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Concussions in NCAA Varsity Football Athletes: A Qualitative Investigation of Player Perception and Return to Sport

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Abstract

Background: The objective of this study was to understand the experiences and perspectives of varsity football athletes on return to play following a concussion injury.

Methods: Two experienced interviewers conducted qualitative, semistructured interviews of college-level football players who had sustained at least one concussion during their varsity careers.

Results: Twenty varsity football players who averaged 2.3 concussions each (range, 1–5) were interviewed regarding peer pressure, the culture of football, and player awareness as factors affecting return to sport following a concussion. Less common secondary factors included risk management, severity and timing of the injury, and team support.

Conclusions: Psychological stressors, the culture of football, and increased awareness were the most influential factors affecting collegiate football players' deciding to return to sport following a concussion.

Level of Evidence: Level III

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JAAOS Glob Res Rev 2017;1:e070

DOI: 10.5435/

JAAOSGlobal-D-17-00070

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The potential for sustaining a concussion among football players remains quite high.^{1–6} The sequelae of head injuries have come under intense public scrutiny because awareness of the long-term pathological consequences has increased.^{1,7–9} Reports of neurological decline in former football players exposed to repeated concussions have bolstered public awareness of these consequences.^{7,9} Repeated concussions have been linked to permanent neuropathological changes in football players.^{8–13} Diffuse axonal injury, associated with repeated concussions, has been shown to lead to the accumulation of abnormal protein aggregates in brain cells, which are associated with the

alteration of many physiological processes.^{8,9,11,14} Abnormal protein aggregates in the brains of football players likely lead to late-onset chronic traumatic encephalopathy.¹⁴ Chronic traumatic encephalopathy is characterized by neuropsychiatric symptoms, such as depression, agitation, psychosis, aggression, dementia, and parkinsonism^{14–16} and is responsible for the accelerated cognitive and neuropsychiatric decline observed in a small number of former football players.^{13–17}

Repeated concussions can be avoided with proper treatment methods and preventive measures, but because concussions show few outward signs of injury, medical training staff must rely on players'

reporting to establish a diagnosis and determine a timeline for return to play.² Despite increased public awareness of the long-term pathological consequences of repeated concussions, athletes seldom self-report their concussive symptoms.^{1,2,18,19} Miyashita et al²⁰ found that athletes commonly do not understand the significance and potential consequences of a repeated concussion injury. Yet Kurowski et al¹⁹ found that didactic-based preseason concussion education likely has minimal benefit. They speculate that other factors influence student-athlete concussion reporting. Sullivan et al²¹ speculate that young athletes think that concussions may be “toughed out” and do not require medical attention. This is supported by another study claiming that preventive measures will unlikely have considerable impact without a fundamental cultural change in the perception of concussions by all who are involved in the sport.¹ A student-athlete perception of concussions and the factors influencing disclosure and concussion-related symptoms remains unknown in the literature.² The purpose of this study was to qualitatively investigate the experiences and perspectives of varsity football athletes on return to play following a concussion injury.

Methods

Consenting varsity football players aged 18 to 25 years from a single, NCAA Division I university who were diagnosed with a concussion during their collegiate careers from

2010 to 2015 were eligible for this study. Participation in this study remained anonymous. Approval from the research ethics board was granted before study commencement.

Forty-five minute, audio-recorded personal interviews by two interviewers trained in qualitative methods (V.K.T. and H.P.B.) were conducted using a study-specific interview guide derived from a review of sports psychology, rehabilitation, neuroscience, and qualitative studies. An iterative, semistructured approach was used to address unquantifiable concerns surrounding concussions. This approach is based on a continuum that allows the interviewer to “actively” explore vague expressions or opinions with follow-up questions rather than “passively” allowing patients to respond freely without intrusion or limitations in time or topics of discussion.²² Demographic data as well as postinjury and current sport participation were recorded. The sample size was determined once data saturation was reached,²³ in other words, once new concepts, themes, and explanations no longer emerged with the addition of subsequent interviews.

Three members of the research team (V.K.T., H.P.B., and M.A.T.) applied the method²⁴ of open coding, axial coding, and selective coding to each of the transcribed interviews.²⁵ Specific phrases or ideas from the raw data were then grouped into commonalities that reflected categories. Connections between these categories were then classified as themes. Player-generated themes from this analysis revealed the factors influencing an athlete’s perception of return to sport following concussion.

Results

Twenty varsity football players were interviewed, each having sustained an average of 2.28 (confidence interval ± 0.75) concussions throughout his college career while being diagnosed and treated for an average of only 1.35 (confidence interval ± 0.61) concussions. Three of the 20 (15%) chose not to continue playing varsity football following their final concussions, whereas 2 (10%) participants currently play professional football, 5 (20%) players continue to play division I football, and 5 (23%) play recreational noncontact flag football; a total of 8 (40%) have retired from all contact sports. Demographic data are outlined in Table 1.

Player-derived Themes

The factors surrounding concussion management, return to sport, and subsequently an athlete’s perception and understanding of risk can be sensitive and personal. The following themes were generated from these in-depth qualitative interviews: psychological stress, the culture of football, and heightened awareness and concussion education.

Psychological Factors

These varsity football athletes described serious psychological repercussions after sustaining on-field concussions. The most significant stressor was that of self-reporting and a tendency to under-report: “All five of mine went unnoticed. I think it’s common to see guys not reporting symptoms, but when I look back, I’m not sure it

Dr. Terry or an immediate family member has received nonincome support (such as equipment or services), commercially derived honoraria, or other non-research-related funding (such as paid travel) from Arthrex, Saunders/Mosby-Elsevier, and Smith & Nephew and has received royalties and research or institutional support from Smith & Nephew. None of the following authors or any immediate family member has received anything of value from or has stock or stock options held in a commercial company or institution related directly or indirectly to the subject of this chapter: Dr. Tjong, Mr. Baker, Mr. Cogan, Ms. Montoya, and Mr. Lindley.

was worth it all” (3); “Everybody knows the guy who always tells” (17); “Being a freshman, I didn’t want the team to think I was soft” (8). Fear of replacement was another factor affecting a player’s mental stability: “I knew that if I reported a concussion, my spot was in jeopardy, especially if I sat out for a significant period of time” (6).

Beyond the disparate symptoms, such as headache, fatigue, and disorientation, players experienced changes in mood and outlook during the assessment and management phases. For example, one student reported that “the trainers said I was crying. I don’t remember why or even that I cried, but I know it ruined the season for me” (11); “Guys thought I was faking it to just get out of practice, but they had no idea what I was feeling in my head” (2).

One player reflected in hindsight that “all the stress of missing meetings and practice and feeling like I was letting the team down was hard at the time. But now, I think I made the right decision to sit out those games because I wasn’t ready” (10). Others explained how purposefully scoring low on baseline testing created pressure among teammates: “I never agreed with this, but some guys just couldn’t afford to miss that much time” (8); “In the end, you can’t fake your motor skills, but some still tried as a precedent to others, and everyone knew” (19). The psychological burden following a sports-related concussion emerged not only during the initial reporting phase but also throughout treatment and re-engagement of play.

Culture of Football

Among all the players interviewed, there was a level of dedication to football and love of the sport, with phrases such as “Ball is life” (2) and “League or die” (20) used to describe a player’s passion. This culture within the sport of football can play

Patient Demographics	
Factor	No.
Age	22.95 (0.61) ^a
BMI	32.27 (2.01) ^a
Position	
No. of offensive players	16 (2TE, 8OL, 2QB, 2WR, 1RB, and 1FB)
No. of defensive players	4 (2DB, 1DL, and 1LB)
No. of diagnosed concussions per player	1.35 (0.61) ^a
No. of sustained concussions per player	2.28 (0.75) ^a

BMI = body mass index, DB = defensive back, DL = defensive lineman, FB = fullback, LB = linebacker, OL = offensive lineman, QB = quarterback, RB = running back, TE = tight end, WR = wide receiver
^a Mean ± confidence interval

a large role in a player’s decision to report a concussion. These are detailed accounts of a players’ perception on return to play and concussion reporting:

The football culture celebrates guys who are willing to fight through injuries. Many times I’ve witnessed a coach praise a player for fighting through an injury during a practice or game. Guys who approach injuries more cautiously are seen as being “soft” or their commitment to the team can be called into question, which is not fair but that’s just how it is (16).

There is a stigma in football, especially within some position groups like the offensive line, that you should be tough. Offensive linemen take pride in playing through injuries and being the toughest guys on the field. We don’t get that reputation by reporting symptoms (3).

The expectations of being a Division I football player are extreme. It’s just a way of thinking. If you get hit with a pitch going 100 mph as a baseball player, you’re expected to jog to first base (18).

This notion of staying tough and not letting the team down not only created a huge influence in concussion underreporting, but also subsequently accelerated return to play.

Player Awareness

As widespread understanding of the risks, outcomes, and management of sports-related concussions continues to grow, these collision athletes have noticed an increased level of concussion-related education in the classroom, news media, and, most importantly, in the training room. This heightened level of concussion awareness was unanimously seen as a positive advancement in the safety of collision athletes.

Interestingly, senior players described a transition of knowledge acquisition: “I was never exposed to the process before or what symptoms were relevant because I didn’t know anything about concussions, but by my senior year, we had a ton of education on the subject and everyone knew what to look out for” (1). Subsequently, this created a change in players’ attitudes toward this injury: “The stigma of sitting out with a concussion disappeared, and the old stigma of ‘getting your bell rung’ is now being

turned around” (11); “With all the news and media attention on concussions in football, the whole system is evolving and it’s good for the players, but in the end, football is a violent sport and there’s not much to prevent without changing the game itself” (7).

Most effective has been the response to the consequences and risks following a sports-related concussion: “I believe that there are a lot of valuable lessons the game teaches young men and I can see how those lessons have affected me and my growth as a person, and I want my kids to have that opportunity, but they must be educated fully about concussion risks” (5).

Discussion

An injury of any magnitude has been shown to have serious psychological effects on an athlete’s well-being in every sport.²⁶ Negative psychological responses characterized by periods of low self-esteem, anxiety, and even depression are common findings in patients after an athletic injury.^{27–30} Both musculoskeletal and concussion-related injuries have shown a relationship to an increased incidence of depressive symptoms in both chronic and serious injuries.³¹ A study by Richmond et al³² demonstrated an 18% prevalence of a major depressive disorder, depression not otherwise specified, or dysthymia 1 year after even a minor injury. In addition, psychiatric complaints remain common following traumatic brain injury (TBI), regardless of the severity.^{33,34} Persistent alterations in affect and cognition after a concussion have in the past been termed post-concussion syndrome, which the *Diagnostic and Statistical Manual of Mental Disorders IV* defines as changes in cognition in accordance

with a significant decline in social or occupational functioning along with ≥ 3 symptoms from the following: fatigue, sleep disturbance, headache, dizziness, irritability, affective disturbance, personality change, and apathy for ≥ 3 months.³⁵ However, because of the tremendous overlap associated with symptoms of a major depressive episode, the *Diagnostic and Statistical Manual of Mental Disorders V* has abandoned the term “postconcussion syndrome” in favor of considering the diagnosis of major depression.^{36,37}

Mood changes, however, are only one instance of the broader category of psychological stress following injury. Another commonly cited source of psychological stress following injury stems from fear, which was reiterated by participants in this study, causing them to underreport or even misreport symptoms. In a study by Podlog and Eklund,³⁸ this fear proved to be a pervasive concern for athletes recovering from injury. Fear of upholding one’s reputation on the team and meeting the goals of coaches and teammates were among the most important stressors after an injury. The insight provided by participants in our study demonstrated almost synonymous fears of disappointing the team or losing one’s reputation by self-reporting a concussion. Our data are consistent with previous studies on the prevalence of players underreporting concussion symptoms so as to be kept on the field, despite the long-term health consequences.³⁹ Responses from participants in our study indicate that players underreport symptoms and underperform on baseline concussion screening tests because of the underlying fear that they will disappoint their teams. This stress is further aggravated by the fact that there is no standardized recovery time for football players following a concussion injury.^{5,20} This increases the level of peer pressure experienced by players

with more severe concussions because they are compared, or compare themselves, with teammates who were able to return to play much sooner.

Interestingly, a variation on this aspect of fear influencing a player’s decision to report concussion symptoms arose instead as a motivating factor for some to report their symptoms. This parallels a phenomenon known as kinesiophobia, which is often used in describing an athlete’s psychological “fear of re-injury” after anterior cruciate ligament reconstruction or other musculoskeletal injury.^{30,40} As opposed to preventing the process of recovery and rehabilitation in the event of anterior cruciate ligament reconstruction, kinesiophobia seems to play a role as a protective factor in the recovery from a concussion.

A common recurring theme among our study participants is that the culture within the sport of football influences player decision-making. Football is one of the most virile games played today. Thus, football players attempt to embody a persona of being “tough.” The results of this study suggest that athletes understand the significance and potential consequences of a repeated concussion injury, thus contradicting the findings of Miyashita et al.²⁰ Yet despite this increased awareness of the possible long-term pathological consequences of repeated concussions, studies have shown that athletes continue to underreport their concussive symptoms.^{1,2,18,19} Sullivan et al²¹ speculate that young athletes think concussions can be “toughed out” and do not require medical attention; the findings of this study support that assumption.

Traditionally, the football culture tends to downplay injuries so as to keep players in the game.⁴¹ The athletes interviewed in this study described a common trend in which a player who fights through an

injury is praised not only for his toughness but also for his commitment to the game. Injury is associated with weakness and disappointment, whereas those who fight through their injuries are praised. Not surprisingly, the athletes in this study described a negative stigma associated with being injured. In fact, some injured players were made to wear the colors of a rival opponent, imposing a humiliating association between being injured and the rival. With these cultural influences in mind, the minimal benefit of didactic-based preseason concussion education reported by Kurowski et al¹⁹ is not surprising. They speculate that other factors, besides knowledge, influence student-athlete concussion reporting. This supports the finding that the culture of football plays a significant role in influencing a player's decision to report a concussion.¹⁹ Results from this study buttress the claim made by Murray et al¹ that it is unlikely that preventive measures will have much impact without a fundamental change in the perception of concussions by all who are involved in the sport.

Over the past few years, awareness and education regarding the neurological sequelae of recurrent TBI from sport-related concussion has grown dramatically.^{1,7-9} Preseason education on the signs and symptoms of a concussion has proved to be effective, as studies of high school athletes have shown an increase in self-reporting concussions following such educational sessions.⁴² Other studies, however, have looked at the long-term efficacy of such education and have shown that there is likely minimal benefit.¹⁹ Participants in our study echo the inconclusiveness seen in the literature, as some found that the “the stigma of sitting out with a concussion disappeared” after educational intervention, whereas

others found little help in making change without “changing the game itself.” These sentiments support the findings of multiple studies, which showed that educational sessions help athletes identify symptoms of concussion but do not necessarily improve intention to report.⁴³ As such, a broader notion of culture change, as opposed to player education, was suggested by multiple participants in our study as an important step in improving concussion reporting, and many studies have suggested similarly that intervention surrounding parents, coaches, and trainers should be the focus.⁴³

Because of the nature of self-reporting, players must decide when the harmful risks and consequences following concussion outweigh the benefit of returning to play. The decision to return to play is a complex one, regardless of injury type, and it is made more difficult in the context of sports-related TBI because of factors such as recurrence, proximity, and severity in relation to previous concussions, age, sport, position, and preexisting conditions.⁴⁴ For many who have sustained multiple concussions, the decision to return to sport is weighed with the knowledge of the detrimental effects on psychological, cognitive, and overall health related to sustaining multiple concussions.⁴⁵ Although the decision to return to sport is multifactorial, affected by a number of internal factors (eg, concussion history, injury threshold, previous injury) and external factors (eg, coach and teammate expectations, fear of losing one's reputation, fear of replacement), the steady increase in player awareness and education regarding the consequences of injury can only help better inform players to make a decision taking more of their well-being into account.

This study provides a unique approach to understanding perspectives on return to play following

concussion in collegiate football players. However, this study has intrinsic limitations. The design of a qualitative methodology allows for data saturation at the discretion of the research team, thereby innately creating interviewer bias. Players who volunteered to be interviewed may have social desirability bias or responder bias because of the sensitive nature of the topic, despite anonymity. Furthermore, this study focused on a specific population of collision athletes with results that may not be applicable to professional football players or players at other levels of the sport.

Conclusion

Psychological stressors, the culture of football, and increased awareness were the most influential factors affecting collegiate football players following a concussion. Collision athletes undertake substantial physical risks with every game. As concussion education and management continue to evolve, the importance of understanding an athlete's decision to return to play remains a concern.

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