Moriarty, *First Major League Baseball Player Diagnosed with CTE*, CNN, <https://www.cnn.com/2013/12/15/health/baseball-ryan-freel-cte-suicide/index.html> (last updated Dec. 15, 2013, 8:51 PM).

as well as its first soccer game.³⁸ By that time, however, soccer was firmly established on the global scene.³⁹

When and where in human history a group of people first kicked a roughly round object amongst each other is unclear, but some form of “kicking game” has existed since ancient times, and virtually every world culture has seen a version of it.⁴⁰ The ancient Greeks played, as did the Romans.⁴¹ So, too, did the Chinese and the Japanese.⁴² And when the Pilgrims landed in what is now Massachusetts, the Native Americans they encountered played a “kicking game” called “Pasuckquakkohowog,” which often involved “entire villages” playing on a massive patch of ground.⁴³ Those games, however, are related to modern-day soccer only in that they involved the act of kicking a ball or something like it.⁴⁴ The concept of two opposing teams on a bounded playing surface, each defending its own goal while simultaneously working to kick the ball through the other team’s goal, is generally credited to the nineteenth-century English.⁴⁵ Before long, English expatriates began spreading the game to other nations, including the United States.⁴⁶ It was a form of the English game, combined with aspects of rugby, that pitted Princeton and Rutgers in the 1869 match.⁴⁷

Although the game would not be recognizable today as either football or soccer, it featured characteristics of both sports. As in soccer, the players used a round ball and were permitted to strike it with their feet.⁴⁸ As in football, however, players were able to catch the ball, and they recorded points by kicking the ball between two upright posts.⁴⁹ On that November day in New Brunswick, New Jersey, soccer stood even with football on the American sporting landscape.⁵⁰ But not long thereafter, the aspects of the Princeton-Rutgers game characterizing football and those characterizing soccer would drift apart, ultimately birthing two separate sports.⁵¹ Universities interested in competing in intercollegiate athletics seemed to prefer the “handling” aspects of the game to

38. ANDREI S. MARKOVITS ET AL., OFFSIDE: SOCCER & AMERICAN EXCEPTIONALISM 71 (2001).

39. DAVID GOLDBLATT, THE BALL IS ROUND: A GLOBAL HISTORY OF SOCCER 86–95 (2006).

40. *Id.* at *passim*.

41. *Id.* at 13.

42. *Id.* at 6.

43. MARKOVITS ET AL., *supra* note 38, at 69–71.

44. *Id.* at 70.

45. *Id.* at 71–72; *see also* GOLDBLATT, *supra* note 39, at 30.

46. *See* DAVID WANGERIN, SOCCER IN A FOOTBALL WORLD: THE STORY OF AMERICA’S FORGOTTEN GAME, 22–21 (2006).

47. MARKOVITS ET AL., *supra* note 38, at 71–72.

48. WANGERIN, *supra* note 46, at 20. The ball was also allowed to be “buted with the head.” *Id.*

49. *Id.*

50. MARKOVITS ET AL., *supra* note 38, at 71–72.

51. WANGERIN, *supra* note 46, at 20–22.

its “kicking” aspects.⁵² And, in 1876, four of them founded the “Intercollegiate Football Association” to compete in a game closely related to football as we know it today but without any trace of soccer.⁵³

B. Football’s Violent Ascension

The “handling” game quickly became a national fixture due in no small part to its brutal physicality, which reflected a phenomenon squarely at the root of late-nineteenth-century American identity: violent, militaristic conquest.⁵⁴ When football was born, America was barely one hundred years old and only narrowly removed from both its bloody birth in the Revolutionary War and its even bloodier internal struggle in the Civil War.⁵⁵ And before, throughout, and after both wars, Americans slowly marched across the country – from east to west – exterminating the Native Americans who previously inhabited the land.⁵⁶ The nation was young, but both violence and conquest were central to its burgeoning identity.⁵⁷ It is no wonder, therefore, that America’s new sport celebrated conquest through violence and grew so popular.⁵⁸

At base, writes Joseph L. Price in *From Season to Season: Sports as American Religion*, “the object of [football] is the conquest of territory.”⁵⁹

52. *See id.* at 21.

53. *Id.* at 21–22.

54. *See* SAL PAOLANTONIO, HOW FOOTBALL EXPLAINS AMERICA 8–10 (2008); *see also* DAVE ZIRIN, GAME OVER: HOW POLITICS HAS TURNED THE SPORTS WORLD UPSIDE DOWN 155 (2013) (“The heart of the founding of modern athletics was economic elites sending their children to die in Ivy League football games merely because they were terrified that they wouldn’t be tough enough to lead conquests abroad and industrial brutality at home.”).

55. *See* PAOLANTONIO, *supra* note 54, at 8. The Revolutionary War ended in 1783, the Civil War ended in 1865, and the first official football game was in 1869. *Id.*; U.S. DEP’T VETERANS AFF., AMERICA’S WARS, https://www.va.gov/opa/publications/factsheets/fs_americas_wars.pdf (last visited Sept. 1, 2018).

56. *See* PAOLANTONIO, *supra* note 54, at 8–10.

57. *See id.*

58. *See id.*

59. Joseph L. Price, *The Superbowl as Religious Festival*, in *FROM SEASON TO SEASON: SPORTS AS AMERICAN RELIGION* 137, 138 (2001). The relationship between football and war is explored regularly in popular culture perhaps most famously by comedian George Carlin:

In football [sic] the object is for the quarterback, also known as the field general, to be on target with his aerial assault, riddling the defense by hitting his receivers with deadly accuracy in spite of the blitz, even if he has to use shotgun. With short bullet passes and long bombs, he marches his troops into enemy territory, balancing this aerial assault with a sustained ground attack that punches holes in the forward wall of the enemy’s defensive line.

Football is played on a one hundred yard long field separated at the fifty yard line into two halves, one belonging to each team, and the goal is to “invade[] foreign land, traverse[] it completely, and complete[] the conquest by settling in the end zone.”⁶⁰ Even at football’s inception in the late nineteenth century, its basic mantra, “Capture territory. Hold it. Advance” resounded,⁶¹ and “the rules of the game gave prominence to violence.”⁶² Indeed, as the game developed, coaches and players continually created new means of punishing opponents,⁶³ making the game ever more violent.

For instance, in 1892, Harvard’s football team pioneered the flying wedge as a means of clearing a path for the ball carrier.⁶⁴ Before a play started, while the ball was still on the line of scrimmage, many of Harvard’s offensive players “formed two, unconnected, inward slanting columns fifteen to twenty-five yards behind the line of scrimmage and began to run, their columns converging”⁶⁵ By the time the columns of players reached the line of scrimmage and the ball was snapped, the players – now moving at top speed – had converged to form a large V that plunged through the defensive line with such force that serious injuries were inevitable.⁶⁶

The flying wedge and other maneuvers that allowed players to establish momentum before the ball was snapped were ultimately outlawed, but even in their absence, extreme violence characterized the game.⁶⁷ In fact, during the 1905 collegiate football season, at least eighteen people died from football-related injuries, and over 150 more were seriously injured.⁶⁸ The carnage was such that President Theodore Roosevelt became involved, imploring the nation’s most successful and influential football schools to condemn the sport’s more brutal aspects.⁶⁹ Rule changes followed, and football fatalities declined,

Toni Monkovic, *Football is War! (George Carlin’s Routine)*, N.Y. TIMES: THE FIFTH DOWN NFL BLOG (May 31, 2008, 1:05 AM), <https://fifthdown.blogs.nytimes.com/2008/05/31/football-is-war-george-carlins-routine/>.

60. See Price, *supra* note 59, at 138.

61. See PAOLANTONIO, *supra* note 54, at 7.

62. See WILLIAM DEAN, *THE AMERICAN SPIRITUAL CULTURE: AND THE INVENTION OF JAZZ, FOOTBALL, AND THE MOVIES* 151–52 (A&C Black 2006); see also KURT EDWARD KEMPER, *COLLEGE FOOTBALL AND AMERICAN CULTURE IN THE COLD WAR ERA* 23 (2009) (“[President Dwight] Eisenhower declared that ‘morale – the will to win, the fighting heart – are the honored hallmarks’ of [football], and that such competitive values were crucially applicable in the defense of the Republic.”).

63. DEAN, *supra* note 62, at 152–53.

64. *Id.* at 152.

65. *Id.*

66. *Id.*

67. *Id.*

68. Katie Zezima, *How Teddy Roosevelt Helped Save Football*, WASH. POST. (May 29, 2014), https://www.washingtonpost.com/news/the-fix/wp/2014/05/29/teddy-roosevelt-helped-save-football-with-a-white-house-meeting-in-1905/?utm_term=.a2a59afb2fc6.

69. *Id.*

but the game retained, and continues to retain, its violent and often brutal character both in college and in the NFL, which was founded in 1920.⁷⁰

Soccer never grasped the nation the way football did. That was due in part to soccer's foreign origin and Americans' strong desire at the time to assert "cultural independence by developing games of [their] own."⁷¹ In addition, however, soccer "provide[d] fewer opportunities than . . . football[] for spectators to work out their frustrations vicariously by identifying with violent actors on the field of play."⁷² So while football, with violence at its core, flourished, soccer persisted for most of the twentieth century as a fringe and somewhat counter-culture sporting option.⁷³

C. The "Soccer is Safe" Narrative

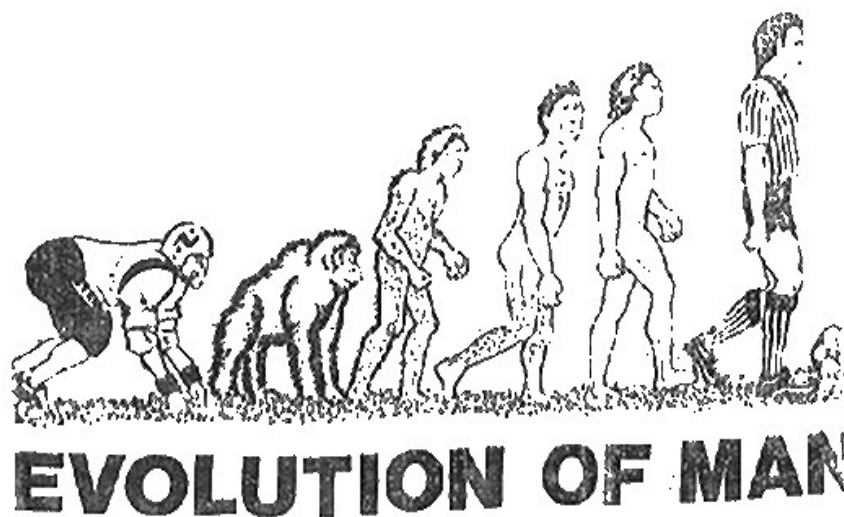
Just as football's proponents relished football's violence and hardiness, soccer's proponents in the United States celebrated their game's more civilized and less violent image. This vision of soccer was, perhaps, most clearly exemplified by a graphic, popular in the 1980s soccer community, titled, "Evolution of Man." It depicted a football player in a four-point stance evolving into an ape, then into an early homo sapien, then into a modern man, and finally into a soccer player, standing tall on two legs.

70. *Id.*; Michaeleen Doucleff, *Are NFL Football Hits Getting Harder and More Dangerous?*, NPR (Feb. 1, 2013, 12:02 PM), <https://www.npr.org/sections/health-shots/2013/01/31/170764982/are-nfl-football-hits-getting-harder-and-more-dangerous>.

71. WANGERIN, *supra* note 46, at 22; accord Kelsey Ontko et al., *Why is Soccer Less Popular in the U.S.?*, DUKE U.: SOCCER POL., <https://sites.duke.edu/wcwp/research-projects/soccermarkets-in-the-u-s/soccer-exceptionalism-in-america/> (last visited Sept. 1, 2018).

72. ERIC DUNNING, *SPORTS MATTERS: SOCIOLOGICAL STUDIES OF SPORT, VIOLENCE AND CIVILIZATION* 143 (1999).

73. See Ontko et al., *supra* note 71 (noting that football consumes the vast majority of social space for sports in the United States).



Soccer's detractors also emphasized soccer's lack of violence, albeit in a less flattering manner, by painting soccer as a soft or effeminate sport. For instance, sports radio host Jim Rome once famously stated, "[M]y son is not playing soccer. I will hand him ice-skates and a shimmering sequined blouse before I hand him a soccer ball. Soccer is not a sport, does not need to be on my TV, and my son will not be playing it."⁷⁴

Among soccer proponents and detractors alike, soccer has largely avoided a reputation as a dangerous sport. Indeed, in the United States, soccer has long been deemed a safe and child-friendly alternative to football and has grown exponentially over the past fifty years.⁷⁵ During the last quarter of the twentieth century, the number of children playing organized youth soccer in the United States jumped from roughly 100,000 to over three million.⁷⁶ This exponential growth drove professional interest, and in 1996, Major League Soccer ("MLS"), America's premier professional soccer league, was founded with

74. YUYA KIUCHI, *SOCCER CULTURE IN AMERICA: ESSAYS ON THE WORLD'S SPORT IN RED, WHITE AND BLUE* 108 (2013).

75. See, e.g., David Hansen, *Youth Football Versus Soccer: Injury Statistics Tell the Story*, L.A. TIMES (July 29, 2016, 12:18 PM), <http://www.latimes.com/socal/weekend/tn-wknd-et-hansen-20160730-story.html> (comparing statistics on reported injuries in youth football and soccer to argue that the latter is safer).

76. *Who is US Youth Soccer?*, U.S. YOUTH SOCCER, <https://www.usyouthsoccer.org/about/who-is-us-youth-soccer/> (last visited Sept. 1, 2018).

ten teams.⁷⁷ In just over twenty years, the league has more than doubled in size to twenty-three teams, fueled largely by children who participated in the game and who have grown with the game into adulthood.⁷⁸

This narrative of soccer as a non-violent sport, which propelled soccer's rise during the end of the twentieth century and the beginning of the twenty-first century, took center stage when the link between football and brain injury solidified.⁷⁹ That narrative only strengthened when former NFL players' head trauma lawsuits began to clog the courts. The first such suit was filed in 2011.⁸⁰ Jason Luckasevic, a Pittsburgh-based personal injury attorney, filed suit on behalf of seventy-five former NFL players who had suffered brain injuries.⁸¹ Additional lawsuits involving scores of players followed, and in 2012, they were consolidated into one massive class action, involving 18,000 retired players, before the U.S. District Court for the Eastern District of Pennsylvania.⁸² In essence, the players "alleged that the NFL . . . failed to take reasonable actions to protect players from the chronic risks created by concussive and sub-concussive head injuries and fraudulently concealed those risks from players."⁸³ In 2013, the players and the NFL reached a \$765 million settlement designed to "compensate victims, pay for medical exams, and underwrite research."⁸⁴

77. See *1996 Season Recap*, MLS, <https://www.mlssoccer.com/history/season/1996> (last visited Sept. 1, 2018).

78. See Alicia Rodriguez, *Lagerwey: Seattle's Time of Being Biggest Spenders in MLS Are Behind Them*, MLS (Apr. 30, 2018, 6:03 PM), <https://www.mlssoccer.com/post/2018/04/30/lagerwey-seattles-time-being-biggest-spenders-mls-are-behind-them> (noting how fans base and the size of the MLS has changed the Seattle Sounders' management's decision making); Steve Wilson, *The Other Reason Soccer Keeps Growing*, NEW REPUBLIC (June 27, 2010), <https://newrepublic.com/article/75903/the-other-reason-soccer-keeps-growing>.

79. Patrick O'Grady, *Soccer Replacing Football as the Safer Sports Alternative*, CAROLINIAN (Apr. 13, 2016), <https://carolinianuncg.com/2016/04/13/soccer-replacing-football-as-the-safer-sports-alternative/>; see also Shane Paul Neil, *Soccer is Here, for Real This Time*, HUFFINGTON POST (Apr. 20, 2016), http://www.huffingtonpost.com/shane-paul-neil/soccer-is-here-for-real-t_b_9730440.html.

80. Mark Fainaru-Wada, *Lawyers, Others Vie for Pieces of NFL Concussion Settlement*, ESPN (Mar. 29, 2017), http://www.espn.com/espn/otl/story/_/id/19029607/billion-dollar-nfl-concussion-settlement-turns-nasty-lawyers-others-vie-pieces-payouts-players.

81. Michael Sokolove, *How One Lawyer's Crusade Could Change Football Forever*, N.Y. TIMES MAG. (Nov. 6, 2014), https://www.nytimes.com/2014/11/09/magazine/how-one-lawyers-crusade-could-change-football-forever.html?_r=0.

82. See *In re Nat'l Football League Players' Concussion Injury Litig.*, 307 F.R.D. 351, 361 (E.D. Pa. 2015), *aff'd* by 821 F.3d 410 (3d Cir 2016); *NFL, Ex-Players Agree to \$765M Settlement in Concussions Suit*, NFL (Aug. 29, 2013), <http://www.nfl.com/news/story/0ap1000000235494/article/nfl-explayers-agree-to-765m-settlement-in-concussions-suit>.

83. *Nat'l Football League Players' Concussion Injury Litig.*, 307 F.R.D. at 361.

84. *NFL, Players Reach Concussion Deal*, ESPN (Aug. 29, 2013), http://www.espn.com/nfl/story/_/id/9612138/judge-nfl-players-settle-concussion-suit.

Judge Anita Brody, who presided over the case, refused to approve the settlement because she feared the settlement amount would be insufficient to cover the needs of all the class members.⁸⁵ Over a year later, after the parties amended the settlement – increasing the NFL’s payout to potentially \$1 billion – Judge Brody approved it.⁸⁶ And one year after that, the U.S. Court of Appeals for the Third Circuit upheld it.⁸⁷

Although the NFL, which enjoys annual revenues of \$14 billion,⁸⁸ can absorb a \$1 billion settlement, the collateral public relations damage it has suffered has proven harder to absorb. With parents fearful of the game, youth participation rates have plummeted year after year. In 2015, 22% of parents polled said they would not let their sons play football.⁸⁹ In 2016, that number jumped to 31%.⁹⁰ In 2017, it jumped further to 43%.⁹¹ And in 2018, for the first time, roughly half of parents polled said they would not let their sons play football.⁹² Indeed, even the game’s greatest successes and most stalwart ambassadors – NFL Hall of Famers – have publicly expressed their concern about the toll football takes on players and about the future of the game.

Troy Aikman: “I think that we’re at a real crossroads, as it relates to the grassroots of our sport, because if I had a [ten]-year-old boy, I don’t know that I’d be real inclined to encourage him to go play football, in

85. *Nat’l Football League Players’ Concussion Injury Litig.*, 821 F.3d at 422–23.

86. *Id.* at 423.

87. *Id.* at 447–48.

88. Daniel Kaplan, *NFL Revenue Reaches \$14B, Fueled by Media*, SPORTSBUSINESS J. (Mar. 6, 2017), <http://www.sportsbusinessdaily.com/Journal/Issues/2017/03/06/Leagues-and-Governing-Bodies/NFL-revenue.aspx>.

89. Tom Krattenmaker, *Football’s Down but Not Out*, USA TODAY: PAL ITEM. (Feb. 6, 2017, 6:13 PM), <http://www.pal-item.com/story/opinion/contributors/2017/02/06/footballs/97570770/> (last updated Feb. 7, 2017, 1:49 PM).

90. *Id.*

91. See *Concussion Concerns Influence Whether Parents Allow Children to Play Sports*, AM. OSTEOPATHIC ASS’N (Apr. 10, 2017), <https://www.osteopathic.org/inside-aoa/news-and-publications/media-center/2017-news-releases/Pages/4-10-concussion-concerns-influence-whether-parents-allow-children-to-play-sports.aspx>. A Harris Poll found 16% of parents decline to enroll their children into sports because of the concussion risks. *Id.* Thirty-three percent (33%) reported their decision to enroll their child was contingent on the sport. *Id.* Of that 33%, 82% of parents would not allow their children to play football. *Id.*

92. Chelsea Howard, *Poll Shows Nearly 50 Percent of American Parents Don’t Want Their Children Playing Football*, SPORTING NEWS (Feb. 3, 2018), <http://www.sportingnews.com/nfl/news/nfl-ncaa-injuries-concussions-college-football-polls-parents-kids-news/1j6qjgndeqx991p1zgdzm5e3g0>. A poll by NBC found 48% of parents would encourage their child to play a sport other than football. *Id.*

light of what we are learning from head injury. And so [sic] what is the sport gonna [sic] look like 20 years from now?"⁹³

Terry Bradshaw: "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."⁹⁴

Harry Carson: "I cannot in good conscience allow my grandson to play knowing what I know. . . . I don't want him to play. He's got golf clubs; I take him swimming; we do all kinds of stuff. But I don't want him to play football [] because I think this young, smart black kid, I want him to be intelligent [sic]; I want him to be brilliant; I want him to be able to use his brain and not his brawn. And I want him to be the best that he can be."⁹⁵

Mike Ditka: "That's sad. [If I had a young son] I wouldn't [let him play football]. And my whole life was football. I think the risk is worse than the reward. I really do."⁹⁶

Brett Favre: "I would be real leery of [my son, if I had one] playing football In some respects, I'm almost glad I don't have a son because of the . . . physical toll that it could possibly take on him"⁹⁷

Kurt Warner: "[W]hen you know certain things having played the game, and then obviously when you understand the size, the speed, the violence of the game . . . [i]t scares me as a dad [of children who want

93. Henry Blodget, *Star NFL Quarterback Troy Aikman: Football Has Gotten So Dangerous I Wouldn't Even Let My Kid Play the Game*, BUS. INSIDER (Feb. 3, 2011, 10:48 AM), <http://www.businessinsider.com/troy-aikman-football-injuries-nfl-2011-2>.

94. Brian McIntyre, *Terry Bradshaw Wouldn't Let Son Play Football Now*, NFL (June 14, 2012, 12:40 PM), <http://www.nfl.com/news/story/09000d5d829d33b9/article/terry-bradshaw-wouldnt-let-son-play-football-now> (last updated July 26, 2012, 8:15 PM).

95. *League of Denial: The NFL's Concussion Crisis*, PBS (Sept. 4, 2013), <http://www.pbs.org/wgbh/pages/frontline/sports/league-of-denial/the-frontline-interview-harry-carson/#seg9>.

96. Kevin McSpaden, *NFL Hall of Famer Mike Ditka Wouldn't Let His Son Play Football Today*, TIME (Jan. 20, 2015), <http://time.com/3673997/nfl-painkillers-mike-ditka-1985-chicago-bears/>.

97. Anwar S. Richardson, *Former NFL Standout Brett Favre Would Not Allow His Son to Play Football*, YAHOO! SPORTS (Nov. 17, 2013, 12:04 PM), <http://sports.yahoo.com/blogs/shutdown-corner/former-nfl-standout-brett-favre-not-allow-son-180444136--nfl.html>.

to play football]. I just wonder – I wonder what the league’s going to be like. . . . [I]t’s a scary thing for me.”⁹⁸

Although the NFL continues to be the world’s most profitable professional sports league, some commentators suggest it is just a matter of time until its bottom line is substantially impacted.⁹⁹

With lawyers, scientists, media pundits, and former players all highlighting the dangers of football, soccer’s relative lack of attention in that regard, combined with the “soccer is safe” narrative, has positioned it as a potential refuge for athletes wanting to avoid football’s risks. A critical look, however, indicates that soccer, like football, presents players with significant risk of brain trauma – the extent of which is underappreciated.

IV. SOCCER’S HEAD DANGER

While soccer games and practices feature their share of torn ligaments and broken bones, like in football, the head faces danger as well, and the injuries that result from blows to the head can be catastrophic.

A. The Tragic Case of Patrick Grange

For some years, the United Kingdom’s soccer community has been stewing in what *The Telegraph* has described as “silent shame” – quiet recognition of the neurological damage soccer has caused some of the nation’s greatest players.¹⁰⁰ Chief among them was former national team player Jeff Astle who developed dementia and died in 2002 at age fifty-nine as a result of the damage his brain suffered during his career.¹⁰¹ Astle was renowned for his heading ability, and the coroner’s conclusion that “it was heading the soccer ball that

98. Michael David Smith, *Kurt Warner Would Prefer His Sons Not Play Football*, NBC SPORTS: PRO FOOTBALL TALK (May 3, 2012, 10:14 AM), <http://profootball-talk.nbcsports.com/2012/05/03/kurt-warner-would-prefer-his-sons-not-play-football/>.

99. Rick Rothacker, *Will Concussions Like Kuechly’s Hurt the NFL’s Fortunes?*, THE CHARLOTTE OBSERVER (Nov. 18, 2016, 5:58 PM), <http://www.charlotte-observer.com/news/business/article115763008.html> (last updated November 18, 2016, 7:35 PM).

100. See Jeremy Wilson, *Football’s Silent Shame: Dementia ‘Conspiracy’ Is a Stain on the Game*, TELEGRAPH (May 30, 2016, 10:01 PM), <http://www.telegraph.co.uk/football/2016/05/30/footballs-silent-shame-dementia-conspiracy-is-a-stain-on-the-gam/>. Among the afflicted are “1966 England World Cup winners Nobby Stiles, Martin Peters and Ray Wilson, Liverpool legends Ron Yeats and Tommy Smith and Celtic’s European Cup-winning captain Billy McNeill” as well as Rod Taylor who played for several top-level clubs and died in 2018 after struggling with dementia for years after retirement. *Brain Injury Expert Calls for Ban on Heading in Football*, BBC (Aug. 8, 2018), <https://www.bbc.com/sport/football/45110282>.

101. Wilson, *supra* note 100.

had killed him” shook the community, even though many were loath to admit they were shaken.¹⁰²

In the United States, “silent shame” was limited mainly to football with precious little discussion of brain trauma in the soccer community. Soccer’s head danger, however, came into clear view in 2010 through the case of Patrick Grange, an avid young soccer player from Albuquerque, New Mexico.¹⁰³ Grange loved the game and started playing at the age of three.¹⁰⁴ As he grew older, he committed more and more time to soccer, eventually playing in college and semiprofessionally in hopes of one day making a MLS roster.¹⁰⁵ But, in 2010, at age twenty-seven, Grange began to experience symptoms of Amyotrophic Lateral Sclerosis (“ALS”), a degenerative motor neuron disease.¹⁰⁶ Within months, he was restricted to a wheelchair and then, due to paralysis, grew unable to feed himself.¹⁰⁷ Less than a year and a half after his official ALS diagnosis, at age twenty-nine, Grange was dead.¹⁰⁸ In 2014, researchers posthumously examined Grange’s brain, which revealed that he had CTE and that his brain had “very extensive . . . damage” much like football players who had died and whose brains had been posthumously examined.¹⁰⁹

Grange had suffered some major blows to the head over the years, including being knocked unconscious once during a high school game and sustaining a gash above his eye from a collision during a college game, which required seventeen stitches.¹¹⁰ He had also absorbed thousands of less impactful blows over the years when heading the ball. Indeed, beginning at the age of three, Grange was, according to his parents, “endlessly tossing a soccer ball into the air and heading it into a net.”¹¹¹ Grange continued to practice heading as he grew older, and when he played high school, college, and semiprofessional soccer, it was a key component of his game.¹¹² There is no way to know

102. Frank M. Webbe & Christine M. Salinas, *When Sciences and Politics Conflict: The Case of Soccer Heading in Adults and Children*, in HANDBOOK OF SPORT NEUROPSYCHOLOGY 275, 281 (Frank Webbe ed., (2010), https://www.researchgate.net/publication/276847510_When_Sciences_and_Politics_Conflict_The_Case_of_Soccer_Heading_in_Adults_and_Children).

103. *Patrick’s Story*, PATRICK GRANGE MEMORIAL FOUND., <http://www.thepatrick-grangememorialfoundation.com/about-pgmf/> (last visited Sept. 1, 2018).

104. John Branch, *Brain Trauma Extends to the Soccer Field*, N.Y. TIMES (Feb. 26, 2014), <https://www.nytimes.com/2014/02/27/sports/soccer/researchers-find-brain-trauma-disease-in-a-soccer-player.html>.

105. *See id.*

106. *Id.*

107. *Id.*

108. *Id.*

109. *Id.*

110. *Id.*

111. *Id.*

112. *See id.* Grange prided himself on his heading capabilities. *Id.*

whether Grange's brain was damaged by the major blows, the repetitive heading, or a combination of the two, but his death demands inquiry into both types of head impacts in soccer and what might be done to prevent them.

B. Concussive Blows

FIFA's World Cup is undoubtedly the sporting world's highest profile event, bringing together thirty-two national soccer teams in a month-long tournament that doubles as a global party.¹¹³ It is soccer at its most visible. And during FIFA's 2014 World Cup, the soccer establishment's lack of concern regarding head trauma was broadcast around the globe. During the tournament, three players suffered severe blows to the head, and the handling of each suggested no concern about the blows' consequences.¹¹⁴

On June 19, 2014, in an opening round game between England and Uruguay, Uruguayan defender Alvaro Pereira was knocked unconscious when an opposing player's knee smashed into his head.¹¹⁵ Pereira lay motionless on the field while teammates frantically waved trainers and the team doctor onto the field.¹¹⁶ Once revived, however, Pereira argued to stay in the game and, without assessing the extent of his injury, the coaching staff promptly sent him back in.¹¹⁷

On July 9, 2014, in a quarterfinal match between Argentina and the Netherlands, Argentina's Javier Mascherano and a Dutch player clashed heads while contesting for a head ball.¹¹⁸ Mascherano staggered around disoriented until he finally dropped to the turf.¹¹⁹ Just as when Pereira was injured, medical staff rushed onto the field to tend to Mashcherano.¹²⁰ Just as when Pereira was

113. See Kevin Baxter, *World Cup Expands to 48 Teams for 2026 and U.S. Is a Likely Host*, L.A. TIMES (Jan. 10, 2017, 2:00 AM), <http://www.latimes.com/sports/sportsnow/la-sp-fifa-world-cup-teams-20170110-story.html> (last updated Jan. 10, 2017, 10:40 AM).

114. *Kramer Has 'Suspected Concussion'*, ESPN (July 13, 2014), <http://www.espnfc.us/fifa-world-cup/story/1949196/germanys-christoph-kramer-has-suspected-concussion>.

115. *Fifa Accused After 'Unconscious' Alvaro Pereira Played on for Uruguay*, GUARDIAN (June 20, 2014), <https://www.theguardian.com/football/2014/jun/20/alvaro-pereira-uruguay-england-concussion-fifa-world-cup>.

116. *Id.*

117. *Id.*

118. Dan Diamond, *Did Argentina's Player Have a Concussion? Who Knows – Because FIFA's Protocol Is a Joke*, FORBES (July 9, 2014), <https://www.forbes.com/sites/dandiamond/2014/07/09/did-argentinas-player-have-a-concussion-who-knows-because-fifas-protocol-is-a-joke/#7d8c67411b0f>; *Javier Mascherano Stumbles to Ground with Head Injury, Re-enters*, SPORTS ILLUSTRATED (July 9, 2014), <https://www.si.com/soccer/planet-futbol/2014/07/09/javier-mascherano-head-injury-argentina-netherlands-world-cup-semifinal>.

119. *Javier Mascherano Stumbles to Ground with Head Injury, Re-enters*, *supra* note 118.

120. *Id.*

injured, Mashcherano was helped off the field.¹²¹ And just as when Pereira was injured, Mashcherano reentered the game quickly and apparently without evaluation.¹²²

On July 13, 2014, in the tournament's championship match between Germany and Argentina, an Argentinian player's shoulder slammed into the head of Germany's Christopher Kramer, whipping it to the side.¹²³ Kramer collapsed to the ground in evident agony.¹²⁴ Notwithstanding the clear blow to the head and Kramer's distress, he was not even ushered off the field.¹²⁵ Kramer was kept in the game and played ineffectually for fourteen minutes before he finally collapsed to the ground.¹²⁶ Only then was he removed from the game.¹²⁷

Commentators lamented the seeming lack of adherence to any concussion protocol in the aftermath of the injuries and assailed FIFA as being unconcerned with player health. The criticism reached its peak after Kramer's injury in the championship match. Former players whose careers were ended and whose health was imperiled because of blows to the head were some of the most concerned. For example, Alecko Eskandarian, the 2003 MLS number one draft pick and former collegiate soccer player of the year who was ultimately driven from the game because of multiple concussions, expressed his shock.¹²⁸ Upon seeing Kramer's injury and immediate return to action, he simply stated, "My God, this is crazy."¹²⁹

Taylor Twellman, a former U.S. National Soccer team player turned broadcaster, who was also forced into retirement by multiple concussions, was more verbose.¹³⁰ Twellman angrily assailed those responsible for allowing Kramer to continue playing after the blow to the head: "They handled it exactly the way you're not supposed to handle it If he got hit again, it's the second

121. *Id.*

122. *Id.*

123. See Kramer Has 'Suspected Concussion', *supra* note 114; *Soccer Concussions Debated After World Cup Final*, CBS NEWS, <https://www.cbsnews.com/pictures/soccer-concussions-debated-after-world-cup-final/> (last visited Sept. 1, 2018).

124. Kramer Has 'Suspected Concussion', *supra* note 114.

125. *See id.*

126. *Id.*

127. *Id.*

128. Juliet Macur, *FIFA's Dazed and Dated Attitude*, N.Y. TIMES (July 15, 2014), https://www.nytimes.com/2014/07/16/sports/soccer/world-cup-2014-christoph-kramers-head-injury-brings-fifas-problem-to-the-forefront.html?action=click&contentCollection=Soccer&module=RelatedCoverage®ion=Marginalia&pgtype=article&_r=0.

129. *Id.*

130. See Dave Ungrady, *Taylor Twellman Questions FIFA Concussion Proposal*, USA TODAY (Sept. 26, 2014), <https://www.usatoday.com/story/sports/mls/2014/09/26/fifa-concussion-proposal-taylor-twellman-mls/16263947/>.

one – second impact syndrome – that causes life or death problems.”¹³¹ He also ranted on Twitter: “Here we go again FIFA . . . #WorldCupFinal and your ineptitude to address the head injury problem is for everyone to see. Kramer was concussed! . . . Before I die, I will get FIFA to change their ways and get an independent doctor on the sideline.”¹³²

The medical establishment was just as critical. Dr. Robert Cantu, a neurosurgeon who co-directs the Center for the Study of Traumatic Encephalopathy at Boston University and who is perhaps the nation’s foremost authority on brain trauma stated, “It’s atrocious . . . FIFA was terrible, allowing players and coaches to override medical personnel on the field.”¹³³

Chris Nowinski, a former Harvard football player who co-founded the Sports Legacy Institute, which educates the public about head injuries, went a step further.¹³⁴ Nowinski expressed concern about the signal that Kramer’s continued play after the injury sent to children worldwide: “I’m worried about how many kids emulate these athletes. It wasn’t just one athlete hurt; it was one multiplied by [one] million . . . They didn’t even use a bully pulpit and say: ‘This is unacceptable.’”¹³⁵

Concerns about inadequate concussion protocols spurred the *Journal of the American Medical Association* to publish a comprehensive review of head collisions throughout the tournament.¹³⁶ The study was damning. It revealed that during the sixty-four-game tournament, sixty-one players were involved in a total of eighty-one head collisions.¹³⁷ In most cases, fellow players, referees, and health care personnel attended to the injured player on the field in contravention of the then-prevailing concussion protocol, which required an assessment by health care personnel on the sidelines.¹³⁸ And in cases when health care personnel assessed the injured player and the injured player displayed three or more concussion signs, the vast majority resumed play after assessments that averaged only eighty-four seconds.¹³⁹

131. *Id.*

132. Jimmy Golen, *US Concussion Expert: World Cup Sets Bad Example*, SAN DIEGO UNION-TRIB. (July 15, 2014, 3:12 PM), <http://www.sandiegouniontribune.com/sdut-us-concussion-expert-world-cup-sets-bad-example-2014jul15-story.html>.

133. John D. Watson, *What FIFA Can Learn From the NFL*, MEDSCAPE.COM (Oct. 15, 2014), <http://www.medscape.com/viewarticle/833124>.

134. *See* Golen, *supra* note 132.

135. *Id.*

136. *See* Michael D. Cusimano et al., *Assessment of Head Collision Events During the 2014 FIFA World Cup Tournament*, 314 JAMA 2548, 2548 (2017), <https://jamanetwork.com/journals/jama/fullarticle/2633899>.

137. *Id.*

138. *Id.*; *see also* Paul McCrory et al., *Consensus Statement on Concussion in Sports*, BRIT. J. SPORTS MED. (April 26, 2017), <https://bjsm.bmj.com/content/early/2017/04/26/bjsports-2017-097699> (last updated Apr. 28, 2017).

139. Cusimano et al., *supra* note 136, at 2548.

In the World Cup's aftermath, FIFA set out to improve its ineffective response to head collisions¹⁴⁰ and, in 2016, officially adopted a new concussion protocol known as SCAT5.¹⁴¹

Under SCAT5, a player sustaining a head injury must be assessed by team physicians or other medical personnel on alert at games for concussion symptoms and be cleared before returning to the field of play.¹⁴² Players who display concussion symptoms, and are therefore not cleared, should be disallowed from returning to the game.¹⁴³ Moreover, such players should be administered a follow-up assessment, including a comprehensive neurological examination, and should return to physical activity slowly over the course of days, weeks, or months and to on-field play only upon full recovery.¹⁴⁴

Sadly, the 2018 World Cup revealed the concussion protocols to be little more than "eye candy":¹⁴⁵ attractive but ultimately empty. Like the 2014 World Cup, the 2018 iteration featured gruesome head injuries and shockingly inadequate attention to the injured.¹⁴⁶ Most notably, during an opening round match between Morocco and Iran, Moroccan midfielder Nordin Amrabat's head collided with an Iranian player's head, and Amrabat collapsed to the

140. *FIFA's Medical Committee Proposes New Protocol for the Management of Concussion*, FIFA (Sept. 23, 2014), <http://www.fifa.com/development/news/y=2014/m=9/news=fifa-s-medical-committee-proposes-new-protocol-for-the-management-of-c-2443024.html>.

141. See generally McCrory et al., *supra* note 138.

142. See Ruben J. Echemendia et al., *Sport Concussion Assessment Tool – 5th Edition*, 51 BRIT. J. SPORTS MED. 851, 851, 856 (2017), <https://bjsm.bmj.com/content/bjsports/51/11/851.full.pdf>.

143. See *id.* at 858.

144. See *id.* MLS, which has also become more attentive to head injuries in recent years, utilizes a similar protocol. *MLS Concussion Protocol in Focus After Pair of Weekend Incidents*, ESPN (May 18, 2017), <http://www.espn.com/soccer/major-league-soccer/story/3128614/mls-concussion-protocol-in-focus-after-pair-of-weekend-incidents>.

145. Jeremy Wilson, *Why Won't Football Follow Other Sports and Introduce Concussion Subs?*, TELEGRAPH (June 18, 2018, 5:44 PM), <https://www.telegraph.co.uk/world-cup/2018/06/18/wont-football-follow-sports-introduce-concussion-subs/>.

146. See, e.g., Henry Bushnell, *FIFA, World Cup Teams Continue to Ignore Soccer's Concussion Problem*, YAHOO! SPORTS (June 20, 2018, 1:08 PM), <https://sports.yahoo.com/fifa-world-cup-teams-continue-ignore-concussions-170836604.html>; David Geier, *FIFA's Ignorance of Concussions on Display During World Cup*, POST AND COURIER (July 18, 2018), https://www.postandcourier.com/sports/fifa-s-ignorance-of-concussions-on-display-during-world-cup/article_088c833a-8926-11e8-aa51-17df22d6015d.html; Lee Igel, *Why FIFA Needs New Thinking About Concussions at World Cup*, FORBES (June 25, 2018, 1:09 PM), <https://www.forbes.com/sites/leeigel/2018/06/25/why-and-how-fifa-needs-new-thinking-about-concussions-at-world-cup/#7f8e19c97dfe>.

ground seemingly unconscious, his body initially becoming rigid and then going limp.¹⁴⁷ When he finally was helped up and to the sideline, he was, as journalist Alexander Zaitchik describes it, “examined by a member of Morocco’s medical staff, whose idiosyncratic concussion protocol involved slapping him repeatedly in the face.”¹⁴⁸

Even if the protocols are followed to a tee, they are, of course, only able to prevent a second concussion coming on the heels of the first. They do nothing to stop the first concussion or to prevent additional concussions once protocols have been followed and a player has returned to action.

To substantially reduce the occurrence of concussions overall, a more fundamental alteration to the game would be required. And because roughly one-third of concussions in soccer result from “colliding with a player, object, or the ground” when heading or attempting to head the ball,¹⁴⁹ elimination of heading would seem a logical possibility. Once one considers the potential additional sub-concussive damage caused by heading a soccer ball, the need to eliminate heading becomes apparent.

C. Sub-Concussive Blows

While the spectacular collisions, such as those endured by Pereira, Mashcerano, and Kramer, draw critics’ attention, sub-concussive blows can also prove damaging.

In the 1980s, Dr. Alf Tysvaer and his colleagues in Norway were the first to produce research revealing the toll that heading a soccer ball can take on the brain.¹⁵⁰ Tysvaer’s curiosity about heading’s neurological impact was borne of the cognitive assessments he had done previously on boxers.¹⁵¹ Tysvaer hypothesized that the sub-concussive impact of a soccer ball colliding with a head was similar in the damage it caused to the sub-concussive impact of a boxer’s jab hitting his opponent’s head.¹⁵² Tysvaer tested his hypothesis through a study of the neurocognitive functioning of retired Norwegian professional soccer players, and he found that soccer players exhibited impaired neurological functioning “with alarming frequency,” which he attributed to repeatedly heading the ball.¹⁵³

Other studies on heading, drawing various conclusions, followed over the years, but the soccer establishment resisted those that indicated the danger

147. Alexander Zaitchik, *FIFA’s CTE Problem: Are Soccer Regulators Doing Enough to Prevent Brain Injuries?*, ROLLING STONE (July 11, 2018, 2:34 PM), <https://www.rollingstone.com/culture/culture-features/fifa-cte-problem-soccer-regulators-prevent-brain-injuries-697834/>.

148. *Id.*

149. *Mehr v. Fédération Internationale De Football Ass’n*, 115 F. Supp. 3d 1035, 1062–63 (N.D. Cal. 2015).

150. *See* Webbe & Salinas, *supra* note 102, at 275.

151. *See id.*

152. *Id.*

153. *Id.* at 275.

posed by heading the ball.¹⁵⁴ As Frank Webbe and Christine Salinas put it in their seminal article, *Science and Politics Conflict: The Case of Soccer Heading in Adults and Children*, which traces the soccer community's decades-long resistance to science revealing heading's danger, "Studies that reported on heading-related concerns and frank impairments among players were dismissed in almost a knee-jerk reaction."¹⁵⁵

Evidence that heading's sub-concussive blows are detrimental to brain health, however, has in recent years grown too overwhelming to credibly deny. First, it is clear that repeated sub-concussive blows can produce the same symptoms as concussive blows, such as headaches and confusion.¹⁵⁶ They can also negatively impact memory.¹⁵⁷ Indeed, a 2016 study produced by the University of Stirling in the United Kingdom examined soccer players for twenty-four hours after heading twenty balls delivered at the speed of an average corner kick and found that the players suffered "reduction[] in memory test performance of 41[%] to 67[%]."¹⁵⁸ And a 2017 study published in *Neurology*, the medical journal of the American Academy of Neurology, concluded that soccer players who frequently head the ball are three times more likely to suffer concussion symptoms, generally, than those who rarely head the ball.¹⁵⁹

Worse still, it is well-established that repeated sub-concussive blows can cause brain abnormalities *without producing concussion symptoms* and can therefore go unnoticed.¹⁶⁰ As Dr. Cantu explained in a 2014 interview,

[T]here have been [thirteen] studies that I'm aware of – there might be more – that have shown that sub-concussive hits in sports . . . have

154. *Id.* at 275–76.

155. *Id.* at 282.

156. Jessica Body, *With Concussion Risk in Soccer, Headers May Kick It Up a Notch*, NPR (Feb. 1, 2017, 4:03 PM), <http://www.npr.org/sections/health-shots/2017/02/01/512848122/with-concussion-risk-in-soccer-headers-may-kick-it-up-a-notch>.

157. Jeremy Wilson, *PFA Urges FA to Consider Ban on Heading for Children Under 10*, TELEGRAPH (Dec. 29, 2016, 8:32 PM), <http://www.telegraph.co.uk/football/2016/12/29/pfa-urges-fa-consider-ban-heading-children-10/>.

158. Christopher Clarey, *Soccer Without Headers? New Research Shows It's Worth Discussing*, N.Y. TIMES (Oct. 28, 2016), https://www.nytimes.com/2016/10/29/sports/soccer/soccer-without-headers-new-research-shows-its-worth-discussing.html?_r=0; see generally Thomas G. Di Virgilio et al., *Evidence for Acute Electrophysiological and Cognitive Changes Following Routine Soccer Heading*, 13 *BIO MEDICINE* 66 (2016), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5264439/pdf/main.pdf>.

159. Walter F. Stewart et al., *Symptoms from Repeated Intentional and Unintentional Head Impact in Soccer Players*, 88 *NEUROLOGY* 1, 3 (2017); Hester Lingsma & Andrew Maas, *Heading in Soccer: More Than a Subconcussive Event?*, 88 *NEUROLOGY* 822, 823 (2017); see also Body, *supra* note 156.

160. See *Young Kids Should Stop Heading the Ball, Says Top Neurosurgeon*, PBS (Oct. 25, 2014, 12:19 PM), <http://www.pbs.org/newshour/updates/qa-soccer-players-wear-helmets-top-neurosurgeon-weighs-concussion-risks/>.

shown abnormalities on DTI MRI, have shown abnormalities on functional MRIs . . . and [have] also [shown] breakdown of the blood-brain barrier And that's happened without recognized concussion, just from repetitive trauma. And they found the individuals with the highest degree of abnormalities were those individuals that took the highest number of hits over the course of a season.¹⁶¹

Chief among the studies Dr. Cantu references is a 2013 study of soccer players conducted by researchers at Yeshiva University's Albert Einstein College of Medicine in New York City.¹⁶² Noting that the average soccer player heads the ball several times per game and over thirty times per practice, they questioned what the cumulative effects of heading might be.¹⁶³ Using diffusion tensor imaging, an MRI-like tool,¹⁶⁴ the researchers examined the brains of a group of amateur soccer players, ranging in age from twenty-one to forty-four, and concluded that the most frequent headers of the ball were more likely to have white matter abnormalities and attendant memory problems.¹⁶⁵ While the study's authors urged that additional research be done, they concluded that the study "provides compelling preliminary evidence that brain changes resembling mild traumatic brain injury are associated with frequently heading a soccer ball over many years."¹⁶⁶ Scientists at University College London, who have also studied soccer players who head the ball frequently and who have also called for further research on heading, have concluded in more accessible, real-world terms that "[t]hese players had the same pathology as boxers."¹⁶⁷

161. *Id.* (first ellipsis added).

162. *Id.* ("In this one particular study that's most cited by a Dr. Lipton in Raidolgy, it was 885 times a year and higher that they saw these changes."); see generally Michael Lipton et al., *Soccer Heading Is Associated with White Matter Microstructural and Cognitive Abnormalities*, 268 *RADIOLOGY* 850 (2013).

163. Jessica Berman, *Repeated Heading Causes Brain Injury in Soccer Players*, *VOA NEWS* (June 12, 2013, 8:29 PM), <https://www.voanews.com/a/soccer-head-injuries/1680739.html>.

164. Diffusion Tensor Imaging ("DTI") examines the movement of water molecules in the brain's white matter, which allows researchers to assess whether the nerve fibers that make up the white matter are damaged. Michelle Castillo, *Frequent Soccer Headers May Leave Lasting Brain Damage*, *CBS NEWS* (June 11, 2013, 12:21 PM), <http://www.cbsnews.com/news/frequent-soccer-headers-may-leave-lasting-brain-damage/>. Low water movement typically indicates brain injury. *Id.*

165. See Lipton et al., *supra* note 162, at 85.

166. *Soccer Heading Injuries: Frequent Soccer Ball 'Heading' May Lead to Brain Injury*, *ALBERT EINSTEIN C. OF MED.* (June 11, 2013), <http://www.einstein.yu.edu/news/releases/915/frequent-soccer-ball-heading-may-lead-to-brain-injury/> (statements of Michael Lipton).

167. Henry Bodkin, *Heading Footballs Causes Same Brain Damage as Boxing - Major New Study*, *TELEGRAPH* (Feb. 15, 2017, 12:01 AM), <http://www.telegraph.co.uk/science/2017/02/15/heading-football-causes-brain-damage-boxing-major-new-study/> (statements of Helen Ling).

Considering the science on the matter, soccer governing bodies must take the risk of heading the ball seriously. While it is, of course, difficult to isolate the cause of brain trauma in any given soccer player, it would be irresponsible to rule out heading as a contributing factor. Indeed, although Dr. Ann McKee, the neuropathologist who examined Patrick Grange's brain after his death, acknowledged that she could not "say for certain that heading the ball caused [Grange's] condition," her examination revealed that Grange had "very extensive frontal lobe damage," and because heading principally impacts the front of the player's head, she suspected it played a role.¹⁶⁸

When the risk of brain damage due to concussion is taken together with the risk of brain damage due to repeated sub-concussive blows, it becomes clear that intervention is necessary. To protect players and the game, soccer's regulatory entities must either protect the head or eliminate heading. As the following section of this Article explains, head protection used in many other sports – the helmet – is not likely to be effective protection in soccer, leaving elimination of heading as the logical solution to soccer's brain injury problem.

V. THE HELMET FALLACY

A. *Helmet Use in American Sports*

When concerns about head safety have arisen in American sports, professional leagues have often turned to helmets, and football has led the way.

The first football helmets, made of leather, were developed in the 1880s amidst an epidemic of skull fractures and some deaths during college football games.¹⁶⁹ Not all players, however, chose to wear them.¹⁷⁰ Similarly, when the NFL was founded in 1920, leather helmets were optional rather than required.¹⁷¹ They remained optional until 1943, when the NFL began to mandate helmet use for all players.¹⁷² Not long thereafter, plastic helmets came into vogue, and over the following several decades, the NFL and its manufacturing partners introduced additional helmet innovations, including protective air bladders inside the helmet as well as facemasks.¹⁷³

168. See Branch, *supra* note 104.

169. DAVID M. NELSON, *THE ANATOMY OF A GAME: FOOTBALL, THE RULES AND THE MEN WHO MADE THE GAME* 76 (1994); Loren Grush, *The Concussion Epidemic: Should Helmets be Banned from Football?*, FOX NEWS: HEALTH (Jan. 9, 2014), <http://www.foxnews.com/health/2014/01/09/concussion-epidemic-should-helmets-be-banned-from-football.html>.

170. The NCAA did not require helmets until 1939. Zezima, *supra* note 68 (citing NELSON, *supra* note 169, at 76).

171. See *id.*

172. *History of the NFL Football Helmet*, NFL (Nov. 14, 2012, 7:04 PM), <http://www.nfl.com/news/story/0ap1000000095139/article/history-of-the-nfl-football-helmet> (last updated Nov. 15, 2012, 8:25 AM).

173. *Id.*

Major League Baseball (“MLB”) began mandating helmets for its new players in 1971,¹⁷⁴ and the National Hockey League (“NHL”) did so in 1979.¹⁷⁵ While those already in the leagues had the option under a grandfather clause to continue to play without helmets, before long, as those players eventually retired, every MLB and NHL player wore a helmet.¹⁷⁶

Notwithstanding the reality of collisions in soccer, the game has no history or tradition of helmet use. To avoid “collateral injury to opponents,” any soccer helmet must obviously be soft rather than hard (such as those used in the NFL, MLB, and the NHL) unless there exists a blanket helmet-wearing requirement for all players, which no professional soccer league in the world has adopted.¹⁷⁷ Only a scarce few collegiate and professional players wear these soft helmets (known also in the sport as headgear), and those who do generally do so only after suffering a substantial head injury.¹⁷⁸ Despite the rarity of headgear among soccer players, in response to head trauma concerns, some soccer authorities, at least on the local level, have required the use of headgear.¹⁷⁹

174. Paul Lukas, *Alex Torres and the History of Headgear in Baseball*, ESPN (Apr. 23, 2015), http://www.espn.com/mlb/story/_/id/12741917/uni-watch-history-headgear-mlb-alex-torres.

175. Richard Bak, *A Short, Heads-up History of the Hockey Helmet*, DETROIT ATHLETIC CO. (Nov. 2, 2011), <https://www.detroitathletic.com/blog/2011/11/02/a-short-heads-up-history-of-the-hockey-helmet/>. A decade before the mandate, Bill Masteron, a professional hockey player, struck his helmetless head and passed away on the ice. *Id.*

176. *See, e.g.*, Christopher M. Bonfield & Douglas Kondziolka, *Beyond the Game: The Legacy of Bill Masteron*, NEUROSURGICAL FOCUS, July 2016, at 1, 3 (explaining the process in which the entire NHL is helmeted).

177. *See* Webbe & Salinas, *supra* note 102, at 289.

178. *See, e.g.*, Luke Augustus, *Petr Cech Wants to Play Without His Helmet*, DAILY MAIL (Nov. 16, 2015), <http://www.dailymail.co.uk/sport/football/article-3320204/Petr-Cech-wants-play-without-helmet-doctors-order-Arsenal-No-1-on.html> (last updated June 13, 2016). The most globally notable of these players is Petr Cech, the star goalkeeper for Arsenal in the English Premier League. Ed Hawkins, *The Horror of Petr Cech's Head Injury*, BLEACHER REP. (OCT. 14, 2016), <http://thelab.bleacherreport.com/the-horror-of-petr-cech-s-head-injury/>. After being kicked in the head and fracturing his skull in multiple places while attempting to defend the goal in 2006, doctors ordered him to wear headgear every time he plays. Augustus, *supra*. He has worn headgear since then, although he dislikes it and would jettison it if doctors were to assent. *Id.*

179. *E.g.*, Jacob Urist, *Helmets for Soccer?*, TODAY (Oct. 9, 2013, 7:41 AM), <http://www.today.com/parents/helmets-soccer-why-some-parents-are-saying-no-thanks-8C11359522>. Schools in Princeton, New Jersey have required students to wear headgear at practice and during games. *Id.*

B. The Inefficacy of Soccer Headgear in Preventing Brain Injury

While attempts at protecting players' heads are well-meaning, research suggests the efficacy of headgear in preventing brain injury in soccer is highly questionable. It may be effective at reducing abrasions and lacerations, but it is unlikely to reduce detrimental brain impact.¹⁸⁰ Webbe and Salinas, having conducted a review of the literature, explain that “[s]everal studies have been published that have evaluated soccer headgear, and the typical conclusion is that there appears to be no benefit regarding protection from concussion.”¹⁸¹ The national soccer community largely concurs. Dr. Margot Putukian, a member of U.S. Soccer’s Medical Committee, is on record as doubting the efficacy of headgear in preventing concussions,¹⁸² as is U.S. Soccer Chief Medical Officer George Chiampas.¹⁸³ And in 2017, the National Federation of State High School Association’s Sports Medicine Advisory Committee released a position statement noting that wearing headgear to prevent concussions is neither scientifically nor medically supported.¹⁸⁴

Some studies, such as a 2005 *British Journal of Sports Medicine* study, run contrary, finding that headgear does substantially reduce the force of head-to-head clashes, dissipating energy and reducing the incidence of concussion.¹⁸⁵ These studies, though, are in the distinct minority. Even if the great weight of the authority has it wrong and headgear does provide some benefit in preventing concussions, that benefit may well be counterweighed by the altered behavior that wearing it can prompt. Indeed, many sports physicians, including former U.S. National Soccer Team physician Dr. William W. Briner Jr., argue that headgear does more harm than good because it gives players a sense of invulnerability and prompts them to make risky challenges they would not make without the headgear.¹⁸⁶

180. See Webbe & Salinas, *supra* note 102, at 290.

181. *Id.*

182. See Woitalla, *supra* note 16.

183. *Id.*

184. NAT’L FED’N OF STATE HIGH SCH. ASS’N, SOFT HEADGEAR IN NON-HELMETED SPORTS POSITION STATEMENT 1 (July 2017), https://www.nfhs.org/media/1018445/nfhs_position_statement_soft_headgear_april_2017.pdf.

185. C. Withnall et al., *Effectiveness of Headgear in Football*, BRIT. J. OF SPORTS MED., Aug. 2005, at 40, 47 (2005), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1765314/pdf/v039p00i40.pdf>.

186. See Urist, *supra* note 179; cf. Josh Bean, *Should High School Soccer Players Wear Helmets?*, AL.COM (Apr. 25, 2016), <http://highschoolsports.al.com/news/article/1452407366397506003/should-high-school-soccer-players-wearhelmets/> (asserting proper training is the best concussion prevention, not headgear).

This phenomenon has been borne out in football, where at least one doctor has acknowledged that “the increased safety [has lead] to an increased threshold to assume risk.”¹⁸⁷ Dr. Erik Swartz, a kinesiology professor at the University of New Hampshire who advocates that football be played without helmets, analogizes the phenomenon to behavior at the wheel of an automobile, noting that “once [cars] started having anti-lock breaks, padded interiors and seat belts, accident rates went up . . . deaths went up.”¹⁸⁸ Moreover, Swartz explains, the increased assumption of risk may be simple human nature: “It’s referred to as risk compensation, or risk homeostasis When a player has a body part that’s protected, and the contact with somebody else is imminent, you’re going to put your protected body part first, just reflexively.”¹⁸⁹

Dr. Swartz’s research supports his theory. Together with colleagues at the University of New Hampshire, including the head football coach, Dr. Swartz conducted a study in which he divided players on the football team into two groups and exposed one of the groups to helmetless tackling drills.¹⁹⁰ The other group of players participated in no such drills.¹⁹¹ In actual games, members of the former group suffered 28% fewer head impacts than members of the latter group.¹⁹²

Although Swartz’s study is the first known study of its kind, the game of rugby offers anecdotal support for Swartz’s statistical findings. Rugby, which, like football, is a rugged game to which tackling is central, has long produced far fewer head impacts and concussions than football.¹⁹³ Dr. Mike Loosemore, a leading member of the medical team at the 2012 London Olympics and the physician for the British boxing team, credits the absence of helmets for rugby’s low incidence of concussions relative to football and cautions against helmets’ use in rugby.¹⁹⁴ Loosemore points specifically to the NFL, where he asserts that “the risk of brain injury is extremely high despite the helmets that

187. Tadd Haislop, *Football Helmets Are Creating More Problems than They Solve*, SPORTING NEWS (May 28, 2015), <http://www.sportingnews.com/nfl/news/nfl-concussions-football-helmets-risk-taking-behavior-brain-injury-helmetless-tackling-technique-lawsuit/15srtbuzodfbk10tkmhxm8ayr7> (last updated May 15, 2017).

188. *Id.*

189. *Id.*

190. Lindsay Gibbs, *Could Getting Rid of Helmets Actually Make Football Safer?*, THINK PROGRESS (Jan. 7, 2016, 1:43 PM), <https://thinkprogress.org/could-getting-rid-of-helmets-actually-make-football-safer-75393ffe5c32>.

191. *Id.*

192. *Id.*

193. *Is Rugby or American Football More Dangerous?*, TELEGRAPH, <http://www.telegraph.co.uk/film/concussion/is-rugby-or-american-football-more-dangerous/> (last visited Sept. 1, 2018).

194. Simon Briggs, *Head Guards in Rugby Would Add to the Concussion Problem, Not Solve It, Says Doctor*, TELEGRAPH (Oct. 8, 2014, 8:06 PM), <http://www.telegraph.co.uk/sport/rugbyunion/news/11150094/Headguards-in-rugby-would-add-to-the-concussion-problem-not-solve-it-says-doctor.html>.

they wear. Rugby headguards would be just as ineffective; in fact, they would actively create problems.”¹⁹⁵

In the same way, the use of headgear in soccer may actively create problems; that is, its use may produce more head impacts and potentially increase the number of concussions sustained overall.

The bigger weakness in the soccer headgear movement, however, is that even if wearing headgear were to reduce the incidence of concussion in soccer and doing so did not alter players’ risk tolerance in a way that eliminated the potential benefit of the headgear, that benefit does not apply to the damage suffered from heading the ball. Webbe and Salinas report that “evaluative work on the effectiveness of soccer headgear has near unanimity that helmets are remarkably ineffective in . . . ameliorating impact blows in ball heading.”¹⁹⁶ Even the aforementioned *British Journal of Sports Medicine* study, which concluded that headgear reduces the impact of head-to-head collisions in soccer and may therefore reduce the incidence of concussions, found that the headgear produced no material benefit in protecting the brain from the impact of a head meeting a ball.¹⁹⁷ The study measured the impact response of the head when struck by a ball at low speed (between 6.4 and 8.2 meters per second, designed to mimic volunteer heading) and at high speed (between ten and thirty meters per second, designed to mimic head-to-ball contact that may not be voluntary).¹⁹⁸ In both cases, “High speed video confirmed that the ball undergoes much larger deformation than the headband. The headgears tested are not effective because it is the ball which dominates the impact response.”¹⁹⁹

Of even greater concern, wearing headgear may make matters worse for female players because heading a ball with headgear on may be more damaging than heading a ball without headgear. As a general matter, females are more likely than males to suffer brain trauma while playing soccer.²⁰⁰ The reason for this sex-based disparity is not entirely clear, but researchers attribute it, at least in part, to anatomical differences in the head and neck region.²⁰¹ Female necks are, on average, less muscular than male necks, meaning that females tend to exhibit less “head-neck segment stability” when their heads collide against an object.²⁰² Once impacted, therefore, female heads accelerate more

195. *Id.*

196. See Webbe & Salinas, *supra* note 102, at 290.

197. See Withnall et al., *supra* note 185, at 47.

198. *Id.*

199. *Id.*

200. See Alison, *Women and Brain Injury: What You Need to Know*, BRAIN INJURY SOCIETY OF TORONTO (Mar. 11, 2015), <https://torontobraininjuryblog.com/2015/03/11/women-and-tbi-what-you-need-to-know/> (“Despite the fact that more men play contact sports than women, women suffer significantly higher rates of concussions than man in these sports.”).

201. See Ryan Tierney et al., *Gender Differences in Head-Neck Segment Dynamic Stabilization During Head Acceleration*, MED. & SCI. IN SPORTS & EXERCISE, Feb. 2005, at 272, 277–78, <https://www.ncbi.nlm.nih.gov/pubmed/15692324>.

202. *Id.* at 277.

quickly, prompting their brains to rattle more forcefully against the insides of their skulls.²⁰³

In 2008, relying, as a basis, on Newton's Second Law of Motion – that the force acting on an object is equal to the mass of the object times its acceleration – Temple University Kinesiology Professor Ryan Tierney conducted experiments with male and female college-aged soccer players heading soccer balls while wearing different types of headgear as well as none at all.²⁰⁴ The study revealed that the gap between female and male head acceleration when heading a soccer ball with headgear was substantially larger than the gap with no headgear and that the increased acceleration of female players' heads would counteract any benefit provided by the headgear's cushioning.²⁰⁵ Tierney concluded that the headgear tested would likely result in “an increased concussion risk in women.”²⁰⁶ Moreover, based on the study's results, Tierney, noting that children generally “exhibit low amounts of head-neck segment stability,” expressed concern about children wearing headgear and urged that “research is . . . needed to examine if soccer headgear may lead to increased head accelerations in children during soccer heading.”²⁰⁷

In that (1) substantial research suggests soccer headgear is not effective in preventing concussions; (2) there is near unanimity that headgear does nothing to reduce the impact on the brain of sub-concussive blows from heading the ball; (3) headgear may encourage riskier challenges than are currently the norm with the potential for greater injury; and (4) for women and potentially children, wearing headgear may, all other things being equal, pose a greater risk to the brain than not wearing it, headgear is likely not the solution to soccer's head danger.

The solution is eliminating heading from soccer.

VI. ELIMINATING HEADING FROM SOCCER

A. The Original Header-Less Game

While traditionalists may view heading in soccer as sacrosanct, it is certainly not indispensable to the game. Though heading is commonplace in the sport today, history teaches that it has not always been. Indeed, none of the rules systems that held sway in England during the nineteenth century as the

203. Ryan Tierney et al., *Sex Differences in Head Acceleration During Heading While Wearing Soccer Headgear*, J. OF ATHLETIC TRAINING, Nov./Dec. 2008, at 578, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2582549/#attr-43-06-18-Tierney1>.

204. *Id.* at 578–79.

205. *Id.* at 583.

206. *Id.* at 582–83.

207. *Id.* at 584.

game developed specifically mentioned players using their heads.²⁰⁸ In addition, when the International Football Association Board (“IFAB”), which was founded in 1886, established the 17 Laws of the Game (“17 Rules”), the concept of heading was nowhere within them.²⁰⁹ The IFAB has, over time, updated and altered the 17 Rules, which FIFA has adopted as soccer’s official rules, but heading remains absent.²¹⁰

While the absence of heading references in the foundational rules of soccer does not necessarily mean heading was prohibited,²¹¹ it certainly indicates heading was not a critical component of the game. And, indeed, a headed ball was, for decades, an extremely rare occurrence in a soccer match. In fact, heading was to be avoided if at all possible because the balls used in the late 1800s were heavy and cumbersome objects and were “prone to becoming water-logged, which led to frequent head and neck injuries.”²¹²

Although soccer ball construction had advanced by the turn of the nineteenth century, balls remained un conducive to heading. “Most balls produced by that time used rubber bladders . . . covered with heavy brown leather.”²¹³ Although these balls had more bounce to them and were easier to kick than the previous generation of balls, heading the ball remained a perilous proposition.²¹⁴

With technological advances in ball design, by the middle of the twentieth century balls were – as compared with those of old – somewhat more conducive to heading, and, as a result, heading frequency increased.²¹⁵ Heading, however, remained painful and difficult.²¹⁶ George Cohen, who played professionally during the 1950s and 1960s as a defender on England’s 1966 World Cup Championship team, and who now campaigns for brain safety in soccer, recalls that “[the balls] started out at [fourteen] to [sixteen] ounces but, with rain, they were two or three pounds . . . [I]f the ball hit you from the sky when

208. See *The Early Rules of Soccer*, SOCCERDATA, <http://www.soccer.mistral.co.uk/histrule.htm> (last visited Sept. 1, 2018) (listing the three main sets of rules in the nineteenth century that contributed to modern day soccer).

209. See Webbe & Salinas, *supra* note 102, at 277–78. See generally IFAB, LAWS OF THE GAME: 1903, http://static-3eb8.kxcdn.com/documents/640/131117_290118_1903_law.pdf (last visited Sept. 1, 2018) (overlooking headers in the 1903 alterations).

210. *Id.* (“Interestingly, heading the ball never even receives mention in the 17 Laws of the Game.”).

211. See FIFA, LAWS OF THE GAME (2010), https://www.fifa.com/mm/document/affederation/generic/81/42/36/lawsofthegame_2010_11_e.pdf (penalizes the touching of the ball with hands but is silent to penalize headers).

212. Noah Davis, *What Happens When Soccer Bans Heading?*, THE RINGER (Apr. 25, 2017, 9:00 AM), <https://www.theringer.com/2017/4/25/16041684/us-soccer-header-ban-concussions-4805684f63ca>.

213. *The History of the Soccer Ball*, SOCCER BALL WORLD, <http://www.soccerballworld.com/History.htm> (last visited Sept. 1, 2018).

214. *Id.*

215. See Davis, *supra* note 212.

216. See Webbe & Salinas, *supra* note 102, at 282–83.

you were still on the ground, the feeling would go right through to your feet.”²¹⁷ Still, to strengthen their necks for efficacy when heading in games, some clubs in that era were known to practice by heading large, heavy, medicine balls.²¹⁸

Eventually, as soccer balls became lighter and bouncier and as the act of heading appeared safer, the frequency of heading increased further, and it is now a fundamental and celebrated part of the game.²¹⁹ While heading may appear safer than when heavier balls were used, it may, in fact, be riskier. Dr. Michael Grey, a motor neuroscience physiologist at the University of Birmingham in the United Kingdom, explains:

The issue is the amount of energy imparted on the head by the ball. It is very simple physics. There is a formula for kinetic energy. That formula is one[-]half mass times velocity squared. The more important part of that equation is the velocity squared. We know players are bigger, stronger and kicking the ball faster. So the amount of energy in the ball is maybe even more [than when the balls were heavier]. There is still energy in the new balls to wobble the brain inside the cranium.²²⁰

The act of heading the ball played little or no role in soccer as originated because it was painful and dangerous. Now that heading is generally no longer painful, it plays a large role. Unfortunately, it remains dangerous – perhaps more dangerous than it was in the past. Indeed, it has been posited that “[i]f the rules of the game were being written today, making head-to-ball contact would be outlawed”²²¹

B. Attempts to Restrict Heading Among Youth

In August of 2014, parents of youth soccer players concerned about head injuries filed a class-action lawsuit in the U.S. District Court for the Northern District of California against FIFA, U.S. Soccer, U.S. Youth Soccer Associa-

217. Jeremy Wilson, *George Cohen: English Football Needs to Act on Dementia*, TELEGRAPH (May 31, 2016, 10:30 PM), <http://www.telegraph.co.uk/football/2016/05/31/george-cohen-english-football-needs-to-act-on-dementia/>.

218. Jeremy Wilson, *Football's Brain Injury Risk No Lower Now Than in the Past, Warn Medics*, TELEGRAPH (May 31, 2016, 12:28 PM), <http://www.telegraph.co.uk/football/2016/05/31/footballs-brain-injury-risk-no-lower-now-than-in-the-past-warn-m/>.

219. See Kelsey Mullins, *Could Soccer Exist Without Heading?*, BROCK (June 20, 2017), <http://www.brockusa.com/2017/06/could-soccer-exist-without-heading/> (discussing how heading is a part of a regular practice).

220. Wilson, *supra* note 218.

221. See Davis, *supra* note 212.

tion, American Youth Soccer Organization, U.S. Club Soccer, and the California Youth Soccer Association.²²² In the lawsuit, *Mehr v. Fédération Internationale de Football Association*, plaintiffs alleged that the defendants were negligent in monitoring and treating head injuries.²²³ The court dismissed FIFA from the suit with prejudice, noting that there existed “no connection between any claim asserted in th[e] case and any action by FIFA in California”²²⁴ The court also dismissed the United States defendants on standing grounds after finding that the parents did not sufficiently demonstrate injury.²²⁵ The dismissal on standing grounds, however, was without prejudice and plaintiffs’ counsel immediately indicated an intent to amend the complaint and proceed with the lawsuit against the United States defendants.²²⁶ The parties soon thereafter engaged in settlement discussions, and within a few months they reached an agreement.²²⁷ The agreement did not involve money but rather rule changes, including changes with respect to heading.²²⁸

While the agreement was hailed as a success among those concerned about head injuries in soccer, its restrictions on heading were actually quite limited. As a threshold matter, the amount of authority that the defendants have over individual youth teams varied, so while the changes are required with respect to, for instance, U.S. Soccer’s Youth National Teams and Development Academy, they are merely recommendations for most youth soccer clubs and leagues around the country.²²⁹ Moreover, the recommended (and for select bodies, as noted above, required) restrictions do not apply to all youth players.²³⁰ While it is recommended that children age ten and under do not head the ball at all during games and practices, other than restricting the number of head balls taken during practices, the recommendation does not extend to

222. *Mehr v. Fédération Internationale De Football Ass’n*, 115 F. Supp. 3d 1035, 1043 (N.D. Cal. 2015).

223. *Id.* at 1046; see also Ben Strauss, *U.S. Soccer, Resolving Lawsuit, Will Limit Headers for Youth Players*, N.Y. TIMES (Nov. 9, 2015), <https://www.nytimes.com/2015/11/10/sports/soccer/us-soccer-resolving-lawsuit-will-limit-headers-for-youth-players.html>.

224. *Mehr*, 115 F. Supp. 3d at 1054, 1071.

225. *See id.*

226. *Id.*; Jonathan Stempel, *FIFA, Others Defeat U.S. Soccer Concussion Lawsuit*, REUTERS (July 17, 2015, 9:00 AM), <http://www.reuters.com/article/us-soccer-concussions-fifa-lawsuit-idUSKCN0PR1JN20150717>.

227. *See* Strauss, *supra* note 223.

228. *Id.* (establishing that the new guidelines and youth initiatives governing youth players heading the ball resolved the class-action suit).

229. *U.S. Soccer Provides Additional Information About Upcoming Player Safety Campaign*, U.S. SOCCER (Nov. 9, 2015), <http://www.ussoccer.com/stories/2015/11/09/22/57/151109-ussoccer-provides-additional-information-about-upcoming-player-safety-campaign>.

230. *See id.*; US YOUTH SOCCER, US YOUTH SOCCER POLICY AND PLAYERS AND PLAYING RULES 7 (Aug. 20, 2016), <https://www.usyouthsoccer.org/file.aspx?DocumentId=71>.

eleven-and-twelve-year-olds.²³¹ No restrictions of any sort are recommended for players older than twelve.²³²

The Professional Footballers' Association, which is the union for professional soccer players in the United Kingdom, has tracked U.S. Soccer's movement on the issue and has argued for similar restrictions, urging the Football Association, the United Kingdom's supreme soccer governing body, to eliminate heading for children under the age of ten.²³³ The Football Association has taken no action, committing only to "researching and examining" the issue, but the public and the medical community have expressed increasing concern.²³⁴ For instance, Dr. Willie Stewart, a Glasgow, Scotland-based Neuropathologist who collaborated on the aforementioned University of Stirling study, has mocked the United Kingdom's soccer authorities' inaction, stating:

If I put boxing gloves on my hands, went into a school and offered to bang the kids around the head with the same force as a [soccer ball], I would be locked up. If I take a [soccer ball] in and did the same thing, I would be appointed coach.²³⁵

C. What About Adults' Brains?

While perspectives differ as to whether and to what extent heading should be permitted in soccer, discussion of its elimination has been limited almost exclusively to the youth game. Why it is limited as such, however, is not clear. Neither the research on heading's dangers nor the nature of U.S. Soccer's regulations and recommendations support restricting heading regulation to youth soccer.

Without question, protecting childrens' brains from damage through sports must be a priority. Their brains are more susceptible to damage than adults' brains and, because children's brains are still developing, any damage is likely to have greater consequences.²³⁶ A brain is, however, an extraordinary and delicate organ at any age, and heading a soccer ball, at any age, can harm the brain. Indeed, the studies cited in Part IV of this Article that warn of the danger of sub-concussive impacts – the Norwegian study, the Stirling study,

231. *Id.*

232. *Id.* Bennet Omalu, the neuropathologist who discovered CTE and diagnosed the first case of the disease in an NFL player, has called for more expansive restrictions. He suggests that all heading be eliminated for players under eighteen years old and that players younger than twelve be taught a new form of soccer involving less contact. *Brain Injury Expert Calls for Ban on Heading in Football*, *supra* note 100.

233. *See* Wilson, *supra* note 157.

234. *Id.*

235. *Id.*

236. *See Children and Concussions*, WEILL CORNELL MED. CONCUSSION AND BRAIN INJ. CLINIC, <https://concussion.weillcornell.org/about-concussions/kids-and-concussions> (last visited Sept. 1, 2018).

the *Neurology* study – all involved adults’ brains.²³⁷ Eliminating heading in the youth game, therefore, does not go far enough.

While adults can consent to the dangers inherent in an activity in a way that children, as a legal matter, cannot,²³⁸ playing soccer should not require anyone, regardless of age, to put his or her brain at risk with every head ball. There has, however, been no adult-focused *Mehr* analogue or potentially crippling NFL-like nationwide concussion lawsuit to truly rattle the American soccer establishment’s cage,²³⁹ which may be part of the reason that heading’s place in the game for players over twelve years old has gone unaltered notwithstanding increasing evidence of its danger.

Another part of the reason may be the deep devotion to heading that many in the soccer community, and certainly those who are good at it, have. A perfectly placed head ball into the opponent’s goal can be majestic. Soccer highlight reels are filled with them, and they are widely celebrated. Moreover, the opportunity to strike a ball with one’s head confers an obvious advantage upon those who are able to do so well – an advantage that would be lost if heading were eliminated. Tall, attacking players who are strong in the air and more adept at scoring with their heads than manipulating the ball into the net with their feet would be phased out of the game. In exploring the potential merits of eliminating heading from soccer, columnist Noah Davis asserts that “[a] header requires less technical ability than a [thirty]-yard strike, often rewarding the brave rather than the skilled.”²⁴⁰ Though Davis discounts the athletic ability great headers of the ball must possess, the elimination of heading would certainly disadvantage such players vis-a-vis their contemporaries who possess a “tiki-taka” short passing, ball control style popularized in recent years by the

237. See *supra* Section IV.C.

238. See LOUIS R. FRUMER AND MELVIN I. FRIEDMAN, *PERSONAL INJURY: ACTIONS, DEFENSES, DAMAGES* § 28.15 (2018) (noting that although infancy generally precludes a child from consenting to conduct, a child’s consent to participate in a game is limited “to the bodily contacts or confinement that the reasonable rules and usages of the game permit.”).

239. While they have had minimal impact on the national conversation regarding rules changes, several soccer-related concussion lawsuits have been brought. See, e.g., *In re Nat’l Collegiate Athletic Assoc. Student-Athlete Concussion Injury Litig.*, 314 F.R.D. 580 (N.D. Ill. 2017) (approving class action settlement in soccer student-athletes’ concussion-related claim); Steven Goff, *Namoff’s Lawsuit Was Dismissed*, WASH. POST (Jan. 14, 2015), https://www.washingtonpost.com/news/soccer-insider/wp/2015/01/14/namoffs-lawsuit-was-dismissed/?utm_term=.0443a6f414ec (noting that the Superior Court of the District of Columbia dismissed Bryan Namoff’s \$20 million negligence claim against D.C. United’s coach, trainer, and doctor); Jamie Goldberg, *Portland Timbers No Longer a Defendant in Eddie Johnson’s Concussion Lawsuit*, OREGONIAN (Jan. 19, 2017), http://www.oregonlive.com/timbers/index.ssf/2017/01/portland_timbers_no_longer_a_d.html (explaining that although a circuit court in Oregon dismissed the Timbers in former soccer player Eddie Johnson’s negligence lawsuit, the case is still open as to the trainer and other health providers).

240. See Davis, *supra* note 212.

Spanish club FC Barcelona.²⁴¹ For instance, Argentina national Lionel Messi, a magician with the ball at his feet,²⁴² would likely be far less troubled by a head ball ban than England national Andy Carroll, who is known to be a powerful force in the air but is lampooned for his relative lack of skill with the ball on the ground.²⁴³ For that matter, entire nations' soccer programs would potentially rise or fall in stature relative to competitor nations' programs in the wake of a heading ban, as nations that have traditionally emphasized technical ability and short passes would, at least in the short term, separate themselves from those that have traditionally emphasized a more physical approach that privileges prowess in the air.

A discussion of how a heading ban would shift the balance of power among soccer players and among soccer-playing nations is beyond the scope of this Article, and more importantly, it is beside the point. Study after study reveals that heading the ball and the collisions so often borne of attempting to head the ball threaten the brain, at any age.²⁴⁴ That should be enough to render irrelevant both romantic notions of the role heading has occupied in the game and considerations of who a heading ban would most disadvantage.

Sports evolve. Basketball rules have changed over the years to introduce the slam dunk, the three-point shot, and the shot clock, and they have dramatically changed the game, altering decades-old strategic philosophies and advantaging players with different skill sets and attributes.²⁴⁵ Still, it is basketball. Soccer without heading will still be soccer but with healthier brains in its players' heads.

VII. CONCLUSION

A well-executed head ball is beautiful, and some of the game's greatest players, such as U.S. Women's National Team legend Abby Wambach, have

241. Philip Ball, *FC Barcelona: The Science Behind Their Success*, BBC (Nov. 18, 2014), <http://www.bbc.com/future/story/20141024-what-makes-barcelona-so-special>.

242. Scott Davis, *Here's What Makes Lionel Messi So Impossible to Defend*, BUS. INSIDER (June 6, 2015, 8:08 AM), <http://www.businessinsider.com/lionel-messi-dribbling-2015-6> (calling Messi the "world's best dribbler").

243. See Barney Ronay, *Andy Carroll, the Man with a Head Like a Foot, Is a Weapon England Don't Need*, GUARDIAN (Apr. 15, 2016), <https://www.theguardian.com/football/blog/2016/apr/15/andy-carroll-weapon-england-roy-hodgson-west-ham-euro-2016>.

244. See *supra* Section IV.C.

245. Ryan Fagan, *Two Simple Rules: How the Shot Clock and the 3 Pointer Changed College Hoops*, SPORTING NEWS (Apr. 15, 2012), <http://www.sportingnews.com/ncaa-basketball/news/2288263-two-simple-rules-how-the-shot-clock-and-the-3-pointer-changed-college-hoops>.

made beautiful head balls their trademark.²⁴⁶ However, the consequences of heading the ball – and of missing the ball and instead hitting another player’s head, shoulder, elbow, foot, fist, or the goal post – are potentially dire, as seemingly acknowledged by Wambach herself in announcing that upon her death she would like her brain donated to the study of CTE.²⁴⁷ While soccer’s regulatory bodies have begun recommending that young children not head the ball, there has been no movement to eliminate heading among adults despite overwhelming evidence as to the neurological damage heading the ball and attempting to head the ball, at any age, can cause.

The NFL ignored evidence of its burgeoning brain health crisis, and by the time it faced the problem and tried to address it, youth football participation had declined, legendary players were lamenting having played the game, and the NFL faced a mammoth class action lawsuit it ultimately settled for \$1 billion.²⁴⁸ For the good of “The Beautiful Game,” soccer’s governing bodies should take a different path. Soccer is a brain-dangerous sport, but it can be made far less so with one rule change: the elimination of heading. By eradicating heading from soccer, the sport’s governing bodies can protect the game and its players into the future.

246. Sharelle M. Burt, *Abby Wambach Announces Retirement: Top 10 Career Accomplishments*, N.Y. DAILY NEWS (Oct. 27, 2015, 6:09 PM), <http://www.nydailynews.com/sports/soccer/abby-wambach-top-10-career-accomplishments-article-1.2413720> (calling the header Wambach’s “signature” move).

247. *Abby Wambach Will Donate Brain for Concussion Research*, SPORTS ILLUSTRATED (Mar. 30, 2016), <https://www.si.com/planet-futbol/2016/03/30/uswnt-abby-wambach-will-donate-brain-concussion-research>.

248. See discussion *supra* notes 86–88.

