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Current Concussion Education Practices in NCAA Member Institutions: A Descriptive Study

Samuel E. Johnson II

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CURRENT CONCUSSION EDUCATION PRACTICES IN NCAA MEMBER INSTITUTIONS: A
DESCRIPTIVE STUDY

by

SAMUEL JOHNSON II

(Under the Direction of Nicholas Murray)

ABSTRACT

Purpose: To investigate concussion education implementation methods in NCAA member institutions.

Methods: Of the 1,078 athletic trainers across all NCAA Divisions that were contacted, 355 were included in this study. Participants were asked to complete the Current Concussion Education Practices Questionnaire (CCEPQ). The CCEPQ consisted of four sections: demographics, concussion education questionnaire, perceived effectiveness of concussion education, and limitations/barrier to providing concussion education. Outcome frequencies were used to report survey results. Respondent division-level categorical differences across survey items were assessed with a 2X3 chi-square test of independence.

Results: Providing concussion education occurs in 98.9% of NCAA member institutions.

Educating student athletes on concussion annually occurs in 85.1% of NCAA member institutions. Among those institutions who provide concussion education, 5.1% report only providing concussion education to contact/collision sports. Utilization of the NCAA concussion facts sheet, and NCAA concussion education video occurs in 50.1% of NCAA member institutions. Only 70.7% of NCAA member institutions report providing information on the long-term consequences. Educating one team (65.4%) or multiple teams (46.8%) at a time regarding

concussion had the greatest outcome frequencies when asked about the environment concussion education is provided.

Conclusions: The majority of NCAA member institutions are providing concussion education to student-athletes. However, adherence to the NCAA Concussion Education Policy and Legislation appears to still be a concerning issue. Substantial heterogeneity with content and delivery method of concussion education among member institutions was not unexpected, due to the limited requirements and guidelines set by the NCAA Concussion Education Policy. NCAA member institutions whom provide concussion education appear to use material created by the NCAA. Future research should evaluate the current concussion education practices reviled in the present study for effectiveness. After evaluation of current concussion education practices, the creation of improved concussion education policies can commence.

INDEX WORDS: Concussion, Concussion Education, NCAA, Dissemination and implementations, Student-athlete health education, Concussion Policy

CURRENT CONCUSSION EDUCATION PRACTICES IN NCAA MEMBER INSTITUTIONS: A

DESCRIPTIVE STUDY

by

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B.S., Grand Valley State University, 2014

M.S., Georgia Southern University 2016

A Thesis Submitted to the Graduate Faculty of Georgia Southern University

Partial Fulfillment of the Requirements of the Degree

MASTERS OF SCIENCE

STATESBORO, GEORGIA

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DESCRIPTIVE STUDY

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Electronic Version Approved:
May 2016

DEDICATION

Throughout life my family has consistently been there, supporting my passions in life. Without their love and support, I would not be where I am today. My mother and father have always pushed my brother, Drew, and I to fight for what we want in life. At times when obstacles came in the way of our dreams, they advised us to find a way. By listening to their advice, I have learned what it means to succeed. Succeeding is not being the best, it is being *your* best. To be the best *you* can be one must realize that everything happens for a reason, and to never give up. During this project there were plenty of times where I needed strength, and because of my family, I feel like succeeded. Therefore, I would like to dedicate this work to my parents and brother.

Always remember where you came from. This is a phrase that I have heard over and over again. When I started my undergraduate work, I had no idea what it meant to work hard. What I did know is that I was self-driven, and wanted to get a good education. Once I started the Athletic Training program at Grand Valley State University, I quickly came to the realization that college was not going to be easy. The professors expected a lot out of their students, and knew how to push us to work harder than we ever thought. Having multiple overnight study parties in the library after being at clinical rotations all day, was not out of the norm. I will never forget how hard we had to work, and how much our professors and preceptors cared. Without my undergraduate experience, I would not be as prepared to work as hard as I have on this project. I would like to thank my professors and preceptors from Grand Valley State University for preparing me to succeed not only in graduate school, but in the profession I love as well.

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This project would not have been possible without the members of my committee. I feel very fortunate that each of the committee members agreed to use their specialties in helping me create, and complete this project. Each of them expected a lot out of me, and I appreciate their diligence. With their input and guidance, I was able to put together a project that I am proud of. Therefore, I would like to first acknowledge the members of my committee.

Secondly, I would like to acknowledge the Athletic Trainers whom participated in this study. Without their participation, and ambition to protect the health and wellbeing of student-athletes, this project would not have been possible.

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CHAPTER 1

INTRODUCTION

Concussion is defined as any temporary neurologic dysfunction following a biomechanical force placed upon the head or body.¹ The mechanism of injury of a concussion stems from the definition. According to the National Athletic Trainers' Association (NATA), concussions arise when a force is applied directly or indirectly to the skull that results in the rapid acceleration and deceleration of the brain.² An estimated 1.6 to 3.8 million sport-related concussions occur in the United States annually.³ These rates are grossly underreported as the majority of concussion injuries are not reported.⁴ This information can lead to the understanding that athletes are unaware of what a concussion is, and the associated risks.

Healthcare clinicians trained in the assessment and management of concussion, use a multifaceted approach in evaluating patients with a possible concussion.^{2,5,6} A multifaceted approach would include graded symptoms checklist, balance, pupillary reaction, and cranial nerve examination. It is crucial that the evaluator be trained in concussion assessment and management. Once the diagnosis of a concussion is made, it is in the best interest of the patient to not return to athletic participation that day.²

Unfortunately, the diagnosis and safe care of a patient with a concussion relies on patient honesty, appropriate knowledge, and attitude regarding concussion. In 2005, LaBotz et al. conducted a study finding 71% of collegiate athletes failed to report their concussion symptoms to an appropriate healthcare professional.⁷ Similarly in 2015, Delaney et al. found that 78.3% of their collegiate athletes who believed they sustained a concussion also failed to report their symptoms to an appropriate healthcare professional.⁸ Delaney et al. also found

collegiate athletes were not reporting their symptoms because they did not believe the injury was severe enough, and they could continue to participate without risk of further harm.⁸ Another explanation for these studies findings is student-athletes do not have the appropriate knowledge of concussion symptoms or long-term consequences.^{9,10}

With student-athletes failing to report and recognize concussion symptoms, they could return to participation prematurely. Failing to recognize and report concussion-like symptoms can predispose patients to short and long-term consequences, or even further catastrophic injury such as death.^{1,2,6} Examples of short term consequences include further neuronal injury (cranial nerve impairments), coma, and death.¹ Examples of these long-term consequences included increase risk of depression¹¹, motor system abnormalities¹², abnormal mineral build up in brain tissue¹³, and memory problems.¹⁴ Motor system abnormalities include decelerated motor execution, balance problems, and abnormal motor cortex excitability.¹² These critical findings highlight the impact and importance that concussion education plays in preventing premature return to participation after concussion.

Sports medicine healthcare providers should be providing appropriate education on concussion to their patients prior to the start of their respective sport.^{2,15} Providing concussion education should be used as a prevention strategy to decrease the likelihood of premature return to participation. Due to patients failing to recognize and report concussion-like symptoms, proper education could lead to earlier recognition and prevent further catastrophic injury. However many studies have found student-athletes still have insufficient knowledge when it comes to head injury.^{4,8-10} Other reasons why concussion symptoms go underreported is due to patients not believing concussions are a serious injury, and therefore could continue

without risk of further injury.⁸ With knowledge being an important factor related to underreporting concussion symptoms, it is crucial to increase concussion knowledge in patients.

The National Collegiate Athletic Association (NCAA) assists in providing concussion education to participating NCAA institutions. They provide concussion educational materials for sports medicine clinicians to use while implementing concussion education within their institutions.¹⁶ This provided educational material includes videos, action plans, posters, and facts sheet.¹⁷ In the *2013-14 NCAA Sports Medicine Handbook*, the NCAA Concussion Policy and Legislation was released.¹⁸ This mandate stated all NCAA member schools have to provide annual concussion education to all student-athletes.¹⁸ However, this policy does not restrict member institutions from using non-NCAA sanctioned concussion educational tools/materials. This allows the member institutions to take an individual approach to concussion education.

With this policy and legislation being released, compliance with this mandate is brought to the forefront of research. Baugh et al. found 70.8% of NCAA member institutions provide concussion education to their student athletes.¹⁵ The authors of this NCAA concussion policy compliance study also found 15.6% of NCAA member institutions only provide concussion education to contact collision sports.¹⁵ Evidence of non-compliance in NCAA member institutions regarding concussion education practices, may have an impact on the self-reporting rate of concussion in student-athletes. Research has found failing to report concussion symptoms can predispose the patient to short and long term consequences, including death.^{1,2,6} Therefore, this major compliance issue may have a direct effect on the safety and well-being of the student-athletes.

Another major concern with this policy is there are no requirements on content, delivery and evaluation of concussion education. This fact along with the findings from Baugh et al.¹⁵, raise concern to what current concussion education practices are at NCAA member institutions. Without documentation of what current concussion education practices in NCAA institutions are, there is no way to evaluate them for effectiveness. By not evaluating these current practices for effectiveness, there is no way of knowing if there are gaps in the education or if it is being delivered appropriately. Currently there is no documentation to how, where and when concussion education is provided to student-athletes at NCAA member institutions. With this knowledge, current concussion education practices can be evaluated and the creation of improved concussion education policies can commence.

PURPOSE

To investigate concussion education implementation methods across NCAA Division I, II and III.

RESEARCH QUESTIONS

The following research questions will be asked to provide basis for the discussion:

- a) Do NCAA member institutions provide concussion education to their student-athletes?
- b) Do NCAA member institutions provide concussion education to all of their student-athletes?
- c) Do NCAA member institutions use the concussion education material created by the NCAA?
- d) Do NCAA member institutions only use the concussion education material created by the NCAA?

- e) Do NCAA member institutions differ in concussion education content and delivery methods?
- f) Do NCAA member institutions differ in reporting limitations or barriers to providing concussion education?

HYPOTHESES

The following hypotheses were constructed off the preceding research questions:

- 1) H_A: NCAA member institutions do not provide concussion education to all student-athletes.
 H_O: NCAA member institutions do provide concussion education to all student-athletes.
 - a) H_A: There are Division level differences when reporting providing, or not providing concussion education to student-athletes.
 H_O: There are no Division level differences when reporting providing, or not providing concussion education to student-athletes.
- 2) H_A: NCAA member institutions provide concussion education only to contact/collision sports.
 H_O: NCAA member institutions do provide concussion education to all sports.
 - a) H_A: There are Division level differences when reporting providing concussion education only to contact/collision sports.
 H_O: There are no Division level differences when reporting providing concussion education only to contact/collision sports.
- 3) H_A: NCAA member institutions provide concussion education material created through the NCAA.

H_0 : NCAA member institutions do not provide concussion education material created through the NCAA.

a) H_A : There are Division level differences when reporting providing concussion education created through the NCAA.

H_0 : There are no Division level differences when reporting providing concussion education created through the NCAA.

4) H_A : NCAA member institutions only use concussion education material created through the NCAA.

H_0 : NCAA member institutions do not only use concussion education material created through the NCAA.

a) H_A : There are Division level differences when reporting providing only concussion education material created through the NCAA.

H_0 : There are no Division level differences when reporting providing only concussion education material created through the NCAA.

5) H_A : NCAA member institutions differ in concussion education content and delivery methods.

H_0 : NCAA member institutions administer the same concussion education content and method of delivery.

6) H_A : There are Division level differences when reporting limitations and barriers to providing concussion education.

H_0 : There are no Division level differences when reporting limitations and barriers to providing concussion education.

CHAPTER 2

LITERATURE REVIEW

DEFINITION OF CONCUSSION

According to the Zurich Consensus Statement on Concussion in Sport, a concussion is defined as a temporary neurologic dysfunction as result of a biomechanical force applied to the head or body.⁶ While the definition of a concussion has been debated^{2,5,6,19}, all definitions mention that concussion is a functional injury which begins a complex pathophysiological process.

EPIDEMIOLOGY OF CONCUSSION

Concussions are a major public health issue, which has been highlighted in the media. An estimated 1.6 to 3.8 million sport-related concussions occur annually in the United States.³ Hootman et al. found concussion represents 5% of all injuries in NCAA member institutions.²⁰ That rate of concussive injury is also supported by Gessel et al., whom reported concussions make up 5.8% of all collegiate injuries.²¹ Epidemiology studies present rates based on reported concussions, which may be an inaccurate representation due to self-reporting behavior. In 2005, LaBotz et al. reported only 71% of their participants failed to report their concussion.⁷ Similarly in 2015, Delaney et al. found 78.3% of their participants who believed they sustained a concussion, did not report their symptoms.⁸ With more than half of the concussions that occur in the United States each year going unreported, the exact rates are unknown.

Higher rates of concussion have been reported in college-aged athletes versus youth athletes^{22,23}. This may be due to being in a higher competitive level, and increase strength training regimens as compared to high school athletics. With participating in strength and

conditioning programs, athletes who participate in contact or collision sports may be enduring greater forces during competition. On the contrary, a descriptive epidemiologic study conducted by Gessel et al. found high school-aged athletes have the higher rate of concussion²¹. Nonetheless, concussive injuries have been documented within all age levels.

High school and college-aged females are at greater risk for concussion than males^{21,24,25}. These rates are found through reported concussions, which could be skewed. Females may be more honest about reporting their concussion symptoms than males²⁶, which could account for the differences in concussion rates between males and females.

Researchers have reported an estimated 0.43 concussions per 1,000 athlete exposures (AEs).^{21,27} Sport and sport requirements are risk factors of concussion. An estimated 0.61 concussions per 1,000 AEs occur in collegiate football.²⁷ Other studies have reported football accounts for 47.1% of all concussions.^{21,25,27,28} The sport requirements of football may be an explanation for football having the highest rate of concussion. During football the athlete will be put in a position to either tackle or be tackled. Marar et al. found 70.3% of concussive injuries come from player-to-player contact.²⁷ A recent epidemiological study of concussions in NCAA football, stated the rate of concussions is about 0.39 per 1,000 AEs.²⁹ This rate is slightly lower than previous reports^{21,27}, which may be due to a possible increase in underreporting rates.⁸

ASSESSMENT AND DIAGNOSIS OF CONCUSSION

Assessment and diagnosis of a concussion is performed by a properly trained healthcare clinician (ATCs, DOs, MDs). During the assessment the clinician may administer brief neurocognitive exams such as the Standardized Assessment of Concussion (SAC)³⁰ or the Sport

Concussion Assessment Tool 3 (SCAT3). Diagnostic tools are designed to ensure a multifaceted approach is being used while assessing for concussion. Without the use of a multifaceted approach, the patient could return to participation prematurely and sustain a catastrophic injury. Graded symptoms checklists, balance, pupillary reaction and cranial nerve examinations are also involved in the assessment of a concussion. Once the diagnosis of a concussion is made, it is in the best interest of the patient to not return to athletic participation.²

SIGNS AND SYMPTOMS OF CONCUSSION

During the assessment of a head injury, the evaluator will be looking for specific signs that may indicate concussion. Concussion signs are believed to be a result of the neurometabolic cascade that occurs immediately post-concussion.^{1,31} Loss of consciousness is considered to be a sign of concussion, but is not required in order to diagnose.^{1,31} Other signs of concussion include impaired balance, anterograde/retrograde amnesia, delayed verbal and motor responses, emotional changes, and visual and sleep disturbances.⁵

Concussion symptoms are believed to be a result of the neurometabolic cascade that occurs immediately post-concussion.^{1,31} Concussion symptoms typically last 7-10 days¹, however can persist for extended periods of time if not treated appropriately.³² Collins et al. describes after 7 days post-injury, the symptoms tend to fall into clinical trajectories which can be utilized in determining best course of treatment to enhance concussion recovery.³²

The onset of concussion symptoms and cognitive impairment may be delayed.⁶ This is another reason why clinicians must rely on a multifaceted approach when evaluating for concussion. Without clinician reliance on using a multifaceted approach when assessing for concussion, athletes are at a greater risk for premature return to participation. Premature

return to participation can increase the athlete's risk of long-term consequences, or even further catastrophic injury such as death.^{2,6} Examples of these long-term consequences include increase risk to depression¹¹, motor system abnormalities¹², chronic traumatic encephalopathy¹³, and dementia-related syndromes.¹⁴

CHRONIC TRAUMATIC ENCEPHALOPATHY

Chronic Traumatic Encephalopathy (CTE) has been a documented issue since the 1920s, and was commonly referred to as "dementia pugilistica".³³ This condition is a neurodegenerative disease associated with repetitive brain trauma. This condition had only been documented with athletes who competed in the sport of boxing.³³ McKee et al. documented finding CTE in former professional football athletes in 2009.¹³ This neurodegenerative disease has more recently been documented in other contact sports as well.³⁴⁻³⁷ Currently there is no way to diagnose this condition before death.

DEPRESSION

Depression is a mood disorder which may have a connection in those who have sustained multiple concussions. Guskiewicz et al. found there was a correlation between recurrent concussion and depression.¹¹ In this sample of former professional football athletes, those who reported three or more concussions were found to be three times more likely to be diagnosed with clinical depression.¹¹ This emphasizes that there are neurological consequences with sustaining multiple concussions.

DEMENTIA-RELATED SYNDROMES

Recurrent concussion can lead to dementia-related syndromes such as mild cognitive impairment (MCI), and memory impairment such as Alzheimer's disease.¹⁴ Researchers have

found decreases with mental health over time in former professional football athletes.^{14,38} Guskiewicz et al. found a significant relationship between multiple concussions and clinically (P=0.02) MCI, as well as self-reported (P=0.001).¹⁴ Participants reporting having memory impairment also had an earlier onset of Alzheimer's disease, as compared to the general public.¹⁴ Most common sample populations used in research related to concussion and dementia-related syndromes are former professional football athletes.¹⁴

MOTOR SYSTEM ABNORMALITIES

Balance and vision can be affected immediately post-concussion, and are evaluated by the healthcare clinician trained in the management and assessment of concussion. Balance and vision play a significant role in the postural control, however balance is not the same as postural control. Balance refers to the state of the body when the subsequent forces/moments applied to the body are zero.³⁹ Postural control is defined as the action of sustaining, attaining or reestablishing a state of balance throughout various postures or activities.³⁹ De Beaumont et al. conducted a study to determine if there are persistent motor system abnormalities in athletes who have sustained a concussive injury.¹² Participants who had sustained a concussion more than nine months prior to the study, were found to have alterations in postural control.¹² These results support previous literature on motor system abnormalities post-concussion.^{40,41}

CONCUSSION KNOWLEDGE IN STUDENT-ATHLETES

Although any student-athlete who sustain a concussion immediately exhibit signs and symptoms of the injury visible to others. Assessment is reliant on the student-athlete to self-report concussion-like symptoms. In order for this to occur, the student-athlete must have a basic understanding of how to recognize signs and symptoms of concussion. Self-reporting

concussion-like symptoms can prevent premature return to participation. Long-term consequences or even further catastrophic injury such as death can occur due to premature return to participation.^{2,6}

Concussion symptoms such as being more emotional, personality change, increased nervousness or anxiousness, and trouble falling asleep were under-recognized in a cross-sectional survey study of high school varsity football student-athletes.¹⁰ Fedor and Gunstad found 70% of collegiate student-athletes selected a distractor symptom to be that of a concussion.⁴² Distractor symptoms were those not of concussion symptoms. Another collegiate sample demonstrated lack of knowledge of short and long-term consequences of concussion.⁹ Without the appropriate concussion symptom knowledge, student-athletes are not able to recognize and report concussion-like symptoms.

One reason for the lack in concussion symptom knowledge is student-athletes are not being educated about concussion. Cournoyer et al. reported only 60% of their cohort of high school varsity football players received concussion education.¹⁰ Similarly, Baugh et al. reported 70.8% of NCAA member institutions provided concussion education¹⁵, despite an NCAA rule mandating concussion education for all students-athletes. With both the lack of concussion symptoms knowledge and concussion education, student-athletes are at great risk of premature return to participation.

ATTITUDES ABOUT CONCUSSION IN STUDENT-ATHLETES

Athletes have insufficient knowledge when it comes to head injury.^{4,8-10} Other reasons why concussion symptoms go underreported is due to patients not believing concussions are a serious injury, and therefore did not wish to be removed from the game.⁸ Register-Mihalik

reported a strong association between concussion reporting behaviors with concussion knowledge and attitude towards concussion.⁴³ There are strong implications for furthering concussion knowledge in patients to change attitudes towards concussion, and prevent further catastrophic or long-term injury.

Attitudes toward concussion play a significant role in concussion reporting. Attitude is one of three variables of intention used in the Theory of Planned Behavior. Kroshus et al. used a survey examining all three of these variables in hopes to understand concussion reporting through the Theory of Planned Behavior.⁴⁴ The authors found attitude towards concussion play a huge role in intention to self-report concussion symptoms.⁴⁴ Intention is the driver of behavior.⁴⁵ With the knowledge of there being a negative attitude towards concussion in student-athletes, this helps explain why the rates of self-reporting concussion symptoms are low.

CURRENT CONCUSSION EDUCATION MATERIAL

Education as a means for prevention has been used throughout the public health field. Sports medicine clinicians should provide appropriate concussion education to student-athletes annually.^{2,15} With knowledge of student-athletes failing to recognize and report concussion-like symptoms, proper education can lead to earlier recognition and prevent further catastrophic injury.

Educational interventions have been developed to aid in changing the athletes' attitudes about concussion, and providing appropriate concussion knowledge. Current educational materials available include videos, action plans, posters, fact sheets, and classroom presentations.¹⁷ One of the more popular methods of education aiming to increase concussion

knowledge and awareness is the Centers for Disease Control's *Heads Up* initiative. *Heads Up* aims to further educate clinicians, high school coaches, youth sport coaches, school professionals, and parents.⁴⁶ There is no *Heads Up* initiative geared toward youth athletes. The purpose of the *Heads Up* initiative is to change the behavior and attitudes of those around the athlete.

Other current concussion education programs include ThinkFirst and Sports Legacy Institute Community Educators (SLICE) program.⁴⁷⁻⁴⁹ The ThinkFirst program uses videos and classroom presentations in providing concussion education. The SLICE program uses classroom presentations and guest speakers that discuss the consequences of concussion. The purposes of both of these educational programs are to increase awareness and knowledge of concussion.

The National Collegiate Athletic Association (NCAA) provides fact sheets, posters, and videos to sports medicine clinicians to aid in the providing of concussion education to student-athletes.¹⁶ The fact sheet defines concussion, signs and symptoms of concussion, and prevention of concussion. The one page handout discusses what the student-athlete should do if he or she suspects they or one of their teammates has a concussion. A poster made available by the NCAA lists common signs and symptoms of a concussion and is intended to be posted in areas where student-athletes will see it (i.e. locker rooms, athletic facilities, athletic training clinics). The concussion video produced by the NCAA discusses what a concussion is, the signs and symptoms of a concussion, how to prevent a concussion, and what to do if a concussion is suspected.

EFFECTIVENESS OF AN EDUCATIONAL INTERVENTION ON CONCUSSION

Bramley et al. conducted a study which examined if concussion education would change self-reporting behavior of concussion symptoms.⁵⁰ The study reported student-athletes with previous concussion education were more likely to notify their coach of their concussion symptoms, than those who did not have previous concussion education.⁵⁰ On the contrary, Kroshus et al. found no significant change in reporting behavior after receiving concussion education.⁵¹

Concussion education programs may lead to short-term increases in concussion knowledge. Echlin et al. evaluated two concussion educational programs, a DVD and a computer-based module.⁴⁷ Immediate increases in concussion knowledge scores for both educational models was observed.⁴⁷ Similarly, Cusimano et al. found immediate increases in concussion knowledge scores after showing a concussion educational video.⁵² Cusimano et al. retested their subjects two months after receiving the concussion educational video, and reported there were no significant differences between the two-month posttest and pretest concussion knowledge scores.⁵² The immediate effect of concussion education, increases in concussion knowledge scores, appears to decrease over time.

Improving concussion knowledge scores may be an incorrect way of measuring educational program effectiveness. Kroshus et al. elaborates on this idea in a study evaluating NCAA concussion education intentions in ice hockey.⁵³ The authors find current NCAA concussion education guidelines are not effectively changing behavior towards concussion reporting.⁵³ Many educational programs aim at improving concussion knowledge, which is not

enough. Current concussion education programs are not built within the constructs on the Theory of Planned Behavior; which may be a better method of changing behavior.

POTENTIAL METHODS FOR CONCUSSION EDUCATIONAL INTERVENTION IMPROVEMENT

KNOWLEDGE TRANSFER PRINCIPLES AND CONCUSSION EDUCATION

A main goal of concussion education would be improving the rate of self-reported concussion-like symptoms in student-athletes. Researchers have found student-athletes with concussion symptoms are not reporting them to the appropriate healthcare provider in both the high school and collegiate settings.^{4,8} One conclusion why these student-athletes do not report their concussion symptoms is because they lack concussion knowledge. Knowledge transfer (KT) principles have been proposed to be the missing link for improving concussion education.⁵⁴

In developing concussion educational programs, while understanding student-athletes have different strengths and weaknesses in intelligence, is a crucial step in effective KT. In a recent qualitative literature review by Providenza et al. states using KT models and theory of multiple intelligences, can help identify gaps in concussion knowledge as well as create effective concussion educational programs.⁵⁵ By using KT, creators of concussion educational programs can increase concussion awareness, and evaluate educational programs. This is how concussion education can evolve and grow in effectiveness.

A qualitative literature review by Providenza and Johnston discusses the principles of KT and how they can be applied to concussion education.⁵⁴ In this review it is made clear coaches play an important role in concussion education.⁵⁴ Coaches do play a major role in the growth and success of student-athletes, hence the reason why coaches are seen as the

educators in the athletic realm. This may be an underlying cause in why student-athletes return to play while symptomatic. A survey examining concussion knowledge in youth sport coaches by Valovich-McLeod et al. found there are many misunderstandings regarding concussion⁵⁶. Including coaches in the target audience, as well as part of the message delivery team, may be beneficial in creating effective concussion education programs.

SURVEY RESPONSE RATES

Survey research is critical to many fields worldwide, in which many methods have been created. Survey response rate directly effects the generalizability of the results. One widely used method is Dillman's "Tailored Design Method."⁵⁷ This method has been used widely throughout the social sciences.⁵⁸ This methodology is built on the social-exchange theory. This theory states that people are more likely to engage in behaviors that seem satisfying, and are less likely to employ behaviors that appear costly.⁵⁹ This method has been utilized to increase the response rates of mail, and online surveys.⁵⁸ Dillman discusses the survey is not the determinant of response rate.⁵⁷ The determinant of response rate is how the survey is distributed.⁵⁷

Dillman's method includes sending (1) an preliminary email notifying the study's subjects of an upcoming survey they will be receiving; (2) an recruitment email with a link to the online survey; (3) reminder emails to the subjects who have not responded, send at two week intervals; and (4) a final reminder email stating this is the non-respondent's last opportunity to respond.⁵⁷ By following this method, increased response rates should be obtainable in survey research.

SPORT CLASSIFICATIONS

Sports have varying requirements on the student-athletes participating. These requirements play a role in the level of contact within each sport. The NCAA classifies sports based on the probability of impacts or collisions experience by the participants.¹⁸ The contact can be from another player, equipment, and/or the ground. An example of equipment would be the diver colliding with the diving board. Contact/Collisions sports are at the highest risk for impacts delivered to the student-athletes. Examples of NCAA contact/collision sports include: field hockey, football, ice hockey, lacrosse, pole vault, skiing, soccer, wrestling, baseball, basketball, diving, gymnastics, softball and water polo.¹⁸ Limited contact sports are at moderate risk for impacts delivered to student-athletes. Examples of NCAA limited contact sports include: bowling, cross country, fencing, golf, rifle, swimming, tennis, track and field, beach volleyball and volleyball.¹⁸ Non-contact sports include sports without the risk of impacts or collisions delivered to the student-athlete. The NCAA does not recognize any of their sports as non-contact.¹⁸

NCAA CONCUSSION EDUCATION RECOMMENDATIONS

The most recent NCAA Sports Medicine Handbook states all student-athletes must receive annual concussion education.¹⁸ In 2010, the NCAA mandated all member institutions provide annual concussion education to all student-athletes.¹⁸ Institutions are further required to have a written concussion management policy.¹⁸ A recent cross-sectional survey by Baugh et al. examined compliance with the NCAA concussion policy, and reported only 70.8% of respondents had an existing annual concussion education policy.¹⁵ These authors also reported 15.6% of NCAA member institutions provided annual concussion education to only student-

athletes in contact or collision sports.¹⁵ The reasons behind the non-compliance are unknown. One reason may be the NCAA does not provide requirements on the content that needs to be used in the educational programs. Without requirements on content, institutions may not understand what information should be provided in regard to concussion. A second reason may be that the NCAA does not provide requirements on delivery method of concussion education. Without requirements on delivery method, institutions may not have the knowledge of how to appropriately provide the concussion education. Other reasons in regard to this non-compliance may be due to various limitations/barriers to providing concussion education; such as time, and availability of concussion education materials. Currently, the NCAA does not have a procedure in place to examine the effectiveness of the concussion education.

FORMAT AND CONTENT OF CONCUSSION EDUCATION IN NCAA MEMBER INSTITUTIONS

The NCAA Concussion Education Policy does not set requirements, nor provides guidelines to the format in which concussion education should be provided. This policy also does not set requirements, nor provides guidelines to the content to be included in concussion education. By not setting requirements or providing guidelines, the NCAA leaves interpretation of this policy to each individual member institution. Recent work by Kroshus and Baugh examined what format, and content is being provided in NCAA member institutions.⁶⁰

Current concussion education is provided in various formats, such as; videos, action plans, posters, fact sheets, and classroom presentations.¹⁷ The NCAA does not regulate which format their members choose to implement. Kroshus and Baugh found 73.2% of NCAA member institutions use written materials to provide concussion education to student-athletes.⁶⁰

Whether these written materials were NCAA or non-NCAA created concussion education

material was not reported. Kroshus and Baugh also discovered 29.3% of NCAA member institutions use a video to provide concussion education to student-athletes.⁶⁰ This study did not report if the video(s) were NCAA or non-NCAA created concussion education material. Although it is beneficial to know what formats are used in providing concussion education, what concussion educational materials are being used by NCAA member institutions is still a mystery.

As previously mentioned, the NCAA Concussion Education Policy provided little guideline to what content should be included in concussion education. A recent study shows among NCAA member institutions whom provide concussion education, educating student-athletes on the symptoms of a concussion was the highest reported content area (96.4%).⁶⁰ While educating student-athletes on the symptoms of a concussion is a positive step, the long-term consequences of concussion may be more beneficial at changing attitudes towards self-reporting these symptoms. Prior research with collegiate student-athletes demonstrated lack of knowledge of short and long-term consequences of concussion.⁹ Kroshus and Baugh reported only 72.8% of NCAA member institutions are educating student-athletes on the long-term consequences of concussion.⁶⁰ Educating student-athletes on various content areas of concussion may help early recognition and diagnosis.

CHAPTER 3

METHODS

PARTICIPANTS

A convenience sample of athletic trainers who work at NCAA member institutions was used in this study. These athletic trainers was contacted via email to complete the survey. All email addresses were collected off each institutions athletic directory web page and categorized by division level. The target population was all NCAA member head athletic trainers. However, not all institutions had an athletic directory web page. Therefore a convenience sample was used, consisting of all the institutions with a listed athletic trainer on their athletic directory web page. From each sought out participating institution, only a single athletic trainer's response to the survey was evaluated. The athletic trainers identifying as the head of the sports medicine department (Director of Sports Medicine, Head Athletic Trainer, Assistant Athletic Director of Sports Medicine, or Associate Athletic Director of Sports Medicine) were the primary person of contact. The head of the sports medicine department was sought out because they will most likely have the best knowledge of their concussion education policy. If the athletics' directory page does not list a head of the sports medicine department, the first listed assistant/associate athletic trainer was the person of contact.

The current study consisted of respondents from NCAA divisions I, II and III. Obtaining current concussion education practices aided in creating an accurate picture of what NCAA member institutions are implementing, with regard to concussion education. This assisted in the representation, and comparison between NCAA divisions. There are currently 1,281 NCAA member institutions. With web-based survey research, the desired response rate is between

25-30%.⁵⁸ The researchers desired a 30% response rate, based upon prior survey research response rates within NCAA member institutions reaching 30%.¹⁵ The participants in the survey were voluntary, and there was no reward or compensation for completing the survey.

INSTRUMENTATION

This study collected data via an online survey. The developed survey was named the survey the Current Concussion Education Practices Questionnaire (CCEPQ). The CCEPQ aimed at discovering and gathering information regarding concussion education practices at NCAA member institutions. The CCEPQ was developed with the Qualtrics© 2015 software (Qualtrics, Version May 2015, LLC; Provo, Utah). This survey software allowed the researchers to send reminders to those institutions who have not completed the survey. Each institution received an individualized survey link, which allowed the survey to be completed once. This ensured no more than one response is accounted for at each contacted institution.

Content validity was found for each survey item (see Table 1: Current Concussion Education Practices Questionnaire (CCEPQ) utilized to establish Item-Level Content Validity). This was done by discovering each item-level content validity index (I-CVI). In 1986, Lynn suggested I-CVIs no lower than 0.78 be assumed to have sufficient content validity.⁶¹ For example, with five raters, there could be one not relevant/clear rating and still have an I-CVI of 0.80. With four raters, and one not relevant/clear rating, the I-CVI would drop below the suggested 0.78. Therefore, this survey consisted of five content experts review each survey item and rate its relevance and clarity (see Appendix B: Introduction and Direction Letter to the Content Jury). Survey items with a found I-CVI of below 0.80 were discarded, or revised (see Table 2: Item-Level Content Validity results from the Current Concussion Education Practices

Questionnaire (CCEPQ)). Demographic questions were not discarded if found to have an I-CVI of below 0.80. This survey was pilot tested. The pilot group consisted of current athletic trainers who work at a NCAA member institution, whom do not identify as the head of the department. The pilot group consisted of non-department heads so the particular NCAA member institution could be included in the final survey.

Table 1: Current Concussion Education Practices Questionnaire (CCEPQ) utilized to establish Item-Level Content Validity

Demographics	
1	What is your sex?
2	What is your age?
3	Are you a Board of Certification (BOC) certified Athletic Trainer?
4	What is your job title?
5	How long have you been in this position?
6	Are you an Athletic Trainer at an NCAA member university?
7	What NCAA Division is your university?
8	Are you aware of the NCAA Concussion Policy and Legislation Regarding concussion education?
Concussion Education Questionnaire	
9	Does your university provided concussion education?
10	To whom does your university's concussion education get provided to?
11	What sports are provided with concussion education at your university?
12	When does concussion education get provided to student-athletes at your university?
13	Where are the student-athletes when they receive your university's concussion education?
14	What is the environment in which concussion education is provided?
15	What topic areas of concussion are included in your university's concussion education?
16	What does your university do for concussion education?
17	How often is the concussion education provided to student-athletes at your university?
18	Does your university provided concussion education to their coaching staff?
19	Is the coaching staff present during the administration of the concussion education to student-athletes at your university?
Perceived Effectiveness of Concussion Education	
20	Your university's provided concussion education is effective.
Limitations/Barriers to Providing Concussion Education	
21	Where are the limitations or barriers that affect providing your university's concussion education?

Table 2: Item-Level Content Validity results from the Current Concussion Education Practices Questionnaire (CCEPQ)

Demographics		Relevancy	Clarity
1	What is your sex? *	60%	100%
2	What is your age?	100%	100%
3	Are you a Board of Certification (BOC) certified Athletic Trainer?	100%	100%
4	What is your job title?	80%	100%
5	How long have you been in this position?	80%	100%
6	Are you an Athletic Trainer at an NCAA member university?	100%	100%
7	What NCAA Division is your university?	100%	100%
8	Are you aware of the NCAA Concussion Policy and Legislation Regarding concussion education?	100%	100%
Concussion Education Questionnaire			
9	Does your university provide concussion education?	100%	80%
10	To whom does your university's concussion education get provided to?	100%	80%
11	What sports are provided with concussion education at your university?	100%	100%
12	When does concussion education get provided to student-athletes at your university?	100%	80%
13	Where are the student-athletes when they receive your university's concussion education? **	100%	60%
14	What is the environment in which the concussion education is provided?	80%	80%
15	What topic areas of concussion are included in your university's concussion education? **	80%	60%
16	What does your university do for concussion education? **	80%	60%
17	How often is the concussion education provided to student-athletes at your university?	100%	100%
18	Does your university provide the concussion education to their coaching staff?	80%	100%
19	Is the coaching staff present during the administration of the concussion education to student-athletes at your university?	100%	100%
Perceived Effectiveness of Concussion Education			
20	Your university's provided concussion education is effective.	80%	80%
Limitations/Barriers to Providing Concussion Education			
21	What are the limitations or barriers that affect providing your university's concussion education?	100%	100%

Note. Percentages on the right side of the table represent the percentage of content experts rated the survey item clear or relevant. *Item 1 was kept even though it did not reach appropriate relevance. This decision was made due to item 1 being a demographic question. ** Items 13, 15 and 16 did not meet appropriate clarity. These items were reworded for clarity.

The Current Concussion Education Practices Questionnaire (CCEPQ) consists of four sections. The survey begins with a brief demographic questionnaire (see Table 3: Final Draft of Current Concussion Education Practices Questionnaire (CCEPQ)). In this section the respondent informed the researchers they meet the inclusion criteria. The inclusion criteria consisted of being a certified athletic trainer, and working at an NCAA member institution. Which NCAA division the respondent's institution is, and if the respondent is aware of the NCAA Concussion Policy and Legislation regarding concussion education was collected in the demographics section. Other information collected was job title, and years held in position title. The second section of the survey consisted of questions relating to concussion education practices at the respondent's institution (see Table 3: Final Draft of Current Concussion Education Practices Questionnaire (CCEPQ)). The questions "Does your institution provide concussion education?", and "To whom does your institution's concussion education get provided to?" were used to answer the first hypothesis. The question "Athletes in which sports are provided with concussion education at your institution?" is answered by selecting groups of sports rated on level of contact during participation. These include contact or collision, limited contact, and non-contact sports. This question assisted in answering the second hypothesis. The question "What method(s) are used to educate student-athletes about concussion at your institution?" were used to answer the third and four hypothesis. Other questions related to concussion education environment, time of administration, and concussion information being provided were asked in order to report what current concussion education practice are in NCAA member institutions. The third section consisted of one question asking the respondent to rate their perceived effectiveness of their institutions concussion education (see Table 3: Final Draft of

Current Concussion Education Practices Questionnaire (CCEPQ)). This question required the respondent to answer on a Likert-like scale ranging from 1 to 7, where 7 is strongly effective and 1 is strongly ineffective. The fourth section consisted of one question asking the respondent to report their perceived limitations, and/or barriers to providing concussion education at their institution (see Table 3: Final Draft of Current Concussion Education Practices Questionnaire (CCEPQ)). Respondents answered this by selecting response from a premade list, as well as having had the option to create their own list. The premade list included the selections; money, time, and lack of concussion education materials.

Table 3: Final Draft of Current Concussion Education Practices Questionnaire (CCEPQ)

<i>Demographics</i>	
1	What is your sex?
2	Are you a Board of Certification (BOC) certified Athletic Trainer?
3	Are you an Athletic Trainer at an NCAA member institution?
4	What NCAA Division is your institution?
5	What is your job title?
6	What is your age?
7	How long have you been in this position?
8	Are you aware of the NCAA Concussion Policy and Legislation Regarding concussion education?

<i>Concussion Education Questionnaire</i>	
9	Does your institution provide concussion education?
10	To whom does your institution's concussion education get provided to?
11	Athletes in which sports are provided with concussion education at your institution?
12	When does concussion education get provided to student-athletes at your institution?
13	Which area of campus are your student-athletes when they receive your institution's concussion education?
14	What is the environment in which the concussion education is given?
15	What information about concussion is provided to your student-athletes during your institution's concussion education?
16	What method(s) are used to educate student-athletes about concussion at your institution?
17	How often is the concussion education provided to student-athletes at your institution?
18	Does your institution provide the concussion education to their coaching staff?
19	Is the coaching staff present during the administration of the concussion education to student-athletes at your institution?

<i>Perceived Effectiveness of Concussion Education</i>	
20	Your institution's provided concussion education is effective.

<i>Limitations/Barriers to Providing Concussion Education</i>	
21	What are the limitations or barriers that affect providing your institution's concussion education?

PROCEDURES

The survey was administered via email to athletic trainers currently working at a NCAA member institution. This recruitment email introduced the primary investigator, and the topic of the current study (see Appendix C: Participant Recruitment Email). Within this email the athletic trainers were provided a link to the online survey. Passive consent was utilized for this study, and was obtained prior to the beginning of the survey (see Appendix D: Informed Consent of the Current Concussion Education Practices Questionnaire). The Dillman method was implemented in effort to obtain a sufficient response rate.⁵⁷ The Dillman survey distribution method includes:⁵⁷

- 1) A preliminary email notifying the study's subjects of an upcoming survey they will be receiving
- 2) A recruitment email with a link to the online survey
- 3) Two reminder emails to the subjects who have not responded, send at two week intervals
- 4) A final reminder email stating this is the non-respondent's last opportunity to respond

The athletic trainers received three reminders during the course of the study, in order to obtain highest response rate possible. The online survey was open from October 2015 to December 2015. This time frame was chosen due to the fact many fall sports will be in season. Therefore, there is a high likelihood the athletic trainers will be at the work place.

Due to inactive or incorrect email addresses collected, the researchers received an email stating email failure. When this occurred, the institution's athletic staff directory was used to

retrieve another athletic trainer's email address to be the point of contact for the specific institution. This ensured that efforts were made to obtain the largest sample possible.

DATA ANALYSES

Statistical Package for Social Sciences (SPSS) software version 21.0 was used for all analyses. Data was analyzed via nonparametric analyses. Nonparametric tests are used when nominal data is being collected.⁶² Nonparametric tests are performed when the outcomes are assumed not to be normally distributed.⁶² Therefore, nonparametric tests are referred to as distribution-free analyses.⁶² Utilizing the mode was most appropriate to extrapolate the results. The mode is a measure of outcome frequency, which better represented the way the three divisions answered each survey item. In a recent survey research study examining NCAA concussion policy management compliance, mode was also used as the measure of outcome frequency for each survey item.¹⁵ Respondent division level categorical differences across survey items (9, 10, 11, 14, 15, 16, and 21) was assessed with 2X3 chi-square test of independence. If a significant difference was found, 2x2 chi-square tests will be run to identify which division level is significantly different from the other division levels. Two-way chi square analyses are used to determine the probability the two categories are different from one another.⁶² This analysis was selected due to the collected data meeting the assumptions of chi square analyses; data collected via frequency measures, NCAA divisions are independent from one another, the expected and observed frequencies are equal, and the sample size will be sufficient.⁶² The alpha value of 0.05 was set a priori.

CHAPTER 4

RESULTS

SURVEY DISTRIBUTION AND RESPONSE RATE

Of the 1,281 NCAA member institutions, 1,078 of these surveys were successfully sent and received. 341 NCAA Division I institutions, 308 Division II institutions, and 434 Division III institutions were contacted by the researchers. A total of 34 survey responses were excluded secondary to being unfinished, or failed to meet the inclusion criteria. This left a total of 355 surveys which met the inclusion criteria (see Figure 1: Current Concussion Education Practices Questionnaire (CCEPQ) Distribution Flow Chart).

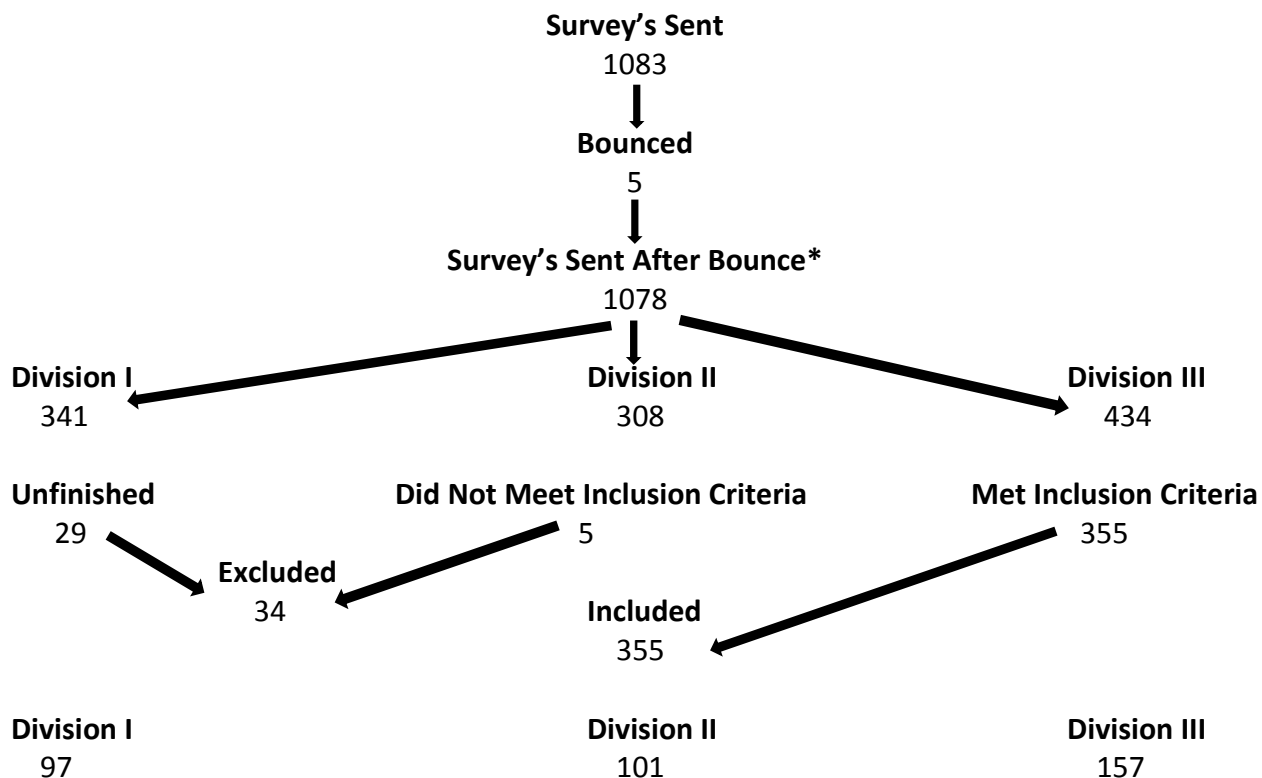


Figure 1: Current Concussion Education Practices Questionnaire (CCEPQ) Distribution Flow Chart *Note.* *When administering the initial recruitment email, email failure occurred from incorrect contact information. Therefore, another email address was collected from that institution. If email failure occurred a second time, that institution was not included in the distribution of the survey.

The desired response rate was 25-30%, based on expected response rates from web-based survey research.⁵⁸ This survey had a total response rate of 32.93% (355/1078). Almost each division reached 30% response rate (see Table 4: Current Concussion Education Practices Questionnaire (CCEPQ) Response Rate). Division I had a total response rate of 28.45% (97/341), which was the only division to not reach a 30% response rate. Therefore, 27.3% (97/355) of the survey responses are from Division I; 28.5% (101/355) of the survey responses are from Division II; and 44.2% (157/355) of the survey responses are from Division III.

Table 4: Current Concussion Education Practices Questionnaire (CCEPQ) Survey Response Rate

	Response Rate %	% of Entire Sample (N=355)
Total NCAA Respondents	32.93	100.00
Division I	28.45	27.30
Division II	32.79	28.50
Division III	36.18	44.20

RESPONDENT DEMOGRAPHICS

The majority of the respondents self-identified as male, 65.4% (232/355). The highest reported, 33.0% (117/355), age of the respondents was 40-50 years of age. 99.4% (353/355) of the respondents reported being a board certified athletic trainer. All, 100% (355/355), of the respondents reported being an athletic trainer at an NCAA member institution. Most of the respondents, 76.3% (271/355), selected Head Athletic Trainer was in their job title. The majority of respondents, 47.9% (170/355), have been in their selected job title(s) for 10 or more years. 98.6% (350/355) of the respondents stated they were aware of the NCAA Concussion Policy and Legislation regarding concussion education. 1.4% (5/355) of the respondents were not aware of this policy and legislation (see Table 5: Demographics of the CCEPQ Respondents).

Table 5: Demographics of the CCEPQ Respondents

Variable	Frequency	% of Sample (N=355)
Sex		
Male	232	65.4
Female	122	34.4
Chose Not To Answer	1	0.3
Age		
<20 Years of Age	0	0.0
20-29 Years of Age	35	9.9
30-39 Years of Age	115	32.4
40-50 Years of Age	117	33.0
>50 Years of Age	88	24.8
Board Certified Athletic Trainer		
Yes	353	99.4
No	2	0.6
Athletic Trainer at an NCAA Member Institution		
Yes	355	100.0
No	0	0.0
Job Title		
Associate Athletic Director	43	12.1
Director of Sports Medicine	85	23.9
Head Athletic Trainer	271	76.3
Associate/Assistant Athletic Trainer	12	3.4
Graduate Assistant Athletic Trainer	0	0.0
Intern Athletic Trainer	0	0.0
Years in Job Title		
5 or Less Years	116	32.7
5-10 Years	69	19.4
10 or More years	170	47.9
Aware of NCAA Concussion Education Policy		
Yes	350	98.1
No	5	1.4

Note. The data presented in this table were extracted from questions 1-3 and 5-8, of the demographics section of the Current Concussion Education Practices Questionnaire (CCEPQ) survey.

RECEIVERS CONCUSSION EDUCATION

When asked if subject's institution provides concussion education, 98.9% (351/355) of the respondents reported they do provide concussion education. However, all of the

respondents (355/355) completed questions about the concussion education provided at their institution (see Table 6: Receivers of Concussion Education at NCAA Member Institutions).

Table 6: Receivers of Concussion Education at NCAA Member Institutions

Variable	% of Sample (N=355)	% of Division I (N=97)	% of Division II (N=101)	% of Division III (N=157)
Provides Concussion Education				
Yes	98.9	100.0	99.0	98.1
No	0.8	0.0	1.0	1.3
Unsure	0.3	0.0	0.0	0.6
Receivers of Concussion Education				
Student-Athletes	97.2	100.0	95.0	96.8
Coaching Staff	90.7	95.9	89.1	88.5
Athletic Administration	62.0	77.3	52.5	58.6
Sports Medicine Staff	85.9	94.8	86.1	80.3
Unsure	0.3	0.0	0.3	0.0

Note. The data presented in this table were extracted from questions 9 and 10, of the concussion education questionnaire section of the Current Concussion Education Practices Questionnaire (CCEPQ) survey.

The majority, 97.2% (345/355), of the respondents reported their institution provided concussion education to student-athletes. 90.7% (322/355) of the respondents reported providing concussion education to their institution's coaching staff; and 62.0% (220/355) reported providing concussion education to the athletic administration. The sports medicine staff was reported receiving concussion education by 85.9% (305/355) of the respondents. 0.8% (1/355) of the respondents reported being unsure of who received their institution's concussion education (see Table 6: Receivers of Concussion Education at NCAA Member Institutions).

Providing concussion education to student-athletes was the highest reported group for all NCAA Divisions. All respondents from Division I (97/97) reported their institution provides concussion education to student-athletes. 95.0% (96/101) of Division II respondents stated

providing concussion education to student-athletes. 96.8% (152/157) of respondents from Division III reported providing concussion education to student-athletes (see Table 6: Receivers of Concussion Education at NCAA Member Institutions).

The results of the 2x3 chi-square analysis revealed no significant difference between division level and providing concussion education ($p=0.65$). The 2x3 chi-square analysis was also conducted to identify significant differences between division level and whom received concussion education. From these analyses there were no significant differences between division level and providing concussion education to student-athletes ($p=0.102$), or coaches ($p=0.119$).

The results of the chi-square analysis revealed a significant difference among Division I and Division II when reporting the athletic administration is provided concussion education ($p<0.001$, $\phi= -0.260$) (see Table 7: Cross Tabulation of NCAA Division I and II and Providing Concussion Education to the Athletic Administration). Therefore, a significantly greater proportion, 77.3% (75/97), of Division I respondents reported providing concussion education to their institution's athletic administration more than Division II, 52.5% (53/101). A significant difference was also observed among Division I and Division III when reporting that the athletic administration is provided with concussion education ($p= 0.002$, $\phi= -0.192$). Therefore, a significantly greater proportion, 77.3% (75/97), of Division I respondents reported providing concussion education to their institution's athletic administration more than Division III, 58.6% (92/157) (see Table 8: Cross Tabulation of NCAA Division I and III and Providing Concussion Education to the Athletic Administration). The chi-square analysis did not reveal a significant

difference between Division II and Division III when reporting providing concussion education to the athletic administration ($p= 0.333$).

Table 7: Cross Tabulation of NCAA Division I and II and Providing Concussion Education to the Athletic Administration

Providing Concussion Education to Athletic Administration	NCAA Institutions		χ^2	Φ
	Division I	Division II		
Yes	75 (3.7)	53 (-3.7)	13.363*	-0.260
No	22 (-3.7)	48 (3.7)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

Table 8: Cross Tabulation of NCAA Division I and III and Providing Concussion Education to the Athletic Administration

Providing Concussion Education to Athletic Administration	NCAA Institutions		χ^2	Φ
	Division I	Division III		
Yes	75 (3.1)	92 (-3.1)	9.331*	-0.192
No	22 (-3.1)	65 (3.1)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

The chi-square analyses revealed a significant difference among Division I and Division II when reporting providing concussion education to the sports medicine staff ($p= 0.038$, $\phi= -0.148$). Therefore, a significantly greater proportion, 94.8% (92/97), of Division I respondents reported providing concussion education to their institution's sports medicine staff more than Division II, 86.1% (87/101) (see Table 9: Cross Tabulation of NCAA Division I and II and Providing Concussion Education to the Sports Medicine Staff). A significant difference was also observed among Division I and Division III when reporting that the sports medicine staff is provided with concussion education ($p= 0.001$, $\phi= -0.203$). Therefore, a significantly greater proportion, 94.8% (92/97), of Division I respondents reported providing concussion education to their institution's sports medicine staff more than Division III, 80.3% (126/157) (see Table 10: Cross Tabulation of

NCAA Division I and III and Providing Concussion Education to the Sports Medicine Staff). No significant difference was seen between Division II and Division III when reporting providing concussion education to the sports medicine staff ($p= 0.224$).

Table 9: Cross Tabulation of NCAA Division I and II and Providing Concussion Education to the Sports Medicine Staff

Providing Concussion Education to Sports Medicine Staff	NCAA Institutions		χ^2	Φ
	Division I	Division II		
Yes	92 (2.1)	87 (-2.1)	4.324*	-0.148
No	5 (-2.1)	14 (2.1)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

Table 10: Cross Tabulation of NCAA Division I and III and Providing Concussion Education to the Sports Medicine Staff

Providing Concussion Education to Sports Medicine Staff	NCAA Institutions		χ^2	Φ
	Division I	Division III		
Yes	92 (3.2)	126 (-3.2)	10.493*	-0.203
No	5 (-3.2)	31 (3.2)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

TYPES OF SPORTS WHOM RECEIVE CONCUSSION EDUCATION

Student-athletes involved in contact or collision sports were the highest reported, 99.2% (352/355), type of sport whom receive concussion education across all divisions. Following contact or collision sports, 93.8% (333/355) of the respondents reported providing concussion education to limited contact sports. The majority, 85.9% (305/355), of the respondents reported providing concussion education to student-athletes participating in non-contact sports. Only 0.8% (3/355) of the respondents reported being unsure which types of sports receive concussion education (see Table 11: Types of Sport Provided with Concussion Education at NCAA Member Institutions).

Table 11: Types of Sport Provided with Concussion Education at NCAA Member Institutions

Types of Sport	% of Sample (N=355)	% of Division I (N=97)	% of Division II (N=101)	% of Division III (N=157)
Contact or Collision Sports	99.2	100.0	98.0	99.4
Limited Contact Sports	93.8	95.9	95.0	91.7
Non-Contact Sports	85.9	91.8	84.2	83.4
Unsure	0.8	0.0	2.0	0.6

Note. The data presented in this table were extracted from question 11 of the Concussion Education Questionnaire section of the Current Concussion Education Practices Questionnaire (CCEPQ).

2x3 chi-square analyses were ran to identify differences between division level and types of sport provided with concussion education. The results of the chi-square analyses revealed no significant differences was found between division level and whether or not concussion education is provided to contact or collision sports ($p= 0.292$), limited contact sports ($p= 0.340$), or non-contact sports ($p= 0.151$).

METHODS USED TO EDUCATE STUDENT-ATHLETES ABOUT CONCUSSION

The single page handout with concussion facts created by the NCAA was the highest reported, 85.9% (305/355), concussion educational method being used across all divisions. Following the NCAA concussion facts handout, 76.9% (273/355) of respondents reported using a general discussion between the student-athletes and athletic training staff in providing concussion education. Less than half, 39.2% (139/355), of the respondents across all divisions reported using the NCAA concussion education video as the method in which concussion education. Some, 11.3% (40/355), of the respondents stated having a general discussion between the student-athletes and the team physician in delivering concussion education. Few, 7.6% (27/355), of the respondents reporting using an interactive computer module to educate student-athletes about concussion. Following using an interactive computer module, 2.5%

(9/355) of the respondents stated having a general discussion between the student-athletes and a neurologist in delivering concussion education. Only 0.8% (3/355) of the respondents were unsure of the method(s) used to educate student-athletes about concussion (see Table 12: Methods used in Providing Concussion Education at NCAA Member Institutions).

From the respondents who selected “Other...” and listed a response in the text box available, were evaluated for similarities. Of the 47 respondents who selected “Other...”, 47 gave a reason in the text box available when selecting this option. Only 43 of these responses were reduced to additional options, based on similarities of responses. The remaining (4) responses were kept as those who selected “Other...”, which was 1.1% of respondents (4/355) (see Table 12: Methods used in Providing Concussion Education at NCAA Member Institutions).

Providing a handout created by the institution’s sports medicine staff was reported by 4.5% (16/355) of the respondents (16/355). Following a handout created by the institution’s sports medicine staff, 2.5% (9/355) of the respondents reported using a PowerPoint presentation to educate student-athletes about concussion. Using a non-NCAA created concussion education video was reported by 2.5% (9/355) of the respondents. Few, 1.1% (4/355), of the respondents stated having some sort of general discussion to provide concussion education. A presentation/lecture lead by the Head Athletic Trainer was reported by 0.8% (3/355) of the respondents. Only 0.6% (2/355) of the respondents stated using the Preston Plevretes video (see Table 12: Methods used in Providing Concussion Education at NCAA Member Institutions).

Table 12: Methods used in Providing Concussion Education at NCAA Member Institutions

Method	% of Sample (N=355)	% of Division I (N=97)	% of Division II (N=101)	% of Division III (N=157)
NCAA Concussion Facts Sheet	85.9	94.8	86.1	80.3
NCAA Concussion Education Video	39.2	25.8	43.6	44.6
Interactive Computer Module	7.6	11.3	5.0	7.0
General Discussion between Student-Athletes and Athletic Training Staff	76.9	84.5	72.3	75.2
General Discussion between Student-Athletes and a Team Physician	11.3	19.6	9.9	7.0
General Discussion between Student-Athletes and a Neurologist	2.5	3.1	2.0	2.5
Unsure	0.8	0.0	1.0	1.3
Other	1.1	13.4	10.9	14.6
<i>Collapsed Written Responses*</i>				
PowerPoint Presentation	2.5			
Preston Plevretes Video	0.6			
Handout Created by Athletic Training Staff	4.5			
Non-NCAA Concussion Education Video	2.5			
Presentation/Lecture Lead by the Head Athletic Trainer	0.8			
Other General Discussion	1.1			

Note. The data presented in this table were extracted from question 16 of the Concussion Education Questionnaire section of the Current Concussion Education Practices Questionnaire (CCEPQ). *Written responses were collapsed into categories based on similarities across all NCAA Divisions.

2x3 chi-square analyses was ran to identify significant differences between division level and concussion educational methods. The results of the chi-square analysis revealed no significant difference was found between division level and using an interactive computer module ($p= 0.221$). There was no significant difference observed between division level and having a general discussion about concussion between student-athletes and the athletic training staff ($p= 0.097$). No significant difference was found between division level and having a general discussion about concussion between student-athletes and a neurologist ($p= 0.883$).

There was also no significant difference between division level and those who selected other ($p= 0.684$), or reported that they were unsure what method(s) were used to providing concussion education at their institution ($p= 0.550$).

The results of the chi-square analysis revealed significant difference among Division I and Division II when reporting the use of the NCAA concussion fact sheet as a method in providing concussion education ($p= 0.038$, $\phi= -0.148$) (see Table 13: Cross Tabulation of NCAA Division I and II and Using the NCAA Concussion Facts Sheet). Therefore, a significantly greater proportion, 94.8% (92/97), of Division I respondents reported using the NCAA concussion facts sheet than those from Division II, 86.1% (87/101). This significant difference was also observed among Division I and Division III when reporting the use of the NCAA concussion fact sheet as a method in providing concussion education ($p= 0.001$, $\phi= -0.203$). Therefore, a significantly greater proportion, 94.8% (92/97), of Division I respondents reported using the NCAA concussion fact sheet to educate student-athletes about concussion, more than Division III, 80.3% (126/157) (see Table 14: Cross Tabulation of NCAA Division I and III and Using the NCAA Concussion Facts Sheet). No significant difference was seen between Division II and Division III when reporting using the NCAA Concussion Facts Sheet ($p= 0.224$).

Table 13: Cross Tabulation of NCAA Division I and II and Using the NCAA Concussion Facts Sheet

Using the NCAA Concussion Facts Sheet	NCAA Institutions		χ^2	Φ
	Division I	Division II		
Yes	92 (2.1)	87 (-2.1)	4.324*	-0.148
No	5 (-2.1)	15 (2.1)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

Table 14: Cross Tabulation of NCAA Division I and III and Using the NCAA Concussion Facts Sheet

Using the NCAA Concussion Facts Sheet	NCAA Institutions		χ^2	Φ
	Division I	Division III		
Yes	92 (3.2)	126 (-3.2)	10.493*	-0.203
No	5 (-3.2)	31 (3.2)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

The results of the chi-square analysis revealed significant difference among Division I and Division II when reporting the use of the NCAA concussion education video as a method in providing concussion education ($p= 0.009$, $\phi= 0.187$) (see Table 15: Cross Tabulation of NCAA Division I and II and Using the NCAA Concussion Education Video). Therefore, a significantly greater proportion, 43.6% (44/101), of Division II respondents reported providing concussion education to their institution's athletic administration more than Division I, 25.8% (25/97). This significant association was also observed among Division I and Division III when reporting the use of the NCAA concussion education video as a method in providing concussion education ($p= 0.003$, $\phi= 0.189$) (see Table 16: Cross Tabulation of NCAA Division I and III and Using the NCAA Concussion Education Video). A significantly greater proportion, 44.6% (70/157), of Division III respondents reported using the NCAA concussion education video than those from Division I, 25.8% (25/97) (see Table 16: Cross Tabulation of NCAA Division I and III and Using the NCAA Concussion Education Video). No significant difference was seen between Division II and Division III when reporting using the NCAA Concussion Education Video ($p= 0.872$).

Table 15: Cross Tabulation of NCAA Division I and II and Using the NCAA Concussion Education Video

Using the NCAA Concussion Education Video	NCAA Institutions		X ²	Φ
	Division I	Division II		
Yes	25 (-2.6)	44 (2.6)	6.898*	0.187
No	72 (2.6)	57 (-2.6)		

Note. *=p<0.05. Adjusted standardized residuals appear in parentheses beside group frequencies.

Table 16: Cross Tabulation of NCAA Division I and III and Using the NCAA Concussion Education Video

Using the NCAA Concussion Education Video	NCAA Institutions		X ²	Φ
	Division I	Division III		
Yes	25 (-3.0)	70 (3.0)	9.063*	0.189
No	72 (3.0)	87 (-3.0)		

Note. *=p<0.05. Adjusted standardized residuals appear in parentheses beside group frequencies.

The results of the chi-square analysis also revealed a significant difference among Division I and Division III when reporting using a general discussion between student-athletes and a team physician, when providing concussion education ($p= 0.003$, $\phi= -0.189$) (see Table 17: Cross Tabulation of NCAA Division I and III and Having a General Discussion between Student-Athletes and a Team Physician about Concussion). As such, a significant greater proportion, 19.6% (19/97), of respondents from Division I reported using a general discussion about concussion between student-athletes and a team physician, than those from Division III, 7.0% (11/157). There was no significant difference found between Division I and Division II ($p= 0.054$), nor Division II and Division III ($p= 0.407$), when using a general discussion between student-athletes and a team physician to provide concussion education.

Table 17: Cross Tabulation of NCAA Division I and III and Having a General Discussion between Student-Athletes and a Team Physician about Concussion

General Discussion between Student-Athlete and a Team Physician	NCAA Institutions		χ^2	Φ
	Division I	Division III		
Yes	19 (3.0)	11 (-3.0)	9.111*	-0.189
No	78 (-3.0)	146 (3.0)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

CONCUSSION EDUCATION CONTENT PROVIDED

When asked what information about concussion is provided, 99.4% (353/355) of the respondents across all divisions reported providing information on signs and symptoms of a concussion. Most, 97.5% (346/355), of the respondents reported providing information on what to do if you think you may have a concussion. Providing the definition of concussion was reported by 96.9% (344/355) of the respondents. What to do if you think your teammate may have a concussion is provided as reported by 89.9% (319/355) of the respondents. Less than three quarters, 70.7% (251/355), of the respondents reported including long-term consequences of concussion within the concussion education. Providing information on their institution's return to play policy following a concussion was reported by 70.4% (250/355) of the respondents. Having a general questions and answers session was reported by 62.8% (223/355) of respondents. Providing the common misconceptions about concussion was reported by 61.4% (218/355) of the respondents. Educating on the biomechanics of concussion was reported by 56.9% (202/355) of the respondents. Just over half, 51.5% (183/355), of the respondents reported providing information about how a concussion is diagnosed. Educating on the pathophysiology of concussion was reported by 46.2% (164/355) of the respondents. Only 0.6% (2/355) of the respondents selected being unsure what information about

concussion is providing in their institution's concussion education (see Table 18: Concussion Education Content Provided at NCAA Member Institutions).

Table 18: Concussion Education Content Provided at NCAA Member Institutions

Concussion Information	% of Sample (N=355)	% of Division I (N=97)	% of Division II (N=101)	% of Division III (N=157)
Definition of Concussion	96.9	97.9	98.0	95.5
Biomechanics of Concussion	56.9	55.7	67.3	51.0
Pathophysiology of Concussion	46.2	46.4	48.5	44.6
Signs and Symptoms of Concussion	99.4	100.0	99.0	99.4
What to do if You Think You May Have a Concussion	97.5	99.0	97.0	96.8
What to do if You Think Your Teammate May Have a Concussion	89.9	93.8	87.1	89.2
Common Misconceptions About Concussion	61.4	69.1	60.4	57.3
How a Concussion is Diagnosed	51.4	58.8	54.5	45.2
University's Return to Play Policy Following a Concussion	70.4	78.4	71.3	65.0
Long-Term Consequences of Concussion	70.7	70.1	71.3	70.7
General Questions and Answers Session	62.8	74.2	64.4	54.8
Unsure	0.6	0.0	1.0	0.6
Other	1.4	5.2	1.0	3.2
<i>Collapsed Written Responses*</i>				
How to Reduce Symptoms After Sustaining a Concussion	0.3			
How to Accommodate Academic Workload	0.8			
Importance of Baseline Concussion Testing	0.3			
Who to Talk to About a Concussion	0.3			
Risks Factors of Continued Participation with a Concussion	0.3			

Note. The data presented in this table were extracted from question 15 of the Concussion Education Questionnaire section of the Current Concussion Education Practices Questionnaire (CCEPQ). *Written responses were collapsed into categories based on similarities across all NCAA Divisions.

From the respondents who selected "Other..." and listed a response in the text box available, were evaluated for similarities. Of the 11 respondents who selected "Other...", all 11

gave a reason in the text box available when selecting this option. Only 6 of these responses were reduced to additional options, based on similarities of responses. The remaining (5) responses were kept as those who selected “Other...”, which was 1.4% of respondents (5/355) (see Table 18: Concussion Education Content Provided at NCAA Member Institutions).

Very few respondents, 0.8% (3/355), reported providing information on how to accommodate academic workload after sustaining a concussion. Fewer respondents, 0.3% (1/355), of the respondents reported providing information on how to reduce symptoms after sustaining a concussion; the importance of baseline testing; who to talk to about a concussion; and the risks of continued participation after sustaining a concussion (see Table 18: Concussion Education Content Provided at NCAA Member Institutions).

2x3 chi-square analyses were ran to identify differences between division level and concussion education content provided. These analyses revealed no significant differences between division level and providing the following information within concussion education: definition of concussion ($p= 0.420$); pathophysiology of concussion ($p= 0.825$); signs and symptoms of concussion ($p=0.640$); what to do if the student-athlete thinks they may have sustained a concussion ($p= 0.540$); what to do if the student-athlete thinks one of their teammates may have sustained a concussion ($p= 0.276$); common misconceptions about concussion ($p= 0.169$); how a concussion is diagnosed ($p= 0.087$); institution’s return to play policy following a concussion ($p= 0.074$); and long term consequences of concussion ($p= 0.983$).

The results of the chi-square analysis did reveal a significant difference among Division II and Division III when reporting providing information about the biomechanics of a concussion ($p= 0.009$, $\phi= -0.162$) (see Table 19: Cross Tabulation of NCAA Division II and III and Educating

Student-Athletes on the Biomechanics of Concussion). As such, a significantly greater proportion, 67.3% (68/101), of respondents from Division II reported educating student-athletes on the biomechanics of concussion, than those from Division III, 51.0% (80/157). There was no significant difference observed between Division I and Division II ($p= 0.092$), nor between Division I and Division III ($p= 0.465$), in reporting the biomechanics of concussion as information providing within the institution's concussion education provided to student-athletes.

Table 19: Cross Tabulation of NCAA Division II and III and Educating Student-Athletes on the Biomechanics of Concussion

Educating on the Biomechanics of Concussion	NCAA Institutions		χ^2	Φ
	Division II	Division III		
Yes	68 (2.6)	80 (-2.6)	6.735*	-0.162
No	33 (-2.6)	77 (2.6)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

The results of the chi-square analysis also revealed a significant difference among Division I and Division III when reporting the inclusion of a general questions and answers session as part of the concussion education ($p= 0.002$, $\phi= -0.195$) (see Table 20: Cross Tabulation of NCAA Division I and III and Reporting the Inclusion of a General Questions and Answers Session during Concussion Education). As such, a significantly greater proportion, 74.2% (72/97), of respondents from Division I reported including a general questions and answers session with a team physician as part of the concussion education, than those from Division III, 54.8% (86/157). There was no significant difference between Division I and Division II ($p= 0.133$), nor between Division II and Division III ($p= 0.127$), in reporting the inclusion of a

general questions and answers session with a team physician as part of the concussion education.

Table 20: Cross Tabulation of NCAA Division I and III and Reporting the Inclusion of a General Questions and Answers Session during Concussion Education

Inclusion of a General Questions and Answers Session during Concussion Education	NCAA Institutions		χ^2	Φ
	Division I	Division III		
Yes	72 (3.1)	86 (-3.1)	9.647*	-0.195
No	25 (-3.1)	71 (3.1)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

DELIVERY ENVIRONMENT OF CONCUSSION EDUCATION

Delivering concussion education to one team at a time was the most selected, 65.4% (232/355), by the respondents across all divisions. Less than half, 46.8% (166/355), of the respondents reported providing concussion education to multiple teams at a time. Concussion education provided to the student-athlete to complete on their own time was reported by 29.6% (105/355) of the respondents. A one-on-one discussion with the student-athlete was reported to be used to deliver concussion education by 14.4% (51/355) of the respondents (see Table 21: Environment of Which Concussion Education is delivered in NCAA Member Institutions).

From the respondents who selected "Other..." and listed a response in the text box, were evaluated for similarities. Of the 23 respondents who selected "Other...", 23 gave a reason in the text box when selecting this option. 18 of these responses were reduced to additional options, based on similarities of responses. The remaining responses (5) were added to those respondents who selected "Other..." and did not leave a response in the text box available. 1.4% (5/337) of the respondents selected "Other..." when asked about the environment the

concussion education is provided at their institution (see Table 12: Environment of Which Concussion Education is delivered in NCAA Member Institutions).

Table 21: Environment of Which Concussion Education is delivered in NCAA Member Institutions

Delivery of Concussion Education	% of Sample (N=355)	% of Division I (N=97)	% of Division II (N=101)	% of Division III (N=157)
One-On-One Discussion	14.4	21.6	9.9	12.7
One Team at a Time	65.4	85.6	59.4	56.7
Multiple Teams at a Time	46.8	29.9	51.5	54.1
Completed by Each Student-Athlete on Their Own Time	29.6	23.7	34.7	29.9
Unsure	0.6	0.0	1.0	0.6
Other	1.4	8.2	3.0	7.6
<i>Collapsed Written Responses*</i>				
Online	1.7			
Varies on Team Type and Size	1.4			
Provided in the Student-Athlete Handbook	0.3			
During Baseline Concussion Testing	0.6			
Within Paperwork to be Completed by Each Student-Athlete Prior to Campus Arrival	0.8			
One-On-One Discussion After Sustaining a Concussion	0.3			

Note. The data presented in this table were extracted from question 14 of the Concussion Education Questionnaire section of the Current Concussion Education Practices Questionnaire (CCEPQ). *Written responses were collapsed into categories based on similarities across all NCAA Divisions.

Providing concussion education online was reported by 1.7% (6/355) of the respondents. Delivering concussion education dependent on team type and size was reported 1.4% (5/355) of the respondents. Concussion education provided through paperwork give to the student-athlete prior to campus arrival was reported by 0.8% (3/355) of the respondents. Concussion education taking place during baseline concussion testing was reported by 0.6% (2/355) of the respondents. Only 0.3% (1/355) of the respondents reported providing

concussion education in the student-athlete handbook, or by a one-on-one discussion after sustaining a concussion (see Table 21: Environment of Which Concussion Education is delivered in NCAA Member Institutions).

2x3 chi-square analyses were ran to identify differences between division level and environment in which concussion education is provided. These analyses revealed no significant differences between division level and the following regarding the environment of which concussion education is delivered: concussion education is completed by each student-athlete on their own time ($p= 0.239$); unsure of the environment of which concussion education is delivered ($p= 0.640$); and selecting other when asked about the environment in which concussion education is delivered ($p= 0.640$)

The results of the chi-square analysis revealed a significant difference among Division I and Division II when reporting having a one-on-one discussion in delivering concussion education ($p= 0.023$, $\phi= -0.162$) (see Table 22: Cross Tabulation of NCAA Division I and II and Reporting Using a One-On-One Discussion in Delivering Concussion Education). As such, a significantly greater proportion, 21.6% (21/97), of respondents from Division I reported educating student-athletes via a one-on-one discussion regarding concussion, than those from Division II, 9.9% (10/101). There was no significant difference between Division I and Division III ($p= 0.061$), nor between Division II and Division III ($p= 0.488$), in reporting delivering concussion education by having a one-on-one discussion with each student-athlete.

Table 22: Cross Tabulation of NCAA Division I and II and Reporting Using a One-On-One Discussion in Delivering Concussion Education

One-On-One Discussion in Delivering Concussion Education	NCAA Institutions		χ^2	Φ
	Division I	Division II		
Yes	21 (2.3)	10 (-2.3)	5.172*	-0.162
No	76 (-2.3)	91 (2.3)		

Note. $\ast=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

The chi-square analysis also revealed a significant difference among Division I and Division II when reporting educating one team at a time about concussion ($p<0.001$, $\phi= -0.292$) (see Table 23: Cross Tabulation of NCAA Division I and II and Reporting Educating One Team at a Time about Concussion). As such, a significantly greater proportion, 85.6% (83/97), of respondents from Division I reported educating one team at a time about concussion, than those from Division II, 59.4% (60/101). There was significant difference seen among Division I and Division III as well, regarding delivering concussion education to one team at a time ($p<0.001$, $\phi= -0.300$) (see Table 24: Cross Tabulation of NCAA Division I and III and Reporting Educating One Team at a Time about Concussion). As such, a significantly greater proportion, 85.6% (83/97), of respondents from Division I reported educating one team at a time about concussion, than those from Division III, 56.7% (89/157). There was no significant difference between Division II and Division III ($p= 0.666$), in reporting educating one team at a time about concussion.

Table 23: Cross Tabulation of NCAA Division I and II and Reporting Educating One Team at a Time about Concussion

Educating One Team at a Time About Concussion	NCAA Institutions		χ^2	Φ
	Division I	Division II		
Yes	83 (4.1)	60 (-4.1)	16.880*	-0.292
No	14 (-4.1)	41 (4.1)		

Note. *=p<0.05. Adjusted standardized residuals appear in parentheses beside group frequencies.

Table 24: Cross Tabulation of NCAA Division I and III and Reporting Educating One Team at a Time about Concussion

Educating One Team at a Time About Concussion	NCAA Institutions		χ^2	Φ
	Division I	Division III		
Yes	83 (4.8)	89 (-4.8)	22.873*	-0.300
No	14 (-4.8)	68 (4.8)		

Note. *=p<0.05. Adjusted standardized residuals appear in parentheses beside group frequencies.

The results of the chi-square analysis revealed a significant difference among Division I and Division II when reporting educating multiple teams at a time about concussion ($p= 0.002$, $\phi= 0.219$) (see Table 25: Cross Tabulation of NCAA Division I and II and Reporting Educating Multiple Teams at a Time about Concussion). As such, a significantly greater proportion, 51.5% (52/101), of respondents from Division II reported educating multiple teams at a time about concussion, than those from Division I, 29.9% (29/97). There was significant difference seen among Division I and Division III as well, regarding educating multiple teams at a time about concussion ($p<0.001$, $\phi= 0.237$) (see Table 26: Cross Tabulation of NCAA Division I and III and Reporting Educating Multiple Teams at a Time about Concussion). As such, a significantly greater proportion, 54.1% (85/157), of respondents from Division III reported educating multiple teams at a time about concussion, than those from Division I, 29.9% (29/97). There

was no significant difference between Division II and Division III ($p= 0.677$), in reporting educating multiple teams at a time about concussion.

Table 25: Cross Tabulation of NCAA Division I and II and Reporting Educating Multiple Teams at a Time about Concussion

Educating Multiple Teams at a Time About Concussion	NCAA Institutions		χ^2	Φ
	Division I	Division II		
Yes	29 (-3.1)	52 (3.1)	9.539*	0.219
No	68 (3.1)	49 (-3.1)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

Table 26: Cross Tabulation of NCAA Division I and III and Reporting Educating Multiple Teams at a Time about Concussion

Educating Multiple Teams at a Time About Concussion	NCAA Institutions		χ^2	Φ
	Division I	Division III		
Yes	29 (-3.8)	85 (3.8)	14.245*	0.237
No	68 (3.8)	72 (-3.8)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

LIMITATIONS AND BARRIERS TO PROVIDING CONCUSSION EDUCATION

Almost all of the respondents, 94.93% (337/355), answered the last question on the survey. This question asked what limitations or barriers affect providing concussion education at the subject's institution. Only 5.1% (18/355) did not answer this question regarding limitations or barrier to providing concussion education. The response rates between divisions are as follows: Division I 26.98% (92/341); Division II 30.52% (94/308); and Division III 34.79% (151/434). 27.3% (92/337) of responses from this question are from Division I respondents. 27.9% (94/337) of the responses from this question are from Division II respondents. Lastly, 44.8% (151/337) of the responses from this question are from Division III respondents.

The main limitation and/or barrier to providing concussion education was time according to 75.1% (253/337) of the respondents across all divisions. Less than a quarter, 19.9% (67/337), of respondents reported money being a limitation and/or barrier to providing concussion education at their institution. Only 10.4% (35/337) of the respondents reported a lack of concussion education material as a limitation and/or barrier to providing concussion education at their institution (see Table 27: Limitations and Barriers to Providing Concussion Education at NCAA Member Institutions).

Table 27: Limitations and Barriers to Providing Concussion Education at NCAA Member Institutions

Limitations and Barriers	% of Sample (N=355)	% of Division I (N=97)	% of Division II (N=101)	% of Division III (N=157)
Money	19.9	12.0	29.8	18.5
Time	75.1	68.5	73.4	80.1
Lack of Concussion Education Material	10.4	6.5	11.7	11.9
Other	2.9	-	-	-
<i>Collapsed Written Responses*</i>				
Lack of Interest from Student-Athletes	8.3	6.5	10.6	7.9
Lack of Sports Medicine Staff	3.9	3.3	2.1	5.3
Lack of Support from Administration and Coaches	1.2	0.0	1.1	2.0
No Limitations or Barriers	10.1	17.4	10.6	5.3

Note. The data presented in this table were extracted from question 21 of the Limitations/Barriers to Providing Concussion Education section of the Current Concussion Education Practices Questionnaire (CCEPQ) survey. *Written responses were collapsed into categories based on similarities across all NCAA Divisions.

From the respondents who selected “Other...” and listed a response in the text box, were evaluated for similarities. Of the 89 respondents who selected “Other...”, 88 gave a reason in the text box when selecting this option. 79 of these responses were reduced to additional options, based on similarities of responses. The remaining responses (10) were added to those

respondents who selected “Other...” and did not leave a response in the text box. Only 2.97% (10/337) of the respondents stated there were other reasons which are limitations and/or barriers to providing concussion education at their institution (see Table 27: Limitations and Barriers to Providing Concussion Education at NCAA Member Institutions).

The following limitation and/or barrier options were created based off similarities of the responses from those respondents who selected “Other...” and left a response in the text box. Among all respondents from all divisions, 10.1% (34/337) reported no limitations and/or barriers to providing concussion education at their institution. Lack of interest from student-athletes being a limitation and/or barrier to providing concussion education at their institution was reported by 8.3% (28/337) of the respondents. Few respondents, 3.9% (13/337), reported lack of sports medicine staff being a limitation and/or barrier to providing concussion education at their institution. Only 1.2% (4/337) of the respondents reported lack of support from the athletic administration and coaching staff being a limitation and/or barrier to providing concussion education at their institution (see Table 27: Limitations and Barriers to Providing Concussion Education at NCAA Member Institutions).

2x3 chi-square analyses were ran to identify differences between division level and reported limitations/barrier to providing concussion education. From these analyses no significant differences were found between division level and the following limitations/barriers in providing concussion education: time ($p= 0.114$); lack of concussion education material ($p= 0.362$); lack of interest from the student-athlete ($p= 0.582$); lack of sports medicine staff ($p= 0.429$); and lack of support from administration and coaches ($p= 0.379$).

The results of the chi-square analysis revealed a significant difference among Division I and Division II when reporting money as a limitation or barrier to providing concussion education ($p= 0.003$, $\phi= 0.219$) (see Table 28: Cross Tabulation of NCAA Division I and II and Reporting Money as a Limitation or Barrier to Providing Concussion Education). As such, a significantly greater proportion, 29.8% (28/94), of respondents from Division II reported money as a limitation or barrier to providing concussion education, compared to Division I, 12.0% (11/92). A significant difference was observed among Division II and Division III when reporting money as a limitation or barrier to providing concussion education ($p= 0.042$, $\phi= -0.130$) (see Table 29: Cross Tabulation of NCAA Division II and III and Reporting Money as a Limitation or Barrier to Providing Concussion Education). As such, a significantly greater proportion, 29.8% (28/94), of respondents from Division II reported money as a limitation or barrier to providing concussion education, compared to Division III, 18.5% (28/151). There was no significant difference between Division I and Division III ($p= 0.175$) in reporting money as a limitation or barrier to providing concussion education.

Table 28: Cross Tabulation of NCAA Division I and II and Reporting Money as a Limitation or Barrier to Providing Concussion Education

Money as a Limitation or Barrier to Providing Concussion Education	NCAA Institutions		χ^2	Φ
	Division I	Division II		
Yes	11 (-3.0)	28 (3.0)	8.920*	0.219
No	81 (3.0)	66 (-3.0)		

Note. $*=p<0.05$. Adjusted standardized residuals appear in parentheses beside group frequencies.

Table 29: Cross Tabulation of NCAA Division II and III and Reporting Money as a Limitation or Barrier to Providing Concussion Education

Money as a Limitation or Barrier to Providing Concussion Education	NCAA Institutions		X ²	Φ
	Division II	Division III		
Yes	28 (2.0)	28 (-2.0)	4.154*	-0.130
No	66 (-2.0)	123 (2.0)		

Note. *=p<0.05. Adjusted standardized residuals appear in parentheses beside group frequencies.

The results of the chi-square analysis also revealed a significant difference among Division I and Division III when reporting no limitations or barriers to providing concussion education ($p= 0.002$, $\phi= -0.197$) (see Table 30: Cross Tabulation of NCAA Division II and III and Reporting No Limitations or Barriers to Providing Concussion Education). As such, a significantly greater proportion, 17.4% (16/92), of respondents from Division I reported no limitations or barriers to providing concussion education, compared to Division III, 5.3% (8/151). There was no significant difference between Division I and Division II ($p= 0.184$), nor Division II and Division III ($p= 0.119$) in reporting no limitations or barriers to providing concussion education.

Table 30: Cross Tabulation of NCAA Division I and III and Reporting No Limitations or Barriers to Providing Concussion Education

Money as a Limitation or Barrier to Providing Concussion Education	NCAA Institutions		X ²	Φ
	Division I	Division III		
Yes	16 (3.1)	8 (-3.1)	9.393*	-0.197
No	76 (-3.1)	143 (3.1)		

Note. *=p<0.05. Adjusted standardized residuals appear in parentheses beside group frequencies.

CHAPTER 5

DISCUSSION

PROVIDING CONCUSSION EDUCATION IN THE NCAA

The purpose of this study was to investigate concussion education implementation methods in NCAA member institutions. In the *2013-14 NCAA Sports Medicine Handbook*, the NCAA updated their concussion education policy mandating that NCAA member institutions provide annual concussion education to all student-athletes.¹⁸ The present study found that 98.9% of responding NCAA member institutions provide concussion education. This finding supports the first hypothesis, NCAA member institutions do not provide concussion education to all student-athletes. The researchers find it concerning there is still 1.1% of NCAA member institutions whom do not provide concussion education. This finding may be inaccurate, as all of the survey respondents whom reported no providing concussion education also reported information about their concussion education. Therefore, this finding may be the results of a selection error response when answering whether or not the respondent's institution provides concussion education.

As previously stated, the NCAA Concussion Policy states concussion education should be provided annually. An interesting additional finding to the current study was that 63.9% (227/355) of NCAA member institutions were in full compliance of the policy. Adherence to the NCAA concussion policy has been brought to the forefront of research, with prior work by Baugh et al., finding similar results to the present study.¹⁵ It is concerning NCAA member institutions are non-compliant with the education component of the NCAA Concussion Policy, as it directly effects the healthcare and well-being of collegiate student-athletes.

RECEIVERS OF CONCUSSION EDUCATION IN THE NCAA

PROVIDING CONCUSSION EDUCATION TO STUDENT-ATHLETES

The NCAA Concussion Policy mandates all types of sports receive concussion education. The NCAA classifies sports based on the probability of impacts or collisions experienced by the participants.¹⁸ These classifications include contact/collision, limited contact, and non-contact sports. The present study found 85.1% of NCAA member institutions provide concussion education to all types of sports. Prior work by Baugh et al. as they reported similar results (81.5%).¹⁵ The present study also found 5.1% of NCAA member institutions provide concussion education to only contact/collision sports. This finding supports the second hypothesis, NCAA member institutions provide concussion education only to contact/collision sports. Granted few NCAA member institutions report providing concussion education only to contact/collision sports, this finding shows non-compliance with the NCAA Concussion Policy amongst its members. This supports prior work by Baugh et al. who found 15.6% of these institutions provide concussion education only to contact/collision sports.¹⁵ The divergent findings may indicate an increase in compliance with the NCAA concussion education mandate, stating all types of sports must receive concussion education. There was no significant difference observed between division level and providing concussion education to all types of sports. This suggests all NCAA member institutions do not differ in which types of sports are provided with concussion education. This also suggests increased adherence to the NCAA concussion education mandate is seen in all NCAA member institutions.

OTHER RECIEVERS OF CONCUSSION EDUCATION

According to the NCAA Concussion Policy, annual concussion education must be provided to coaches, athletic administrators and sports medicine personnel. Of the responding institutions, 90.7% report providing concussion education to the coaching staff. This finding is contradictory to Kroshus et al. whom reported 67.0% coaches at NCAA member institutions received concussion education.⁶³ Reasons for this discrepancy may be results of differences in survey response rates, or differences in response rates between division levels. Kroshus et al. included multiple coaches from the same institution, which could cause misrepresentation of the entire NCAA with regard to providing concussion education to coaches. As such if multiple coaches were used from an institution whom does not provide concussion education to their coaching staff, it could appear that a large number of NCAA member institutions do not provide concussion education to coaches. Another reason for this divergent finding may be due to the present study surveying athletic trainers, where Kroshus et al. surveyed coaches.⁶³

The current study found 85.9% of NCAA member institutions provide concussion education to their sports medicine staff, and 62.0% educate their athletic administration. A significantly greater proportion of Division I were found in the present study to provide concussion education to the athletic administration than that of Division II, and Division III (see Results: Table 7: Cross Tabulation of NCAA Division I and II and Providing Concussion Education to the Athletic Administration; Results: Table 8: Cross Tabulation of NCAA Division I and III and Providing Concussion Education to the Athletic Administration). The present study also found a significantly greater proportion of Division I reported providing concussion education to the sports medicine staff than that of Division II, and Division III (see Results: Table 9: Cross

Tabulation of NCAA Division I and II and Providing Concussion Education to the Sports Medicine Staff; Results: Table 10: Cross Tabulation of NCAA Division I and III and Providing Concussion Education to the Sports Medicine Staff). Reasons for this significant difference may be due to varying staffing levels between division levels. On the contrary, Division II was the least to report lack of sports medicine staff as a limitation and/or barrier to providing concussion education (see Results: Table 27: Limitations and Barriers to Providing Concussion Education at NCAA Member Institutions). It is important to note this shows non-compliance to the NCAA Concussion Policy, which mandates all groups (student-athletes, coaching staff, sports medicine staff, and athletic administration) must receive annual concussion education. This was not a hypothesized finding, therefore further research is warranted in compliance with the NCAA concussion education policy regarding educating coaches, athletic administrators, and sports medicine personnel.

CONCUSSION EDUCATION MATERIALS/METHODS USED BY NCAA MEMBER INSTITUTIONS

IMPLEMENTATION OF NCAA CONCUSSION EDUCATION MATERIALS

The NCAA does not set requirements or guidelines on what concussion education materials/methods should be used to educate student-athletes. Currently there is no literature explaining what concussion education materials/methods are being utilized in NCAA member institutions. The present study is the first to report what materials/methods are being utilized to educate student-athletes on concussion. Concussion education created through the NCAA were the highest reported materials used to educate student-athletes on concussion (see Results: Table 12: Methods used in Providing Concussion Education at NCAA Member Institutions). This finding supports the third hypothesis, NCAA member institutions provide

concussion education material created through the NCAA. When examining division levels, a significantly greater proportion of Division I reports using the NCAA concussion facts sheet than that of Division II and Division III (see Results: Table 13: Cross Tabulation of NCAA Division I and II and Using the NCAA Concussion Facts Sheet; Results: Table 14: Cross Tabulation of NCAA Division I and III and Using the NCAA Concussion Facts Sheet). Interestingly enough, significantly greater proportions of Division II and Division III report using the NCAA concussion education video compared to Division I (see Results: Table 15: Cross Tabulation of NCAA Division I and II and Using the NCAA Concussion Education Video; Results: Table 16: Cross Tabulation of NCAA Division I and III and Using the NCAA Concussion Education Video). One reason for this discrepancy may be due to the cost of obtaining enough NCAA concussion facts sheet for each student-athlete. This reason could be supported by the present study's finding Division II significantly reported money as a limitation or barrier to providing concussion education more compared to Division I (see Results: Table 28: Cross Tabulation of NCAA Division I and II and Reporting Money as a Limitation or Barrier to Providing Concussion Education). Nevertheless it is important to know the NCAA concussion education material was the highest reported as being utilized as a method in providing concussion education. With this knowledge, further research should be geared to measure the effectiveness of the concussion education material created through the NCAA. Prior concussion educational material evaluation has largely focused on assessing change pre and post-concussion knowledge assessments.^{48,49,64} With increasing student-athlete knowledge of concussion, Bramely et al. found student-athletes will be more likely to self-report their concussion symptoms.⁵⁰ There is no research to date has evaluated the concussion educational material provided, and produced by the NCAA.

OTHER CONCUSSION EDUCATION MATERIALS IMPLEMENTED

Some NCAA member institutions reported using other materials to provide concussion education, such as PowerPoints and handouts created by the institution's sports medicine staff. It was hypothesized NCAA member institutions only used concussion education material created by the NCAA, which was not supported in the present study. The NCAA Concussion Policy does not restrict member institutions from using non-NCAA sanctioned concussion educational tools/materials. This allows the member institutions to take an individual approach to concussion education. The researchers recommend the NCAA provide guidelines on which concussion educational materials should be used in order to provide effective concussion education. Providing standardized concussion education materials for all NCAA member institutions to use may aid by increasing the compliance rate.

CONCUSSION INFORMATION PROVIDED BY NCAA MEMBER INSTITUTIONS

There are no specific requirements or guidelines set by the NCAA Concussion Policy, on what information regarding concussion should be included during student-athlete concussion education. The present study found 99.4% of NCAA member institutions are educating student-athletes on the signs and symptoms of concussion. This finding is supported by Kroshus and Baugh, whom reported 96.4% of institutions include signs and symptoms in concussion education.⁶⁰ Long-term consequences was reported as included in concussion education by 70.7% of the NCAA member institutions, in the current study. Prior work by Kroshus and Baugh found similar results, regarding educating student-athletes about the long-term consequences of concussion.⁶⁰ Providing education on the signs, symptoms and long-term consequences of concussion are important to include within concussion education. While 78.3% of collegiate

student-athletes choose to self-report their concussion symptoms, some choose not to self-report their concussion symptoms.⁸ This puts these student-athletes at risk for further injury with continued participation while having a concussion. Previous literature demonstrates collegiate student-athletes lack knowledge of the short or long-term consequences of concussion.⁹ With not having the knowledge of the seriousness of concussion, this may explain why collegiate student-athletes choose not to self-report their concussion symptoms. This notion is supported by Delaney et al., who found collegiate student-athletes are unaware of how serious concussions are and the risks of continued participation.⁸ It is concerning the present study found more than 25% of NCAA member institutions are educating their student-athletes on the long-term consequences. Register-Mihalik et al. reported a strong association between concussion reporting behaviors with concussion knowledge.⁴³ Therefore, the researchers recommend requirements be set on the concussion education content provided NCAA member institutions.

The present study found differences between concussion education content and division level. A significantly greater proportion of Division II include the biomechanics of concussion, compared to Division III. Understanding a concussion can occur from a direct or indirect blow to the head, or body, is important for student-athletes to know. By understanding the biomechanics of concussion, the student-athlete may be able to recognize how their concussion occurred. A significantly greater proportion of Division I included a general questions and answers session about concussion information, compared to Division III. Having a general questions and answers session could be greatly beneficial, giving time for student-athletes to deepen their understanding of the concussion information provided to them. It was

hypothesized NCAA member institutions differ in concussion education content, which is supported by the variability of concussion education content currently being provided to student-athletes in NCAA member institutions.

DELIVERY ENVIRONMENT OF CONCUSSION EDUCATION AT NCAA MEMBER INSTITUTIONS

Currently the NCAA does not have any recommendations or guidelines to what environment in which concussion education should be delivered. According to the respondents of the current study, 65.4% of NCAA member institutions educate one team at a time about concussion. Educating multiple teams at a time was the second largest (46.8%) reported environment in which student-athletes are when delivered concussion education. When assessing differences between division level and environment in which concussion education is provided, an interesting association was discovered in the current study. A significantly greater proportion of Division I educates one team at a time compared to Division II, and Division III. One reason for this could be varying staffing levels between divisions. This would be supported by the current study's finding significantly greater proportions of Division II and Division III educate multiple teams at a time, compared to Division I. Conversely, a greater percentage of Division I reported lack of sports medicine staff as a limitation and/or barrier to providing concussion education compared to Division II. It is also possible Division I has more time available to provide concussion education, which allows educating one team at a time. This would be supported by the finding greater portions of Division II and Division III reported time as a limitation or barrier, compared to Division I. Yet there were no significant differences were found between division level and reporting time as a limitation or barrier to providing concussion education. Nevertheless, these varying results support the hypothesis, NCAA

member institutions differ in concussion education delivery methods. Further research should be performed to determine whether educating one or multiple teams at a time is more effective when delivering concussion education to student-athletes.

CONCLUSION

Concussion education plays a critical role in preventing student-athletes from premature return to play, increasing risk of further neuronal injury. By providing concussion education it is hopeful student-athletes will be able to recognize, and self-report their concussion symptoms to the appropriate healthcare provider. As Bramley et al. found, increasing concussion knowledge will increase the ability to recognize and report concussion symptoms.⁵⁰ Therefore, it is important all student-athletes receive appropriate concussion education.

The NCAA mandates all of their member institutions provide annual concussion education to all student-athletes.¹⁸ This mandate does not set requirements on the concussion education materials to be used at NCAA member institutions. However, the NCAA has produced and provides concussion education materials to its member institutions. There is no literature stating the use of this NCAA created concussion education material. The present study is the first to show the NCAA concussion education materials are a part of the concussion education materials being used within NCAA member institutions. With this knowledge, future research should be performed to evaluate the NCAA concussion education materials for effectiveness. Previous research determined concussion education program effectiveness based on assessing changes in concussion knowledge.^{47-49,64,65}

Concussion education content provided at NCAA member institutions was found to be consistent with previous literature, but appears to have some variability between division levels.⁶⁰ Without requirements on content set by the NCAA, the substantial heterogeneity among member institutions is not unexpected. Providing student-athletes any information on

concussion is a positive step. However, it is of concern almost 30% of NCAA member institutions are not educating student-athletes on the long-term consequences of concussion. This is especially concerning because prior research has shown knowledge of short and long-term consequences of concussion have been strongly associated with self-reporting behaviors.⁴³

The environment in which concussion education is delivered is also a factor that can be decided by each individual institution. This study is the first to show the majority of NCAA member institutions are educating one team or multiple teams at a time. The significant heterogeneity of content and delivery environment results from the NCAA Concussion Policy not setting specific requirements, with regard to education. It is recommended that the NCAA set requirements on concussion education materials, content to be provided, and how to deliver the concussion education. With specific requirements, concussion education can become more standardized within NCAA member institutions. However, with or without requirements within the NCAA Concussion Policy, compliance may remain an issue of concern.

Non-compliance to the NCAA Concussion Policy was prevalent in this study, which supports previous findings.¹⁵ The NCAA Concussion Policy mandates that annual concussion education must be provided to student-athletes. To be non-complaint, the institution must report not providing student-athletes with annual concussion education. Reasons for non-compliance have not been researched. However, it is possible without set requirements on content and delivery method of concussion education, NCAA member institutions may not understand how concussion education should be provided. Nevertheless, future research should evaluate the current concussion education practices revealed in the present study for

effectiveness. By evaluating these current concussion education practices, gaps in education can be identified and addressed. After evaluation of current concussion education practices, the creation of improved concussion education policies can commence.

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APPENDIX A

RESEARCH QUESTIONS

The following research questions will be asked to provide basis for the discussion:

- 1) Do NCAA member institutions provide concussion education to their student-athletes?
- 2) Do NCAA member institutions provide concussion education to all of their student-athletes?
- 3) Do NCAA member institutions use the concussion education material created by the NCAA?
- 4) Do NCAA member institutions only use the concussion education material created by the NCAA?
- 5) Do NCAA member institutions differ in concussion education content and delivery methods?
- 6) Do NCAA member institutions differ in reporting limitations or barriers to providing concussion education?

HYPOTHESES

The following hypotheses were constructed off the preceding research questions:

- 1) H_A : NCAA member institutions do not provide concussion education to all student-athletes.
 H_O : NCAA member institutions do provide concussion education to all student-athletes.
 - a) H_A : There are Division level differences when reporting providing, or not providing concussion education to student-athletes.

H_0 : There are no Division level differences when reporting providing, or not providing concussion education to student-athletes.

- 2) H_A : NCAA member institutions provide concussion education only to contact/collision sports.

H_0 : NCAA member institutions do provide concussion education to all sports.

- a) H_A : There are Division level differences when reporting providing concussion education only to contact/collision sports.

H_0 : There are no Division level differences when reporting providing concussion education only to contact/collision sports.

- 3) H_A : NCAA member institutions provide concussion education material created through the NCAA.

H_0 : NCAA member institutions do not provide concussion education material created through the NCAA.

- a) H_A : There are Division level differences when reporting providing concussion education created through the NCAA.

H_0 : There are no Division level differences when reporting providing concussion education created through the NCAA.

- 4) H_A : NCAA member institutions only use concussion education material created through the NCAA.

H_0 : NCAA member institutions do not only use concussion education material created through the NCAA.

- a) H_A : There are Division level differences when reporting providing only concussion education material created through the NCAA.
- H_0 : There are no Division level differences when reporting providing only concussion education material created through the NCAA.
- 5) H_A : NCAA member institutions differ in concussion education content and delivery methods.
- H_0 : NCAA member institutions administer the same concussion education content and method of delivery.
- 6) H_A : There are Division level differences when reporting limitations and barriers to providing concussion education.
- H_0 : There are no Division level differences when reporting limitations and barriers to providing concussion education.

LIMITATIONS

One limitation to this study is that the responses will be represented based on the amount of respondents within each division. Therefore, there is potential for results to only represent certain divisions. This survey will be sent to all divisions within the NCAA with hopes to get equal respondents per division. The survey will be collecting each respondent's division level. The data to be collected is nominal data, which utilizes nonparametric statistics. This leaves room for outliers to occur, which may skew the results. Lastly, the athletics directory web page may not have the most up-to-date email addresses for their head athletic trainer. Without the correct email addresses, respondents may not receive the invite to participate in the current study. This will increase the potential for low response rate. In the case of receiving

a notice of incorrect email address, the researchers will obtain another email address from that institution's athletic directory web page.

DELIMITATIONS

The current study was delimited to the subjects who actually completed the online survey, which may not accurately portray all NCAA divisions or geographical locations. Therefore, the data is only representative of respondents of the survey. This study was also delimited to athletic trainers, whom may not create the concussion education policy. Typically athletic trainers are the main health care providers and health educators for student-athletes. However this may not be the case in all institutions where physical therapists, and/or other healthcare professionals may also play a role in the organization of concussion education. The current study is also delimited to the email address listed on each institutions athletic directory page, which may not have any of the athletic trainers listed.

ASSUMPTIONS

This study assumes that the respondents of the survey answered honestly. The perceived effectiveness question opens the respondents up to being bias towards their concussion education methods. Another assumption of this study is that the listed concussion educational interventions were representative of the majority of currently used methods of concussion education. It is also assumed that the listed concussion educational intervention choices were interpreted by the participant as they were meant by the researchers.

APPENDIX B

INTRODUCTION AND DIRECTION LETTER TO THE CONTENT JURY

**Juror's Review Form******Current Concussion Education Practice Questionnaire (CCEPQ)*****Current Concussion Education Practices in NCAA Member Institutions: A Descriptive Study**

Dear Content Jury,

My name is Sam Johnson and I am currently a master's student of athletic training in the department of Health and Kinesiology at Georgia Southern University. This letter is to inform you of the purpose of this research survey and instructions on how best to proceed as a content jury member. The results of current survey will enable me to ascertain the content validity and hopefully proceed forward in the process of completing my master's thesis. Your help and careful consideration is greatly appreciated. Please find the below content and instructions.

Content: Concussion is a major public health issue, which if not managed appropriately could result in unfavorable consequences to the patient's short and long-term health. The National Collegiate Athletic Association (NCAA), National Athletic Trainers' Association (NATA), and the Team Physician concussion statements recommend sports medicine healthcare professionals provide concussion education to participating student-athletes annually. There are currently no requirements on content, delivery, or evaluation methods for the concussion education being provided to student-athletes at NCAA member institutions. In addition, no documentation or

published data is available on what NCAA member institutions are implementing with regard to concussion education. Therefore, the primary purpose of this study is to investigate current concussion education practices at NCAA member institutions. With the results from this study, future research can evaluate these current concussion education methods for effectiveness.

Master's Thesis Committee Members

Dr. Nicholas Murray, PhD (912) 478-0203

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Dr. Nicholas Murray is the director of concussion research at Georgia Southern University. He currently serves as the chair and research advisor to this master's thesis project. He has approved this survey to be distributed to the content jury to find the item-level content validity for each item contained in this survey.

Directions to Jurors

As content experts in the field of concussion, you were each specifically chosen to evaluate the clarity and relevance of the survey. Please answer each question found in the link provided below. Upon completion of each question a text box will appear where you may choose to respond with further clarifications and comments regarding that particular question. Once all juror responses are in and processed, the survey (if found to sufficient validity and reliability) will be sent to the Institutional Review Board at Georgia Southern University. Once

this is completed, the survey will be distributed to participating healthcare professional working at a NCAA member university. Again, thank you for taking the time to review this survey and if you have any questions or concerns please do not hesitate to contact myself or Dr. Murray.

Jurors' Task

- 1) Copy the link to the online survey, below, and paste into your Web browser:

<https://www.surveymonkey.com/s/M879LPF>

- 2) Please only mark one response regarding "Relevancy", and one response regarding "Clarity" for each survey item.

For example please indicate whether each item is:

Relevant; Relevant with minor revision; Not relevant without major revision; or Not relevant

Clear; Clear with minor revision; Not clear without major revision; or Not clear

- 3) If you marked "*Not clear without major revision*", "*Not clear*", "*Not relevant without major revision*", or "*Not relevant*", please feel free to specify why you chose that in the comment box below each item.
- 4) Contact Sam Johnson at (231)286-6346 if you have questions or concerns regarding the above instructions.
- 5) Please complete by **April 25th, 2015**.

*Adapted from Geiger, B.F. & Fulmore, J.S. (2007). "Juror's Review Form AL Curriculum Coordinator's Survey About Cancer Education," available from the authors, UAB Center for Educational Accountability, Room EB 233, 1530 3rd Ave. So., Birmingham, AL 35294-1250, Tel.

205/975-5388.

Juror Instructions

Please only mark one response regarding "Relevancy", and one response regarding "Clarity" for each survey item.

For example please indicate whether each item is:

Relevant; Relevant with minor revision; Not relevant without major revision; or Not relevant

Clear; Clear with minor revision; Not clear without major revision; or Not Clear

If you marked "Not clear without major revision", "Not clear", "Not relevant without major revision", or "Not relevant", please feel free to specify why you chose that in the comment box below each item.

Contact Sam Johnson at (231)286-6346 if you have questions or concerns regarding the above instructions

Please complete by April 25th, 2015.

Next

Current Concussion Education Practices Questionnaire (CCEPQ) - Content Jury's

Demographics

1. Please rate the relevancy of each item below.

	Relevant	Relevant with minor revision	Not relevant without major revision	Not relevant
What is your sex?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
What is your age?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
Are you a Board of Certification certified Athletic Trainer?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
What is your job title?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
How long have you been in this position (job title)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
Are you an Athletic Trainer at an NCAA member university?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
What NCAA Division is your university?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
Are you aware of the NCAA Concussion Policy and Legislation regarding concussion education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose "Not relevant without major revision" or "Not relevant", please explain why below.

2. Please rate the clarity of each item below.

Clear Clear with minor revision Not clear without major revision Not clear

What is your sex?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

What is your age?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Are you a Board of Certification (BOC) certified Athletic Trainer?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

How long have you been a certified Athletic Trainer?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

What is your job title?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

How long have you been in this position (job title)?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Are you an Athletic Trainer at an NCAA member university?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

What NCAA Division is your university?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Are you aware of the NCAA Concussion Policy and Legislation regarding concussion education?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Previous

Next

Current Concussion Education Practices Questionnaire (CCEPQ) - Content Jury's

Concussion Education Questionnaire

3. Please rate the relevancy of each item below.

	Relevant	Relevant with minor revision	Not relevant without major revision	Not relevant
Does your university's athletic department, or sports medicine department, provide concussion education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
To whom does your university's concussion education get provided to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
What sports are provided with concussion education at your university?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
When does this concussion education get provided at your university?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
Where are the student-athletes when they receive your university's concussion education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
What is the environment in which the concussion education is provided?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
What topic areas of concussion are included in your university's concussion education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Relevant	Relevant with minor revision	Not relevant without major revision	Not relevant
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
What does your university do for concussion education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
How often is the concussion education provided to student-athletes at your university?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
Does your university provide the concussion education to their coaching staff?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				
Is the coaching staff present during the administration of the concussion education to student-athletes at your university?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not relevant without major revision" or "Not relevant", please explain why below.				
<input type="text"/>				

4. Please rate the clarity of each item below.

	Clear	Clear with minor revision	Not clear without major revision	Not clear
Does your university's athletic department, or sports medicine department, provide concussion education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not clear without major revision" or "Not clear", please explain why below.				
<input type="text"/>				
To whom does your university's concussion education get provided to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you chose "Not clear without major revision" or "Not clear", please explain why below.				
<input type="text"/>				
What sports are provided with concussion education at your university?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose "Not clear without major revision" or "Not clear", please explain why below.

When does this concussion education get provided at your university?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Where are the student-athletes when they receive your university's concussion education?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

What is the environment in which the concussion education is provided?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

What topic areas of concussion are included in your university's concussion education?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

What does your university do for concussion education?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

How often is the concussion education provided to student-athletes at your university?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Does your university provide the concussion education to their coaching staff?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Is the coaching staff present during the administration of the concussion education to student-athletes at your university?

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Previous

Next

Perceived Effectiveness of Concussion Education

5. Please rate the item below on relevancy. This item requires the respondent to rate this statement on a Likert Scale: 1 being strongly disagree, and 7 being strongly agree.

	Relevant	Relevant with minor revision	Not relevant without major revision	Not relevant
Your university's concussion education program is effective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose "Not relevant without major revision" or "Not relevant", please explain why below.

6. Please rate the item below on clarity. This item requires the respondent to rate this statement on a Likert Scale: 1 being strongly disagree, and 7 being strongly agree.

	Clear	Clear with minor revision	Not clear without major revision	Not clear
Your university's concussion education program is effective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Previous

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Limitations/Barriers

7. Please rate the relevancy of the item below.

	Relevant	Relevant with minor revision	Not relevant without major revision	Not relevant
What are limitations or barriers that effect administration of your university's concussion education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose "Not relevant without major revision" or "Not relevant", please explain why below.

8. Please rate the clarity of the item below.

	Clear	Clear with minor revision	Not clear without major revision	Not clear
What are limitations or barriers that effect administration of your university's concussion education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose "Not clear without major revision" or "Not clear", please explain why below.

Previous

Next

Comments, Concerns and Suggestions

9. Please leave any general comments, concerns or suggestions below.

Previous

Next



Thank you for your time and review of this survey!

Previous

Next

ITEM-LEVEL CONTENT VALIDITY INDEX RESULTS AND EXPLANATION

The I-CVI score of 0.78 was interpreted by the researchers as good content validity. Each survey item had to reach 0.78 for both relevancy and clarity. All of the survey items reached the acceptable I-CVI score with regards to relevancy, except for one of the demographics questions (see Figure 2. Content validity results). This question involved the respondent to report what sex (male or female) that they are. Due to this not directly effecting the hypotheses, the researchers decided to include this question in the final survey. Only three of the survey items did not reach an acceptable I-CVI score, with regard to clarity (see Figure 2. Content validity results). Due to all three of these questions reaching acceptable I-CVI scores with relevancy, these three questions were rephrased in hopes to increase clarity. These three questions were not resent out for additional clarity testing.

Content Jury Survey Results		Relevancy	Clarity
Demographics			
1	What is your sex?	60%	100%
2	What is your age?	100%	100%
3	Are you a Board of Certification (BOC) certified Athletic Trainer?	100%	100%
4	What is your job title?	80%	100%
5	How long have you been in this position?	80%	100%
6	Are you an Athletic Trainer at an NCAA member university?	100%	100%
7	What NCAA Division is your university?	100%	100%
8	Are you aware of the NCAA Concussion Policy and Legislation Regarding concussion education?	100%	100%
Concussion Education Questionnaire			
9	Does your university provide concussion education?	100%	80%
10	To whom does your university's concussion education get provided to?	100%	80%
11	What sports are provided with concussion education at your university?	100%	100%
12	When does concussion education get provided to student-athletes at your university?	100%	80%
13	Where are the student-athletes when they receive your university's concussion education?	100%	60%
14	What is the environment in which the concussion education is provided?	80%	80%
15	What topic areas of concussion are included in your university's concussion education?	80%	60%
16	What does your university do for concussion education?	80%	60%
17	How often is the concussion education provided to student-athletes at your university?	100%	100%
18	Does your university provide the concussion education to their coaching staff?	80%	100%
19	Is the coaching staff present during the administration of the concussion education to student-athletes at your university?	100%	100%
Perceived Effectiveness of Concussion Education			
20	Your university's provided concussion education is effective.	80%	80%
Limitations/Barriers to Providing Concussion Education			
21	What are the limitations or barriers that affect providing your university's concussion education?	100%	100%
KEY			
	Survey item was accepted due to appropriate relevancy to the study, however reworded due to insufficient clarity.		
	Wording of the survey item was adjusted per reviewers request for clarity.		
	Survey item was discarded due to insufficient relevancy and clarity values.		
	Percentage below the acceptable value.		

Figure 2: Current Concussion Education Practices Questionnaire (CCEPQ) Content Validity

Results

The blue highlighted items represent the three items which failed to reach 0.78 in regard to clarity (see Figure 2. Content validity results). However, these items were rephrased and kept due to reach of the items reaching appropriate I-CVI scores in regard to relevancy. The yellow highlighted questions were updated based on language changes (see Figure 2. Content validity results). This involved changing “university” to “institution”, based on appropriate language.

APPENDIX C

PARTICIPANT RECRUITMENT EMAIL

“Greetings,

This email message is an approved request for your participation in research that has been approved by the Georgia Southern University Institutional Review Board (IRB).

My name is Sam Johnson and I am currently a master’s student of post-professional athletic training, in the department of Health and Kinesiology at Georgia Southern University. As partial requirement of my master’s degree, this study desires to collect data on current National Collegiate Athletic Association (NCAA) concussion education practices. You have been found and contacted via your university’s directory page, for participation in this study. The purpose of this study is to investigate current concussion education practices at NCAA member institutions. With the results from this study, future research can evaluate these current concussion education methods for effectiveness.

Your participation in this study would be highly beneficial to leading future research, and the continual improvement of concussion education policies. Your participation is completely voluntary, and no reward or compensation will be provided. You will be required to complete a twenty question online survey, which can be found by accessing the link below. Completion of this survey should only take 10-15 minutes, and would be very much appreciated.

(Link will be inserted here once survey is opened)

This project has been reviewed by the GSU Institutional Review Board under tracking number H15428. To contact the Office of Research Compliance for answers to questions about

the rights of research participants or for privacy concerns please email

IRB@georgiasouthern.edu or call (912) 478-0843.

Questions about this research should be addressed to either of the below contact information:

Samuel Johnson II, ATC, LAT

352 Langston Chapel Road

Statesboro, GA 30458

Cell: (231) 286-6346

Email: sj02931@georgiasouthern.edu

Or

Nicholas Murray, PhD

P.O. BOX 8076

Statesboro, GA 30458

Phone: (912) 478-0203

Email: nmurray@georgiasouthern.edu

Thank you for your consideration and/or participation.

Sincerely,

Sam Johnson, ATC, LAT

Georgia Southern University

Graduate Assistant Athletic Trainer - Women's Volleyball

sj02931@georgiasouthern.edu

C - 231.286.6346"



**GEORGIA SOUTHERN
UNIVERSITY**

**College of Health and Human Sciences
Department of Health and Kinesiology**

**Current Concussion Education Practices in NCAA Member
Institutions: A Descriptive Study
Informed Consent**

My name is Sam Johnson and I am currently a master's student of post-professional athletic training, in the department of Health and Kinesiology at Georgia Southern University. Concussion is a major public health issue, which if not managed appropriately could result in unfavorable consequences to the patient's short and long-term health. The National Collegiate Athletic Association (NCAA) concussion statement mandates that sports medicine healthcare professionals provide concussion education to participating student-athletes annually. There are currently no requirements on content, delivery, or evaluation methods for the concussion education being provided to student-athletes at NCAA member institutions. In addition, no documentation or published data is available on what concussion education is being provided to student-athletes at NCAA member institutions. Therefore, the primary purpose of this study is to investigate current concussion education practices at NCAA member institutions. With the results from this study, future research can evaluate these current concussion education methods for effectiveness.

I, the participant of this study, will completion this online survey voluntarily. There will be no reward or compensation for my participation. I must be eighteen years or older to participate. I will be required to complete a twenty question online survey. Completion of this survey should take me ten to fifteen minutes. I may withdraw from completing the online survey at any time, and can decline to answer survey questions if desired. There will not be a follow-up survey. Completion of this survey will not cause me any physical or emotional discomfort, and there are no associated risks. There are no benefits to me directly; however society will benefit by the results raising concussion awareness, and assisting in the improvement of concussion education policies.

Survey responses will be submitted anonymously. I will not be asked to provide my contact information, and my IP address will not be collected. My completed survey will be given an identification code, which will only be used by the researchers. My email address in which I was contacted through will be stored in a password protected computer file, and will not be used or distributed at any time for other reasons outside this study. All survey responses will be stored in a locked cabinet for a minimum of seven years, at which all survey responses will be destroyed by the committee chair/research advisor.

I, the participant of this study, will received a copy of this consent form to keep for my records. This project has been reviewed by the GSU Institutional Review Board under tracking number *H15428*. To contact the Office of Research Compliance for answers to questions about the rights of research participants or for privacy concerns please email IRB@georgiasouthern.edu or call (912) 478-0843.

Principal Investigator:
Samuel Johnson II, ATC, LAT
352 Langston Chapel Road
Statesboro, GA 30458
Cell: (231) 286-6346
Email: sj02931@georgiasouthern.edu

Faculty Advisor:
Nicholas Murray, PhD
P.O. BOX 8076
Statesboro, GA 30458
Phone: (912) 478-0203
Email: nmurray@georgiasouthern.edu

By starting this online survey, I acknowledge that I have read the above information, and agree to participate. I begin this online survey with the knowledge that I may withdraw my participation at any time without penalty.

>>



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What sex are you?

- Male
- Female
- I choose not to answer.

Are you a Board of Certification (BOC) certified Athletic Trainer?

- Yes
- No

Are you an Athletic Trainer at an NCAA member institution?

- Yes
- No

>>



What NCAA Division is your institution?

- Division 1
- Division 2
- Division 3

What is your job title? (Select all that apply)

- Associate Athletic Director
- Director of Sports Medicine
- Head Athletic Trainer
- Associate/Assistant Athletic Trainer
- Graduate Assistant Athletic Trainer
- Intern Athletic Trainer

How long have you been in this position?

- 5 or less years
- 5-10 years
- 10 or more years

What is your age?

- <20 years of age
- 20-29 years of age
- 30-39 years of age
- 40-50 years of age
- 50+ years of age

Are you aware of the NCAA Concussion Policy and Legislation regarding concussion education?

- Yes
- No

>>



Does your institution's provide concussion education?

- Yes
- No
- Unsure

To whom does your institution's concussion education get provided to? (Select all that apply)

- Student-Athletes
- Coaching Staff
- Athletic Administration
- Sports Medicine Staff
- Unsure

Athletes in which sports are provided with concussion education at your institution? (Select all that apply)

- Contact or Collision Sports
- Limited Contact Sports
- Non-Contact Sports
- Unsure

When does concussion education get provided to student-athletes at your institution?

- During the Preparticipation Physicals
- Before the Beginning of Each Athlete's Particular Sport's Season
- During the Inseason of a Particular Sport
- At the End of the Academic Year
- Unsure
- Other (Please Specify Below)

Which area of campus are your student-athletes when they receive your institution's concussion education?

- Academic Lecture Hall or Classroom
- Sport's Team Meeting Room
- Athletic Training Room or Sports Medicine Room
- Practice Field
- Unsure
- Electronic Classroom
- Other

What is the environment in which the the concussion education is given?

- One-on-One Discussion
- One Team at a Time
- Multiple Teams at a Time
- Concussion Education is Completed by each Student-Athlete on their own time
- Unsure

What information about concussion is provided to your student-athletes during your institution's concussion education? Please select all that apply.

- Definition of Concussion
- Biomechanics of Concussion
- Pathophysiology of Concussion
- Signs and Symptoms of Concussion
- What to do if You Think You May Have a Concussion
- What to do if You Think Your Teammate May Have a Concussion
- Common Misconceptions About Concussion
- How a Concussion is Diagnosed
- University's Return to Play Policy Following a Concussion
- Long-Term Consequences of Concussion
- General Questions and Answers Session
- Other (Please Specify Below)

- Unsure

**What method(s) are used to educate student-athletes about concussion at your institution?
Please select all that apply.**

- Handout NCAA Concussion Facts Sheet
- Watch NCAA Concussion Education Video
- Interactive Computer Module
- General Discussion between Student-Athletes and Athletic Training Staff
- General Discussion between Student-Athletes and Team Physician
- General Discussion between Student-Athletes and Neurologist
- Unsure
- Other (Please Specify Below)

How often is the concussion education provided to student-athletes at your institution?

- Once Every Sports Season
- Once Per Academic Semester
- Once to Every Incoming Freshman/Transfer Class
- Annually
- Bi-Annually
- Every Other Year
- Unsure
- Other (Please Specify Below)

Does your institution provide the concussion education to their coaching staff?

- Yes
- No
- Unsure

Is the coaching staff present during the administration of the concussion education to student-athletes at your institution?

- Yes
- No
- Unsure

>>



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Your institution's provided concussion education is effective.

Strongly Disagree Somewhat Disagree Disagree Neither Disagree or Agree Agree Somewhat Agree Strongly Agree



>>



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What are the limitations or barriers that affect providing your institution's concussion education?

- Money
- Time
- Lack of Concussion Education Material
- Other (If selected please list reason in text box below)

>>



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We thank you for your time spent taking this survey.
Your response has been recorded.

APPENDIX D

INSTITUTIONAL REVIEW BOARD APPLICATION FOR RESEARCH APPROVAL

Research Compliance Combined Cover Page
Georgia Southern University
Application for Research Approval

Investigator Information:		
Name of Principal Investigator: Samuel Ernest Johnson II	Phone: 2312866346	For Office Use Only: Protocol ID: _____ Date Received:
Email: sj02931@georgiasouthern.edu (Note: Georgia southern email addresses will be used for correspondance.)	<input type="checkbox"/> Faculty; <input type="checkbox"/> Doctoral; <input type="checkbox"/> Specialist; <input checked="" type="checkbox"/> Masters <input type="checkbox"/> Undergraduate	
Department Name and PO Box:		
Name(s) of Co-Investigators: Dr. Nicholas Murray (Chair) Dr. Donna Burnett Ms. Erin Jordan	Phone: 9124780203 9124782123 9124787734	
Email addresses: nmurray@georgiasouthern.edu Faculty dburnett@georgiasouthern.edu Faculty ejordan@georgiasouthern.edu Faculty	<input checked="" type="checkbox"/> Faculty; <input type="checkbox"/> Doctoral; <input type="checkbox"/> Specialist; <input type="checkbox"/> Masters <input type="checkbox"/> Undergraduate (If multiple: identify by initial letter behind name. E.g., F for faculty)	
Department Name and PO Box: P.O. Box 8076	School of Health and Kinesiology	
Personnel and/or Institutions Outside of Georgia Southern University involved in this research (Attach training certification): N/A		
Project Information: (Note: funded project titles must match grant title)		
Title: Current Concussion Education Practices in NCAA Member Institutions: A Descriptive Study		
Brief (less than 50 words) Project Summary: The NCAA mandates that concussion education should be provided to student-athletes annually. Researchers have found that some NCAA member institutions do not provide concussion education, and some only to certain sports. The current study will discover what NCAA member institutions' current concussion education practices are.		
Compliance Information:		
Please indicate which of the following will be used in your research: (application may be submitted simultaneously)		
<input checked="" type="checkbox"/> Human Subjects (Complete Section A: Human Subjects below)		
<input type="checkbox"/> Care and Use of Vertebrate Animals (Complete Section B: Care and Use of Vertebrate Animals below)		
<input type="checkbox"/> Biohazards (Complete Section C: Biohazards below)		

<input type="checkbox"/> Do you or any investigator on this project have a financial interest in the subjects, study outcome or project sponsor. (A disclosed conflict of interest will not preclude approval. An undisclosed conflict of interest will result in disciplinary action.). N/A	
Project Start Date: 07/30/2015 End Date: 05/01/2016 (no more than 1 year) Anticipated renewals <input type="checkbox"/> year 2 <input type="checkbox"/> year 3	Check one: <input checked="" type="checkbox"/> New submission <input type="checkbox"/> Resubmission # _____
Funding Source: <input type="checkbox"/> Federal <input type="checkbox"/> State <input type="checkbox"/> Private <input type="checkbox"/> Internal GSU <input checked="" type="checkbox"/> Self-funded/non- funded	
Funding Agency:	<input checked="" type="checkbox"/> Not Applicable

Section A: Human Subjects <input type="checkbox"/> Not Applicable	
Number of Subjects (Maximum) <u>1,281</u>	Date of IRB education completion: 01/18/2015 (attach copy of completion certificate)
<i>Purpose of Research: (Check all that apply)</i> <input checked="" type="checkbox"/> Publication/use in thesis/dissertation <input checked="" type="checkbox"/> Publication (journal, book, etc.) <input type="checkbox"/> Poster/presentation to a scientific audience <input type="checkbox"/> Completion of a class project <input type="checkbox"/> Presentation to GSU audience only <input type="checkbox"/> Presentation in outside of GSU <input type="checkbox"/> Results will not be published <input type="checkbox"/> Other	<i>Please indicate if the following are included in the study (Check all that apply):</i> <input type="checkbox"/> Human Subjects Incentives <input checked="" type="checkbox"/> Informed Consent Document <input type="checkbox"/> Greater than minimal risk <input type="checkbox"/> Research Involving Minors <input type="checkbox"/> Deception <input checked="" type="checkbox"/> Generalizable knowledge (results are intended to be published) <input checked="" type="checkbox"/> Survey Research <input type="checkbox"/> At Risk Populations (prisoners, children, pregnant women, etc) <input type="checkbox"/> Video or Audio Tapes <input type="checkbox"/> Medical Procedures, including exercise, administering drugs/dietary supplements, and other procedures

Section B: Care and Use of Vertebrate Animals <input checked="" type="checkbox"/> Not Applicable	
<i>Purpose of use/care of animals:</i> <input type="checkbox"/> Research <input type="checkbox"/> Teaching <input type="checkbox"/> Demo only <input type="checkbox"/> Student participation in faculty work <input type="checkbox"/> Class Project <input type="checkbox"/> Exhibition <input type="checkbox"/> Display	<i>Please indicate if the following are included in the study:</i> <input type="checkbox"/> Physical intervention with vertebrate animals <input type="checkbox"/> Housing of vertebrate animals <input type="checkbox"/> Euthanasia of vertebrate animals <input type="checkbox"/> Use of sedation, analgesia, or anesthesia <input type="checkbox"/> Surgery <input type="checkbox"/> Farm animals for biomedical research (e.g., diseases, organs, etc.) <input type="checkbox"/> Farm animals for agricultural research (e.g., food/fiber production, etc.) <input type="checkbox"/> Observation of vertebrate animals in their natural setting

Section C: Biological Research <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Submitted Separately	
<i>Biosafety Level:</i> <input type="checkbox"/> Exempt <input type="checkbox"/> BSL 1 <input type="checkbox"/> BSL 2 <input type="checkbox"/> BSL 3	<i>Please indicate if the following are included in the study:</i> <input type="checkbox"/> Use of rDNA <input type="checkbox"/> Non native/invasive plant species <input type="checkbox"/> Last EHS lab safety inspection date: <u>Attach Report</u> <input type="checkbox"/> Last IBC biosafety lab inspection date: <u>Attach Report</u>

Signature of Applicant(s): (PI, CoPI)	Date:
X	

<i>If student project please complete research advisor's information below (note that advisor signature must be received before application will be reviewed.):</i>	
Research Advisor's Name: Nicholas Murray, PhD	Advisor's E-mail: nmurray@georgiasouthern.edu
Advisor's Phone: 912 478 0200	Advisor's Department: School of Health and Kinesiology P.O. Box: 8076
If student project - Signature of faculty member who is responsible for the student conducting research. If faculty project – Signature of department head or chair.	
<i>By signing this cover page I acknowledge that I have reviewed and approved this protocol for scientific merit, rational and significance. I further acknowledge that I approve the ethical basis for the study.</i>	
Signature of Committee Chair/Research Advisor (if student) Department Chair(if faculty):	Date:
X	

Please submit this protocol to the Georgia Southern University Research Compliance Office, c/o The Office of Research Services & Sponsored Programs, P.O. Box 8005. The application should contain all required documents specific to the committee to which you are applying. Questions or comments can be directed to (912)478-0843 or IRB@georgiasouthern.edu Fax 912-478-0719.

For optional email submission: Save the application forms to your computer. Complete the forms and name them beginning with your last name and first initial. Email the entire submission package to IRB@georgiasouthern.edu in a single email. Original signature pages may follow by mail or fax. (Signatures located on cover page, certification of investigator responsibilities and last page of application where certifications required.)

NARRATIVE FOR RESEARCH APPROVAL

PERSONNEL

Samuel Johnson, ATC, LAT – Graduate Student/Principal Investigator

Dr. Nicholas Murray, PhD – Georgia Southern Faculty Member/Co-Investigator (CHAIR)

Dr. Donna Burnett, PhD – Georgia Southern Faculty Member/Co-Investigator

Erin Jordan, MS, ATC, LAT – Georgia Southern Faculty Member/Co-Investigator

PURPOSE

The purpose of this study is to discover what NCAA member institutions are implementing with regard to concussion education.

Research Questions:

Do NCAA member institutions provide concussion education to their student-athletes?

Do NCAA member institutions provide concussion education to all of their student-athletes?

Do NCAA member institutions use the concussion education material created by the NCAA?

Do NCAA member institutions only use the concussion education material created by the NCAA?

Hypotheses:

NCAA member institutions do not provide concussion education to all student-athletes.

NCAA member institutions provide concussion education only to contact/collision sports.

NCAA member institutions provide concussion education material created through the NCAA.

NCAA member institutions only use concussion education material created through the NCAA.

There will be no immediate benefit to the participants or others from this project.

Evaluation of current concussion education programs is important, and cannot be performed

until there is documentation of what concussion education NCAA member institutions are providing to their student-athletes. The findings from this study will add to the body of knowledge for future concussion education research to continue. The further researched concussion education can lead to increased awareness, and improve concussion education policies.

LITERATURE REVIEW

Concussions are a wide spread public health issue, which have been found to be grossly underreported⁴. Any temporary neurologic dysfunction following a biomechanical force placed upon the head or body is considered to be a concussion¹. An estimated 1.6 to 3.8 million sport-related concussions occur annually in the United States³. These numbers of sport-related concussions have come from a study in 2006. Most likely, the annual total in the United States has risen since then. Reasons for this included increased awareness of concussion, and possible increased self-report rates of concussion.

Diagnosis and safe care of a patient with a concussion relies on the patient being honest, and having appropriate knowledge and attitude regarding concussion. McCrea et al. found that only 47.3% of their 1,532 participants reported their concussive injury to an appropriate healthcare professional⁴. Similarly, Delaney et al. found that 78.3% of their participants who believed they sustained a concussion, failed to report their symptoms to an appropriate healthcare professional⁸. One explanation for these studies findings is that high school and collegiate athletes do not have the appropriate knowledge of concussion symptoms or long-term consequences^{9,10}.

Failing to recognize and report concussion-like symptoms can predispose student-athletes to long-term consequences, or even further catastrophic injury such as death^{2,6}. Examples of these long-term consequences included increase risk to depression¹¹, motor system abnormalities¹², chronic traumatic encephalopathy¹³, and dementia-related syndromes¹⁴. Due to this it is of high importance that concussion education be effective in preventing premature return to participation after concussion.

Education as a means for prevention has been used throughout the public health field. Sports medicine healthcare providers are recommend to provide concussion education to their patients^{2,15}. With knowledge of patients failing to recognize and report concussion-like symptoms, proper education can lead to earlier recognition and prevent further catastrophic injury. However many studies have found that athletes still have insufficient knowledge when it comes to head injury^{4,8-10}. Other reasons why concussion symptoms go underreported is due to patients disbelief that concussions are a serious injury, and therefore did not wish to be removed from the game⁸. There are strong implications for furthering concussion knowledge in patients and changing attitudes towards concussion.

In the collegiate setting, the NCAA provides concussion education materials to all participating institutions. In the *2013-14 NCAA Sports Medicine Handbook*, the NCAA released a Concussion Policy and Legislation for all member institutions to follow¹⁸. This statement insists that all NCAA member institutions provide annual concussion education to their student-athletes. The NCAA does provide concussion educational tools/materials for sports medicine clinicians to use¹⁶. These concussion education tools/materials can be found online, free of charge.

With this policy and legislation being released, compliance with this mandate is brought to the forefront of research. The NCAA mandates that all student-athletes receive annual concussion education; Baugh et al. found that 70.8% of NCAA member institutions provide concussion education to their student athletes¹⁵. The authors of this NCAA concussion policy compliance study also found that 15.6% of NCAA member institutions only provide concussion education to contact collision sports¹⁵. This is a major compliance issue that directly affects the safety and well-being of the student-athletes.

Another major issue is that there are no requirements on content, delivery and evaluation of concussion education. This fact along with the findings from Baugh et al.¹⁵, raise concern to what current concussion education practices are at NCAA member institutions. Without documentation of what current concussion education practices in NCAA institutions are, there is no way to evaluate them for effectiveness. By not evaluating these current practices for effectiveness, there is no way of knowing if there are gaps in the education or if it is being delivered appropriately. Currently there is no documentation to how, where and when concussion education is provided to student-athletes at NCAA member institutions. With this knowledge, current concussion education practices can be evaluated and the creation of improved concussion education policies can commence.

OUTCOME

The results of this study hope to support a previous study's findings on the number of NCAA member institutions provided concussion education, and to what groups of student-athletes the concussion education is provided to. I also expect to discover more about the content and delivery methods used when providing concussion education at NCAA member

institutions. Knowledge of what current concussion education practices are in NCAA member institutions, future research can evaluate these methods for effectiveness. This will benefit student-athletes and sports medicine clinicians by providing better prevention methods for premature return to play after concussion. The results from this study may also help drive concussion education policy changes within the NCAA.

SUBJECTS

The current study will survey collegiate athletic trainers who work at NCAA member institutions. There will only be one athletic trainer represented from each 1,281 NCAA member institutions. The athletic trainers will be contacted via email. All email addresses were collected off each institutions athletic directory web page, and recorded in an excel document by the primary investigator. The target population is one athletic trainer from each of the 1,281 NCAA member institutions. The current study desires to consist of respondents from all NCAA divisions, evenly dispersed. This will assist in the representation, and comparison between NCAA divisions. Completion of this survey will be voluntary, and there will be no reward or compensation upon completion.

Inclusion Criteria:

- Board of Certification (BOC) certified Athletic Trainer
- Athletic Trainer works at an NCAA member institution
- Did not participate as a member of the content jury for this study
- Did not participate as a participant in the pilot study of this survey

Exclusion Criteria:

- Non BOC certified Athletic Trainer

- Athletic Trainer currently not working at an NCAA member institution
- Member of the content jury for this study
- Participant in the pilot study of this survey

RECRUITMENT AND INCENTIVES

The participants will complete the survey voluntarily, and there will be no reward or compensation upon completion. Below is a copy of the email which will be sent to all participants.

“Greetings,

This email message is an approved request for your participation in research that has been approved by the Georgia Southern University Institutional Review Board (IRB).

My name is Sam Johnson and I am currently a master’s student of post-professional athletic training, in the department of Health and Kinesiology at Georgia Southern University. As partial requirement of my master’s degree, this study desires to collect data on current National Collegiate Athletic Association (NCAA) concussion education practices. You have been found and contacted via your university’s directory page, for participation in this study. The purpose of this study is to investigate current concussion education practices at NCAA member institutions. With the results from this study, future research can evaluate these current concussion education methods for effectiveness.

Your participation in this study would be highly beneficial to leading future research, and the continual improvement of concussion education policies. Your participation is completely voluntary, and no reward or compensation will be provided. You will be required to complete a twenty question online survey, which can be found by accessing the link below.

Completion of this survey should only take 10-15 minutes, and would be very much appreciated.

(Link will be inserted here once survey is opened)

This project has been reviewed by the GSU Institutional Review Board under tracking number H15428. To contact the Office of Research Compliance for answers to questions about the rights of research participants or for privacy concerns please email IRB@georgiasouthern.edu or call (912) 478-0843.

Questions about this research should be addressed to either of the below contact information:

Samuel Johnson II, ATC, LAT

352 Langston Chapel Road

Statesboro, GA 30458

Cell: (231) 286-6346

Email: sj02931@georgiasouthern.edu

Or

Nicholas Murray, PhD

P.O. BOX 8076

Statesboro, GA 30458

Phone: (912) 478-0203

Email: nmurray@georgiasouthern.edu

Thank you for your consideration and/or participation.

Sincerely,

Sam Johnson, ATC, LAT

Georgia Southern University

Graduate Assistant Athletic Trainer - Women's Volleyball

sj02931@georgiasouthern.edu

C - 231.286.6346"

RESEARCH PROCEDURES AND TIMELINE

This study is a cross-sectional survey design. The survey will consist of twenty-one structured and unstructured items, in hopes to get the most accurate response from each participant. The survey will consist of four sections: demographics, concussion education questionnaire, limitations/barriers to providing concussion education, and the athletic trainers' perceived effectiveness of the concussion education. The demographics section to ensure the subject meets the inclusion criteria. The second section will consist of questions of what the subject's institution's current concussion education practices are. The third section will consist of one question that examines the level of perceived effectiveness of the concussion education program. The fourth section will consist of one question asks what are the limitations or barriers to providing concussion education at the subject's institution. This survey will be administered online, where all subjects will be sent three reminders over the length of the study in hopes to increase response rate. This online survey will open August 1st, 2015 and close October 1st, 2015.

Face validity for each survey item. This was found by having five content experts review each survey item and rate its relevance and clarity. Survey items which are found to not be relevant and/or clear by more than one content juror were discarded, or revised. The survey items had a 92.38% overall average percentage for relevance, and 89.52% overall average

percentage for clarity. The survey is currently piloted to a select group of Athletic Trainers working at a NCAA member institution.

DATA ANALYSES

Statistical Package for Social Sciences (SPSS) software version 21.0 will be used for all analyses. Data will be analyzed via nonparametric analyses. Nonparametric tests are used when nominal data is being collected. Measures of central tendency will be found for each survey item. Nonparametric tests are performed without the assumption that the outcomes will be normally distributed. Utilizing the mode will be most appropriate to extrapolate the results. The mode is a measure of outcome frequency, which will better represent the way the three divisions answer each survey item. Outliers, away from the mode, will be reported if present. A single survey item, or a combination of survey items will be used to answer each hypotheses. Respondent division-level categorical differences across survey items (8-20) will be assessed with 2X2 chi-square test of independence. Differences amongst NCAA divisions will be assessed by using a pairwise comparison after using a post hoc Bonferroni correction, with discovered P-values. The alpha value of 0.05 will be set a priori. The data will be kept in a locked cabinet in the Georgia Southern University's biomechanics lab for seven years or more. After those seven years if the data is unusable, it will be destroyed at Georgia Southern University by my research supervisor.

SPECIAL CONDITIONS:

RISK

This is a survey design study, which all subjects must voluntarily complete. If the subject can choose to end the survey at any moment, for any reason.

RESEARCH INVOLVING MINORS

This study will not involve minors.

DECEPTION

This study does not involve deception.

MEDICAL PROCEDURES

This study does not involve medical procedures.

REFERENCES

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7. McCrory P, Meeuwisse WH, Aubry M, et al. Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport, Zurich, November 2012. *J Athl Train*. 2013;48(4):554-575.
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INFORMED CONSENT OF THE CURRENT CONCUSSION EDUCATION PRACTICES QUESTIONNAIRE

College of Health and Human Sciences

Department of Health and Kinesiology

Current Concussion Education Practices in NCAA Member

Institutions: A Descriptive Study

Informed Consent

My name is Sam Johnson and I am currently a master's student of post-professional athletic training, in the department of Health and Kinesiology at Georgia Southern University. Concussion is a major public health issue, which if not managed appropriately could result in unfavorable consequences to the patient's short and long-term health. The National Collegiate Athletic Association (NCAA) concussion statement mandates that sports medicine healthcare professionals provide concussion education to participating student-athletes annually. There are currently no requirements on content, delivery, or evaluation methods for the concussion education being provided to student-athletes at NCAA member institutions. In addition, no documentation or published data is available on what concussion education is being provided to student-athletes at NCAA member institutions. Therefore, the primary purpose of this study is to investigate current concussion education practices at NCAA member institutions. With the results from this study, future research can evaluate these current concussion education methods for effectiveness.

I, the participant of this study, will completion this online survey voluntarily. There will be no reward or compensation for my participation. I must be eighteen years or older to participate. I will be required to complete a twenty question online survey. Completion of this

survey should take me ten to fifteen minutes. I may withdraw from completing the online survey at any time, and can decline to answer survey questions if desired. There will not be a follow-up survey. Completion of this survey will not cause me any physical or emotional discomfort, and there are no associated risks. There are no benefits to me directly; however society will benefit by the results raising concussion awareness, and assisting in the improvement of concussion education policies.

Survey responses will be submitted anonymously. I will not be asked to provide my contact information, and my IP address will not be collected. My completed survey will be given an identification code, which will only be used by the researchers. My email address in which I was contacted through will be stored in a password protected computer file, and will not be used or distributed at any time for other reasons outside this study. All survey responses will be stored in a locked cabinet for a minimum of seven years, at which all survey responses will be destroyed by the committee chair/research advisor.

I, the participant of this study, will received a copy of this consent form to keep for my records. This project has been reviewed by the GSU Institutional Review Board under tracking number H15428. To contact the Office of Research Compliance for answers to questions about the rights of research participants or for privacy concerns please email IRB@georgiasouthern.edu or call (912) 478-0843.

Principal Investigator:

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By starting this online survey, I
acknowledge that I have read the above
information, and agree to participate. I
begin this online survey with the knowledge
that I may withdraw my participation at any
time without penalty.

INSTITUTIONAL REVIEW BOARD RESEARCH APPROVAL LETTER

Georgia Southern University Office of Research Services & Sponsored Programs		
Institutional Review Board (IRB)		
Phone: 912-478-0843		Veazey Hall 2021
Fax: 912-478-0719	IRB@GeorgiaSouthern.edu	P.O. Box 8005 Statesboro, GA 30460

To: Samuel Ernest Johnson II
Dr. Nicholas Murray
Dr. Donna Burnett
Erin Jordan

From: Office of Research Services and Sponsored Programs
Administrative Support Office for Research Oversight Committees
(IACUC/IBC/IRB)

Initial Approval Date: 08/17/2015

Expiration Date: 07/31/2016

Subject: Status of Application for Approval to Utilize Human Subjects in Research –
Expedited or Full Board Process

After a review of your proposed research project numbered **H15428** and titled "**Current Concussion Education Practices in NCAA Member Institutions: A Descriptive Study**" it appears that (1) the research subjects are at minimal risk, (2) appropriate safeguards are planned, and (3) the research activities involve only procedures which are allowable. You are authorized to enroll up to a maximum of **1281** subjects.

Therefore, as authorized in the Federal Policy for the Protection of Human Subjects, I am pleased to notify you that the Institutional Review Board has approved your proposed research. – Description: This study will investigate what NCAA member institutions' current concussion education practices are.

If at the end of this approval period there have been no changes to the research protocol; you may request an extension of the approval period. Total project approval on this application may not exceed 36 months. If additional time is required, a new application may be submitted for continuing work. In the interim, please provide the IRB with any information concerning any significant adverse event, **whether or not it is believed to be related to the study**, within five working days of the event. In addition, if a change or modification of the approved methodology becomes necessary, you must notify the IRB Coordinator **prior** to initiating any such changes or modifications. At that time, an amended application for IRB approval may be submitted. Upon completion of your data collection, you are required to complete a *Research Study Termination* form to notify the IRB Coordinator, so your file may be closed.

Sincerely,


Eleanor Haynes
Compliance Officer

APPENDIX E

EXPECTED RESULTS OF THE CURRENT CONCUSSION EDUCATION PRACTICES QUESTIONNAIRE

The pilot study consisted of ten subjects from various NCAA member institutions. All of the subjects fell between the ages of twenty and twenty-nine years old. All of the subjects were board certified athletic trainers; in which eighty percent of the respondents self-identified as a graduate assistant athletic trainer. These respondents all have been in the position for no more than 5 years. Ninety percent of the respondents were from division I, and none of the respondents reported working at a division III institution. All of the respondents stated that they were aware of the NCAA concussion policy and legislation regarding concussion education.

Due to all the respondents stating that they were aware of the policy and legislation regarding concussion education, the assumption of compliance could be made. However this was not the case. Only ninety percent of respondents reported that their institution provided concussion education. Of this ninety percent, ten percent reported to only provide concussion education to contact/collision sports. The highest frequency outcomes for provided concussion information included: definition of concussion; signs and symptoms of concussion; what to do if you think you have a concussion; what to do if you think your teammate has a concussion; and common misconceptions about concussion. Ninety percent of respondents reported using the concussion facts sheet provided by the NCAA. Seventy percent reported providing annual concussion education. When examining limitations/barriers to providing concussion education, all respondents reported time as a key factor. Twenty percent also reported that they felt they had a lack of concussion education materials, which directly affected the implementation of concussion education at their institution.

These preliminary findings support the first four alternative hypotheses. The fifth hypothesis was not able to be examined due to the unequal distribution of divisions. The researchers will use these survey responses to ensure the appropriate statistical analyses are being utilized within this study.