

MAKING HEADWAY: AN EXPLORATORY STUDY OF THE PERCEPTIONS OF
AND THE COMPOSITION OF NCAA DIVISION I CONCUSSION MANAGEMENT
PLANS

Devin Gabrielle Fratarcangeli

A thesis submitted to the faculty of the University of North Carolina at Chapel Hill in
partial fulfillment of the requirements for the degree of Masters of Arts in the Department
of Exercise and Sport Science (Sport Administration).

Chapel Hill
2012

Approved By:

Coyte G. Cooper, Ph. D

Jason Mihalik, Ph. D, CAT (C), ATC

Johna Register-Mihalik, Ph. D, ATC

Erienne Weight, Ph. D

ABSTRACT

DEVIN G. FRATARCANGELI: Making Headway: An exploratory study on the Perceptions of and Composition of NCAA Division I Concussion Management Plans
(Under the direction of Dr. Coyte G. Cooper)

Concussion in sport has attracted substantial attention from the media and the public. Stories depicting the fatality of concussion have raised concern for athletes. It is estimated that 300,000 sport-related traumatic brain injuries occur in the United States annually (Langlois, 2006). Research shows that the frequency and severity of the brain impact leads to symptoms that can last for as little as several hours to a lifetime (DeKosky, 2010; Guskiewicz, 2003; Kelly, 1997). Resulting from the increased awareness and knowledge of concussions in addition to the influence of litigation, the National Collegiate Athletic Association (NCAA) furthered its dedication to the health of student-athletes in 2010 by mandating that all member institutions must have written concussion management plans on file. The purpose of this study was to analyze the perceptions of Division I athletic administrators and sports medicine personnel of concussion management plans and to determine the composition of those plans.

To my parents, Carol and Frank, and my brother, Corey for all your love and willingness to spend countless hours talking about concussions and listening to my presentations.

To Hunter, my best friend, for your patience, enthusiasm, encouragement, and most of all love.

ACKNOWLEDGEMENTS

First and foremost I need to thank my wonderful family; while I know this is dedicated to you, it simply does not do justice to how much your love and support have gotten me to where I am today. Without your examples of passion and drive, this document would not have been possible. Unfortunately there are only two phrases in the English language that explain what I want to say: Thank You and I Love You. This continues from my family to my best friend Hunter. I cannot put into words how much your love has meant to me; you have kept me sane and balanced in the times I needed it the most: Thank You and I Love You.

On that same level, I would like to acknowledge the deep appreciation I have for my advisor, Dr. Coyte Cooper. Your enthusiasm and guidance have led me through an amazing process and it is truly hard to put into words how thankful I am to have had you there every step of the way. Thank you for your dedication, your effort on my behalf, and for being someone I can always talk to.

I also owe a vast thank you to my committee members Dr. Erianne Weight, Dr. Jason Mihalik, and Dr. Johna Register-Mihalik. You have served as the best teammates I could have asked for in this process. Thank you for all your work and your passion for my study.

Finally, to the Masters of Arts Sports Administration Class of 2012..... we did it!

TABLE OF CONTENTS

LIST OF TABLES	viii
Chapter	
I. INTRODUCTION	1-9
Statement of Issue	1-5
Statement of Purpose	5
Research Questions	5-7
Operational Definitions	7-8
Assumptions	8
Limitations	8
Delimitations	9
Significance of the Study	9
II. REVIEW OF LITERATURE	10-20
The History of the National Collegiate Athletic Association (NCAA)	10-12
Concussion Research	13-15
What Is Concussion?	13-15
Concussion Management Plan	15-16
Change Leadership	16-20
III. METHODOLOGY	21-24
Purpose	21
Instrumentation	21-22

	Credibility, Validity, & Reliability	22
	Sample.....	22-23
	Procedures & Data Collection	23
	Statistical Analysis Process.....	23-24
IV.	RESULTS	25-35
	Demographic Information.....	25
	Differences in Perceptions Amongst All Groups.....	25-27
	Elements Most Important to Athletic Administrators.....	28
	Elements Most Important to Sports Medicine Personnel	28-29
	Elements Most Important to Those Identified as Both	29
	Perceptions on Mandated Concussion Management Plan	30-31
	Thoughts on Concussions	31-32
	Additional Information Gathered From Survey.....	33-35
V.	DISCUSSION	36-49
	Literature Discussion	36-37
	Implications of Element Importance.....	37-40
	Implications of Perceptions about Concussions	41-44
	Composition of Current Concussion Management Plans	44-45
	Practical Recommendations.....	46-47
	Future Research Suggestions	47-48
	Conclusion	48-49
	APPENDICES	50-54

Appendix A: 2011-2012 Sports Medicine Handbook Concussion Management Guidelines	50
Appendix B: Survey Instrument	51-54
REFERENCES	55-58

LIST OF TABLES

Table

4.1	Analysis of Mean Differences of Element Importance Based on Title	27
4.2	Frequency of Element Importance Response	27
4.3	Frequency of Perceptions on NCAA Concussion Management Mandate	31
4.4	Thoughts of Respondents Regarding Concussions.....	32
4.5	Element Presence Within Current Concussion Management Plans	34
4.6	Open-Ended Frequency of Most Important Element.....	35

CHAPTER I

INTRODUCTION

Statement of Issue

Traumatic brain injuries are prevalent and dangerous. It is estimated that 1.4 million traumatic brain injuries (TBIs) occur in America every year, with about 300,000 of them attributed to a sport-related event (Langlois, 2006). However, these numbers are thought to be grossly under-representative of actual concussion occurrences as athletes and coaches seem to have a general lack of knowledge about concussions and symptoms (Kuehl, Snyder, Erickson, & McLeod, 2010), and because concussions do not manifest themselves as a bruise, swelling or a physical injury they are more likely to go overlooked and symptoms tend not to get reported (Baird, 2011; Guskiewicz, 2003). Many mechanisms of brain injury exist in athletics. A concussion is described by the Third International Conference on Concussion in Sport as, “a complex, pathophysiological process affecting the brain, induced by traumatic biomechanical forces” (p. 142). Concussions are especially dangerous because of the varying degrees of short and long-term effects on brain functioning. Concussions can cause symptoms as mild as headaches, acuteness to light and sound, fatigue and nausea to as severe as vertigo, memory loss, difficulty concentrating, impulsiveness, balance issues, and depression (DeKosky, 2010; Guskiewicz, 2003). These symptoms have differing durations ranging from a few days to several months. It is also feasible that a one-time blow to the head could result in a concussion leading to permanent brain damage as well as permanent deficiencies in sensory, motor, and cognitive functions (DeKosky, 2010).

Sport situations are prime activities for TBIs, which lately have been publicized as extremely catastrophic often leading to death. The medical field has found the frequency of TBIs affect the severity of an athlete's injury, saying "repeated mild brain injuries occurring within a short period (i.e., hours, days, or weeks) can be catastrophic or fatal" (Kelly, 1997, p. 224). Stories of catastrophic injury or death resulting from concussion have been highlighted by the media generating great public discussion.

On November 5, 2005, 19-year-old Preston Plevretes took the field as a linebacker for LaSalle University. While covering a punt he received a jarring hit to the head and lapsed into a coma about five minutes later (Associated Press, 2009). Plevretes had to undergo emergency surgery to help stop the swelling in his brain. Preston had previously sustained a concussion on October 4th in practice, but was not fully asymptomatic before returning to the field (Finder, 2011). Preston now finds himself amidst greatly debilitating symptoms such as a complete lack of peripheral vision, speech abilities reduced to sputtering, and an inability to control his balance. Preston must also undergo grueling physical and occupational therapy on a daily basis (Finder, 2011). Concussion has changed this young man's life forever.

Jaquan Waller, a high school student in North Carolina died from complications of Second Impact Syndrome; which can be described as "a second impact on top of an unhealed concussion causes blood vessels to fail and the brain to swell so violently that within days an athlete can end up in a wheelchair or a coffin" (Finder, 2011, par. 7). Waller had incurred a concussion during football practice on a Wednesday, but was cleared to play in a game on Friday. The second hit Waller sustained in the game on Friday was not to his head, yet he collapsed on the sidelines shortly after (Latimer, 2011). Another high school student, Jake Snakenberg also fell victim to multiple concussions, and was killed after complications from

Second Impact Syndrome (Casey, 2010). Most recently was the case of Owen Thomas, the promising quarterback at the University of Pennsylvania, who took his own life in September 2010. Thomas had never been diagnosed with a concussion; however, after the autopsy it was discovered that Thomas was experiencing the beginnings of chronic traumatic encephalopathy (CTE) (ESPN.com). Chronic traumatic encephalopathy has been connected to depression and impulse control especially seen in NFL players who have sustained multiple head impacts. Doctors believe Thomas' CTE could have stemmed from impacts not quite intense enough to be classified as concussive, but because of their frequency, the blows caused permanent or cumulative brain injury (ESPN.com).

These stories of young athletes dying from concussive impacts draw great attention and spark intense conversation. As a result, the scrutiny has inspired sports governing bodies, such as the National Collegiate Athletic Association (NCAA), to revisit their core values and address the health and safety concerns. The NCAA itself was originally founded out of safety and welfare necessity (The History of the NCAA, 2011) based on concern for football player and their health. Thus, it makes sense that one of the core principles of the NCAA is Student-Athlete Well Being. This principle states, "Intercollegiate athletics programs shall be conducted in a manner designed to protect and enhance the physical and educational well-being of student-athletes" (NCAA Division I Manual, p.15; The Principle of Student-Athlete Well-Being, 2005). Specifically in section 2.2.3 Health and Safety, the NCAA principle mandates that "it is the responsibility of each member institution to protect the health of, and provide a safe environment for, each of its participating student athletes" (NCAA Division I Manual, p.15; Health and Safety). The NCAA is dedicated to the safety of its student-athletes; so it is logical that after an increased frequency

of heard trauma, media attention, and heightened medical research, the organization decided to address these concussion injuries.

The NCAA gathered a panel of experts to offer suggestions on how athletic departments should handle student-athlete concussions. In December of 2009, the Committee on Competitive Safeguards and Medical Aspects of Sports (CSMAS) finalized a list of recommendations for institutions to use with regard to student-athletes concussions (Runkle, 2010). On April, 26th, 2010 the committee translated those recommendations into guidelines for concussion management plans athletic departments should implement (refer to Appendix A for CSMAS Guidelines Memo). The NCAA decided to mandate all athletic departments follow these guidelines and create a concussion management plan. A deadline of August 1st, 2010 was put into place on when concussion management plans must be enacted.

These concussion management guidelines reflect a new push towards culture change in athletic departments. While the concussion management plan is geared towards athletic training, the leadership of the department, its athletic administrators charged with the oversight of athletic training, must support the change as well. For change to be effective the higher levels of management and leadership need to support it. The guidelines are specific in who writes the plans: a physician. Typically those physicians are the directors of sports medicine either working in the athletic department or are originally employed by the institution's health services. The director of sports medicine or in some institution's the head athletic trainer is inherently responsible for the plan and the medical requirements which must be written in. However, sole accountability for the plan should not rest only on the director of sports medicine; the athletic administrator, who oversees sports medicine, should have a basic knowledge of the plan and its

existence. The support of both of these parties will make the adoption of and compliance to the concussion management plan complete.

Statement of Purpose

The purpose of this study is to explore the perceptions of athletic administrators and sports medicine personnel related to the content and composition of NCAA Division I institution concussion management plans.

Research Questions

Based on the guidelines supplied by the NCAA Concussion Management Plan guidelines and the groups of interest, the following research questions were developed to help gather relevant information:

[RQ 1] Are there any significant differences between how the athletic administrators, sports medicine personnel and those that identify as ‘both’ perceive the elements [1A, 1B, 1C, 1D, 1E, 1F] of the concussion management plan?

[1A] Concussion Education

[1B] Return to Play Guide

[1C] Pre and Post-Concussion Testing

[1D] Concussion Documentation

[1E] Same Day Return-to-Play Prohibition

[1F] Enforcement Procedures

[RQ 2] What elements [2A, 2B, 2C, 2D, 2E, 2F] of the concussion management plan guidelines do athletic administrators perceive as most important?

[2A] Concussion Education

[2B] Return to Play Guide

[2C] Pre and Post-Concussion Testing

[2D] Concussion Documentation

[2E] Same Day Return-to-Play Prohibition

[2F] Enforcement Procedures

[RQ 3] What elements [3A, 3B, 3C, 3D, 3E, 3F] of the concussion management plan guidelines do sports medicine personnel perceive as the most important?

[3A] Concussion Education

[3B] Return to Play Guide

[3C] Pre and Post-Concussion Testing

[3D] Concussion Documentation

[3E] Same Day Return-to-Play Prohibition

[3F] Enforcement Procedures

[RQ 4] What elements [3A, 3B, 3C, 3D, 3E, 3F] of the concussion management plan guidelines do those classified as *both* an administrator and sports medicine representative perceive as the most important?

[3A] Concussion Education

[3B] Return to Play Guide

[3C] Pre and Post-Concussion Testing

[3D] Concussion Documentation

[3E] Same Day Return-to-Play Prohibition

[3F] Enforcement Procedures

[RQ 5] What are the perceptions of athletic administrators and sports medicine personnel about the mandated NCAA concussion management plan?

[RQ 6] What are the thoughts of athletic administrators and sports medicine personnel about concussions?

Operational Definitions

- *Concussion Management Plan*: A written and developed protocol for the (management) of student-athlete concussions based on the best practices approved and submitted by the NCAA's Committee on Competitive Safeguards and Medical Aspects of Sports.
- *Perception*: Insight, intuition, or knowledge gained by perceiving
- *Athletic Administrator*: The highest level administrator who oversees the area of Sports Medicine and would report to the Director of Athletics.
- *Sports Medicine Personnel*: Individual responsible for administrative oversight of medical coverage for athletic programs (i.e.: Director of Sports Medicine or the Head Athletic Trainer).
- *Concussion Education*: a specific way of disseminating information regarding concussions, how SRC can be incurred, concussion symptoms, and concussion treatment to student-athletes and coaches. This must include concussion-educational materials given to student-athletes and the educational steps taken should be documented as well (Runkle).
- *Return To Play Guide*: After sustaining a concussion, student-athletes must be given a physician written guide to returning the student-athlete to play
- *Pre and Post-Concussion Testing*: Institutions should give baseline testing of symptom checklists and cognitive and balance assessments for pre-concussion testing. For post-concussion testing, neuropsychological tests should be administered (Runkle).

- *Concussion Documentation:* CSMAS guidelines detail that, “institutions should document the incident, evaluation, continued management, and clearance of the student-athlete with a concussion” (p. 8).
- *Same-Day Return-To-Play Prohibition:* Any student-athlete who is diagnosed with a concussion may not return to play for the remainder of that day’s practice or competition (Runkle).
- *Enforcement Procedures:* To ensure compliance with the concussion management plan, the institution should have procedures explaining disciplinary actions that will be taken if members are found to have violated any portion of the plan.

Assumptions

- All respondents will answer completely and truthfully.
- Athletic administrative staff members and sports medicine personnel were the appropriate people to respond to the survey.
- All respondents completed the survey on a voluntary basis.
- The respondents’ answers were anonymous and confidential.

Limitations

- There could be a non-response bias if institutions without concussion management plans do not respond.
- The respondents had to respond to most questions using a 5-point Likert scale and were not able to answer in an open-ended fashion.
- The results may only be generalized to NCAA Division I institutions.
- The results only apply to concussion management plans, not any other policy present in the athletic department.

Delimitations

- Only administrators who oversee athletic training directly and the head of the sports medicine department were asked to respond.
- Only concussion management plan elements were included in the instrument.

Significance of Study

Because the NCAA only recently put forth its guidelines for institution's concussion management plans, there has not been much inquiry into the actual composition of concussion management plans created by member institutions; nor has there been an exploration of how the key members of creating and enforcing these plans (i.e., the head of sports medicine and athletic administrators) feel about these guidelines. Currently the NCAA as well as its member institutions are cited in lawsuits as failing to "enforce safety measures" (Associated Press, 2011) to prevent concussions. The concussion management plan guidelines provide steps to take toward protecting players from sport related concussions. Without inquiry related to the implementation of the concussion management guidelines, the initiatives efficacy in demonstrating a positive effect on student-athlete safety and welfare is difficult to measure.

CHAPTER II

REVIEW OF LITERATURE

The History of the National Collegiate Athletic Association (NCAA)

The National Collegiate Athletic Association (NCAA) was birthed in response to numerous issues surrounding college football. Player safety concerns were paramount, and the inertia created from common catastrophic injuries on the field in addition to numerous secondary issues of concern including amateurism, academic standards, and fair-play questions led to a call for a national governing body (Crowley, 2006). The dangerous V-formation or wedge common to football early on left many athletes physically vulnerable to injury and even death (Falla, 1981). Some reform was attempted to help protect players but that failed to truly curb the problem. Crowley explains,

The specter of violence still haunted the game as the 20th century arrived. Mass play was still popular. Injuries were still common. Death was becoming a factor. The 18 fatalities and 149 serious injuries of the 1905 season brought critics out in force. Condemnations from the press were plentiful. Outrage grew among the American people (p. 9).

The Chancellor of Syracuse University James Roscoe Day eloquently stated, “One human life is too big a price for all the games of the season” (Falla, 1981, p. 13). The public outrage representing both the player safety and amateurism/fair-play camps called so loudly, it fell upon the ears of President Theodore Roosevelt (Crowley, 2006). President Roosevelt called the collegiate athletic leaders to the White House for a discussion on change needed in the game of football (History of the NCAA, 2011). In December of 1905, 62 institutions became the

preliminary members of what was deemed the “Intercollegiate Athletic Association of the United States (IAAUS)” (History of the NCAA, 2011). In 1910, the IAAUS was renamed the NCAA and became the governing body over most collegiate athletics (Crowley, 2006; Smith, 1999).

The function of the NCAA was primarily in rules-establishment until 1921 when its power extended into conducting Championships for sports (History of the NCAA, 2011). After World War II, attention and interest in intercollegiate athletics boomed and the development of a new media resource (television) allowed for increased public knowledge and access (History of the NCAA, 2011; Smith, 1999). With the advent of television, information of collegiate athletics scandals in recruiting, gambling, and amateurism (such as those at City College of New York, Iowa, and William and Mary) were publicized and caused great concern (Smith, 1999). In response to this outcry, the NCAA began to tighten its grip and develop new governing policies for its member institutions to ensure fairness and to allow for better control.

In 1948 a “Sanity Code” was adopted by the NCAA in response to criticism that the body was failing at enforcement of its own rules (Smith, 1999). To help enforce the Sanity Code, meant to ‘alleviate the proliferation of exploitive practices in the recruitment of student-athletes’, the Constitutional Compliance Committee was convened and dedicated to the interpretation of the rules and any investigations following (Smith, 1999). However, the Committee lacked power to punish members based on their offense; it’s only authority came in the form of expulsion (Smith, 1999). Thus the Sanity Code was abandoned and in its place the Committee on Infractions was charged with policy enforcement (Smith, 1999).

Once the NCAA’s enforcement procedures had strengthened an immediate boom in infractions and penalties caught the attention of institutional leaders (Crowley, 2006). From 1974 to 1983, the Committee on Infractions handed down punishments in 96 cases and infractions

cases, such as the Pacific-10 fake grade scandal captured the public eye (Crowley, 2006). Crowley, an intercollegiate athletics historian, wrote, “the negative publicity generated by such cases, together with an understanding that the NCAA’s enforcement function had grown in strength and effectiveness, began to capture the attention and concern of institutional presidents around the country” (p.63). After a drought of interest, Presidents of member institutions became engrossed in NCAA dealings and in time earned their positions on the NCAA top level (Crowley, 2006).

This top level leadership is crucial to the success of change implementation within the NCAA and further at the institutional level. Zaccaro and Banks (2001) explained the necessity for top level involvement in guidance for the overall organization,

Executives have the responsibility for formulating a vision, linking it to a long-term corresponding strategic plan, articulating these to the organization, and persuading organizational constituents to adopt and implement the plan (p. 182).

While Presidents may not have the technical knowledge or the crucial understandings of the details, they can easily delegate responsibilities to those with such expertise. However, they are the top level and the encouragers of change within the NCAA. This serves as the basis for why the top level leadership within individual institutions should serve as the key proponents for change. If at the governing body level, the top leadership is pushing for change and the rest of the association follows and alters its behaviors to advance such change, the same should be said for the micro levels or the institutions’ athletic departments. At that institutional level it is the highest athletic administrators, with oversight of specific areas, within the athletic department that serve as the top level of leadership.

Concussion Research

What is Concussion?

The word “concussion” was originally developed out of the Latin word “concutere” meaning a brain “shaking violently” (Maroon, et. al., 2000). During the Third International Conference on Concussion in Sport in Zurich, the panel of experts described concussion as “a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces” (p. 142).

Concussions result in a wide range of symptoms in varying severities. Symptoms can include: headaches, dizziness, nausea, difficulty concentrating, depression, anxiety, concentration inabilities, memory deficiency, sleep deprivation, and others (DeKosky, Ikonovic, & Gandy, 2010; AAN, 1997). Most of the symptoms of a concussion are experienced immediately at the onset of the injury and seem to dissipate fairly quickly (McCrory, et. al., 2009). However, some concussion effects may be extensive in duration and could result in long-term problems especially in athletes that are in position to sustain potentially multiple concussions, the effects can have lasting effects (McCrory, et. al., 2009).

While many studies regarding the long-term effects of concussion on health have focused on NFL athletes, they still help to show the risks of repeated traumatic brain injury (TBI). Athletes with pasts involving three or more concussions indicate a high chance of experiencing late-life memory impairment, mild cognitive impairment (MCI), and increased risk of Alzheimer’s Disease (AD) (Guskiewicz, et al., 2005). Further, in studies done with younger athletes it has been discovered that individuals with multiple concussions suffer longer term effects (Iverson, G., 2004). Authors Iverson, Gaetz, Lovell, and Collins concluded through their study of young athletes, who had sustained multiple concussions,

Specifically, these athletes are more likely to report ongoing post-concussion symptoms, and they perform slightly worse on preseason memory testing. Moreover, they appear to be more susceptible to sustaining injuries of greater severity in the future. Finally, those athletes with multiple concussions had greater adverse consequences in the acute recovery period (i.e. 2 days) from their next concussion. (p. 441-442).

Kuehl, Snyder, Erickson, and McLeod, 2010 studied how self-reported sport-related concussion history affected collegiate athletes views on their quality of life based on their health. By using a social functioning subscale the authors measured the athletes' perceptions on how they can function socially. The results show they believe their concussion affects their health and their participation in social functions. The authors summarized that the athletes' perceived incapacity to fully socialize as a result of concussion injury caused "a variety of problems, including neglected schoolwork, poor motivation and compliance with treatment programs, or return to participation sooner than is safe" (p. 89).

Based on data from a National Health Interview Survey, Thurman, Branche, and Sniezek estimate that about 300,000 sports-related traumatic brain injuries occur in the United States (Thurman, Branche, & Sniezek, 1998). In 1996, Sosin, Sniezek, and Thurman utilized National Health Interview Survey information to infer that sports and physical activities lead to the second highest amount of traumatic brain injuries in the 15-24 age range (Sosin, Sniezek, & Thurman, 1996). In 2007 data from the NCAA's Injury Surveillance System (NCAAISS) was analyzed for the prevalence of ankle sprains, anterior cruciate ligament (ACL) tears, and concussions in collegiate sports. The NCAAISS had been collecting data from 15 sports and this study focused on a 16 year period from 1988-2004. After compiling the data, Hootman, Dick, and Agel found that, "More than 9000 concussions were reported over the 16 years, an average of 563 per year in

this sample. Assuming the sample represents approximately 15% of the total population, this equates to an annual average of about 3753 concussions in these 15 activities” (p. 315).

Additionally there has been research supporting that once an athlete sustains a concussion the likelihood of him/her experiencing a “re-injury” is increased making the injury potentially more prevalent. In a study done analyzing the effects associated with recurrent concussions, Guskiewicz, et.al, 2003, looked at 2,905 football players from 25 different United States colleges. The study found that “1 in 15 players with concussion may have additional concussions in the same playing season and that these re-injuries typically take place in a short window of time (7-10) days following the first concussion” (p.2553). Other medical research supports this finding, that re-injury is more likely to occur once one concussion has been sustained (Lovell, Collins, & Bradley). Since reaction time, comprehension, thought process, and decision making can all be affected by concussion, an athlete is more susceptible to injury without being aware of it (Sabini & Nutini, 2011).

Based on an analysis of the current research, medical professionals developed a consensus opinion on general concussion management. Those previous studies and the Statement that came from the Zurich Conference helped pave the way for the best practices and recommendations found within the NCAA guidelines for its member’s written concussion management plans.

Concussion Management Plan

Student-athlete well-being is a core principle of the NCAA, “Intercollegiate athletics programs shall be conducted in a manner designed to protect and enhance the physical and educational well-being of student-athletes” (NCAA Division I Manual, p.15; The Principle of Student-Athlete Well-Being, 2005). Specifically in section 2.2.3 Health and Safety, the NCAA

principle mandates that “it is the responsibility of each member institution to protect the health of, and provide a safe environment for, each of its participating student athletes” (NCAA Division I Manual, p.15; Health and Safety). The NCAA has taken steps to help protect student-athletes with concussion injuries and to educate student-athletes and coaches about concussions to support its well-being principles. Concussion management has always been a part of athletic training; however, with the developed consensus statement the NCAA moved to pushing for an actual written plan according to the researched best practices and recommendations. The memo from the CSMAS states, “institutions should have both a written emergency action plan as well as a written concussion management plan on file” (par. 5). The guidelines given by CSMAS encouraged that the following elements be present in written concussion management plans: 1) some form of concussion education, 2) guided return-to-play process, 3) pre and post-concussion testing, 4) documentation process for all concussions, and 5) a ‘no return-to-play the same-day as a concussion diagnosis’ clause.

Change Leadership

In order to successfully implement change within an organization, John Kotter explains “the process is never employed effectively unless it is driven by high-quality leadership” (Kotter, p. 20). Leaders manage people and through their authority and guidance they enable their subordinates to accomplish a change or vision through tasks (Cooper, 2005). “Leadership defines what the future should look like, aligns people with that vision, and inspires them to make it happen despite the obstacles” (Kotter, p. 25). Leadership is what inspires modifications in behavior, causes change to penetrate resistance and stick in the current climate of an organization (Kotter, 1996). Kotter writes, the driving force behind change in an organization is “leadership, leadership, and more leadership” (p. 31).

Leadership comes from different parts of the organizational hierarchy. There will always be top levels of management responsible for the direction setting of the organization as well as the lower levels accountable for implementing strategies to achieve the overall vision for the organization (Zaccaro & Klimoski, 2001). The highest leadership level is charged with the task of creating long-term goals, inspiring moves towards a collective vision and mission, and to guide operational, task-oriented functioning of the organization as a whole. Authors Zaccaro and Banks (2001) describe top level leadership and its specific tasks with regard to the management of its organization writing,

Leaders define and articulate a direction in line with external or environmental contingencies for their subordinate unit. They also create the internal conditions to accomplish the tasks specified by this direction (p. 181).

Leaders react to the climate in which their organization exists. As discussed previously, if an environment shift occurs, the response of the organization must be guided by the leadership (Zaccaro & Klimoski, 2001). In an athletic department the top level of leadership is the athletic director and the associate athletic administrators. The department as a whole relies on their leadership to guide its functioning and to inspire change as is needed.

In their study, Buchanan and Boddy examined the previously discussed role of how leadership can effectively influence change in an organization. Through diary entries of top officials in all types of organizations, Buchanan and Boddy were able to analyze “agents of change” and identify fifteen necessary competencies leaders must have to aptly alter the course of an organization. For the purpose of this study two attributes will be focused on: (1) Communication skills and (2) Team-building (Buchanan & Boddy, 1992).

The diary entries analyzed by Buchanan and Boddy highlighted the importance of a leader's ability to "transmit effectively to colleagues and subordinates the need for changes in project goals and in individual tasks and responsibilities" (p. 100). Since the concussion management plan is a new addition to athletic training, it requires a detailed change in thought and action on behalf of the sports medical staff. Athletic administrators should be able to communicate the need for this alteration and the change in responsibility to those involved.

Directly in line with a leader's communication skills are team building abilities. Buchanan and Boddy define these as the abilities to "bring together key stakeholders and establish effective working groups, and clearly to define and delegate respective responsibilities" (p. 98). The change agent must be capable of creating an atmosphere of teamwork, while still being able to separate tasks and assign them to the appropriate personnel. Heifetz and Laurie discuss how a leader must be able to encourage those within the organization to accept and understand their responsibilities when implementing change (Heifetz and Laurie, 1997). They also suggest that showing employees their importance in developing the future of the organization can allow change to flourish (Heifetz and Laurie, 1997). The concussion management plan must be written by a physician and it will be imposed by the athletic training staff. However, it must be considered important to the athletic department as a whole. While athletic administrators will not be directly writing the pieces of the plan, they should be defining who is involved in the creation and execution of the plan.

These communication and team building skills are especially essential when change occurs at a very deep level. As author Schein explains, when basic functioning of an organization is altered, the leadership must be very involved and focused. He writes "The [leaders] discover that to change deeply embedded assumptions requires far more effort and time" (Schein, 2004).

Before the NCAA gathered its recommended best practices, student-athlete health and welfare regarding concussion was left up to each physician and institution; the new concussion management plan guidelines mark a shift in the underlying way student-athlete health is addressed. It gets to the heart of basic athletic training functioning by putting in a uniform way of how concussion situations should be managed. This type of situation is classified by author Schein as a “turnaround situation” when convention is challenged and altered to meet a changing environment. Schein explains,

The process of developing new assumptions then is a process of cognitive redefinition through teaching, coaching, changing the structure and processes where necessary, consistently paying attention to and rewarding evidence of learning the new ways, creating new slogans, stories, myths, and rituals, and in other ways coercing people into at least adopting new behaviors. (p. 314).

Overall it is the leader’s responsibility to the organization to not only lead but be willing to learn as well. To implement change and be effective in leading that change into the culture a leader must understand how to best utilize and connect to those lower as a leader does not necessarily have to already know all the answers. “A leader, from above or below, with or without authority, has to engage people in confronting the challenge [reason for change], adjusting their values, changing perspectives, and learning new habits” (Heifetz and Laurie, 1997, p. 134).

In the case of the NCAA’s implementation of the guide for written concussion management plans, two leader groups emerge as paramount for the success of the change in management. The head of sports medicine (whether the director or sports medicine or the head athletic trainer) is the obvious leader in that he/she oversees the athletic training department in general and should be involved in day to day activity; therefore, the director becomes the direct

line of enforcement of the written plan medically. But while on the surface this change seems to most affect athletic training, it is an athletic department-wide change. The plan affects student-athletes and coaches as well as medical staff and the oversight of student-athletes and coaches is the higher administrators. The NCAA guidelines require the plan in writing, but if the document is not followed it does not serve its purpose. Therefore, it is imperative that the people most affected by this new plan (i.e.: athletic trainers, team physicians, and even coaches and student-athletes) act accordingly. In *Leadership and Management for the 21st Century*, Geoff Armstrong discusses how upper level management can affect the compliance of employees in a workplace as he writes “The key challenge for managers today is to create the organization (relationships, processes, and practices) that will develop and sustain this behavior [discretionary] tomorrow” (p.289). It is the top level managers and leaders that have the power and influence to set organizational practices which ultimately lead to employees using this discretionary behavior to successfully meet a goal or vision (Cooper, 2005).

The athletic administrators must support the change and work to help enforce the plan so it will ‘have teeth’. Whether the head of sports medicine reports directly to the athletic department or campus health, direction from an athletic administrator will still encourage compliance with the institution’s written concussion management plan. So while the athletic administrators’ leadership does not incorporate actually making the medical change since they do not have the technical understanding to do so, they should be responsible for leading the change in a supportive and enforcing manner.

CHAPTER III

METHODOLOGY

Purpose

The purpose of this study is to explore the perceptions of athletic administrators and of sports medicine personnel related to the content and composition of NCAA Division I institution concussion management plans.

Instrumentation

The survey was assembled based on the recommended best practices set forth by the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports or CSMAS (refer to Appendix B for the survey instrument). The guidelines were created out of the 2008 Consensus Statement on Concussion which was the result of the Third International Conference on Concussion in Sport (Runkle, 2010). The first portion of the survey collected demographic data about the institution and the individual respondent filling out the survey. In addition, the survey included a perception portion that asked respondents to indicate the level of importance that elements of the concussion management plan have in their athletic department. This portion used a 5-point Likert scale (ranging from (1) Unimportant to (5) Very Important) to examine elements such as pre and post-concussion testing, concussion education to coaches and student-athletes, and same-day return-to-play prohibition. This section gathered the feelings of athletic administrators and sports medicine personnel about the guidelines supplied by CSMAS. The third portion asked the subjects to analyze the composition of his/her institution's concussion management plan. A simple "Yes", "No", "Unsure" option identified if the CSMAS elements

had been implemented into the institutions' current concussion plan. Finally, the survey allowed for open-ended responses regarding personal feelings on student-athlete concussions and concussion management plans overall. This area was used for qualitative data on the support or opposition to the NCAA's new rules regarding student-athlete concussions.

Credibility/Validity/Reliability

The survey was approved by the Institutional Review Board (IRB). Once a draft of the instrument was created, it was reviewed by a panel of experts (two professors trained in survey design, two concussion experts, and one research statistician) to ensure that the content was suitable given the purpose of the research. The instrument was also reviewed by statistical software professional to allow the survey to be sent electronically to participants. The device was sent to focus group of athletic administrators and directors of sports medicine at several NCAA Division I institutions to collect pilot data on question clarity. Based on the suggestions from the panel and the insights from the pilot study, the instrument was adjusted and finalized prior to distribution.

Sample

The population of interest for this study is athletic administrators and sports medicine personnel at NCAA Division I institutions ($N=670$ – one person from both groups at each institution). The survey was sent directly to the athletic administrator responsible for overseeing athletic training (with the director of athletics copied as well). If there was no one specific title supervising athletic training, the survey instrument was sent directly to the director of athletics and copied to all other senior level administrators to ensure the survey would reach the most appropriate respondent. The heads of sports medicine were also directly targeted as they would be the people most responsible for implementation of the concussion management plan and

would be working with it on a daily basis. Therefore, the survey was also sent separately to the head of sports medicine at each individual institution, whether that was the director of sports medicine or the head athletic trainer.

Procedures/Data Collection

The instrument was sent to the participants via electronic mail through the Qualtrics software after the addresses were collected by the researcher from each institution's website. Only the appropriate athletic administrator(s), including the director of athletics, were included on the electronic communication. The researcher composed a personalized message to accompany the survey explaining the study and the results expected to be ascertained. Confidentiality and anonymity were ensured to all participants as well. Subjects were thanked for their time and responses and were asked to supply an address to where results should be sent should the participant wish to see them at the conclusion of the study. A follow-up electronic mailing was sent about two weeks after the initial contact to encourage participation in the study in the event of a non-response.

Statistical Analysis Process

Once the data was collected from all the subjects it was organized into a spreadsheet form to accurately import to the statistical package software used to analyze its trends and variance. The software Statistical Package for the Social Sciences (SPSS) was selected to examine the data. To answer research question 1, a 2x6 Mixed Model ANOVA was used. Since the Mixed Model ANOVA yielded a significant interaction effect, a Tukey post hoc test was used to calculate the critical value and determine which groups had significantly different ratings of the elements highlighted. The Mixed Model ANOVA also allowed for other Tukey post hoc tests to determine if any critical differences lay within each separate group (athletic administrators,

sports medicine personnel, and those identified as both) of the sample to answer research questions 2, 3, and 4. To answer research questions 5 and 6, narrative responses were independently reviewed by two researchers. Based on the themes consistent in the responses, an overall coding scheme was developed and coded for. To ensure inter-coder reliability a Scott's Pi analysis was used, with the target of a .81 or above reliability category as that describes "almost perfect agreement" between the two coders.

CHAPTER IV

RESULTS

Demographic Information

A total of 221 people participated in the study which represents 32.99% of the target population; however, respondents were allowed to skip questions for any reason, therefore, every question may not have been addressed by all 221 people. By title, 81 participants (36.7%) identified themselves as an “Athletic Administrator”. 110 participants classified themselves as “Sports Medicine Personnel” (49.8%), and finally 30 participants were “both” (an administrator and sports medicine representative), which represented 13.6% of the sample.

With regard to gender, the clear majority were male. 152 participants (68.8%) were male, while only 66 (29.9%) were female. The highest number of respondents (20.8%) reported to be in the 50-54 age range with the overall mean falling within the 45-49 age range.

Differences in perception of concussion elements amongst athletic administrators, sports medicine personnel, and those identified as “both”

A 3x6 Mixed Model ANOVA was used to determine if there were significant differences in importance of each concussion management plan element based on the title of the respondent. The Mauchly’s Test of Sphericity was not met ($p < .05$), thus, the Huynh-Feldt Correction (the most conservative method) was utilized. The interaction effect of element importance with regard to title yielded an $F(7.130, 985) = 2.466, p < .05$ (p-value of .016), thus showing a statistically significant difference in one or more of the mean scores of element importance based on the title of the respondent. A Tukey post hoc test was needed to determine the specific pair of

element importance means which were different based on the title of the respondent. It was found that for a significant difference to exist, the difference between the mean scores had to be greater than .30.

Out of all the comparisons, only one pair of element importance means differed significantly based on title of the respondent; the difference between the mean scores of element importance of *Enforcement Procedures* (.339) was found to exceed the Tukey critical value of .30. This means that Athletic Administrators ranked *Enforcement Procedures* as *more* important than Sports Medicine personnel did. While the initial means for *Enforcement Procedures* in each of the groups are both within the “Very Important” category, the level of the ranking did differ as the Sports Medicine Personnel mean (1.875) was close to a “2” or “Important” rather than a “1” or “Very Important” (Athletic Administrator mean was 1.536). Table 4.1 illustrates all of the means from each group as well as the critical value differences of all six elements with regard to title. Furthermore, Table 4.2 shows the overall frequency of response of the importance of each element.

Table 4.1

Analysis of Mean Differences of Element Importance Based on Title

Element	Athletic Administrator Means	Sports Medicine Personnel Means	“Both” Means	Mean Difference
Concussion Education	1.130	1.212	1.148	.082
Outlined Return-To- Play Guidelines	1.116	1.231	1.370	.254
Pre and Post- Concussion Testing	1.246	1.394	1.222	.172
Concussion Documentation	1.058	1.077	1.037	.040
Same-Day Return-To- Play Prohibition	1.275	1.144	1.185	.131
Enforcement Procedures	1.536	1.875	1.778	.339*

Note: Responses ranged from Very Important (1) to Unimportant (5)

* $F(7.130, 985) = 2.466$ $p < .05$; Tukey post hoc critical value of .30

Table 4.2

Frequency of Element Importance Response

Element	Very Important (1)	Important (2)	Moderately Important (3)	Of Little Importance (4)	Unimportant (5)
Education	172 (77.8%)	33 (14.9%)	1 (.5%)	0	0
Return-To-Play	171 (77.4%)	31 (14.0%)	2 (.9%)	1 (.5%)	1 (.5%)
Testing	154 (69.7%)	40 (18.1%)	9 (4.1%)	2 (.9%)	0
Documentation	193 (87.3%)	13 (5.9%)	0	0	0
Same-Day Prohibition	172 (77.8%)	27 (12.2%)	6 (2.7%)	0	0
Enforcement	101 (45.7%)	64 (29.0%)	28 (12.7%)	7 (3.2%)	2 (.9%)

Concussion Management Plan Elements Most Important To Athletic Administrators

The main effect of the 3x6 Mixed Model ANOVA explained previously was used to determine if the mean score of element importance differed within the Athletic Administrator category. Due to Mauchly's Test of Sphericity requirement not being met ($p > .05$), the researcher decided to use the most conservative observation, the Huynh-Feldt Correction, which yielded an $F(3.565, 985) = 32.285, p < .05$ (p-value $< .0001$) thus showing at least one significant difference. A Tukey post hoc test revealed the critical level to be .30, thus any significant difference must exceed .30. An overall look at the entire Athletic Administrator category showed a difference larger than .30; therefore, at least one element importance differs from another.

Within Athletic Administrators, only the element of *Enforcement Procedures* was found to be significantly different than several of the other elements. The importance of *Enforcement Procedures* differed from that of *Concussion Education*, *Outlined Return-To-Play Guidelines*, and from *Concussion Documentation*. *Enforcement Procedures* was regarded as *less* important than the previously stated elements since its difference from all other elements' means exceeded the Tukey post hoc critical value of .30. As Table 4.1 shows, all of the elements were ranked in the "Very Important" category; however, the mean of *Enforcement Procedures* was closer to "2" or "Important" than the other elements.

Concussion Management Plan Elements Most Important to Sports Medicine Personnel

The main effect of the 3x6 Mixed Model ANOVA was used to determine if the mean score of element importance differed within the Sports Medicine Personnel category. The Huynh-Feldt Correction yielded an $F(3.565, 985) = 32.285, p < .05$ thus making one or more element's importance score significantly different from the others with the p-value $< .0001$. A

Tukey post hoc test revealed the critical level to be .30, thus for a significance to occur, the mean difference between the importance scores must be greater than .30. An overall look at the entire Sports Medicine Personnel category showed a difference larger than .30; therefore, at least one element importance differs from another.

Enforcement Procedures was significantly less important than all other identified elements as its mean differences from all other elements' means were greater than the critical value .30. Additionally, *Pre and Post-Concussion Testing* significantly differed from *Concussion Documentation* as shown by a mean difference of .317, with *Documentation* being ranked as more important than *Testing*.

Concussion Management Plan Elements Most Important to the Both Category

The main effect of the 3x6 Mixed Model ANOVA was used to determine if the mean score of element importance differed within the Both category. Using the conservative Huynh-Feldt Correction an $F(3.565, 985) = 32.285, p < .05$ was observed, showing one or more differences in the ratings of the elements within the category. Using the same Tukey post hoc critical value of .30, it was found that at least one element importance differs from another.

Within the Both category, much like the Sports Medicine Personnel, *Enforcement Procedures* differed significantly from all other elements as the mean differences were greater than .30. Respondents who categorized themselves as Both an administrator and representative of Sports Medicine ranked *Enforcement Procedures* as *less* important than all the other concussion management plan elements. Furthermore, respondents in the Both category classified *Outlined Return-To-Play Guidelines* as *less* important than *Concussion Documentation*, as shown by the a mean difference of .333.

Perceptions of athletic administrators and sports medicine personnel about the mandated NCAA concussion management plan

An open-ended question was used to capture the perceptions of the respondents on the NCAA's mandate of a concussion management plan; these responses were categorized and reviewed by two independent coders. For this question, a 0.861 score on a Scott's Pi analysis, revealed very high inter-coder reliability falling into the highest (.81 and above) reliability category demonstrating 'almost perfect agreement' between the two coders.

A coding scheme of six categories emerged from the perceptions on the mandated concussion management plan with several responses fitting into two or three different categories based on breadth of topics covered within a single open-ended response. Out of the responses tabulated (N=192), 50.52% made some comment in support of the protocol saying it is very important for departments to have one on file. This category "Positive view about Protocol's Importance to address the concussion issue" had the greatest frequency of occurrence within the responses. The second most frequent theme that emerged (22.396%) included responses which perceived the concussion management plan as allowing for more consistent treatment of concussions and provided a clear process to follow ensuring that everyone in the department is on the same page regarding concussion management. Table 4.3 displays the overall results collected regarding perceptions on the NCAA's mandate.

Table 4.3

Frequency of Perceptions on NCAA Concussion Management Mandate

Description of Statement	Overall Percentage (Frequency of Response) (N = 192)
Positive view about the Protocol's Importance to address the concussion issue.	50.52% (97)
Positive view on Protocol of Clear Rules and Processes.	22.40% (43)
Positive view about providing Protection and Safety to all parties.	11.98% (23)
Neutral view saying the Mandated Protocol is OK, no positive or negative slant to comment.	7.81% (15)
Negative view of the Requirement of Outlined Care; however, concussion is an important issue.	5.73% (11)
Positive/Neutral view: A great thing IF the protocol is followed and IF it is used correctly.	4.69% (9)

Note: Responses could have fit into more than one category.

Thoughts of athletic administrators and sports medicine personnel about concussions

An open-ended question asked participants to elaborate upon any thoughts they had on concussions to measure general un-prompted feelings about the current state of concussion management within the NCAA. These responses were classified and reviewed by two independent coders. For this question, a 0.835 score on a Scott's Pi analysis, revealed very high inter-coder reliability demonstrating 'almost perfect agreement' between the two coders.

The responses regarding concussions in general varied; however, a nine category coding scheme encompassed all responses sufficiently. The greatest number of respondents (26.03%) was concerned with the lack of true consensus regarding many aspects of concussion treatments and evaluations. This uncertainty ranged from a general lack of concussion knowledge in the

field, the proper personnel to evaluate athletes (certified athletic trainer, physician, an independent evaluator), whether computer testing or human testing/cognition was best for diagnosis, to whether treatment should solely be based on policy or be determined by the attending physician. However, the percentage of uncertainty was followed closely by respondents viewing the concussion management plan as a positive addition to their current policies with 24.66% expressing a belief that written protocols are a good thing for their departments. Table 4.4 further describes the results in their entirety from the question about general thoughts about concussions.

Table 4.4
Thoughts of Respondents Regarding Concussions

Description of Response	Overall Percentage (Frequency of Response) (N=73)
Concussion is difficult injury because of the Lack of Consensus (Uncertainty about many aspects).	26.03% (19)
Positive view of Concussion Protocols.	24.66% (18)
Student-Athlete Honesty in reporting of symptoms of concussion.	15.07% (11)
There must be “Buy-In” to the concussion management plan from every party.	10.96% (8)
Need more Awareness/Concern about concussions.	8.22% (6)
The concussion management plan needs more Enforcement.	6.85% (5)
Return-To-Play concerns and issues.	6.85% (5)
Other	5.48% (4)
Concussions Affect Cognitive Ability, how can the off-field activities be addressed?	4.11% (3)

Note: Responses could fit into more than one category.

Additional Information Collected from the Survey

Descriptive statistics were used to identify the general composition of NCAA Division I athletic departments' concussion management plans by showing the percentage of respondents that answered "Yes" in the Element Presence portion of the survey instrument. Overall, 94.6% of respondents (out of 221 returned surveys) said the schools they represent have written concussion management plans, only .5% said their school does not, and .5% were uncertain if the institution had a plan (4.5% of respondents skipped this question). Table 4.5 describes the results of all questions regarding the presence of the key elements within the NCAA's guidelines for concussion management plans.

The *Documentation* process of all concussions identified by the sports medicine staff had the highest percentage of "Yes" responses from all participants with 90.5% saying the element is in their respective concussion management plan. The element of *Enforcement Procedures* for delinquent coaches, certified athletic trainers, and physicians had the lowest percentage of respondents answering "Yes" at only 19.0%, while 60.2% said their plan *did not* contain such a provision; *Enforcement Procedures* also returned the highest rate of "Unsure" at 12.2%.

Table 4.5

Element Presence Within Current Concussion Management Plans (N=221)

Plan Element	Total Number of Responses (out of 221)	“Yes” Percentage	“No” Percentage	“Unsure” Percentage
Concussion Education	205	75.1%	13.6%	4.1%
Outlined Return To Play Guidelines	204	88.2%	2.7%	1.4%
Pre and Post-Concussion Testing	202	87.3%	3.6%	.5%
Concussion Documentation	204	90.5%	1.4%	.5%
Same-Day Return-To-Play Prohibition	201	83.7%	3.2%	4.1%
Enforcement Procedures	202	19.0%	60.2%	12.2%

Note: Respondents were able to skip questions for any reason. This table does not include any institution that does not currently have concussion management plan in place.

In conjunction with ranking the elements with regard to their importance, respondents were asked in an open-ended question to highlight which element(s) he/she felt was of the utmost importance to concussion management. Several responses fit into more than one category based on the elements mentioned within a single open-ended response. Out of the 175 responses, *Concussion Education* was the dominate response with 60 participants (34.29%) highlighting it. Table 4.6 shows the elements highlighted by the respondents. The results of the open-ended questions differed from the means of the ratings of each element where *Concussion Documentation* was rated the most important element.

Table 4.6

Open-Ended Frequency of Most Important Element

Response of Most Important Element	Frequency of Response (N=175)
Concussion Education	60
Return-To-Play Guidelines	47
All Elements	33
Pre and Post-Concussion Testing	25
Concussion Documentation	21
Same-Day Return-To-Play Prohibition	20
Enforcement Procedures	6
All Elements except Enforcement Procedures	6
Education of Plan	6

Note: Respondents were allowed to choose more than one element.

CHAPTER V

DISCUSSION

Literature Discussion

When striving for change within an organization, all change leadership theory echoes one key principle, leaders using a specific vision or mission to inspire and guide strategies and behavior changes within the organization that result in positive change (Kotter, 1996; Cooper, 2005). In 2001, Zaccaro and Banks explained that all leaders are charged with a responsibility of clearly defining a direction for their subordinates based on environmental changes affecting the organization. The recent demand for concern over student-athlete welfare in regard to concussion management marks an alteration in the way sports medicine has been handled within collegiate athletics. This environmental shift caused by both public disquiet and NCAA policy changes affects each member of the NCAA. Therefore, according to the literature, it is the responsibility of the leaders of both the department in its entirety (the administrators) and the leaders of sports medicine to address this change by providing a consistent vision and mission for the rest of the department to follow.

Zaccaro and Klimoski, in 2001, directly addressed the previously described situation of multiple levels of leadership contingencies within an organization and their obligations when faced with a need for change. They wrote that there will always be hierarchical levels of leadership in an organization and while top levels set the vision and create drive, the lower levels are also responsible for implementing plans to achieve the vision. Thus, it is important the different levels of leaders show consistency in what they are striving for so that everyone is on

the same page. The results of this study strove to determine the congruency in the perceptions of the importance of concussion management between the two essential leadership groups, athletic administrators and heads of sports medicine.

Implications of Element Importance

The lack of variance in the rating of element importance amongst the three groups as well as the very high rating of all six elements is extremely positive, especially from a change leadership perspective. The consistency reflects an almost uniform view of concussion management plans from the groups who most influence the success of the plan's implementation, the athletic administrators and the heads of the sports medicine department. With both of these parties supporting the concussion management plan, the literature shows that generating understanding and compliance from the 'lower levels' of the athletic department, such as the coaches, assistant athletic trainers, and student-athletes, should be easier. In 2005, Cooper explained that leaders have the power and influence to change behavior and value in the organization; since the groups in power have a consistent view on the new practice of concussion management, there should be a clear message motivating the athletic trainers, coaches, and student-athletes to adjust to the stipulations of the plan.

The results of this study show that the parties in question are mostly on the same page pertaining to each individual element of the concussion management plan. In each group, all the elements' means fell within the 'Very Important' category. Since management is on the same page, the next step is disseminating the belief and support of the concussion management plan throughout the entire department. In *Leadership and Management for the 21st Century*, chapter author Geoff Armstrong writes that leaders are charged with creating an atmosphere which will encourage and even demand alteration to support a new mission and furthermore will sustain

behaviors amongst the organization's members to continue the new vision. Specifically, for this study it is the responsibility of the administrators and sports medicine personnel to continue to push the importance of concussion management and provide adequate resources for education of both the issue and the department's plan.

As previously discussed, the importance of the six highlighted elements of a concussion plan does not vary much depending on the title of the respondent. However, there is one element which does statistically significantly differ. Athletic Administrators tended to rank *Enforcement Procedures* as *more* important than Sports Medicine Personnel and the Both category. While the rankings did prove to be different, Sports Medicine Personnel and the Both category did find *Enforcement Procedures* to be 'Very Important' albeit at the low end of the spectrum.

Empirically, the means from each group appear to be close, but the statistical difference does merit discussion. It should also be noted that *Enforcement Procedures* was the only element which about 19% of respondents rated as 'Moderately Important' (3) or below. This is starkly different from all other elements where the response hardly ever fell below a rating of 'Important' (2); the only two other elements which were rated at times below the 'Important' level only had 1.9% and 5.0% respectively below that threshold.

Since the leadership groups are slightly inconsistent on this matter, communication skills will be paramount to iron out fine details. Buchanan and Boddy found in 1992 that communication skills were one of the necessary competencies of being a leader. The need to effectively convey reasoning behind change and inspire behavior modification is vital in a leader's ability to achieve a goal (Buchanan & Boddy, 1992). While a difference of .339 between means seems like a trivial amount, if the leadership groups trying to encourage compliance with the concussion management plan are at odds over a small issue, those below in the department

may begin to question the new plan in its entirety and may be less apt to follow the new guidelines due to confusion or doubt.

Enforcement Procedures is also the most difficult part of this particular plan to describe. There are several different parties specifically involved with concussion management plans: physicians, athletic trainers, student-athletes, coaches, and administrators. For each of the groups involved ‘enforcement’ could mean different actions taken. Medical personnel are accountable to the ‘do no harm’ stipulation in their training; however, working for an athletic department has an inherent vested interest in the success of the teams. If a medical staff member is making some decisions about play based on the potential success of the team rather than the best interest of the student-athletes, he/she may not adhere to the concussion management plan. If coaches try to use influence over players to indirectly encourage them to keep concussion symptoms and feelings quiet or to sway a decision of an athletic trainer to play or pull a student-athlete, he/she is not in compliance with the concussion management plan. If student-athletes are not self-reporting symptoms to the athletic training staff, they are not allowing the concussion management plan to work in their favor. The aforementioned situations all show necessity for enforcement and consequences due to non-compliance to a department policy; however, these are all different situations. The complexity of *Enforcement Procedures* is extensive and it is a difficult element to address.

Ultimately due to the complex nature, *Enforcement Procedures* seems to be an element that should be handled internally by an athletic department; however, the conferences can be involved to help encourage compliance, the best interest of the student-athletes, and fair play. A conference official in the Student-Services or Compliance offices of each conference could be responsible for reaching out to member institutions and voice an unbiased suggestion for how to

handle situations particular to concussion management plan issues. A conference guiding hand could help institutions to clearly define enforcement for their staffs and student-athletes.

The results of this study seem to support the elements within the guidelines set forth by CSMAS and the NCAA for composition of concussion management plans for athletic departments. As all elements were reported to be within the ‘Very Important’ category, it seems that athletic administrators and sports medicine personnel find all the areas essential to concussion care. The highest rated element in all three groups was *Concussion Documentation*, this was the only element not focused directly on the contact with the athlete who had sustained a concussion or on punishment for noncompliance. From this study, administrators and heads of sports medicine are concerned with documenting the processes and treatments of each case of concussion. While this element is specifically laid out in the CSMAS guidelines, it also logically seems to have stemmed from the legal cases and questions which have come from several high profile concussion cases. This will be discussed further within the future research section. It is also of note that even though *Concussion Documentation* was rated highest in all groups, in an open-ended question asking respondents to fill in which element was most important the overwhelming majority selected *Concussion Education* as the most important.

Focusing on concussion research and collegiate athletes, it is critical to point out the high regard administrators and sports medicine personnel hold such items as *Return-To-Play Guidelines* and *Same-Day Return-To-Play Prohibition*. These two elements directly address the research done on college football players showing the dangers of sustaining multiple head injuries as well as the expedited timeframe in which a second traumatic head injury can occur after one has previously suffered an impact (Guskiewicz, et. al., 2003).

Implications of Perceptions about Concussions

The majority of all open-ended responses about both the concussion management plan and on the concussion issue in general were positive. Out of the 265 responses returned, 68% (181) included an optimistic look at the new plan for student-athlete welfare and safety as well as an encouraging point of view on the heightened awareness and increase in research interest in concussions. These participants highlighted the fact that a concussion management plan allowed for and created more consistent treatment across all sports sponsored. With a specific outlined plan dedicated to concussion overall, all student-athletes were given the same attention and followed the same protocol. Responses such as “being required to have a plan is important so that schools have some framework to apply when student-athletes suffer a head injury” and “I feel this is very important for the safety and well-being of our student-athletes and for consistent treatment of all” capture the thoughts expressed from a large portion of participants. It should be noted that this study was voluntary; therefore, there is a chance for a biased sample, if persons with a negative view of the concussion management plan chose not to respond. However, overall, this sample sheds light on a positive view of concussion awareness. But while it is reassuring that athletic department officials see concussion as a worthwhile issue to address and look into, there are still several areas brought up in this study that merit discussion.

Despite the fact that the numbers seem to favor a positive view of the concussion management plan requirement, there was a percentage (5.73%) of participants that do not agree with the NCAA’s requirement. The responses acknowledged the importance of the concussion issue and student-athlete safety, yet they felt it was wrong to base care on a written policy. Some felt as though the plan takes away the ability of the medical personnel to react to a situation and determine the best course of care for that student-athlete rather than a general concept of how

concussion should be addressed: “Having a plan on file does not mean [people] will follow it or give it required attention and/or review it. Just because it’s the right thing to do, doesn’t mean they will do it. I prefer to take care of my own house and have it done to meet our needs and standards instead of what others tell me I have to do.” Others say that the necessity is not a written protocol, but a change in attitude and culture: “Concussion management should follow the principles of good medicine and we don’t need written protocols for everything we treat. Protocols don’t change the way people think or act – the culture needs to change. Having said that, if the protocol is an enforceable policy, that is one way of dealing with the different principles within health care and coaching.” This last question of assumptions and beliefs on the clash of health care and coaching delves into the need for collective buy-in to the concussion management endeavor.

As shown within the coding scheme, some responses of participants regarding the concussion management showed concern over “buy-in” and participation of key players (such as coaches). These responses emphasized the importance of everyone understanding and upholding the concussion management plan and administrative support. This ‘buy-in’ concern seems directly in line with what Schein in 2004 described as he wrote about leading change of deeply held assumptions within an organization. He wrote of the necessity of extra time and effort to encourage the alteration of these assumptions; since more complete knowledge of the concussion has come about recently, it is not surprising that some key players (i.e.: coaches and student-athletes) have beliefs of “bell-ringers”. The concern over ‘buy-in’ to the new concussion plan, which would hold players out depending on symptoms, is a legitimate one, but one that should wane with time and effort. As the discussion and the evidence pile, understanding of the severity of the injury should take hold and that ‘buy-in’ should come from the hold out groups. The buy-

in can also be demanded by the use of enforcement procedures within the plan. Change leadership suggests that encouraging personnel to understand their new roles and how to adapt are crucial to the implementation of the new policy and change (Heifetz and Laurie, 1997). The literature shows that leadership can create buy-in by ensuring that coaches and student-athletes understand how instrumental they are in concussion management and in creating an atmosphere inspiring focus on the student-athletes health and welfare.

Even though it was a minority of the responses, about 5% of participants were careful to mention that the concussion management plan will only be as successful as its enforcement and backing, especially by the higher levels of administration. Phrases such as “IF the policy is followed completely” and “IF there is administrative support and backing” were used to describe the necessity of enforcement of the use of the plan. Looking back at the quantitative results, *Enforcement Procedures* was the element ranked lowest overall by the sample in its entirety as well as all three individual title categories; therefore, it is not exceedingly surprising enforcement was not an overwhelming theme within the open-ended responses. It is important to note that *Enforcement Procedures* was still selected as ‘Very Important’ by 101 participants (out of 202); additionally, 19% said *Enforcement Procedures* were a part of the plan currently implemented in the department. The survey did not ask for participants to reveal who specifically those enforcement procedures were for, but it seems like they would be for key proponents (coaches, athletic trainers, and physicians) who were not adhering to the concussion management plan set forth.

Student-athlete honesty encompassed 15% of the responses returned. Since a concussion does not manifest itself outwardly, such as a bruise or swelling, it is not easily detected by sheer observation; while some symptoms are outwardly noticeable (i.e.: loss of balance control),

generally a concussion is an injury that can be hidden. It is the concussions that go unreported by the student-athletes several participants were worried about. Whether it is self-imposed pressure and assumptions or team/coach imposed pressure, student-athletes can easily be coerced into believing it is in their best interest not to report concussion symptoms and to ‘throw dirt on it’ and move on. If it is perceived that the student-athlete will lose playing time if he/she does not practice or that coach will have a lesser opinion of the student-athlete, it is more likely that the student-athlete will remain silent; however, the next impact whether small or large could cause significant damage to that student-athlete’s brain. Since the goal of concussion management plans is to address student-athlete welfare and safety, this dishonesty concern is a very legitimate one and merits further examination.

Composition of Current Concussion Management Plans

The CSMAS guidelines for NCAA member institution’s concussion management plan were taken from experience of the expert panel as well as from the suggestions and compilation of research by the Third International Conference on Concussion in Sport. In general from the results gathered by this study on the presence of the aforementioned elements in current plans, the Division I population appears to be in close compliance with the guidelines set forth. The two elements with the highest percentage of a ‘yes’ response were *Concussion Documentation* and *Outlined Return-To-Play Guidelines* at 90.5% and 88.2% respectively. These two were followed closely by *Pre and Post-Concussion Testing* and *Same-Day Return-To-Play Prohibition* at 87.3% and 83.7%. Lastly out of the CSMAS guidelines came *Concussion Education* with only 75.1% claiming to have the element present in the plan. The element with the smallest reported presence was *Enforcement Procedures*, which was not found within the CSMAS guidelines.

Since *Concussion Education* was the element pointed out by 60 separate responses as the most important element, it is surprising that only 75.1% of the participants say their institution's concussion management plan has *Education* in it. With the potential for *Concussion Education* to address issues of student-athlete honesty and buy-in from coaches and student-athletes, *Education* is an important part of a concussion management plan. By fully understanding what effect a concussion has on the brain and the side effects which could manifest later in life, student-athletes may become more apt to report symptoms and take the injury as serious as it truly is. Missing playing time now may pale in comparison to the potential for late-life memory impairment, mild cognitive impairment, or an increased chance of Alzheimer's Disease (Guskiewicz et. al., 2005). However, if student-athletes are not being fully educated about the inherent dangers of concussions, they may not truly grasp how dire their headache or inability to concentrate is; therefore, the concussion goes unreported and undiagnosed. Additionally, if coaches are not aware of the actual risk to the welfare of their student-athletes in regard to TBIs, they too may brush aside warning signs as 'bell-ringers'. *Concussion Education* is an extremely important part of compliance with the concussion management plans set forth.

It is not surprising that so few institutions claim to have *Enforcement Procedures* in their current concussion management plan. However, *Enforcement Procedures* can directly impact the success of the implementation, compliance to, and support of the concussion management plan. With a consistent, laid out plan everyone should be on the same page about the process and protocol for responding to a TBI; however, specific enforcement action tends to lend a sense of urgency and legitimacy to the overall plan. Once people know the consequences of their actions and behaviors, they tend to think more readily about how to respond in a given situation, having procedures in place for non-compliance tends to discourage it from happening in the first place.

Practical Recommendations

Since many of the problems and concerns previously mentioned in this study are affected by concussion education, it would be beneficial for all NCAA member institutions to convene a task force to research the best methods and ways to educate student-athletes, coaches, and administrators on both concussions and concussion management. While it should remain each institution's choice on how to educate its personnel on concussion, it would help tremendously to have research to consult. It also is important that the task force be able to create suggestions for each individual group (student-athletes, coaches, and administrators), as different information is relevant to all three and also the presentation style may need to be changed depending the group. The task force could be run by CSMAS in the NCAA as a national initiative or it could be run on the conference level to appeal more personally to each institution. It is pertinent that the task force not only include researchers, but practitioners including collegiate athletic training staff, coaches, as well as student-athlete representatives such as the Student-Athlete Advisory Committee. This attention to educating people about the serious risks involved with concussions will hopefully encourage honesty from student-athletes, compliance and support from the coaching staffs and administration, as well as open dialogue amongst the interested parties about how to best address this health issue.

Whether the education task force begins on conference level or not, support of peer institutions can be paramount in stimulating change. Within conference offices, the health and welfare staff should make an attempt to reach out to member institutions and spark discussion about how to best enforce concussion management plans. With new research on concussions being turned out now more than ever, it will be crucial for practitioners to look into what is available and determine how to best apply the research suggestions.

A combined effort with general healthcare providers would be useful to determine how to best address concussion effects on cognitive abilities outside of athletics. While it was a small percentage, 4% of respondents showed a concern for student-athletes' abilities to function in an academic setting after sustaining a concussion. One respondent wrote "we have encouraged, educated, and gotten the support of upper level administrators with concern of the idea of cognitive rest as well as physical rest for concussion recovery. If a student-athlete has been diagnosed with a concussion and has a test, we work with academic services to notify the professor so accommodations can be made for them to make up missed work." This suggestion is a viable option to help truly allow for rest of the brain; however, this must be done in conjunction with both faculty and academic services or at the further advising of healthcare management independent of athletics so the suggestion is not biased.

Future Research Suggestions

There is plenty of room for growth and exploration within both concussion research and concussion management plan development. From the results of this study it will be important for research to continue in determining how to influence student-athlete honesty. In particular, there are a few potential topic areas focusing on student-athletes that would be useful in the development of an education plan to help in this process: how they approach their physical health and well-being, their assumptions and beliefs regarding injury and its effect on their playing time and relationship with the coach, their trust of medical personnel, as well as their understanding of concussions and traumatic brain injuries would aid the development of an education plan geared towards student-athletes.

Further from these results, it is obvious concussion documentation is of the utmost importance to both athletic administrators and heads of sports medicine departments. Digging

into what truly brought this element to the surface would add understanding on how governing bodies can best approach members regarding policy changes. A study entailing a survey focused on what factors (i.e.: NCAA mandate, litigation, student-athlete welfare et c.) were most influential in the creation of the concussion management plan as well as the addition of concussion documentation, would help determine why documentation is so pertinent to the plan, but also could give insight into what truly drives athletic departments to make policy changes.

Lastly from the results of this study, it seems that an investigation into viable solutions addressing the concept of cognitive rest for student-athletes once they sustain a concussion would add tremendous value to continuing efforts to address student-athlete welfare. The effect of perception of health quality of life impacts a student-athlete's ability to function socially, academically and adhere to treatment programs as shown by Kuehl, Snyder, Erickson, and McLeod in 2010. With more research, programs could be developed to assist not only student-athletes, but non-athletes adjust and cope with the stresses of traumatic brain injury without causing more anxiety.

Conclusion

Overall the concussion topic has so many facets which can be furthered by research. While the recent research has greatly expounded upon what little was known about traumatic brain injuries, there is still a tremendous way to go. As one respondent wrote, "until there is a consensus treatment protocol for concussions across the board with physicians and athletic trainers, there will continue to be resistance from some coaches as to the handling of concussions." Concussions are an exceedingly difficult injury because there are so many differing suggestions and findings. The increased awareness and heightened sensitivity to brain injuries can only inspire more research into the topic. These injuries can lead to life and death

situations and that deserves the greatest of attention. Concussion management plans within athletic departments are a move to further support student-athlete welfare. The steps taken so far have certainly inspired conversation and a new policy change, but the plans must continue to adapt and adjust as more research is done on concussions in general. However, without the leaders in the athletic department supporting the need for safety and welfare reform, the initiative may not be upheld or followed, as said best by Heifetz and Laurie in 1997, “a leader, from above or below, with or without authority, has to engage people in confronting the challenge [reason for change], adjusting their values, changing perspectives, and learning new habits” (p. 134).

APPENDIX A

Committee on Competitive Safeguards and Medical Aspects of Sport Concussion Management Guidelines (Klossner, 2011)

Concussion Management Plan. An active member institution shall have a concussion management plan for its student-athletes. The plan shall include, but is not limited to, the following:

- (a) An annual process that ensures student-athletes are educated about the signs and symptoms of concussions. Student-athletes must acknowledge that they have received information about the signs and symptoms of concussions and that they have a responsibility to report concussion-related injuries and illnesses to a medical staff member;
- (b) A process that ensures a student-athlete who exhibits signs, symptoms or behaviors consistent with a concussion shall be removed from athletics activities (e.g., competition, practice, conditioning sessions) and evaluated by a medical staff member (e.g., sports medicine staff, team physician) with experience in the evaluation and management of concussions;
- (c) A policy that precludes a student-athlete diagnosed with a concussion from returning to athletic activity (e.g., competition, practice, conditioning sessions) for at least the remainder of that calendar day; and
- (d) A policy that requires medical clearance for a student-athlete diagnosed with a concussion to return to athletics activity (for example, competition, practice, conditioning sessions) as determined by a physician (e.g., team physician) or the physician's designee.

3.2.4.16.1 Effect of Violation. A violation of Constitution 3.2.4.16 shall be considered an institutional violation per Constitution 2.8.1; however, the violation shall not affect the student-athlete's eligibility.

APPENDIX B

Survey Instrument

Background Information (1/4)

Select Your Title: Senior Level Administrator, Associate Level Administrator, Assistant Level Administrator, Director of Sports Medicine, Head Athletic Trainer, Both, Other

If Director or Sports Medicine: Who do you report to: Athletic Department, Campus Health Services, Other

Gender: Male or Female

Select Age Range: 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59,

Which conference is your institution affiliated with: A-10, ACC, America East, Big East, Big Sky, Big 10, Big 12, Big West, Colonial Athletic, Conference USA, Horizon, Independent, Ivy, MAC, MAAC, MEAC, Missouri Valley, Mountain West, Northeast Conference, Ohio Valley, PAC-12, Patriot, SEC, Southern Conference, Sun Belt, SWAC, WCC, WAC

Does your institution have a written concussion management plan?: Yes No Unsure

Who was involved in the creation of your concussion management plan? (please indicate titles):

Did any senior level administrator supervise or oversee the creation of the concussion management plan?: If yes please indicate the title of the person who was involved

Element Importance (2/4)

Please indicate the level of importance that each of the following parts should have in a concussion management plan in an athletic department:

[1A] Concussion education for coaches and student-athletes

Unimportant
Of Little Importance
Moderately Important
Important
Very Important

[1B] Outlined, step-by-step student-athlete return to play plan after a concussion

Unimportant
Of Little Importance
Moderately Important
Important
Very Important

[1C] Specific pre-concussion and post-concussion testing to assess a student-athlete's injury

Unimportant
Of Little Importance
Moderately Important
Important
Very Important

[1D] Documenting student-athlete concussions

Unimportant
Of Little Importance
Moderately Important
Important
Very Important

[1E] Same-day return-to-play prohibition for student-athletes diagnosed with a concussion

Unimportant
Of Little Importance
Moderately Important
Important
Very Important

[1F] Specific enforcement procedures for delinquent coaches, trainers, and doctors

Unimportant
Of Little Importance
Moderately Important
Important
Very Important

[1G] Which of the previously identified elements do you feel are the most important in concussion management plans and why:

Element Presence (3/4)

Please indicate if the following elements are present in your institution's concussion management plan:

[2A] A form of mandatory concussion education to coaches and student-athletes (could include a PowerPoint presentation, a lecture, or written materials):

Yes No Unsure

[2B] Outlined, step-by-step return to play guidelines for student-athletes after they have sustained a concussion

Yes No Unsure

[2C] Specific pre-concussion and post-concussion tests to assess a student-athlete's injury

Yes No Unsure

[2D] Documentation process for student-athlete concussions

Yes No Unsure

[2E] Same-day return-to-play prohibition for a student-athlete diagnosed with a concussion

Yes No Unsure

[2F] Specific enforcement procedures for non-compliant coaches, trainers, or doctors

Yes No Unsure

[2G] A specific concussion policy and protocol document for how concussions should be managed at your institution

Yes No Unsure

Open-Ended Response (4/4)

How do you feel about institutions being required to have a concussion management plan on file?

How has the concussion management plan been implemented at your institution?

Please discuss any other thoughts you have related to student-athlete concussions and concussion management.

Optional: Your institution for grouping purposes ONLY: _____

If you would like to receive the results of this study following data collection, data analysis, and the peer review process, please enter your e-mail address:

REFERENCES

- American Academy of Neurology (AAN). (1997). Practice Parameter: The Management of Concussion in Sports. *Summary Statement from the Quality Standards Subcommittee*, 1-7.
- Associated Press. (2011). 2 former players sue NCAA over concussion rules. Chicago, IL: The Associated Press.
- Associated Press. (2009). Goodell issues memo changing return-to-play rules for concussions. Retrieved October 15, 2011 from <http://www.nfl.com/news/story?confirm=true&id=09000d5d814a9ecd&template=with-video-with-comments>
- Associated Press. (2009). LaSalle settles injured player's lawsuit. Retrieved from: <http://sports.espn.go.com/ncf/news/story?id=4700355>
- Baird, J. T. (2011). An effective tool in establishing the diagnosis of sport-related concussion. *Journal of the American Academy of Physician Assistants*. Retrieved from: <http://www.lexisnexis.com.libproxy.lib.unc.edu/hottopics/lnacademic/?verb=sr&csi=355056>
- Buchanan , D. & Boddy, D. (1992). *The Expertise of the Change Agent*. Hertfordshire, UK: Prentice Hall International.
- Casey, R. (2010). Signs weren't obvious in concussion death of Jake Snakenberg. *The Denver Post*. Retrieved from: http://www.denverpost.com/preps/ci_16358037
- Cooper, C. (2005). *Leadership and Management in the 21st Century*. New York, NY: Oxford University Press.
- Crowley, J. (2006). In *The Arena: The NCAA's First Century*. Retrieved November 10, 2011 from http://www.ncaapublications.com/productdownloads/in_the_arena584e1fee-ea5d-4487-be73-cb2f718232d9.pdf

- DeKosky, Steven T., Ikonovic, Milos D., Gandy, S. (2010). Traumatic Brain Injury – Football, Warfare, and Long-Term Effects. *The New England Journal of Medicine*, 363, 1293-1296.
- ESPN.com. (2010). Penn's Owen Thomas had CTE. Retrieved from: <http://sports.espn.go.com/nfl/news/story?id=5569329>
- Falla, J. (1981). NCAA: The Voice of College Sports. Mission, KS: National Collegiate Athletic Association.
- Finder, C. (2011). Former football player's concussion has altered his life. *The Pittsburgh Post-Gazette*. Retrieved from: <http://www.post-gazette.com/pg/11002/1115036-139.stm>
- Guskiewicz, K. M., Marshall, S. W., Bailes, J., McCrea, M., Cantu, R. C., Randolph, C., & Jordan, B. D. (2005). Association between Recurrent Concussion and Late-Life Cognitive Impairment in Retired Professional Football Players. *Neurosurgery*. 57(4), p.719-726.
- Guskiewicz, K. M., McCrea, M., Marshall, S.W., Cantu, R.C., Randolph, C., Barr, W., Onate, J.A., Kelly, J.P. (2003). Cumulative Effects Associated With Recurrent Concussion in Collegiate Football Players: The NCAA Concussion Study. *American Medical Association*, 290(19), 2549-2555.
- Heifetz, R. & Laurie, D. (1997). The Work of Leadership. *Harvard Business Review*. 75(1), p. 124-134.
- Hootman, J., Dick, R., & Agel, J. (2007). Epidemiology of Collegiate Injuries for 15 Sports: Summary and Recommendations for Injury Prevention Initiatives. *Journal of Athletic Training*. 42(2), p. 311-319.
- Iverson, G. L., Gaetz, M., Lovell, M. R., & Collins, M. W. (2004). Cumulative effects of concussion in amateur athletes. *Brain Injury*. 18(5), p.433-443.
- Kelly, J. (1997). Sports-Related Recurrent Brain Injuries—United States. *Morbidity and Mortality Weekly Report*, 46(10), 224-227.

- Klossner, D. (2011). *2011-2012 NCAA Sports Medicine Handbook*. Retrieved from http://fs.ncaa.org/Docs/health_safety/2011_12_Sports_Medicine_Handbook.pdf
- Kotter, J. (1996). *Leading Change*. Harvard Business School Press. Retrieved from http://ehis.ebscohost.com/ehost/ebookviewer/ebook/nlebk_35052_AN?sid=f3bc2d71-3768-4f23-a3bd-1eb2619e94ae@sessionmgr110&vid=1
- Kuehl, M. D., Snyder A. R., Erickson, S. E., & McLeod, T. C. (2010). Impact of Prior Concussions on Health-Related Quality of Life in Collegiate Athletes. *Clinical Journal of Sports Medicine*, 20(2), 86-91.
- Langlois, J. A., Rutland-Brown, W., Wald, M.M. (2006). The epidemiology and impact of traumatic brain injury: a brief overview. *Journal of Head Trauma Rehabilitation*. 21(5), 375-378.
- Latimer, P. (2011). New state concussion law has local ties to high school sports. *Wilmington Star News*.
- Lovell, M., Collins, M., & Bradley, J. (2004) Return to play following sports-related concussion. *Clinics in Sports Medicine*. 23(3), p. 421-441.
- Maroon, J. C., Lovell, M. R., Norwig, J., Podell, K., Powell, J. W., & Hartl, R. (2000). Cerebral Concussion in Athletes: Evaluation and Neuropsychological Testing. *Neurosurgery*. 47(3), p. 659-672.
- McCrory, P., Meeuwisse, W., Johnston, K., Dvorak, J., Aubry, M., Molloy, M., & Cantu, R. (2008). Consensus Statement on Concussion in Sport: The Third International Conference on Concussion in Sport Held in Zurich, November 2008. *The Physician and Sportsmedicine*. 2(37), p. 141-159.
- NCAA Division I Manual. (2011). National Collegiate Athletic Association. Indianapolis, IN.
- Runkle, D. (2010). Concussion Management Plan. *Memo from the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports (CSMAS)*.

Sabini, R., & Nutini, D. (2011). Return-to-play Guidelines in Concussion: A Closer Look at the Literature. *The Physician and Sportsmedicine*. 39(3), p. 23-30.

Schein, E. H. (2004). *Organizational Culture and Leadership*. San Francisco, CA: Jossey-Bass.

Smith, A. (1999). A Brief History of the National Collegiate Athletic Association's Role in Regulating Intercollegiate Athletics. *Marquette Sports Law Review*. 11(9), p. 9-22.

Sosin, D., Sniezek, J., & Thurman, D. (1996). Incidence of mild and moderate brain injury in the United States, 1991. *Brain Injury*. 10(1), p. 47-54.

The History of the NCAA. (2011). The Online Resource for the National Collegiate Athletic Association. Retrieved from <http://ncaa.org/wps/wcm/connect/public/ncaa/about+the+ncaa/who+we+are/about+the+ncaa+history>

Thurman, D., Branche, C., & Sniezek, J. (1998). The epidemiology of sports-related traumatic brain injuries in the United States: recent developments. *Journal of Head Trauma Rehabilitation*. 13(2), p. 1-8.

Zaccaro, S. & Klimoski, R. (2001). *The Nature of Organizational Leadership: Understanding the Performance Imperatives Confronting Today's Leaders*. San Francisco, CA: Jossey-Bass.