

1-1-2011

Implications for concussion assessments and return-to-play standards in intercollegiate football: How are the risks managed?

John J. Miller

John T. Wendt

Nick Potter

Follow this and additional works at: <https://trace.tennessee.edu/jasm>

Recommended Citation

Miller, John J.; Wendt, John T.; and Potter, Nick (2011) "Implications for concussion assessments and return-to-play standards in intercollegiate football: How are the risks managed?," *Journal of Applied Sport Management*: Vol. 3 : Iss. 1.

<https://doi.org/10.7290/jasm03jhe2>

Available at: <https://trace.tennessee.edu/jasm/vol3/iss1/17>

This article is brought to you freely and openly by Volunteer, Open-access, Library-hosted Journals (VOL Journals), published in partnership with The University of Tennessee (UT) University Libraries. This article has been accepted for inclusion in Journal of Applied Sport Management by an authorized editor. For more information, please visit <https://trace.tennessee.edu/jasm>.

Implications for concussion assessments and return-to-play standards in intercollegiate football: How are the risks managed?

John J. Miller, John T. Wendt, & Nick Potter

KEYWORDS:

Concussion, Guidelines

ABSTRACT

The lack of understanding regarding the symptoms and effects of concussions by athletes and coaches can generate pressure on both the team physicians to diagnose concussions as well as the sport administrators who need to be aware what concussion protocols are being followed. The significance of appropriate diagnosis of a concussion and the return-to-play protocols may be complicated by the number of guidelines available as well as the reliance on the athlete to self-report the symptoms of a concussion. While the grading guidelines have advanced the use of uniform terminology and increased awareness of concussion signs and symptoms, the lack of scientific method in creating the concussion management guidelines called their effectiveness into question. A total of 65 head football athletic trainers were surveyed to determine how medical personnel at selected universities managed the risk of concussions in intercollegiate football. The results indicated that nearly 70% of the respondents indicated that between five to eight football players on their respective teams incurred a concussion during the season. However, no dominant guidelines for assessing a concussion were revealed as none of the guidelines were employed by more than 29% of the population. Finally, 50% did not believe that the same guidelines should be used for an initial concussion assessments or subsequent concussions. Because no two people can be diagnosed in exactly the same way, guidelines may inhibit proper treatment. However, should an error in judgment occur, litigation against the physician, the athletic administrator, and the university may result.

Miller, J. J., Wendt, J. T., & Potter, N. (2011). Implications for concussion assessments and return-to-play standards in intercollegiate football: How are the risks managed? *Journal of Sport Administration & Supervision* 3(1), 91-103. Published online September 2011.

John J. Miller, Ph.D., is an Associate Dean for the College of Health and Human Services at Troy University in Troy, Ala.

John T. Wendt, J.D., is an associate professor at the University of St. Thomas, in Minneapolis, Minn.

Nick Potter, ATC, is a certified athletic trainer for the Kansas City Chiefs.

On October 10, 2010 Kenjon Barner of the University of Oregon football team was returning a kick when he was hit so violently by a Washington State player that Barner fumbled the ball. Barner was also left motionless and unconscious on the field and was later transferred to the hospital by ambulance (Mosely, 2010b). Oregon coach Chip Kelly later was asked about when Barner could return to play. Kelly said,

Our doctors handle all that - I don't diagnose injuries, I don't get involved in injuries... They tell us who can play and who can't play and we just go from there... For me to weigh in and

say I think his synapses aren't firing on the left side better than they are on the right side, that's not my job. My job is to coach football, their job is to be a medical staff. When they clear a player to play, then they're cleared to play but not until that time (Mosely, 2010a).

To be sure there is an inherent risk of injury in all sports. An inherent risk occurs when an athlete voluntarily assumes the foreseeable dangers of the activity and the activity is considered an integral part of the sport. For example, football would not be football without tackling and blocking, ice hockey would not

be the same sport without “checking” a player into the boards, or baseball without a player sliding into a base or diving for a ball. In each case the athlete should have an understanding that the potential for injury that exists in each of these actions. Intercollegiate football players, especially those with professional aspirations, often will try to persuade medical staffs that they feel fine so they can continue to play even though they do not understand the potential negative consequences. Since an intercollegiate athlete’s career are under the general supervision of the athletic department, often represented by the senior athletic director, a student-athlete can reasonably presume that his or her health and well-being are also under the athletic department supervision (*Kleinknecht v. Gettysburg College*, 1993; *Knapp v. Northwestern University*, 1996; *Plevretes v. La Salle University*, 2007). While a good deal of research has been conducted on the incidence of concussions in intercollegiate athletics from the perspectives of athletic trainers, it is hoped that this study assists athletic administrators in understanding the issues that certified medical personnel must deal with regarding concussions in intercollegiate athletics. Thus, the primary purpose of this study was to determine how medical personnel at selected universities managed concussions in intercollegiate football. By comprehending these issues, athletic directors may continue, or initiate, programs that may protect the coaches and athletes by educating them about the signs, symptoms, and effects of concussion.

Review of Literature

Although high profile college football players including University of Florida Heisman Trophy winner Tim Tebow, Derrick Washington of the University of Missouri and University of California running back Jahvid Best all suffered severe concussions in separate

games during the 2009 intercollegiate season, recent reports have indicated that concussion rates have decreased in intercollegiate sports since 2005 (Copeland, 2010). Yet, gaining accurate accounts of the total number of concussions incurred by athletes every year is difficult due to a dearth of effective reporting (University of Pittsburgh Medical Center, 2008, Meehan & Bachur, 2009). A reason for the inconsistency may be due to the primary method for determining the presence of a concussion has been simply to ask the athlete if they had a headache (Notebaert & Guskewicz, 2005). As a result, concussive symptoms may not always be accurately reported to team medical personnel due to either the athlete’s reluctance to share their true feelings or their misunderstanding of what the symptoms represent. A previous study indicated that 58% of athletes did not possess adequate knowledge of sport-related concussion and less than 50% of athletes comprehend the issues that could occur due to sustaining a concussion (Kaut, DePompei, Kerr, Congeni, 2003). Of special significance to athletic trainers and team physicians is that many athletes do not recognize their symptoms as being the result of a concussion nor do they believe that sustaining a concussion is a potentially grave problem (Kaut, et al., 2003; Rutherford, Stephens, Potter, & Fernie, 2005). This information takes on increased significance as other studies have revealed that relying on the athlete’s report of symptoms may result in potential exposure to an additional head injury (Kelly & Rosenberg, 1997; Lovell, et al, 2003). Often a clinician may ask the athlete several questions to ascertain if symptoms of concussions existed. However, Notebaert and Guskewicz (2005) identified the danger of doing this by stating:

No simple tests can be performed on the brain to determine the severity of a closed head injury and help clinicians establish goals for

rehabilitation and return to play. The complexity of concussion injuries requires clinicians to use a variety of tools for information, but the current tendency is to base the return-to-play decision on the athlete's self-reporting of symptoms and ability to perform sport-specific tasks without a recurrence of concussion symptoms. Relying solely on this information can be dangerous because it creates an incomplete picture of the injury (p. 320).

This challenge becomes even more accentuated because of an athlete's ability to hide concussive symptoms from the football team medical personnel. To be sure the diagnosis and management of sports-related concussion is a challenging undertaking even under the best of circumstances. Since the symptoms of sports-related concussion are not always apparent, team medical personnel may have trouble correctly diagnosing the athlete until prolonged cognitive impairments arise a day or two later (Collins, et al., 1999; University of Pittsburgh Medical Center, 2009). Assessing whether an athlete has sustained a concussion is usually based on limited observation of the athlete and a brief sideline evaluation during which the medical personnel rely on the truthfulness of the athlete. Kaut, et al., (2003) reported that 28% of athletes continue to play after receiving a blow to the head that causes dizziness. Kaut, et al., (2003) further reported that 61% of athletes persist playing after sustaining a blow to the head. Thus, the diagnosis and management of sports-related concussions have often relied a great deal on an athlete's self-report of symptoms which may increase their exposure to harm.

The issue of concussion recognition is not restricted to athletes, but extends also to coaches. Valovich McLeod, Schwartz, and Bay (2007) reported that 25% of coaches would

permit athletes to return to play even though the athlete exhibited symptoms of a concussion. This concern becomes problematic as players who incur concussions are more often looked at by the coach instead of a physician (Valovich McLeod, et al., 2007). Valovich McLeod, Schwartz, and Bay (2007) reported that 42% of coaches perceived that athletes sustained sport-related concussions only when they lose consciousness. Additionally, the Valovich study indicated that 25% of the coaches would permit an athlete to return to competition even though the athlete would exhibit the symptoms of a concussion. When Missouri running back Derrick Washington was hit, Missouri coach Gary Pinkel stated that he was unaware of the severity of the concussion and said, "If I flashed fingers in front of him, he could count them... So that's good right now. Hopefully, he'll be OK" (Associated Press, 2009). Coach Pinkel's statement could be an example of coaches' misperceptions of concussion that if the injured athlete could count the fingers in front of him, the athlete must have recovered from the "ding."

As a result of being unaware to the signs or symptoms of a concussion, athletes may be put into a position to sustain a second impact syndrome. As mentioned previously, second-impact syndrome happens when players return to competition before the symptoms of the first concussion have entirely dissipated (Harmon, 1999) could lead to even greater injury. Should an athlete experience a second jolt of any kind to the head, the result may be a loss of autoregulation of the brain's blood supply (Harmon, 1999; Cantu & Voy, 1995). This decrease of blood supply to the brain can ultimately lead to a herniation of the brain that is often fatal (Harmon, 1999). At the most extreme, athlete's deaths have been attributed to suffering a second impact syndrome (Cantu, 1998; Cantu & Voy, 1995). Basic items that coaches and athletes should understand

Table 1
General Signs and Symptoms Associated with a Concussion

Immediate signs and symptoms of may include	Delayed signs and symptoms may include:
• Loss of consciousness • Convulsions • Amnesia • Confusion • Nausea • Headaches • Ringing in the ears (tinnitus) • Drowsiness • Vomiting • Unequal pupil size	1. Irritability 2. Fatigue 3. Difficulty with gait 4. Headaches 5. Increased sensitivity to sounds, lights 6. Depression 7. Sleep disturbances, including insomnia 8. Loss of sense of taste or smell 9. Poor concentration 10. Slurred speech

Note: The symptoms and signs described above are not comprehensive or listed in any particular order of severity.

Source: Kaut, DePompei, Kerr, Congeni, 2003

are immediate as well as delayed signs and symptoms of a concussion (see Table 1).

Another issue that may complicate sports concussion management is the number of guidelines that are available to give guidance to intercollegiate football athletic trainers and physicians. It has been reported that 19 distinct series of guidelines have attempted to standardize the treatment of sports-related concussions (Field, Collins, Lovell, & Maroon, 2003). As a result, the administration, implementation and management of these guidelines have been less than consistent in intercollegiate football (Collins, Lovell, & Mckeag, 1999; Field, et al., 2003). In an interview Dr. Robert Cantu, author of the Cantu guidelines that will be discussed later, stated:

So many bad decisions are made when trying to assess whether a player is symptomatic or not. We know that an unacceptable number of kids are being sent back while symptomatic, and sometimes with

devastating effects. Athletes, even when assessed by qualified people, seem to be returning to contests prematurely or when symptomatic — an unacceptable number of cases (Schwarz, 2009, p. 14).

Concussion Guidelines

As mentioned previously, a number of sports concussion management guidelines are available to give guidance to team medical personnel. Three of these guidelines have been published by the American Academy of Neurology (American Academy of Neurology, 1997), Robert Cantu (Cantu, 1986), and the Colorado Medical Society (Guskiewicz, et al. 2004). Each of these guidelines, although basically similar, has some major differences in evaluating the symptoms of a concussion and the resultant return-to-play recommendation (see Table 1). The similarities and differences of the most notable guidelines (Guskiewicz, et al., 2004) are summarized in Table 2. Of the concussion guidelines outlined, the Colorado

Table 2

Guideline	First Concussion	Second Concussion	Third Concussion
Cantu 1	Return to play when asymptomatic.	Return to play in two weeks when asymptomatic for one week.	Terminate season. May return next season.
Colorado 1	Return to play when asymptomatic for 20 minutes.	Return to play when asymptomatic for one week.	Terminate. May return in three months.
AAN 1	Return to play when asymptomatic for 15 minutes.	Return to play when asymptomatic for one week. If second concussion in same day, activity should be terminated for that day.	
Cantu 2	Return to play when asymptomatic for one week.	Return to play after one month if asymptomatic for one week.	Terminate season. May return next week. Consider terminating season.
Colorado 2	Return to play when asymptomatic for one week.	Return to play after asymptomatic for one month.	Terminate season. May return next season.
AAN 2	Return to play when asymptomatic for one week.	Return to play after two weeks if asymptomatic.	
Cantu 3	Return to play one month after injury if asymptomatic for one week.	Terminate season.	
Colorado 3	Transport to hospital. Return to play one month after injury if asymptomatic for two weeks.	Terminate season. Discourage return.	
AAN3	Return to play if asymptomatic for two weeks.	Return to play if asymptomatic for one month.	

guidelines have been perceived as being the most conservative (Harmon, 1999).

According to Rosoff (1995) clinical practice guidelines are usually developed from scientific studies that compare the effectiveness of diverse clinical approaches to treating a particular medical situation. The most referenced clinical guidelines provide recommendations regarding the timing and intensity of participation following the first concussion. It should be noted that according to a previous report

assessment, protocols and return-to-play decisions have been based on poorly validated guidelines and clinical judgment (Oliaro, Anderson, & Hooker, 2001). Confusion concerning concussion assessment techniques may lead to unfortunate decisions about when to return an athlete to competition after concussion and could lead to even greater injury including second-impact syndrome (Bey & Ostick, 2009; Harmon, 1999).

Individually Based Guidelines

There has been a strong sentiment in which the management of concussions should be individually oriented to the medical staff, primarily the team physician. Past investigations have suggested that most athletic team medical personnel do not adhere to any specific concussion classification system or return-to-play guidelines in the decision-making process but rather make such decisions on a person by person basis (McCrea, Kelly, Kluge, Ackley, & Randolph, 1997; Notebaert & Guskewicz, 2005). Although a number of symptoms may indicate a concussion, not all athletes exhibiting such symptoms have a concussion. In fact, these symptoms may be the result from dehydration, overtraining, and lack of sleep (Iverson, Brooks, Collins, Lovell, 2006). Individually based evaluations often start with a systematic baseline testing in the pre-participation physical examination (Oliaro, et al., 2001). These baseline scores provide an individualized “normal” to be used for comparison should the athlete incur a concussion (Oliaro, et al., 2001). Baseline data can often vary considerably among athletes. As a result the objective post- concussive neurocognitive and symptom recovery becomes challenging to interpret without knowledge of the pre-injury state (Field, et al., 2003).

Although previous investigations have recognized the significance of standardized for testing for a concussion (Guskewicz, et al., 2000; McCrea et al., 1998), historically there have been no standard assessments for intercollegiate football team’s medical staff to deal with concussions (Harmon, 1999). To determine how intercollegiate football team medical personnel manage the risks of concussion, 65 head football athletic trainers were selected to participate in this study. The methodology will be addressed in the next section.

Methodology

Procedures

A 24 item questionnaire was developed for this study by the investigators using both multiple choice answers as well as a 5 point Likert scale (1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree and 5=Strongly Disagree). The first two questions dealt with demographic information while the subsequent twenty-two regarded concussion assessment and return to play protocols. To ensure that the survey questionnaire was a valid instrument, content validity was employed. Lynn (1986) recommended that a minimum of three experts, but suggested that more than 10 was not effective. As such, a panel of five experts was asked to rate each item in terms of its relevance to the underlying construct. Based on previous research (Davis, 1992; Lynn, 1986) these item ratings were categorized on a 4-point ordinal scale (1= not relevant, 2= somewhat relevant, 3= quite relevant, and 4= highly relevant). As suggested by prior investigations (Davis, 1992; Polit & Beck, 2006), the content validity for each item was determined by the number of experts giving a rating of either 3 or 4 and divided by the total number of experts. For example, an item that was rated as quite or highly relevant by four out of five judges would have an item level content validity of .80. By doing so, the content validity for each item was assured as each item exhibited between .80-1.00 (Davis, 1992; Polit & Beck, 2006).

A test for the reliability of the instrument was conducted as well. As test-retest reliability is the most common method used to determine survey instrument reliability (Litwin, 1995), this method was adopted for the present study using twenty-nine certified athletic trainers who possessed experience in football at a university and surrounding high schools. Test-retest reliability is calculated through correlation (Rothstein, 1985). To be considered a reliable

instrument, the correlation must be greater than .80 (Nunnally, 1959). The result of the pilot study was a Chronbach $\alpha = .86$.

Population

There are eleven conferences in the Football Bowl Subdivision, also known as BCS conferences. However, to be eligible to receive an automatic qualification, all of the BCS conferences have to pass a four-year evaluation covering the regular seasons of 2004, 2005, and 2006 (Bowl Championship Series, 2010b). The Atlantic Coast, Big East, Big Ten, Big 12, Pac-10, and Southeastern Conferences met the threshold and earned automatic qualification from 2008 through the 2013-14 season (Bowl Championship Series, 2010a). Because of the notoriety and visibility that accompanies playing for BCS affiliated schools, as exhibited by the press received by Tebow and Best after their concussive incidents, these conferences were identified for this study. Specifically, all of the head football athletic trainers (N=65) from schools in the Atlantic Coast, Big East, Big Ten, Big 12, Pac-10, and Southeastern Conferences were invited to participate in this study.

Two weeks prior to the online distribution of the questionnaire, all of the head football athletic trainers at the BCS affiliated schools identified for this study were contacted via email. The emails were gleaned from the 2008-2009 NCAA Directory. The early dissemination was done to make certain that the email address was current as well as potentially increase the response rate (Kent & Turner, 2002). Since no email addresses were returned because of an inaccurate address, it was assumed that the addresses were current. An initial email distribution yielded 31 responses. A reminder was sent to all of the potential respondents two weeks later which resulted in an additional seven responses. Of the questionnaires sent to the head football athletic trainers, 38 were returned for a response

rate of 58%. This has been found to be within an acceptable return rate for research-based online surveys (Sheehan & McMillan, 1999). Descriptive statistics were used in this study to determine the percentages, means, and standard deviations of the responses.

Results

Demographics

The majority of the respondents (80%) have been certified athletic trainers for more than 15 years with an additional 12% having been certified for 11 to 15 years. Additionally, 56% have been at their current universities from 11 to more than 15 years. Thus, the vast majority of respondents were not only experienced certified athletic trainers but also have been employed at their present university for an extended length of time.

Incidents of Concussions

Sixty-eight percent of the respondents indicated that between five to eight football players, on their respective teams, incurred a concussion during the 2009 season. Moreover, 55% reported that between one and four players were diagnosed with concussions multiple times during the 2009 season. Seventy-four percent of the respondents indicated that between one to four players had incurred at least one concussion but in different seasons (e.g. 2007-2008 and 2008-2009). Forty-six percent (M=2.82; SD=1.54) indicated that football players at their institution were allowed to participate were allowed to practice without undergoing a neurological pre-test before the start of each season.

Previous Concussion Incidence

Ninety-two percent (M=1.08; SD=.79) agreed that football players on their team had a history of concussion prior to entering the university. Additionally, 89% (M=1.96; SD=.74)

suspected incoming freshman football players at their institution of having undocumented concussions. Eighty-six percent ($M=1.86$; $SD=.76$) indicated that undiagnosed concussions suffered by football players participating in high school athletics were prevalent. As a way to determine the existence of previously undiagnosed concussions, 68% ($M=2.39$; $SD=1.29$) required medical records of all freshmen football players (including walk-ons) from high school athletic trainers before he was allowed to practice.

Concussion Assessments

No dominant guidelines for assessing a concussion were revealed as none of the guidelines were employed by more than 29% of the population. The Cantu/ACSM guideline was used by 29% of the population followed by 24% treating concussions on an individual basis; 13% used the Colorado Medical Society's guidelines; four (11%) used the American Academy of Neurology (AAN) guidelines. Fifty percent ($M=2.86$; $SD=1.43$) of the respondents indicated that their athletic departments had a primary concussion assessment in their medical policies and procedures hand book, yet 39% did not. Although 47% ($M=3.50$; $SD=1.40$) did not believe that standard concussion guidelines should be followed by all intercollegiate football teams, 25% indicated that all intercollegiate football teams should follow common concussion assessments. Fifty percent ($M=3.39$; $SD=1.31$) of the respondents did not believe that the same guidelines should be used for an initial concussion assessments or subsequent concussions.

Return to Play Guidelines

The results varied when the participants were asked about the chief guidelines used in making decisions for return-to-play for a football player following a concussion. The guidelines primarily cited were symptom checklist (31%), impact testing procedure

(22%), CT or MRI (17%), AAN (13%) and Cantu/ACSM (13%). Seventy-six percent ($M=1.93$; $SD=.94$) of the respondents reported that their athletic department had different return-to-play guidelines for athletes who had suffered multiple concussions. Fifty-six percent ($M=3.43$; $SD=1.43$) did not believe that all intercollegiate athletic departments should possess the same concussion policies regarding return-to-play. However, at a minimum 46% ($M=3.21$; $SD=1.23$) believed that an intercollegiate football player should not return to play until 1 week asymptomatic with exercise. Although 52% ($M=2.89$; $SD=.137$) indicated that they had been pressured by a football coach (not necessarily the head coach) to return a concussed player to play earlier than their guideline permitted, 82% ($M=4.43$; $SD=.88$) reported that they had never done so.

Role of the Team Physician

As mentioned earlier the role of the team physician in the assessment of sport-related concussion is significant. According to the respondents, 89% ($M=1.50$; $SD=.69$) the head football team physician was qualified and experienced to diagnose and manage concussions occurring in football. In regards to when an athletic trainer would refer a football player to a physician, 82% ($M=1.14$; $SD=.76$) would do so when any signs or symptoms of a concussion were exhibited by a football player. Although, 89% ($M=1.61$; $SD=.63$) revealed that the head football team physician always consulted with the head football athletic trainer to decide on concussion diagnosis and return-to-play, 97% ($M=1.29$; $SD=.46$) reported that the head football team physician has the ultimate decision.

Discussion

Sport-related concussions are recognized as a major public health concern throughout the United States, especially intercollegiate

sports (McCrea, Hammeke, Olsen, Leo, & Guskiewicz, 2004). Because football players have the greatest annual incidence of concussion of all intercollegiate sports (Guskiewicz, et al., 2000; Notebaert & Guskiewicz, 2005), those in athletic administration must be aware of the protocols followed by the medical staff (Root, 2005). The main reason for such awareness is that if an athlete is prematurely rushed back onto the playing field following a concussion severe ramifications resulting from second-impact syndrome may occur (*Plevretes v. La Salle University*, 2007). By understanding the concussion management protocols followed by medical personnel, an athletic director would be in a better position to protect the university and athletes involved.

This study added support to previous studies (Guskiewicz, et al., 2000; Notebaert & Guskiewicz, 2005) as almost 70% of the respondents revealed that between five to eight football players suffered a concussion during the football season the study took place. More than half of the respondents indicated that one to four players incurred multiple concussions within the same season while nearly 75% revealed that they had football players who have incurred at least one concussion during different seasons.

The results showed that more than 90% of the university football athletic trainers perceived that football players on their teams had incurred concussions in high school. Additionally, nearly 90% believed that undiagnosed therefore unreported concussive incidents were prevalent at the interscholastic level. These results support an earlier contention that unreported concussions were at a higher prevalence among high school football players than expected (McCrea, et. al, 2004). Apparently, more than 75% understood the foreseeability of this likelihood by requiring medical records, including the identification of prior

concussions, of all freshmen football players from high school athletic trainers before the player was allowed to practice.

The results indicated that no standard guidelines for concussion assessments existed as six different ones were identified in this study. However, Makdissi, Darby, Maruff, Ugoni, Brunkner, & McCrory (2010) point out those expert consensus guidelines presently endorse an individual approach when managing concussed athletes. Meehan and Bachur (2009) further stated,

Rather, each concussion should be managed individually by using multiple means of assessment. Generally accepted management principles have been proposed. No player should be returned to play until the symptoms of concussion have resolved completely, both at rest and during exercise.

Although practice guidelines have been used in the medical profession since 1930, it was not until 1980, when faced with rising costs of health care and the perception that much of the increased cost was due to inappropriate clinical practices, that the pace of development began to escalate (Ayres, 1994). As a result, experts have indicated that guidelines might help physicians reduce practice variation and subsequently enhance the quality of patient care (Woolf, 1995). While the grading guidelines have advanced, the use of uniform terminology and increased awareness of concussion signs and symptoms, the lack of scientific method in creating the concussion management guidelines called their effectiveness into question (Collins, Lovell, & Mckeag, 1999). For example, no data exists to support the 15-minute distinction for return to play following a grade 1 concussion (Collins, et al., 1999). Moreover, the guidelines presuppose a standard use for all groups and playing levels, yet do not consider the variability

in symptom presentation, or for differing vulnerabilities to neurological injury for each person at different ages (Collins, et al., 1999).

Additionally, there was no agreement reported in this study regarding the guidelines used in making decisions for return-to-play for a football player following a concussion. Significantly, nearly 50% of the respondents did not perceive that standard concussion guidelines should be followed by all intercollegiate football teams. This finding supports the assertions of other studies in which no standard concussion guidelines existed (Collins, et al., 1999; Oliaro, Anderson, & Hooker, 2001). Perhaps this may explain why authorities in sport-related concussion management have discarded the use of concussion guidelines (Lovell, Collins, Iverson, Johnston, & Bradley, 2004; McCrea, et al., 2004). The primary premises for the abandonment of concussion guidelines were due to insignificant proof that they were effective (Grindel, Lovell, & Collins, 2001) or valid (Bey & Ostick, 2009).

Recently, the NCAA has recently taken several actions regarding concussion-management. In January 2010, the NCAA Playing Rules Oversight Panel (PROP) endorsed efforts by other NCAA committees including the Committee on Competitive Safeguards and Medical Aspects of Sports (CSMAS) to manage concussion issues more effectively (The NCAA News, 2010). PROP Chair, Don Tencher said:

We understand the urgency of the issue and recognize the need to raise awareness of this safety concern... It's important that we approach this the right way so that all institutions have the opportunity to implement appropriate procedures on the local level at all divisions (The NCAA News, 2010).

The CSMAS also proposed the first major changes to the NCAA Sports Medicine Handbook detailing the conditions in which

a student-athlete should be withheld from competition pending clearance by a physician in nearly sixteen years (Copeland, 2010). Debra Runkle, Chair of the CSMAS, emphasized the importance of these guidelines by stating;

We know that all concussions are significant, and that student-athletes should not return to play while they have any symptoms...Medical staffs are acting cautiously in the interest of student-athlete well-being, not only for sports but for long-term life activities, for success in the classroom and academic purposes, and to make sure they can continue to play the sport that they love (Copeland, 2010).

To ensure that student-athletes can continue to play, should the desire still exist, after sustaining a concussion, the authors recommend the following actions: 1) educate all athletes and coaches about the symptoms and signs of a concussion after a blow to the head; 2) document each incident of hits to the head in-depth; 3) log all risks and notify management of their severity; and 4) take professionally approved action to reduce the likelihood of risks occurring.

Research Limitations

The results of this study are limited by factors inherent to survey research. First it was assumed a valid response from the athletic trainers based on their retrospective recount of concussive injuries. The study was also limited by the convenience sample that limits the generalizability of the findings. The findings are limited to the measures used. The participant's responses could reflect a measure of bias on behalf of the institutions. Further it can only be assumed that the individuals responded in a truthful and honest fashion. Finally, it has been suggested that salience has a great influence on response rate. Bean and Roszkowski (1995) stated that if the potential respondents attach

little interest or significance to the survey subject matter the person is most likely not going to respond. Thus, it may be plausible that a number of athletic trainers did not place importance in responding to the survey due to other priorities.

Conclusion

This study was not conducted to determine the physiological underpinnings of a concussion. Rather the essence of the study was to find out how selected intercollegiate athletic medical personnel manage the concussions of their athletes. Although, it was apparent that head football athletic trainers and team physicians are cognizant of concussions, they as well as athletic administrators need to be aware of the culture of sports praises athletes who persevere through injury and personal hardship adds to the difficulty of diagnosing concussions as well as providing a return-to-play guideline.

It is important for an athletic director to remember that the practice of medicine, at all levels and in all forms, is an art. As no two people are diagnosed in exactly the same way in a general practitioner's office, neither should it be expected that any two concussed athletes would be diagnosed and assessed in exactly the same way. Since there are many options with various possible outcomes, no "one-size-fits-all" treatment plan guaranteed to work for every concussed athlete in every case. Dennis Klosner, NCAA director of health and safety and staff liaison to the Committee on Competitive Safeguards and Medical Aspects of Sports, recently stated that, "Recovery time is a variable because each student-athlete with a concussion is unique" (Copeland, 2010, p. 3).

Although team physicians and medical staff may be knowledgeable about the symptoms and consequences of concussion, an athletic administrator should be mindful that athletes and coaches often do not possess that understanding. Thus, it is important that sports

educational intervention sessions be developed and offered to provide a more positive rather than negative environment. Additionally, educational sessions could teach student-athletes the skills to withstand the social pressures to play too soon after a head injury. Thus, the education of athletes and coaches, at all levels of competition, may result in more reporting thereby increasing the likelihood of appropriate concussion management. No student-athlete should suffer such an injury with the potential ramifications of a concussion due to a misdiagnosis or misunderstanding of the consequences. After all, it is important to remember that there is no such thing as a minor head injury.

References

- American Academy of Neurology. (1997). Practice parameter: The management of concussion in sports (summary statement). Report of the Quality Standards Subcommittee. *Neurology*, 48(3), 581-585.
- Associated Press. (2009). Washington suffers concussion. Retrieved June 28, 2010, from <http://sports.espn.go.com/ncf/news/story?id=4677432&campaign=rss&source=ESPNUH%09eadlines>.
- Ayres, J. D. (1994). The use and abuse of medical practice guidelines, *Journal of Legal Medicine*, 15(3), 421-443.
- Bean, A. G. & Roszkowski, M. J. (1995). The long and short of it. *Marketing Research*, 7(1), 20-26.
- Bey, T. & Ostick, B. (2009). Second impact syndrome. *Western Journal of Emergency Medicine*, 10(1), 6-10.
- Bowl Championship Series. (January 21, 2010a). BCS conferences. Retrieved July 12, 2010 from <http://www.bcsfootball.org/news/story?id=4809755>.
- Bowl Championship Series. (January 21, 2010b). The BCS is.... Retrieved July 12, 2010 from <http://www.bcsfootball.org/news/story?id=4809755>.
- Cantu, R.C. (1986). Guidelines for return to contact sports after a cerebral concussion. *The Physician and Sportsmedicine*, 14(10), 75-76, 79, 83.
- Cantu, R.C. (1998). Second-impact syndrome. *Clinical Journal of Sports Medicine*, 1, 37-44.
- Cantu, R.C. & Voy, R. (1995). Second impact syndrome: A risk in any sport. *Physician Sports Medicine*, 2327-2336.

- Collins, M.W., Lovell, M.R., & Mckeag, D. B. (1999). Current issues in managing sports-related concussion. *Journal of the American Medical Association*, 282(24), 2283-2285.
- Colorado Medical Society School and Sports Medicine Committee. (1990). Guidelines for the management of concussion in sports. *Colorado Medical Society*, 87, 4.
- Copeland, J. (February 23, 2010). New data suggest shift in college football concussions rate. Retrieved June 28, 2010 from http://www.ncaafoundation.biz/wps/portal/ncaahome?WCM_GLOBAL_CONTEXT=/nc.
- Davis, L.L. (1992). Instrument review: Getting the most from your panel of experts. *Applied Nursing Research*, 5, 194-197.
- Field, M., Collins, M. W., Lovell, M. R., & Maroon, J. (2003). Does age play a role in recovery from sports-related concussion? A comparison of high school and collegiate athletes. *Journal of Pediatrics*, 142, 546-553.
- Grindel, S. H., Lovell, M.R., & Collins, M.W. (2001). The assessment of sport-related concussion: The evidence behind neuropsychological testing and management. *Clinical Journal of Sport Medicine*, 11(3), 134-143.
- Guskiewicz, K., Bruce, S. L., Cantu, R.C., Ferrara, M. S. Kelly, J. P., McCrea, M., Putukian, M., & Valovich McLeod, T.C. (2004). National Athletic Trainers' Association position statement: Management of sport-related concussion. *Journal of Athletic Training*, 39(3), 280-297.
- Guskiewicz, K. M., Weaver, N.L, Padua, D. A., & Garrett, W.E., Jr. (2000). Epidemiology of concussion in collegiate and high school football players. *American Journal of Sports Medicine*, 28, 643-650.
- Harmon, K.G. (1999). Assessment and management of concussion in sports. *American Family Physician*, 60, 887-894.
- Iverson, G.L., Brooks, B.L., Lovell, M.R., Collins, M.W. (2006). No cumulative effects for one or two previous concussions. *British Journal of Sports Medicine*, 40(1), 72-75.
- Kaut, K.P., DePompei, R., Kerr, J., & Congeni, J. (2003). Reports of head injury and symptom knowledge among college athletes: Implications for assessment and educational intervention. *Clinical Journal of Sport Medicine*, 13(4), 213-221.
- Kelly, J. P. & Rosenberg, J. H. (1997). Diagnosis and management of concussion in sports. *Neurology*, 48, 575-580.
- Kent, A. & Turner, B. (2002). Increasing response rates among coaches: The role of prenotification models. *Journal of Sport Management*, 16(3), 230-238.
- Kleinknecht v. Gettysburg College, 989 F.2d 1360 (3d Cir. 1993).
- Knapp v. Northwestern University, 101 F.3d 473 (7th Cir. 1996).
- Litwin, M.S. (1995). *How to measure survey reliability and validity*. Thousand Oaks, CA.: Sage Publications.
- Lovell, M. R., Collins, M. W., & Bradley, J. (2004). Return to play following sports-related concussion. *Clinics in Sports Medicine*, 23, 421-441.
- Lovell, M. R., Collins, M. W., Iverson, G. L., Field, M., Maroon, J. C., Cantu, R., Podell, K, Powell, J.W. & Fu, F.H. (2003). Recovery from mild concussion in high school athletes. *Journal of Neurosurgery*, 98(2), 296-301.
- Lynn, M.R. (1986). Determination and quantification of content validity. *Nursing Research*, 35, 382-385.
- Makdissi, M., Darby, D., Maruff, P., Ugoni, A., Brunkner, P., & McCrory, P. (2010). Natural history of concussion in sport, markers of severity and implications for management. *American Journal of Sports Medicine*, 38(3), 464-471.
- McCrea, M., Hammeke, T., Olsen, G., Leo, P., & Guskiewicz, K. (2004). Unreported concussion in high school football players: Implications for prevention. *Clinical Journal of Sport Medicine*, 14, 13-17.
- McCrea, M., Kelly, J.P., Kluge, J., Ackley, B., & Randolph, C. (1997). Standardized assessment of concussion in football players. *Neurology*, 48, 586-588.
- McCrea, M., Kelly, J. P., Randolph, C., Kluge, J., Bartolic, E., Finn, G., & Baxter, B. (1998). Standardized assessment of concussion (SAC): On-site mental status evaluation of the athlete. *Journal of Head Trauma Rehabilitation*, 13, 27-35.
- Meehan, W., & Bachur, R. (2009). Sport-related concussion. *Pediatrics*. Retrieved July 26, 2010 from <http://pediatrics.aappublications.org/cgi/content/abstract/123/1/114>.
- Mosely, R. (2010a). Barner 'looks good' after scary hit. Retrieved February 8, 2011, from <http://special.registerguard.com/csp/cms/sites/web/sports/25384495-41/barner-hit-oregon-return-injury.csp>.
- Mosely, R. (2010b). Ducks take no chances in treating concussions. Retrieved February 8, 2011, from <http://special.registerguard.com/csp/cms/sites/web/sports/25402776-41/barner-skaggs-concussions-concussion-symptoms.csp>.
- Notebaert, A. J. & Guskiewicz, K.M. (2005). Current trends in athletic training practice for concussion assessment and management. *Journal of Athletic Training*, 40(4), 320-325.

- Nunnally, J.C. (1959). *Tests and measurements: Assessment and prediction*. New York: McGraw-Hill Book Company, Inc.
- Oliaro, S., Anderson, S., & Hooker, D. (2001). Management of cerebral concussion in sports: The athletic trainer's perspective. *Journal of Athletic Training*, 36(3), 257-262.
- Plevretes v. La Salle University, 2007 U.S. Dist. LEXIS 93029 (E.D. Pa. Dec. 19, 2007).
- Polit, D.F., & Beck, C.T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, 29, 489-497.
- Rosoff, A. J. (1995). The role of clinical practice guidelines in health care reform. *Health Matrix* (5), 369-396.
- Rothstein, A. L. (1985). *Research design and statistics for physical education*. Engelwood Cliffs, NJ: Prentice-Hall, Inc.
- Rutherford, A., Stephens, R., Potter, D., Fernie, G. (2005). Neuropsychological impairment as a consequence of football (soccer) play and football heading: Preliminary analyses and report on university footballers. *Journal of Clinical Experimental Neuropsychology*, 27(3), 299 -319
- Schwarz, A. (2009). New guidelines on young athletes' concussions stir controversy. *New York Times*. Retrieved April 22, 2010 from <http://www.nytimes.com/2009/06/08/sports/08concussions.html>.
- Sheehan, K. B. & McMillan, S. J. (1999). Response variation in e-mail surveys: An exploration. *Journal of Advertising Journal*, 39(4), 45-54.
- The NCAA News. (2010). *Rules panel supports concussion concepts*. Retrieved June 28, 2010, from http://www.ncaa.org/wps/portal/ncaahome?WCM_GLOBAL_CONTEXT=/ncaa/ncaa/ncaa+news/ncaa+news+online/2010/association-wide/rules+panel+supports+concussion+concepts.
- University of Pittsburgh Medical Center. (2008). Sports concussion fact sheet. Retrieved June 14, 2010 from <http://sportsmedicine.upmc.com/PDF/Sports%20Concussion%20Fact%20Sheet.pdf>.
- Woolf, S. H. (1995). Practice guidelines: What the family physician should know. *American Family Physician*, 51(6), 1455-1463.

For a whitepaper summary of this article, visit:

<http://www.jsasonline.org/home/v3n1/whitepaper/Miller-Wendt-Potter-wp.pdf>

Journal of Sport Administration & Supervision

RESEARCH THAT MATTERS!

A STUDY OF CONCUSSION ASSESSMENTS AND RETURN-TO-PLAY STANDARDS IN INTERCOLLEGIATE FOOTBALL: IMPLICATIONS FOR ATHLETIC ADMINISTRATORS

John J. Miller, Ph.D.
Troy University
John T. Wendt, J.D.
University of St. Thomas (MN)
Nick Potter, ATC
Kansas City Chiefs

Contact Information
John Miller
Email: johnm@troy.edu
Phone: 334-808-6468
FAX: 334-670-3743

Research Problem

The purpose of this study was to determine how medical personnel at selected universities managed the risk of concussions in intercollegiate football. This research contains timely information that reveals that no dominant guidelines for assessing a concussion or return-to-play in Division I intercollegiate football were revealed. The implications may result in potential litigation against the university and team medical personnel.

Issue(s)

Although there had been an increasing trend of concussions in intercollegiate football, recent reports have indicated that concussion rates have decreased in intercollegiate sports since 2005. Yet, gaining accurate accounts of the total number of concussions incurred by athletes every year is difficult due to a dearth of effective reporting. A reason for the inconsistency may be due to the primary method for determining the presence of a concussion has been simply to ask the athlete if they had a headache. As a result, concussive symptoms may not always be accurately reported to team medical personnel due to either the athlete's reluctance to share their true feelings or their misunderstanding of what the symptoms represent. A previous study indicated that 58% of athletes do not possess adequate knowledge of sport-related concussion and less than 50% of athletes comprehend the issues that could occur due to sustaining a concussion. A previous report indicated that 42% of coaches perceived that athletes sustained sport-related concussions only when they lose consciousness and 25% of the coaches would permit an athlete to return to competition even though the athlete would exhibit the symptoms of a concussion. Of special significance to athletic trainers and team physicians is that many athletes do not recognize their symptoms as being the result of a concussion nor do they believe that sustaining a concussion is a potentially grave problem. Thus, the diagnosis and management of sports-related concussions have often relied a great deal on an athlete's self-report of symptoms which may increase their exposure to harm.

The lack of understanding about concussions by athletes and coaches is complicated by the number of sports concussion management guidelines that are available to give guidance to intercollegiate football athletic trainers and physicians. It has been reported that 19 distinct series of guidelines have attempted to standardize the

treatment of sports-related concussions. As a result, the administration, implementation and management of these guidelines have been less than consistent in intercollegiate football. It should be noted that according to a previous report assessment, protocols and return-to-play decisions have been based on poorly validated guidelines and clinical judgment. Unfortunately, none are evidence based, and their suggestions are highly varied. While the grading guidelines have advanced the use of uniform terminology and increased awareness of concussion signs and symptoms, the lack of scientific method in creating the concussion management guidelines called their effectiveness into question.

Summary

However, nearly 70% of the respondents indicating that up to eight football players on their respective teams incurred a concussion during the 2009 season. More of the respondents did not believe that standard concussion guidelines should be followed by all intercollegiate football teams nor did they believe that the same guidelines should be used for an initial concussion assessments or subsequent concussions. More than half indicated that they had been pressured by a football coach (not necessarily the head coach) to return a concussed player to play earlier than their guideline permitted. Finally, although the head football team physician often consulted with the head football athletic trainer to decide on concussion diagnosis and return-to-play, the head football team physician almost always made the ultimate decision. This article would likely be useful to intercollegiate athletics department personnel and football team medical personnel. Other sport managers at other levels of sport who are involved with football may also find this article useful

Although a majority of athletic trainers indicated that at least eight of the players on the team during the season this study took place suffered a concussion, that number may be under-reported. Very often athletes and coaches do not have a very good idea of the symptoms, signs, or consequences of incurring one or more concussions. As a result, the team physician is put in the position to diagnose a concussion. This study supported such a notion as well as identifying the team physician as being the final word in concussion assessment. However, appears in the study that no dominant methods for assessing or managing a concussion or determining a player's return-to-play status existed. In fact the majority of athletic trainers indicated that they did not believe that standard concussion guidelines should be followed by all intercollegiate football teams nor did they believe that the same guidelines should be used for an initial concussion assessments or subsequent concussions. A potential reason for abandoning concussion guidelines may be that they have been shown to be ineffective as well as not valid. However, it is recommended that intercollegiate football team personnel continue to strive to reach agreement on appropriate risk management parameters for treating concussions that could be substantiated in a court of law.

While the expertise of the team physician is paramount and appears to be more than adequately prepared to diagnosis a concussion, it is equally important in a legal sense, for them to communicate the aspects of an effective concussion risk management plan. Additionally, although team physicians and medical staff may be knowledgeable about the symptoms and consequences of concussion, athletes and coaches often do not possess sufficient understanding. Thus, it is important that sports educational interventions be developed that are more positive rather than punitive.

Analysis

Concussions in football occur in a relatively frequent fashion, although the number in intercollegiate football appears to be declining. A number of issues complicate the potential consequences of football players sustaining a concussion including the players and coaches' lack of knowledge as well as conflicting concussion assessment and return-to-play guidelines. Confusion involving these issues may lead to unfortunate decisions about when to return an athlete to competition after concussion. In assessing the awareness of a risk from participation in a sport, a higher degree of awareness will be charged to an individual with greater understanding, most often team physicians and trainers. If the return is too hasty and the athlete sustains another concussion, litigation may occur against the university as well as the team physician. To guard against such an occurrence, a formalized approach serves as a "road map" or as evidence of the presence of a risk management plan should be developed. A risk management assessment plan can be individualized to each athlete since recovery time is a variable because each student-athlete

with a concussion is unique. This may be vital as no two people are diagnosed in exactly the same way in a general practitioner's office, neither should it be expected that any two concussed athletes would be diagnosed and assessed in exactly the same way. Additionally, the terms guidelines and standards seem to relay the connotation of strict adherence that provides little latitude for physician discretion and judgment.

Discussions/Implications

Due to the increased notoriety of concussions in sport, the frequency of sports-related concussion litigation may swell if effective risk measures are not employed. Although, it was apparent that head football athletic trainers and team physicians are cognizant of concussions, the culture of sports praises athletes who persevere through injury and personal hardship adds to the difficulty of diagnosing concussions as well as providing a return-to-play guideline. Thus, this article could be well-used by any sport participant, team medical personnel, athletic coaches and administrators.

It is important to remember that the practice of medicine, at all levels and in all forms, is an art. As no two people are diagnosed in exactly the same way in a general practitioner's office, neither should it be expected that any two concussed athletes would be diagnosed and assessed in exactly the same way. Since there are many options with various possible outcomes, no "one-size-fits-all" treatment plan guaranteed to work for every concussed athlete in every case. As such, experts developing guidelines may want to address them more as protocols so they will have a better chance in establishing more definitive standard of care to the athletes. For guidelines to be deemed as standards of care legally, they must be specifically composed so treatment decisions do not rely solely at the discretion of individual physicians. However, it is imperative that university's and their football team medical personnel understand their duties to provide all athletes a reasonable standard of care. To do so they must continue to strive to reach agreement on appropriate risk management guidelines or parameters for treating concussions that could be substantiated in a court of law.

While the expertise of the team physician is paramount and appears to be more than adequately prepared to diagnosis a concussion, it is equally important in a legal sense, for them to communicate the aspects of an effective concussion risk management plan. Additionally, although team physicians and medical staff may be knowledgeable about the symptoms and consequences of concussion, athletes and coaches often do not possess sufficient understanding. Thus, it is important that sports educational interventions be developed that are more positive rather than punitive. A recent example of a punitive reaction was from a football coach at a well-known university punishing a medically-certified concussed player by sending him into a dark room with no supervision for two days in a row. Additionally, educational sessions could teach student-athletes the skills to withstand the social pressures to play too soon after a head injury. Thus, the education of athletes and coaches, at all levels of competition, may result in more reporting thereby increasing the likelihood of appropriate concussion management. No student-athlete should suffer such an injury with the potential ramifications of a concussion due to a misdiagnosis or misunderstanding of the consequences. After all, it is important to remember that there is no such thing as a minor head injury.