

Football Players' Perceptions of Future Risk of Concussion and Concussion-Related Health Outcomes

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Abstract

Concussion is increasingly recognized as a risk of participation in contact and collision sports. There have been few examinations of athletes' perceptions of their susceptibility to concussion or concussion-related health consequences. We examine college football players' perceptions of their risk of sustaining a concussion and concussion-related health consequences in their future, whether these perceptions change over time, and how concussion history is related to perceived future risk of concussion and concussion-related health consequences. A survey was administered to National Collegiate Athletic Association Division I Football Championship Series athletes on 10 teams in 2013 and to nine of those teams in 2014. Athletes answered questions assessing their perceptions of concussion and potential concussion-related health consequences. Approximately 40% of athletes believed there was a strong possibility that they would sustain a concussion in the future, while approximately one-in-four thought a concussion would make them miss a few games. About one-in-10 athletes predicted dementia, Alzheimer's disease, or chronic traumatic encephalopathy would develop from concussions. These beliefs were stronger among athletes who had sustained previous concussions. Across the two years studied, athletes' perceptions of the risk of concussion and missing a few games because of concussion decreased significantly. Overall, a substantial proportion of college football players believe they will have long-term health consequences as a result of sustaining sport-related concussions. The true incidence and prevalence of many of these outcomes are unknown. Further research is needed to determine whether athletes have an accurate perception of the risks of these outcomes developing.

Keywords: American football; brain injury; chronic traumatic encephalopathy; concussion; risk

Introduction

CONCUSSIONS SUSTAINED DURING SPORTS have led to increasing public concern and emerged as a public health issue.¹ This concern may be well justified given the incidence of concussion in sports and a growing body of research pointing to possible short- and long-term morbidity associated with sustaining multiple concussions. The Centers for Disease Control and Prevention estimates that 1.6 to 3.8 million non-fatal traumatic brain injuries (TBIs), most of them concussions, occur in sports and recreational activities in the United States annually,² with American football players among those at highest risk.³⁻⁸

Estimates of the incidence of concussion in college football vary.^{4,5,7-16} In 2016, Houck and associates¹⁶ calculated concussion

rates of a single National Collegiate Athletic Association (NCAA) Division I Football Bowl Subdivision team over a nine-year period and found an overall concussion rate of 1.19 concussions per 1000 athlete-exposures (AEs), with AE defined as one football player participating in one NCAA-sanctioned practice or game. The authors also reported a rate of 4.46 concussions per 1000 AEs during games and 0.92 concussions per 1000 AEs during practice.¹⁶

Other recent studies have reported lower concussion rates with college football players sustaining between 3.01–3.74 concussions per 1000 AEs during games and between 0.42–0.53 concussions per 1000 AEs during practices.¹³⁻¹⁵ One explanation for the varied reports of rates of concussion is the number of undiagnosed concussions. Studies in various sports suggest that between 20% and 60% of athletes with concussion symptoms do not report them to medical personnel.¹⁷⁻²¹

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Short-term consequences

Concussion results in symptoms that affect physical, cognitive, and emotional health.²² Acute symptoms of sport-related concussion typically resolve within several weeks and include loss of consciousness, amnesia, sleep disturbances, behavioral changes, and cognitive impairment.²² For some athletes, symptoms may last weeks to months.^{23–25} Even in the absence of diagnosed concussion, exposure to repeated head impacts may affect the brain. For example, Talavage and colleagues²⁵ performed functional magnetic resonance imaging tests on high school players both pre-season and in-season after impacts to the head. Neurophysiological changes were reported in both persons who sustained a clinically diagnosed concussion and those who did not.

Similarly, McAllister and coworkers²⁶ found changes in white matter diffusivity and cognition in NCAA Division I football and ice hockey athletes over the course of a season, even in the absence of a diagnosed concussion. In addition, Bazarian and associates²⁴ observed white matter changes in the brains of collegiate football players without concussions using diffusion tensor imaging that persisted after six months of no-contact rest.

Long-term consequences

Repetitive concussions have also been associated with long-term consequences, affecting the person years or decades later. Such consequences include cognitive and mood disturbances^{27–31} as well as pathological changes in the brain, including chronic traumatic encephalopathy (CTE), characterized by “an accumulation of abnormal hyperphosphorylated tau (p-tau) in neurons and astroglia distributed around small blood vessels at the depths of cortical sulci and in an irregular pattern.”³²

CTE was recently established in consensus criteria as a unique neuropathological disorder.³² This disease has been found in the brains of persons exposed to repetitive brain trauma through contact sports and other mechanisms, representing another potential later-life consequence of contact or collision sport participation.³³ More research is needed to understand the associations between the pathophysiology and neurobehavioral signs and symptoms. In two separate studies, however, former National Football League players were found to have increased risk of depression.^{28,29} In addition, former professional football players have also been found to have cognitive impairment and executive dysfunction later in life.^{27,30}

Risk perceptions

Accurate concussion risk appraisal is important for athletes, because risk perception is an important factor in determining health behavior.^{34–37} As such, athletes who perceive a higher risk of concussion may be more likely to take precautionary measures such as reporting their symptoms or waiting until symptoms completely resolve before returning to play. Recent research suggests, however, that although athletes are knowledgeable about at least some of the potential consequences of concussions, they still do not report concussion symptoms. This is in part, because of what they perceive to be the negative consequences of reporting, such as letting teammates down or losing their spot in the lineup.^{38,39} This is problematic, because an athlete's ability to appropriately assess risk may be hindered by the lack of clear epidemiological data regarding the chance of sustaining a concussion, of symptom prolongation, and of longer-term concussion-related consequences.

Concussion diagnosis and medical management are important because athletes who sustain an additional head injury before

complete recovery from a previous injury are at risk for potentially catastrophic consequences.⁴⁰ Although researchers are investigating potential biomarkers for concussion, none are currently validated for clinical use.^{41,42} Thus, the willingness of athletes to report concussion symptoms that are not clinically observable^{43,44} remains essential to diagnosis.

Perceptions about concussion have an effect on a person's clinical outcome.^{45–48} Whittaker and colleagues⁴⁵ found that patients who believe the symptoms they experience after a mild TBI (mTBI) will have lasting negative consequences on their lives are at heightened risk of experiencing enduring post-concussion syndrome (PCS).⁴⁵ Using a modified version of the *Brief Illness Perception Questionnaire*, Hou and associates⁴⁸ found that negative perceptions about mTBI were associated with a risk of PCS developing. Specifically, illness identity (associating a number of symptoms to their head injury), personal control (having little control over recovery), timeline (believing symptoms will last a long time), and consequences (having a negative impact on their life) were all significant predictors of PCS.⁴⁸

This could mean that athletes with higher risk perceptions for the effects of concussion, believing that they are at greater susceptibility for the injury or that the injury will be more severe or prolonged, may behave differently. For example, they could be more likely to attribute non-specific symptoms (such as headache) to a concussion, think they have less control over their recovery, believe the symptoms will last for a longer time, and/or that their injury will have more negative consequences than athletes with lower risk perceptions. In such situations, this may impede care-seeking for the true underlying mental or physical health issues, leading to a poor prognosis. Although the exact relationship between risk perception and health-related behaviors is not known,⁴⁹ understanding the risk perception of concussion can help in understanding athletes' behavior (returning to play, reporting possible concussion symptoms), concussion treatment, concussion policy formation, and may have implications for prognosis.

This study describes athletes' risk perceptions, as operationalized as the chance of sustaining a concussion and of experiencing negative concussion-related health outcomes in the future. Specifically, we tested the two hypotheses: (1) a history of diagnosed concussion is independently associated with an athlete's perception of concussion-related risk and (2) perception of the risk of concussion-related health outcomes changes with increased experience in collegiate football.

Methods

Sample and procedure

Before the start of the 2013 fall football season, athletic trainers and/or head football coaches at NCAA Division I Football Championship Series (FCS) schools were approached using publicly available contact information and asked whether members of their team could participate in a questionnaire-based research study examining the perception of concussion among United States collegiate football players. After review by members of the target population for content and clarity, questionnaires were administered using pen and paper, in person, at the athletes' home institutions. A convenience sample of athletes from 10 football teams completed the questionnaires during the 2013 football season. Athletic trainers from these 10 teams were re-contacted before the 2014 fall football season regarding continued participation; nine of the 10 teams that participated in 2013 agreed to participate in 2014.

All athletes provided informed consent before participation, and all research activities were approved by Boston University Medical

Center and Boston Children's Hospital Institutional Review Boards. All data were coded into a database from the original paper questionnaires. Ten percent of questionnaires were chosen, at random, each year and were entered by a second coder to ensure inter-coder reliability and consistency. Error rates were <0.1% both years.

Measures

Participants completed seven statements related to their perceived likelihood of sustaining a concussion in the future and of experiencing negative concussion-related health consequences. All future risk statements included the item stem "In the future, there is a strong possibility that..." and were assessed using a seven-point Likert scale with responses ranging from 1 (strongly disagree) to 7 (strongly agree). Where reported, percent agreement represents responses of slightly agree (5), agree (6), and strongly agree (7) combined. All future risk questions are provided in Appendix 1 and described briefly below.

Perceived risk of sustaining a concussion. In both 2013 and 2014, athletes were first asked how strongly they agreed with the item "In the future, there is a strong possibility that I will get a concussion."

Perceived health consequences of a single concussion. Athletes were queried at both time points about how strongly they agreed with statements related to their risk of sustaining concussion-related health consequences in the future, including missing a few games or ending their season early because of a concussion.

Perceived health consequences of multiple concussions. Athletes were also asked about the cumulative effects of multiple concussions, specifically whether they agreed that there was a strong possibility of their career ending early, having short-term or long-term personal life problems, and dementia, CTE, or Alzheimer's disease developing.

History of diagnosed concussion. Athletes were asked to write in their response to the following question about the number of diagnosed concussions they had sustained: "In your football career, how many times were you diagnosed with a concussion by a medical professional (doctor, athletic trainer, nurse)?"

Statistical analysis

Descriptive statistics are provided to illustrate athletes' agreement with the risk-related statements across the two years of data collection. Paired sample *t* tests were used to examine the difference in mean response to future risk questions between 2013 and 2014. A Bonferroni correction was used to adjust for multiple comparisons. For items with significant between year changes, a change score was created by subtracting the response (1–7) from 2014 from the same response in 2013. This change score was then examined using a multiple linear regression analysis including the predictor variables: year in school (as a categorical variable), number of diagnosed concussions (as a continuous variable), and the initial score on the variable in question during the 2013 survey (as a continuous variable). Likert-scale responses were reduced to binary variables with responses of slightly agree (5), agree (6), and strongly agree (7) collapsed into an "Agree" category.

Bivariate logistic regressions were used to examine whether year in school was a significant predictor of whether or not an athlete agreed with each of the seven concussion-related risk statements. Logistic regression was also used to examine differences in the odds that athletes agreed with a given future risk question as the number of self-reported diagnosed concussions the athlete had

sustained in his football career (examined as a continuous variable) increased, while controlling for the athlete's team and year in school. Statistical analysis was performed in R v. 3.2.3 using an alpha of <0.05 to indicate statistical significance.

Results

Sample characteristics

The study included 734 athletes from 10 teams in year one (2013) of enrollment with 721 completing questions of interest for the present article. In the second year, 807 athletes from nine of the original 10 teams completed questionnaires, including 426 (58.0%) who had participated in 2013. During 2013, the athletes' mean age was 19.6 ± 1.35 years and in 2014 it was 19.8 years ± 1.85 years. All school years were represented; in 2013, the study included 230 freshmen, 164 sophomores, 189 juniors, 151 seniors, and in 2014, 239 freshmen, 196 sophomores, 170 juniors, and 209 seniors were included.

All playing positions were represented across both years; positions included were both similar across the two seasons and in relative representation of the average football team. In 2014, 342 (42.1%) athletes reported a history of one or more diagnosed concussions. Among these athletes, the number of self-reported diagnosed concussions was quite skewed with the majority (57.6%) indicating that they had sustained one diagnosed concussion during their athletic career, with a maximum number of 10 diagnosed concussions (standard deviation = 1.14).

Risk perceptions

About four-in-10 college football players surveyed thought there was a strong possibility that they would sustain a concussion in the future (42% in 2013, 35.3% in 2014). Fewer agreed that there was a strong possibility of sustaining a concussion that would cause them to miss a few games (25.4% in 2013, 21.1% in 2014), end their season early (11.4% in 2013, 10.8% in 2014), or end their career early (8.9% in 2013, 8.8% in 2014). Short-term and long-term difficulties with school, work, or personal relationships were seen as a strong possibility by about one-in-eight athletes (Table 1). Finally, dementia, CTE, or Alzheimer's disease was recognized as a strong future possibility by about one-in-10 (Table 1). Responses to these items by the subset of athletes who participated in both years of the study were in line with the broader sample (Table 1).

Change in risk perceptions across time among subset of athletes

Paired samples *t* tests were used to examine the difference in mean response to each of the seven future risk questions between 2013 and 2014 on the subset of 426 athletes who participated in the survey both years. In 2013, athletes agreed more strongly with the statements, "In the future, there is a strong possibility that I will get a concussion" and "In the future, there is a strong possibility that I will get a concussion that will make me miss a few games" than in 2014 (Table 2). There were no significant differences in agreement with the other five questions between the two years of study. Year in school was not an independent predictor of agreement with any of the future risk statements.

Risk perceptions and concussion history

A history of diagnosed concussion ($\beta = -0.30$, $p = 0.015$) and agreement with the statement in 2013 ($\beta = 0.52$, $p < 0.001$) were each independently associated with agreement with the statement

TABLE 1. FOOTBALL PLAYERS' PERCEPTIONS OF LIKELIHOOD OF FUTURE INJURY OR IMPAIRMENT

<i>In the future, there is a strong possibility that...</i>	<i>Number Agree* (%)</i>			
	<i>2013 (n ~ 721)[#]</i>	<i>Matched subset 2013 (n ~ 431)[#]</i>	<i>2014 (n ~ 807)[#]</i>	<i>Matched subset 2014 (n ~ 430)[#]</i>
1. I will get a concussion.	303 (42.1)	192 (44.7)	285 (35.3)	161 (37.4)
2. I will get a concussion that makes me miss a few games.	183 (25.4)	112 (26.0)	170 (21.1)	91 (21.2)
3. I will get a concussion that makes me end my season early.	82 (11.4)	46 (10.7)	87 (10.8)	46 (10.7)
4. My football career will end early because of concussions.	64 (8.9)	36 (8.4)	71 (8.8)	41 (9.5)
5. I will have short-term problems performing in school/work or my ability to maintain personal relationships because of concussions.	103 (14.3)	61 (14.2)	110 (13.7)	63 (14.7)
6. I will have long-term problems performing in school/work or my ability to maintain personal relationships because of concussions.	84 (11.7)	48 (11.1)	101 (12.5)	59 (13.7)
7. I will develop dementia, CTE, or Alzheimer's disease when I am older because of concussions.	78 (10.8)	39 (9.0)	79 (9.8)	51 (11.9)

*Agreement indicates that an athlete responded to the statement with slightly agree, 5; agree, 6; or strongly agree, 7 on the 7-point Likert scale.

[#]Number of respondents varied per question. Exact number of respondents for each question in 2013: 1. n=720; 2. n=721; 3. n=721; 4. n=719; 5. n=719; 6. n=721; 7. n=720; matched subset 2013: 1. n=430; 2. n=431; 3. n=431; 4. n=429; 5. n=431; 6. n=431; 7. n=431; in 2014: 1. n=807; 2. n=807; 3. n=806; 4. n=806; 5. n=804; 6. n=806; 7. n=804; and matched subset in 2014: 1. n=430; 2. n=430; 3. n=429; 4. n=430; 5. n=428; 6. n=430; 7. n=429.

“In the future, there is a strong possibility that I will get a concussion” in 2014 ($F(3, 417) = 45.52, p < 0.001$, adjusted $R^2 = 0.24$); year in school was not. Similarly, with regard to the statement “In the future, there is a strong possibility that I will get a concussion that will make me miss a few games,” history of diagnosed concussion ($\beta = -0.25, p = 0.027$) and agreement in 2013 ($\beta = 0.60, p < 0.001$) were independently associated with agreement with the statement in 2014 ($F(3, 418) = 61.33, p < 0.001$, adjusted $R^2 = 0.30$); year in school was not.

For each of the future risk statements, an increase in the number of previously diagnosed concussions was associated with significantly greater odds of agreement (Table 3). For example, compared with an athlete who has sustained zero diagnosed concussions, an athlete on the same team and in the same year in school who has sustained one diagnosed concussion has 1.49 times the odds of agreeing with the statement, “In the future, there is a strong possibility that I will get a concussion,” and an athlete with two diagnosed concussions has 2.22 times the odds of agreeing with the

same statement, on average. This represents an 11% difference in agreement between athletes who have sustained one concussion or more and athletes who have not sustained previous concussions (46.3% vs. 35.3%, respectively).

Discussion

Our study suggests that about 10% of collegiate football players believe that there is a strong possibility of dementia, CTE or Alzheimer's disease developing in the future because of concussions sustained during sports. This belief likely stems from previous studies suggesting that National Football League players who have sustained a greater number of concussions have an increased chance of experiencing negative health outcomes.²⁸ Given the limitations of existing evidence, it is unclear whether athletes' perceptions of these risks are in line with the actual risk, or potentially represent an over- or underestimate of the likelihood these health consequences will be experienced.

TABLE 2. PAIRED SAMPLE T TEST: ATHLETES' CHANGE IN PERCEPTIONS OF FUTURE RISK OF CONCUSSION OR CONCUSSION-RELATED OUTCOMES

<i>In the future, there is a strong possibility that...</i>	<i>Mean difference 2013–2014</i>	<i>p value*</i>
1. I will get a concussion.	0.34	<0.001
2. I will get a concussion that makes me miss a few games.	0.26	<0.001
3. I will get a concussion that makes me end my season early.	0.11	0.175
4. My football career will end early because of concussions.	0.07	0.433
5. I will have short-term problems performing in school/work or my ability to maintain personal relationships because of concussions.	0.05	0.555
6. I will have long-term problems performing in school/work or my ability to maintain personal relationships because of concussions.	0.007	0.930
7. I will develop dementia, CTE, or Alzheimer's disease when I am older because of concussions.	-0.09	0.265

Values are derived from a paired samples *t* test comparing responses from the same athletes in 2013 and 2014. Responses were measured on a 7-point Likert-type scale with 1, Strongly Disagree; 7, Strongly Agree. Number of respondents varied per question. Exact number of respondents for each question: 1. n=425; 2. n=426; 3. n=425; 4. n=424; 5. n=424; 6. n=426; 7. n=425.

*To adjust for multiple comparisons, a Bonferroni correction is utilized. Therefore, statistical significance is indicated by $p < (0.05/7)$ or $p < 0.0071$.

TABLE 3. LOGISTIC REGRESSION: FOOTBALL PLAYERS' PERCEPTIONS OF LIKELIHOOD OF FUTURE INJURY OR IMPAIRMENT BASED ON THEIR HISTORY OF DIAGNOSED CONCUSSION, CONTROLLING FOR TEAM AND YEAR IN SCHOOL (N = ~800)[#]

<i>In the future, there is a strong possibility that...</i>	OR	95% OR CI	p value
1. I will get a concussion.	1.49	(1.30, 1.73)	<0.001
2. I will get a concussion that makes me miss a few games.	1.37	(1.19, 1.58)	<0.001
3. I will get a concussion that makes me end my season early.	1.31	(1.11, 1.55)	0.001
4. My football career will end early because of concussions.	1.39	(1.17, 1.65)	<0.001
5. I will have short-term problems performing in school/work or my ability to maintain personal relationships because of concussions.	1.30	(1.11, 1.51)	<0.001
6. I will have long-term problems performing in school/work or my ability to maintain personal relationships because of concussions.	1.28	(1.09, 1.50)	0.002
7. I will develop dementia, CTE, or Alzheimer's disease when I am older because of concussions.	1.25	(1.06, 1.49)	0.007

OR, odds ratio; CI, confidence interval.

Values are derived from a logistic regression with independent variable of self-reported diagnosed concussion in during the athlete's football career and dependent variable represented in the left-most cell of the respective row of the table, controlling for the athlete's team and year in school.

[#]Number of respondents varied per question. Exact number of respondents for each question: 1. *n* = 800; 2. *n* = 800; 3. *n* = 799; 4. *n* = 799; 5. *n* = 797; 6. *n* = 799; 7. *n* = 797.

While the direct pathophysiological mechanism linking diagnosed concussions with long-term health risks is incompletely understood, the association between greater concussion history and increased chance of experiencing concussion-related health outcomes recognized by athletes is likely accurate in directionality despite the magnitude remaining unknown.^{28–30,33} Athletes' perceptions of the likelihood that they will experience short-term and long-term school, work, and interpersonal impairment from concussions as well as their perceptions of their future dementia risk are particularly interesting, given the incomplete evidence about the association between concussions and these outcomes.

Further, athletes' perceptions likely play a role in the health behaviors and overall prognosis.^{45–48} For example, it is possible that athletes who perceive the likelihood of more severe health consequences from concussion are more likely to report a suspected injury to their sports medicine providers.

It is important to recognize that either an athlete's over- or underestimate of the risk of concussion and concussion-related health consequences may have unintended consequences. An underestimate of the risks may lead athletes to inappropriately undervalue current and future health in their decision to continue sport participation. For example, an athlete who underestimates the risk of later-life neurodegenerative disease from concussion may continue participating in sports without accounting for the potential increase in his risk of long-term neuropathological, cognitive, behavioral, or mood disturbances.^{31,33}

Conversely, an overestimate of the risks may lead athletes to inappropriately assume that their personal ailments are resultant from concussion or its related consequences, and perhaps fail to seek appropriate medical care. For example, an athlete who overestimates the likelihood that he will incur a neurodegenerative disease as a result of sports participation may inappropriately attribute cognitive or psychological symptoms to this disease without consulting a physician. As information about these potential health consequences evolves, it is important to communicate these serious risks accurately with athletes in a way that does not convey an inappropriate level of certainty, finality, or inevitability, to enable informed decision-making.

Approximately 40% of NCAA Division I FCS collegiate football players believe it is highly likely they will sustain a concussion in the future, although only 25% believe there is a strong possibility that they will miss a few games as a result. This lower number may reflect an intention by athletes to not report symptoms of a

concussion and continue playing in games, because estimates suggest that approximately half of concussions are not immediately reported to medical personnel.^{17–21,50} Alternatively, it may reflect the athlete's accurate recognition of typical concussion recovery, because most concussion symptoms commonly resolve within 7–10 days,^{51–55} meaning they might only miss one game if following a medically indicated return-to-play protocol.

Among the subset of athletes who participated in both years of this study, there was a significant decrease in the perception of the likelihood of sustaining a concussion and missing a few games because of concussion between 2013 and 2014. Experiencing college football may allow athletes to more accurately appraise the risk of concussion and better understand the removal from play and return-to-play protocols at their institution. In addition, the concussion education provided by the institutions may alter athletes' understanding of the epidemiology of concussion and the typical recovery timeline.

Athletes with a greater number of diagnosed concussions had greater odds of agreeing that there was a strong possibility of each of the queried concussion-related risks in their future. In most cases, the literature supports the athletes' beliefs; there is evidence that a history of previous concussion is associated with an increased risk of sustaining additional concussions.^{10,11,28,56–60}

Limitations

Our findings should be considered in light of their limitations. Given the relatively small number of teams surveyed and the convenience sampling, the findings may not be generalizable to NCAA Division I FCS football as a whole or to other levels of football participation. Survey items were not validated and measured perceived susceptibility to outcomes of varying severity. Future studies should explicitly measure both perceived susceptibility and perceived severity³⁴ as well as examine the best ways to elicit concussion risk perceptions.

Conclusion

A substantial proportion of collegiate football players believe that they will sustain concussions during their careers and that they will likely suffer long-term effects from these concussions, including dementia, CTE or Alzheimer's disease. Their perceived risk of these health outcomes increases with the number of previously diagnosed concussions. Research in other areas suggests that

risk perceptions affect health-related behaviors. Thus, it is important that athletes' perceptions of risk align with the scientific evidence about the particular health consequences, allowing athletes to make informed decisions regarding their participation in sport and to encourage disclosure of concussions.

Therefore, attempts should be made to better quantify the risks of longer term health outcomes after repeated sport-related concussions. As epidemiologic data relating to concussion and concussion-related health consequences grows, sports medicine providers will play a critical role in communicating this information to athletes and ensuring that athletes are able to use this information to make an informed decision about their participation in sport. Future research examining how sports medicine clinicians communicate risk to athletes is warranted and should be guided by risk communication literature from other domains.

Acknowledgments

C.M.B. is supported by the National Institute of Mental Health of Award Number T32MH019733. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. This study was funded, in part, by a grant from the Edmond J. Safra Center for Ethics at Harvard University. The authors would like to thank the athletes who contributed to this research and to the sports medicine providers and coaches who fostered the athletes' participation.

Author Disclosure Statement

Christine M. Baugh is supported by the National Institute of Mental Health of Award Number T32MH019733. She has research funded by the Football Players Health Study at Harvard, which is funded by the NFL Players' Association and has previously received research funding from the National Collegiate Athletic Association.

Dr. Emily Kroshus has research funded by the Football Players Health Study at Harvard, which is funded by the NFL Players' Association. She previously served as a post-doctoral researcher at the National Collegiate Athletic Association Sport Science Institute and currently serves as a consultant there.

Dr. William P. Meehan, III, receives royalties from ABC-Clio publishing for the sale of his book, *Kids, Sports, and Concussion: A guide for Coaches and Parents*, and royalties from Wolters Kluwer for working as an author for *UpToDate*. He is under contract with ABC-Clio publishing for a future book entitled, *Concussions*, and with Springer International publishing for a future book entitled, *Head and Neck Injuries in Young Athletes*. His research is funded, in part, by a grant from the Football Players Health Study at Harvard, which is funded by the NFL Players' Association, and by philanthropic support from the National Hockey League Alumni Association through the Corey C. Griffin Pro-Am Tournament.

For Patrick Kiernan and David Mendel, no competing financial interests exist.

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(Appendix follows →)

APPENDIX 1. FUTURE RISK QUESTIONS

1. In the future, there is a strong possibility that I will get a concussion.
 2. In the future, there is a strong possibility that I will get a concussion that makes me miss a few games.
 3. In the future, there is a strong possibility that I will get a concussion that makes me end my season early.
 4. There is a strong possibility that my football career will end early because of concussions.
 5. There is a strong possibility that I will have short-term problems performing in school/work or my ability to maintain personal relationships because of concussions.
 6. There is a strong possibility that I will have long-term problems performing in school/work or my ability to maintain personal relationships because of concussions.
 7. There is a strong possibility that I will develop dementia, CTE, or Alzheimer's disease when I am older because of concussions.
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