Continuing Education Practices of Athletic Trainer's and Confidence and Knowledge of Concussion Management

A THESIS

Submitted to the Faculty of the School of Graduate Studies and Research
of
California University of Pennsylvania in partial fulfillment of the requirements for the degree of

Master of Science

by
Zak M. Christie

Research Advisor, Dr. Linda Platt Meyer

California, Pennsylvania
2013

CALIFORNIA UNIVERSITY of PENNSYLVANIA
CALIFORNIA, PA

THESIS APPROVAL

Graduate Athletic Training Education

We hereby approve the Thesis of

Zak M Christie
Candidate for the degree of Master of Science

Date	Faculty
MAY 10, 2013	Linda Platt Meyer, EdD, LAT, ATC Chairperson
MAY 10, 2013	William Biddington, EdD, LAT, ATC
MAY 10, 2013	Mike Meyer, PhD, LAT, ATC

ACKNOWLEDGEMENTS

I would like to take this time to identify individuals whom have helped me throughout this research process. Without them, I would not have been able to complete my research.

My family (Mom, Dad, Papou, Grandma, Dan, Cody and Kristina) without a doubt is the largest support system I have. Without their encouragement I would not have believed in myself enough to finish, words cannot describe my gratitude and love.

I would also like to thank my committee members for the time and feedback that they have given me. Dr. Mike Meyer and Dr. Will Biddington provided me with incredible wisdom, and It has allowed me to be proud of this document.

I want to especially thank Dr. Linda Platt Meyer, she has been an inspiration to work with, and the best chair/ mentor a graduate student could hope for. If anything I will look back at this research process with fond memories of her encouragement and direction. It fills me with encouragement that there are AT's like my committee still promoting our profession.

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

The increased worth that the public has put on athletics has increased the intensity of the games along with the risks that accompanies them. One of these risks is concussion, a form of brain injury. The Centers for Disease Control (CDC) reports that over 1.7 million people suffer from concussions annually.[1] The high rate of occurrence brings attention to the people that are on the front line of concussion evaluation, management and treatment. The Athletic Trainer (AT) is the front line health care professional. Athletic training education must make ATs confident in situations when they are placed in stressful situations when dealing with concussions.

There are multiple diagnostic tools that ATs can use to help in their recognition and management of concussion. These tools range from the traditional models[2,3,4,5] to the newer computer-based neurocognitive testing which allows for quantitative variables. [6,7,8,9,10,11,12] These tools can contribute to the ATs' confidence level in assessing severity and making return-to-play decisions.[13,14]

Because there is such a high rate of occurrence of concussions in athletics, it is imperative that ATs are confident in their own abilities. It is also equally important that ATs be familiar and up-to-date with the most recent concussion protocols. The most current and highly respected concussion protocol is addressed in the 2009 Zurich Consensus Statement on concussion in sport.[14] Continuing education awareness stands as one of the strongest tools ATs have in regards to managing concussions properly.[12-18] It is crucial that all ATs are aware and practicing current concussion management.

Another important and overlooked aspect of athletic training is the level of confidence that practitioners have. Building confidence is an important aspect of clinical education. Progressing students to a confident level of medical practice should be one of the main goals of the academic institutions. A study conducted by Hecimvich and Volet[19] examined the progress of chiropractic students' confidence before and after their clinical internships. After their clinical internships, both patient communication and clinical skills increased significantly. The study highlighted the contributing factors in building confidence and found that taking a proactive, hands-on approach is the most beneficial. Confidence typically

increases with experience, though it is still important for newly-certified ATs to portray confidence and feel certain when dealing with concussions in the field.

The purpose of this study is to discuss the continuing education practices of AT's along with their concussion management confidence and knowledge. This study additionally will evaluate current knowledge of concussion protocols. By surveying ATs throughout the ten districts of the National Athletic Trainers' Association (NATA), a better understanding can be made of what educational factors increase ATs' confidence in regards to concussion. From these conclusions, possible changes in athletic training continuing education programs can be adapted to improve confidence levels when managing concussion. This segment of the study will also allow the researcher to spot-check the profession for up-to-date practice techniques for concussion management.

METHODS

The purpose of this is to discuss the continuing education practices of AT's along with their concussion management confidence and knowledge. Additionally, this study evaluates current knowledge of concussion protocols. This section includes the following sections: Research Design, Subjects, Instruments, Procedure, and Data Analysis.

Research Design

A descriptive design was used for this study. The dependent variable is the confidence and knowledge of ATs in regards to concussion management. The independent variable was continued education participation that ATs have with regards to concussion.

Subjects

One-thousand ATs were asked to volunteer by taking a survey for this study. Subjects (N=1000) were randomly selected from the ten districts through the NATA database. Subjects implied informed consent with the completion and return of the survey. Participation in the study was voluntary based upon completion of the survey. The study was approved by the Institutional Review Board (Appendix C1) at California University of Pennsylvania prior to launching the survey.

Preliminary Research

A panel of experts was organized before any research was conducted (Appendix C2). The panel consisted of ATs with experience and knowledge of concussions and survey research construction. The panel members were sent the Concussion Knowledge Survey and instructions on their responsibilities regarding the survey. The panel members reviewed the survey instrument and cover letter. They added to the content validity and made recommendations for improvement. After reviewing the survey, the panel members

provided critiques and changes that were reviewed for potential revision to the instrument. Necessary changes were made to the survey based on critiques by a panel of experts.

Instruments

An original survey was created and entitled "Concussion Knowledge and Confidence Survey." The survey is found in Appendix C3. The survey consists of questions regarding overall confidence level in concussion evaluation, evaluation techniques, managing tools, any deficiencies perceived by the AT, and utilized return-to-play protocols. The data was automatically collected by SurveyMonkey® and placed into spreadsheet format for the researcher to utilize in analysis. The survey consisted of 36 questions and required ten minutes to complete. Variables were measured by exploring the effects of educational experiences and current knowledge ATs have on concussion. A cover letter explaining the risks involved, informed consent and instructions of the confidence and knowledge study also accompanied the survey (Appendix C4).

Procedures

A cover letter with a link to the concussion confidence survey was distributed via e-mail to a random sample of ATs by the NATA via SurveyMonkey.com, a web-based survey program. The researcher allowed three weeks for the ATs to complete the survey. Once a week, during the three weeks, a follow up e-mail was sent to the survey subjects explaining the study and providing a link to the survey. This e-mail was to remind the subjects the survey was still open and able to be completed. The e-mail also stated if the subject had already taken the survey, they do not need to take it again. Once the surveys were completed, the answers were submitted back through SurveyMonkey.com. The web server program automatically organized, calculated, and placed all data in an Excel spreadsheet for import to SPSS 18.0. Data analysis was then performed on the survey results after the three week submission period had passed.

Hypothesis

The following hypothesis is based on previous research and the review of the literature.

1. There will be a difference between participants who identified themselves as likely to search for peer-reviewed literature on concussion management and those participants who did not identify themselves in seeking out new literature for concussion management knowledge.

Data Analysis

All data will be analyzed by SPSS version 16.0 for windows at an α level of 0.05. The research hypothesis was analyzed using *t*-test to measure for means.

RESULTS

The purpose of this study is to discuss the continuing education practices of AT's along with their concussion management confidence and knowledge. By surveying a random sample of ATs through the NATA, the profession can identify possible trends and/ or deficiencies in regards to concussion management.

Demographic Information

One thousand Athletic Trainers were asked to volunteer to take an original survey for this study. Out of the 1,000 Athletic Trainers, 16.9% (N=169) responded to the survey. Table 1 represents the ages of the ATs surveyed.

Table 1. Range of age

Age	Frequency	Percentage
18-22	4	2.3
23-27	45	26.6
28-32	32	18.9
33-37	22	13.0
38-42	20	11.8
43-47	14	8.2
48-52	13	7.6
53-57	6	3.5
>57	13	7.6

Table 2 represents the gender of the surveyed ATs.

Table 2. Gender

Gender	Frequency	Percentage
Female	93	55.0
Male	76	45.0

Table 3 represents the range number of years practicing as a Certified Athletic trainer in this study.

Table 3 Years working as an AT.

Years	Frequency	Percentage
0-1	6	3.6
1-5	48	28.4
5-10	27	16.0
10-15	29	17.2
20-25	28	16.6
>25	31	18.3

Table 4 represents the current work setting of the surveyed ATs in this study.

Table 4 Work Setting

Setting	Frequency	Percentage
College/ University	60	35.5
Hospital/ Clinical	14	8.3
Occupational/ Industrial	4	2.4
Military	0	0.0
Performing Arts	0	0.0
Professional Sports	4	2.4
Public Safety	0	0.0
Clinic/ Secondary School	43	25.4
Hospital/ Secondary School	9	5.3
Other	35	20.7

Table 5 represents the NATA district that the surveyed AT is currently working .

Table 5. NATA district

District	Frequency	Percentage
1	16	9.5
2	31	18.3
3	22	13.0
4	36	21.3
5	7	4.1
6	9	5.3
7	9	5.3
8	12	7.1
9	19	11.2
10	8	4.7

Table 6 represents the highest level of education of the surveyed AT.

Table 6. Level of education

Degree	Frequency	Percentage
Bachelors	49	29.0
Masters	108	63.9
Doctorate	11	6.5
Other	1	0.6

Table 7 represents the credentials which the AT surveyed holds.

Table 7. Credential(s) held

Credential	Frequency	Percentage
ATC	165	97.6
EMT	9	5.3
PA-C	0	0
RN	0	0
LPN	0	0
Nurse Practitioner	0	0
LMT	2	1.2
DC	0	0
DPT	2	1.2
CSCS	16	9.5
PES	9	5.3
Not Available	0	0
Other	34	20.1

Hypothesis Testing

The following hypothesis was tested in this study. The hypothesis was tested with a level of significance set at an $\alpha \leq 0.05$. A *t*-test was used for statistical measurement.

Hypothesis: There will be a difference between participants who identified themselves as likely to search for peer-reviewed literature on concussion management and those participants who did not identify themselves in seeking out new literature for concussion management knowledge. An independent test was calculated comparing the mean score of participants who identified themselves as likely to search for peer-reviewed literature on concussion management to the mean score of those participants who did not identify themselves in seeking out new literature.

Conclusion: In regards to concussion management knowledge, no significant difference was found (($t_{147} = -.341$, $p>.05$). The mean of the likely group (8.633 ± 1.32) was not significantly different from the mean of the non-likely group (8.550 ± 1.29). Therefore, there is no difference between the knowledge of those individuals who are likely to seek out peer reviewed literature and those

who do not seek out peer reviewed literature. This is represented by Tables 8 and 9 below.

Table 8. Independent t-test group statistics: Knowledge

Group	Number of	Mean	SD
Not Likely	40	8.55	1.29
Likely	109	8.63	1.32

Table 9. Independent *t*-test group statistics: Knowledge

Classification	*t*	df	Sig.
Percentage(Equal Variances assumed)	-.341	147.0	.891

No significant difference was found in regards to concussion management confidence ($t(152) = .328$, $p > .05$). The mean of the likely group (M= 11.50, *SD*= .983) was not significantly different from the mean of the non-likely group (M= 11.56, *SD*= .838) in regards to concussion management knowledge. Therefore, there is no difference between the confidence of those individuals who are likely to seek out peer reviewed literature and those who do not seek out peer reviewed literature. This is represented by Tables 10 and 11 below.

Table 10. Independent *t*-test group statistics: Confidence

Group	Number of Subjects	Mean (SD)	Std. Error Mean
Not Likely	41	11.56 (.838)	.130
Likely	113	11.50 (.983)	.092

Table 11. Independent t-test group statistics: Confidence

Classification	*t*	df	Sig.
Percentage(Equal Variances assumed)	.328	152.0	.617

Confidence in the subjects was determined by a total of three questions, using a four point likert scale. These results are represented by Tables 12, 13, and 14 below.

Table 12. How confident are you in recognizing the signs and symptoms of concussion?

District	Frequency	Percentage
Very Confident	139	89.1
Somewhat Confident	15	9.6
Not Confident	0	0.0
Very Unconfident	2	1.3

Table 13. How confident are you in describing the mechanism(s) of injury for concussion?

District	Frequency	Percentage
Very Confident	132	84.6
Somewhat Confident	24	15.4
Not Confident	0	0.0
Very Unconfident	0	0.0

Table 14. How confident are you in preforming a sideline evaluation of concussion?

District	Frequency	Percentage
Very Confident	128	82.1
Somewhat Confident	26	16.7
Not Confident	1	0.6
Very Unconfident	1	0.6

Additional Findings

Findings that were also noteworthy to the study were found in the knowledge assessment portion of the survey. The survey asked the ATs if the terms "mild traumatic brain injury (mTBI)" and "concussion" were interchangeable terms. This resulted in n=152 responses, of these responses 68.4% answered that they were interchangeable terms. This is represented by Tables 12 below.

Table 15. mTBI vs. Concussion

Response	Frequency	Percentage
True	103	68.4
False	46	31.6

Another important finding involved the current reference that the surveyed AT used as current concussion management guidelines. This resulted in N=152 responses. In all, 52.6% (n=80) reported that they use the NATA position

statements as their current concussion management guidelines. Only 24.3% (n=37) reported that they use the Zurich Consensus Statement of Concussion in Sport. The Zurich Consensus Statement of Concussion is the most current guideline in concussion management.

DISCUSSION

The following section is divided into three subsections: Discussion of Results, Conclusions, and Recommendations.

Discussion of Results

This study focused on continuing education awareness and its effect on concussion management confidence and knowledge. Upon research, there were no significant findings when testing the hypothesis. The majority of the knowledge questions were answered correctly. However, some additional findings suggest that there are improvements to be made in regards to concussion knowledge.

The hypothesis is: that there will be a difference between participants who identified themselves as likely to search for peer-reviewed literature on concussion management and those participants who did not identify themselves in seeking out new literature for concussion management knowledge. It was thought that the subject group identified as "likely to go find peer-reviewed literature" to score higher than the group identified as "not likely to find peer-reviewed literature". There was no previous literature in reference to concussion management knowledge and confidence and its relation to continuing education awareness in the athletic training profession. Based on the researcher's own experiences and interaction with peers, it was thought that the ATs who self-identified as "likely to go find peer-reviewed literature" to have higher concussion management confidence and knowledge then the "not likely" group. However, the difference between the groups was not significant and does not support this hypothesis.

Throughout the research, there were some additional findings that are worth discussion. Research conducted by Scorza, Raleigh et al[20] was reaffirmed by this study. During their study, they stated that one of the most common symptoms of concussion is headache, and that both somatic and cognitive systems can be affected. This survey

identified that 100.0% (n=152) of ATs identified dizziness as a common symptom, along with 99.3% (n=151) reporting headache and balance issues as a common symptom.

Electronic testing prevalence was also assessed in this study. Of the subjects, 69.2% (n=108) reported that they use electronic based concussion testing in their concussion management practice. Stiller-Ostrowski[17] also investigated the prevalence of electronic baseline testing; they also found that majority ATs used electronic based tools in the management of concussion. In regards to the electronic software, this study revealed that 80.2%(n=101) of the subjects used the ImPACT™ test as their electronic testing software.

Eckner and Kutcher [23] state in their study that signs and symptoms of concussion do not necessarily present themselves at the time of the injury. In fact, main signs and symptoms might be delayed. This survey affirmed that the general AT population is up-to-date in regards to signs and symptoms possibly being delayed. When asked if signs and symptoms of concussion always present themselves after the mechanism of injury, 98.0% (n=149) responded correctly that the signs and symptoms do not always present after the mechanism of injury.

This research has shown that athletic training professionals have a competent level of concussion knowledge when compared to the Zurich Consensus Statement on concussion in sport[14] the current gold-standard for concussion protocol. Of the subjects, 100.0% (n=152) indicated that special considerations should be taken when treating children or adolescents (under 18 years old) who have sustained a concussion. Of the subjects 86.2% (n=131) correctly answered false when asked if there is any equipment suggested by evidence-based research that can prevent concussion injuries. When asked about the subjects return to play protocol, 94.1% (n=143) correctly responded that it was best described as: "a step-wise progression that gradually increases the patient's activity per every 24 hours." It was also found that 93.3% (n=140) of ATs correctly take 24 hours between steps in their return to play protocol.

The study did find some deficiencies in regards to concussion management knowledge. A large amount of the subjects answered incorrectly 68.4% (n=104) that mTBI and concussion are interchangeable terms. Harmon, Kimberly et al.[21] states that : Concussions have also been referred to as mTBI While all concussions are mTBIs, not all mTBIs are concussions. Concussions are a subset of mild traumatic

brain injury on the less severe end of the brain injury spectrum and are generally self-limited in duration and resolution. It was also found that 52.6% (n=80) use the NATA position statements as their current concussion management reference.

Conclusions

The results of this study do not support the hypothesis, though they do affirm the results of previous studies identified in the literature review. The overall results indicated that ATs have a solid understanding of concussion and the many tools to manage this injury. Based on the results of this study, it may be suggested that the NATA should update its concussion management guidelines to include the most recent concussion management protocol; and in this protocol to identify the difference between concussion and mTBI.

Recommendations

The purpose of this study is to discuss the continuing education practices of AT's along with their concussion management confidence and knowledge. After reviewing the

results, recommendations for future research can be made. The first recommendation that can be made is to increase the sample size; a higher response rate may allow for a better representation of the athletic training profession across the nation. Another recommendation would be to use professional memberships, which was identified as the most beneficial form of continuing education opportunities in regards to concussion management (71.6%, N=111). This could be used as a way to update the athletic training population on the most current concussion guidelines. The last recommendation would be to identify the difference between mTBI and concussion in the most recent concussion management guidelines.

REFERENCES

1. Centers for Disease Control and Prevention. (2010). Nutrition. Retrieved from http://www.cdc.gov/traumaticbraininjury/. Accessed July 20,2012.

2. Day JR, Hanson MR, Reding MJ. Neurocognitive Testing Following Resolution of Concussion Symptoms. *IJATT* 2012;17(2):9-33.

3. Ragan BG, Herrmann SD, Kang M, et al. Psychometric Evaluation of the Standardized Assessment of Concussion: Evaluation of Baseline Score Validity Using Item Analysis. *Atshc* 2009;1(4):180-187.

4. Falconer EK, Geffen GM, Olsen SL, et al. The rapid screen of concussion: An evaluation of the non-word repetition test for use in mTBI research. *Brain Inj* 2006;20(12):1251–1263.

5. Beaumont LD, Mongeon D, Tremblay S, et al. Persistent Motor System Abnormalities in Formerly Concussed Athletes. *J Athl Train* 2011;46(3):234-240.

6. Eckner JT, Kutcher JS, Richardson JK. Between-Seasons Test-Retest Reliability of Clinically Measured Reaction Time in National Collegiate Athletic Association Division I Athletes. *J Athl Train* 2011:46(4):409.

7. Allen BJ, Gfeller JD. The Immediate Post-Concussion Assessment and Cognitive Testing battery and traditional neuropsychological measures: A constructed concurrent validity study. *Brain Inj* 2011;25(2):179-191.

8. Broglio SP, Ferrara MS , Macciocchi SN, et al. Test-Retest Reliability of Computerized Concussion Assessment Programs. *J Athl Train* 2007;42(4):509-514.

9. Brown CN, Guskiewicz KM, Bieiberg J. Athlete Characteristics and Outcome Scores for Computerized

Neuropsychological Assessment: A Preliminary Analysis. *J Athl Train* 2007;42(4);515-523.

10. Thomas DG, Collins MW, Saladino RA, et al. Identifying Neurocognitive Deficits in Adolescents Following Concussion. *AEM* 2011;18(3):246-254.

11. Broglio SP, Ferrara MS, Pinland SG, et al. Concussion history is not a predictor of computerized neurocognitive performance. *Br J Sports Med* 2006;40(9):802–805.

12. Broglio SP, Macciocchi SN, Ferrara MS. Neurocognitive Performance of Concussed Athletes When Symptom Free. *J Athl Train* 2007;42(4):504-508.

13. Guskiewicz K, Bruce S, Cantu R, et al. National Athletic Trainers' Association position statement: Management of sport-related concussion. / Management of sport-related concussion. *J Athl Train.* [serial online]. July 2004;39(3):280-297. Available from: SPORTDiscus with Full Text, Ipswich, MA. Accessed June 22, 2012.

14. McCrory P, Meeuwisse W, Johnson K, et al. Consensus Statement on Concussion in Sport: The 3rd International Conference on Concussion in Sport Held in Zurich, November 2008. *J Athl Train.* [serial online]. July 2009;44(4):434-444. Available from: SPORTDiscus with Full Text, Ipswich, MA. Accessed June 22, 2012.

15. Noteaert AJ, Guskiewicz KM. Current Trends in Athletic Training Practice for Concussion Assessment and Management. *J Athl Train* 2005;40(4):320-325.

16. Hunt TN, Trombley A. Physician Management of Sport-Related Concussions at the Collegiate Level. *Atshc* 2010;2(5):227-234.

17. Covassin T, Elbin R, Kontos AP, et al. Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) Practices of Sports Medicine Professionals. *J Athl Train* 2009;44(6):639-644.

18. McLeod TC. Register-Mihalik JK. Clinical Outcomes Assessment for the Management of Sport-Related Concussion. *J SPORT REHABIL* 2011;20(1):46-60.

19. Hecimovich M, Volet S. Tracing the evolution of chiropractic students' confidence in clinical and patient communication skills during a clinical internship: a multi-methods study.*BMC Medical Education.*June 2012;19;12:42.

20. Scorza KA, Raleigh MG, O'Connor FG. Current Concepts in Concussion: Evaluation and Management. *American Family Physician.* 2012;85(2):123-132.

21. Harmon KG, Drezner J, Gammons M, et al. American Medical Society for Sports Medicine Position Statement: Concussion in Sport. Clin J Sport Med 2013;(23):1-18.

22. Martinez DE. Bloodless Concussion: The Misunderstood Injury. *J Am Chiropractic Assoc* 2011;(7):16-36.

23. Pelletier J. Sports injuries in contact sports: concussion and spinal injuries (invited presentation); 2005 Aug 4l Ottawa, Canada. Available from: jcp@ca.inter.net.

24. Eckner JT, Kutcher JS. Concussion Symptom Scales and Sideline Assessment Tools: A Critical Literature Update. *ACSM* 2010;9(1):8-15.

25. Reddy CC ,Collins MW. Sports Concussion: Management and Predictors of Outcome. *ACSM* 2009;8(1):10-15.

26. Purcell L, Carson J. Sport-Related Concussion in Pediatric Athletes. *CLIN PEDIATR* 2008;47(2):106-113.

27. DeKosky ST, Ikonomovic MD, Gandy S. Traumatic brain injury—football, warfare, and long-term effects. *N Engl J Med*. 2010;363(14):1293-1296.

28. Piland SG, Ferrara MS, Macciocchi SN, et al. Investigation of Baseiine Seif-Report Concussion Symptom Scores.*J Athl Train 2*010;45(3):273-278.

29. Majerske CW, Mihalik JP, Ren D, et al. Concussion in Sports: Postconcussive Activity Levels, Symptoms, and Neurocognitive Performance. *J Athl Train* 2008;43(3):265-274.

30. Mailer BJ, McLeod TC, Bay RC. Healthy Youth Are Reliable in Reporting Symptoms on a Graded Symptom Scale. *J SPORT REHABIL* 2008;17(1):11-20.

31. Fox ZG, Mihalik JP, Blackburn T, et al. Return of Postural Control to Baseline After Anaerobic and Aerobic Exercise Protocols. *J Athl Train* 2OO8;43(5):456-463.

32. Broglio SP, Zhu W, Sopiarz K, et al. Generalizability Theory Analysis of Balance Error Scoring System Reliability in Healthy Young Adults. *J Athl Train* 2009;44(5):497-502.

33. NATA ATEP contempencies (2006) National Athletic Trainers' Association (NATA). *Athletic Training Educational Competencies.*4th ed. Dallas,TX:NATA; 2006.

34. Covassin T, Elbin R, Stiller-Ostrowski SL. Current Sport-Related Concussion Teaching and Clinical Practices of Sports Medicine Professionals. *J Athl Train* 2005;44(4):400-404.

35. Hankemeier DA, Van Lunen BL. Approved Cljnical Instructors' Perspectives on Implementation Strategies in Evidence-Based Practice for Athletic Training Students. *J Athl Train* 2011:46(6):655-664.

36. Manspeaker S, Lunen BV. Overcoming Barriers to Implementation of Evidence-Based Practice Concepts In Athletic Training Education: Perceptions of Select Educators. *J Athl Train* 2011;46(5);514-522.

37. Chiang YZ, Tan KT, Chiang YN, et al. Evaluation of educational methods in dermatology and confidence levels: a national survey of UK medical students. *INT J DERMATOL* 2011;50(2):198-202.

APPENDICES

APPENDIX A

Review of Literature

REVIEW OF LITERATURE

Appendix A: Review of Literature

Concussion awareness and its education, has progressed exponentially throughout the past decade. ATs practice evidence-based medicine. This method of practice provides the athlete/patient with the most current and effective care. Concussion has had numerous evaluative tools created to properly evaluate this potentially life-altering injury. Newer methods are used to manage concussion, and it is up to the practitioner to be aware of new strategies. Many of these strategies are highlighted in consensus statments[13,14] along with other continuing education opportunities.

It is crucial that ATs have experience and are confident handling these injuries along with utilizing the most recent management strategies. The purpose of this study is to discuss the continuing education practices of AT's along with their concussion management confidence and knowledge. The following sections that highlight this information include (1) Etiology, (2) Validity of Assessment Models, (3) Management of Concussion, (4)

Athletic Training Education Styles, and (5) Measuring Confidence.

Etiology of Concussion

The awareness of concussion has been heightened in the sports community and the general population greatly in the past few decades with a rapid acceleration of concussion-related injuries over the last few years. The accompanying attention is concern; concern from parents, health care practitioners, and those athletes whom are at risk of a potentially fatal injury or one that can cause life-altering dysfunction. As certified and licensed health care professionals, it is the job of ATs to be proactive on the treatment and management of this injury. However, to properly treat an injury, one must understand the injury.

The Center for Disease Control (CDC) reports that over 1.7 million people suffer from concussions annually.[1] This is far more common than many would assume. As it is common knowledge, concussions are injuries to the head.

Concussions are simply described as a disturbance in brain function from direct or indirect force to the head.[20] This injury is described as a functional injury, rather than a structural injury and results from sheer stress to

the brain tissue caused by rotational or angular forces.[20,23,23] It is a common misconception that the subject whom has sustained a concussion must have been struck directly in the head. Martinez also describes denial as a possible effect of concussion, making it imperative that the practitioner be aware of multiple signs and symptoms[22].

Pelletier[23] defines concussion as a complex neuro-pathophysiological process affecting the brain, induced by traumatic biomechanical forces, which include a traumatic alteration in brain function that is manifested by an alteration in awareness of consciousness. These forces cause injuries to the subcortical white matter that include shearing or diffuse axonal injury that may occur with or without a focal injury. This is where many individuals make light of this injury, there is no necessary impact that must happen for the athlete to sustain a concussion.

Determining whether a patient has suffered a concussion often presents the practitioner with difficulties. This is because no two concussions are the same,[24,25] each concussion is unique, and many concussions do not present themselves at the time of the injury. Rather, their signs and symptoms are delayed[24]. Concussions have a wide variety of signs and symptoms. Scorza, Raleigh, et al[20] describe headache as the most common symptom of concussion,

although there are a variety of clinical domains (e.g., somatic, cognitive, affective) that can be affected. As practitioners who rely on the patient to describe his/her signs and symptoms, it is important to be aware of all the possible effects of this injury.

The classification of concussion based on severity remains a challenge because of problems with instruments and testers, as well as the likelihood that the injured will deny the injury[24].

Age groups and concussions have become an increasingly popular topic. Athletics has progressed to becoming more aggressive at younger ages, which in turn makes younger athletes more susceptible to injury. Purcell and Carson[26] came to the conclusion that sports-related concussions occur most frequently in the 10-14 year age group. DeKosky, Ikonomovic, et al[27] describe that there is an increase in the accumulation of proteins related to neurodegeneration caused by concussion, and it is occurring at younger ages, with force previously thought to be irrelevant to the recovery/incident of the injury.

Validity of Assessment Models

Throughout the history of sports medicine, there have been dramatic changes in the way head injuries are treated. The more progress as a profession, the more are capable to address and appropriately evaluate diagnostic skills. Practicing evidence-based medicine has allowed ATs to be on top of the most recent and effective concussion assessment models. The following sub-sections address the different type of assessment models, and their reliability when addressing concussions.

Computer-Based Assessment

In sports medicine practice, it is becoming more common to use electronic based concussion testing as an assessment tool. These tests specifically allow ATs to make precise, quantifiable decisions when it pertains to a concussion. Eckner, Kutcher, and Richardson[6] conducted a reliability study which compared manual reaction times versus the reaction time component of CogState

Sport(version 5.6.4) computerized neuropsychological test. The reliability study revealed that manual reaction time testing when used for baseline protocol is a reliable means of measurement when compared to computerized testing. The manual testing methods included using the weighted stick drop method as a measure of reaction time. Manual testing should be used in conjunction with computerized testing for a multifaceted approach.[6,9] However, computerized testing reveals more precise measurements.[6,10]

Other studies also look into how precise the computerized neurocognitive testing is, and whether it should be used more frequently as a diagnostic tool. A study conducted by Thomas, Collins, Saladino, et al[10] examined the detective nature of the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT™) taken immediately (12 hours) after the injury. The ImPACT™ is an electronic based neurocognitive assessment tool. Results were then compared 3 to 10 days after the injury. This study aimed to find if the ImPACT™ could detect differences in head injury severity that clinical grading scales could not detect. Results suggested that computerized testing detected deficiencies that the clinical grading scale could not, and could potentially be used as a tool to determine the recovery time of the patient[10].

As previously mentioned, health care providers rely on the patient to report his/her signs and symptoms. However, when the athlete reports he/she is asymptomatic, there are times where neurocognitive deficiencies might be present. Broglio, Macciocchi, and Ferrara[12] conducted a study using the ImPACT™ test in regards to identifying deficiencies in athletes that reported they were asymptomatic. The ImPACT™ test was administered to all athletes when symptomatic, and when symptoms were reportedly resolved. Results showed there were deficiencies in at least one ImPACT™ variable when the athlete stated he/she was asymptomatic. The research suggests that using only symptom scores as the return to play protocol is not advised and that a multifaceted approach to concussion assessment is most appropriate.

The ImPACT™ test is one of the more popular used electronic concussion assessment tools. Allen and Gfeller[7] used a clinical study consisting of 100 undergraduate students from a small midwestern university to test the validity of the ImPACT™ test. The ImPACT™ test was compared to other traditional tests, results of the study revealed that both traditional tests along with the computerized ImPACT™ had overlapping results, and should be used in conjunction with one another. Other computer-based

concussion assessment tools are being used: such as the Concussion Resolution Index(CRI). Recent literature has compared the CRI to the more popular ImPACT™ test. Results have found that the tests are comparable to one another in terms of reliability; however chronic neurocognitive decrements from sport concussion may be subtle and undetectable by either of these two assessment techniques[11].

The ImPACT™ test is not the only computer-based concussion assessment tool which is being used. Broglio, Ferrara, Macciocchi, Baumgartner, and Elliott[8] also examined test/retest validity in computerized testing. The authors conducted their subjects to complete the ImPACT™, Concussion Sentinel and Head Minder Concussion tests on three separate days. From their results, neurocognitive assessments have been shown to be sensitive to the consequences of concussion; and therefore, computerized testing has many practical advantages in athletic settings. The authors did warn practitioners to be cautious and to approach concussions with a conservative approach, placing greater focus on indexes producing higher reliability scores.

The question of taking a computer-based assessment will result in a significant change of scores still remains. Brown, Guskiewicz, and Bieiberg[9] investigated

possible trends due to gender, SAT scores and sport when evaluating an athlete for neuropsychological testing. Results concluded that computerized neuropsychological tests could possibly be affected by some of the previously mentioned factors.

Traditional Concussion Assessment

Traditional concussion assessments include those assessments that rely on the patient's reported signs and symptoms, these tests are generally administered via a symptom score test or another method which does not heavily revolve around a computer. Day, Hanson and Reding [2] specifically used the traditional Concussion Symptom Assessment Scale (CSAS) along with the electronic Concussion Resolution Index (CRI), to determine if they were proper indicators of neurocognitive deficiency after the patient reported no signs/symptoms. Both tests were used in conjunction with one another for baseline testing. This study showed that 35% of the athletes continued to show neurocognitive deficiencies when reporting no signs or symptoms.

Other traditional tools were also examined; the Standardized Assessment of Concussion (SAC) was questioned for reliability as a baseline tool. SAC testing proved to hold poor reliability, and proved too simplistic for the 76% of the subjects. Ragan, Herrmann, Kang, and Mack[3] concluded that the SAC test might not be the best for cognitive testing, which diminishes the tests' reliability when used for baseline testing.

Not all traditional tests examine only patient signs and symptoms. Beaumont et al[5] found that athletes with a history of concussion had altered scores in baseline balance testing. Methods included using a force platform to access center of pressure (COP) displacement, the subject was then asked to perform rapid alternating movements. Results revealed lower scores in those subjects who sustained a concussion. The authors encourage practitioners to acknowledge that baselines will vary over a period of time.

The non-word repetition test (NWR) uses a method which is described as a test that requires participants to continuously repeat a group of chosen "non-words" aloud. The test aims to measure the phonological loop, which during a concussion can be impaired, therefore determining the severity of the concussion. A total 166 concussions and

uninjured participants were administered the NWR test. Out of these 166 subjects, 107 participants were included (46 concussions and 61 uninjured). Two studies were administered to the group of subjects. The first group was given the NWR along with the Rapid Screen of Concussion (RSC) test. The second test administered the NWR along with the Hopkins Verbal Learning Test. The NWR was found to be reliable in regards to sub-vocal rehearsal speed and was to the acute effects of concussion, thus being an effective indicator in the subtle defects concussion has on patients.[4]

Baseline

Baseline testing is one of the most important factors when managing concussions. The nature of the injury makes it difficult to determine proper return-to-play decisions. This is where baseline testing bridges the gap between uncertainty and safe decision making. However, it is advised for health care providers to be cautious when relying on baseline testing which has been proctored over a substantial period of time due to the changing nature of the results.

An investigative study constructed by Piland, Ferrara, et al.[28] evaluates the influence that history of concussion,

sex, physical illness and acute fatigue has on self-reported baseline concussion testing. A total of six National Collegiate Athletic Association institutions were used, along with 1,065 collegiate student-athletes. Results revealed that student-athletes with previous concussion history, fatigue, physical illness and orthopedic injury had higher concussion symptom scores. However, sex did not show any significant effects on symptom scores.[28] Clinicians are advised to take all of these factors into account when evaluating student-athletes.

Majerske et al.[29] also examined the role of activity post injury and its effect on neurocognitive tests. A cohort design was used to assess the relationship of symptom status and neurocognitive function after a concussion. A total of 95 student-athletes were used in this study. The ImPACT™ and the Colorado Concussion scale were used to determine the severity of the concussion, where the activity intensity scale was used to safely progress the student into exertional activity. Results showed the level of exertion significantly affected symptom scores and neurocognitive performance.[28,29]

One of the biggest uncertainties is reliability when it comes to self-reported symptom tests. It is no secret that many patients may not be honest when reporting his or

her scores. Mailer, McLeod, et al.[30] also used a self-report baseline for a reliability test. The patients used a Graded Symptom Scale (GSS) which has been modified from the Head Injury Scale Self Report Concussion Symptoms Scale (HIS). The subject body of this baseline consisted of 126 middle school students. A survey was given to the students; it consisted of a demographic and life events questionnaire, along with GSS addressing symptom severity and length. Scores were added into a Total Symptom Score report and were found to hold very strong reliability.[30] The authors' results find that healthy youth are reliable with self-reported symptom scales.

It was also found that exertional activity affects a patient's postural stability when performing concussion assessments. Thirty-six college student-athletes were tested for the effects of fatigue on posture after aerobic and anaerobic exercises. Postural stability was accessed by the universal Balance Error Scoring System (BESS) and scores were compared to a baseline test where no exercise was performed. Fox, Mihalik, Blackburn, et al.[31] revealed that balance was negatively affected after aerobic and anaerobic exercise.

The BESS test was specifically examined for reliability by Brogilio, Zhu, Sopiarz, et al.[32] The subjects

included 48 volunteers whose mean age was 20 years old (+/- 2.08). All subjects reported having no prior lower extremity injury. Participants were given the test a total of 5 times, each trial was given 50 days apart. Results found that the BESS held validly and should be considered being included in most clinicians' baseline and post injury concussion testing.

Management of Concussion

Ultimately, management of concussion is what places pressure on the health care provider. It is imperative that all health care professionals be proficient in multiple styles of concussion management. The NATA has set Educational Competencies which identify the need for identification and management of concussion. The competencies that refer to concussion management are not specific to which management styles should be used.

Noteaert and Guskiewicz[15] investigated the current trends of ATs and their management and assessment of concussions. They randomly surveyed a total of 2,750 ATs whom were members of the NATA. Research findings concluded that the majority of ATs surveyed use hybrid evaluation and

management styles; many of these closely resembling the NATA position statement.

The NATA lays out position statements to help provide guidelines for all ATs to be consistent with their decisions, and ultimately make the best decisions for the patient. The NATA position statement on management of concussion[13] lists multiple grading tools for concussion, management tools, and return-to-play guidelines. These guidelines and competencies are helpful when educating ATs, though there is much gray area in the educational process.

Hunt and Trombley[16] investigated via survey the different management styles of concussion amongst a group of 120 team physicians. Results found that family practice physicians evaluated the most concussions per year (30%). A variety of methods were used during concussion assessment. Clinical examination and symptom checklists were reported as the most commonly used methods. Forty-eight percent reported that the clinical examination is the most important method when assessing return to play.

One assessment style mentioned by the NATA position statement is the importance of baseline concussion testing.[13] A survey conducted by Covassin, Elbin, Kontos, and Stiller-Ostrowski[17] investigated the prevalence of neurocognitive baseline concussion testing in the high

school setting. The research concluded there is a high rate of baseline and post-concussion testing being used by AT's, and that symptom scores are weighted heavier than neurocognitive test scores when returning an athlete to play.

Athletic Training Education Styles

Education models in Athletic Training Education are essentially up to the educator. The following section briefly overviews a few methods used to educate health care professionals.

The competencies call for the athletic training education program to identify the signs and symptoms of head trauma including: loss of consciousness, change in standardized neurological function, cranial nerve assessment, and other symptoms that indicate underlying trauma. It also asks for the curriculum to explain the importance of monitoring a patient following the head injury, reviving clearance from a physician to progress the patient, and to define cerebral concussion[33]. Though the NATA identifies these competencies, they do not specifically designate management or assessment models.

This can result to the fact that each protocol can be altered by the ATs' medical directors, within the guidelines of recent literature. However, this can put new ATs at a disadvantage in their first independent time to manage concussions.

Covassin, Elbin, and Stiller-Ostrowski[34] investigated the current concussion guidelines and methods being taught in a classroom, along with tracking the prevalence of the Vienna guidelines in the educational curriculum. A survey was sent program directors and ATs which addressed a variety of questions pertaining to experience and preference in education style. The majority of results showed that the NATA position statement was most widely used in managing concussions along with deciding return to play protocol. Results found that the Vienna guidelines were extremely underused. After review of the Vienna guidelines, 84% of those surveyed stated they would start teaching the guidelines in their curriculum.

Hankemeier and Van Lunen[35] examined the different experiences and opinions of Athletic Training instructors when implementing evidence-based practice concepts into their education program. All clinical instructors acknowledged the importance of evidence-based practice in the athletic training profession. Common themes when

implementing the practice included: self-discovery, promoting critical thinking, and sharing information. Program directors should be implementing evidence-based practice into the curriculum, along with encouraging clinical instructors to practice evidence-based medicine.[35,37] A study by Manspeaker and Lunen[36] also identified the need for evidence-based practice in Commission on Accreditation of Athletic Training Education (CAATE) programs. They concluded that educators must transition towards evidence-based medicine being taught in athletic training curriculum to provide the most relevant information to the students.

Measuring Confidence

As in any health care profession, evaluating one's own personal abilities and growth is important when trying to grow as a professional. Confidence is one of the keystones for having a safe healthcare practice. It is important for

healthcare practitioners, to measure confidence when dealing with certain situations. However, many practitioners do not realize any deficiencies in their confidence until they are asked to reflect upon it. Measuring one's confidence is descriptive in nature, and can be difficult to measure. However, self-reflection through confidence measurements can provide direction for continuing education, and improving the education processes.

In fields such as athletic training, physical therapy, chiropractic, and osteopathy, students are exposed to real patients in a supervised, clinical situation. These clinical situations are vital as they introduce the students into situations they will eventually be placed into as a healthcare provider, ultimately building confidence in the individual. Research done by Hecimvich and Volet[19] examined the progress of chiropractic students' confidence before and after their clinical internships. Methods of their research included using two large-scale surveys and randomly interviewing a sub-sample of their subject base. Tools used to measure confidence included surveys developed by the authors: the Patient communication confidence scale, and the clinical skills confidence scale. Results revealed that before the start of their clinical

internships, students had more confidence in patient communication rather than their clinical skills. After their clinical internships, both patient communication and clinical skills increased significantly. The study highlighted the contributing factors in building confidence, and found that taking a proactive hand on approach is the most beneficial.

Other studies investigated different educational strategies and how it affected the students' level of confidence. Chiang, Tan, Chiang, Burge, Griffiths, and Verbov[37] investigated the impact of different educational methods on confidence levels in dermatology among UK medical students. Premise for their research being that the high coincidences of skin conditions make dermatology education a necessary part of the medical curriculum. Methods included using survey based research to establish: educational experience in dermatology, and confidence levels in the British association of dermatologists core curriculum learning outcomes, confidence measurements were rated uses a five point Likert scale. Results found that students who received education from dermatologists, dermatology specialized nurses and expert patient, held higher levels of confidence. Education in clinical settings and small group settings also revealed the highest levels

of confidence. The authors established that clinical experiences and small group learning settings are the most effective in regards to developing confidence.

Summary

The research is very heavy in terms of evaluating, diagnosing and managing concussions. There are multiple tools that the ATs are presented with to make the correct clinical impression in conjunction of giving the best possible care. Tools range from the newly-developed computerized neurocognitive assessments to the more traditional self-symptoms scores. The NATA, along with other recent literature, outlines these standards both in competencies for the student and position statements for the practicing AT. Studies show that educators in athletic training are able to identify and adapt to their students learning models. However, there is little literature known on the relation between concussion management confidence and its relation to the AT's continuing education awareness.

APPENDIX B

The Problem

STATEMENT OF THE PROBLEM

The athletic trainer has to be familiar and current with the new and established concussion management guidelines. As the intensity of athletics increases, so does the potential of concussion, which if not treated properly, can be life altering. Being familiar with the current guidelines and putting them to practice in a confident fashion is also extremely crucial. The most up to date information is constantly changing. Continuing education is the tool athletic trainers' have to keep current with new practices, the awareness of the athletic trainer in regards to continuing education may relate to his/her knowledge of concussion and possibly his/her confidence in managing concussion.

The purpose of the literature review is to discuss the continuing education practices of AT's along with their concussion management confidence and knowledge. It is important to examine this relationship because concussion is a potentially life threatening injury and are very common in athletics. It would be beneficial for Athletic Training Education Programs to evaluate the comfort level and experience level of new athletic trainers because alterations in curriculum can be made if research finds

that the general subject population feels ill prepared. Additionally, it would be beneficial for athletic trainers to know where many of their newly certified peers stand when dealing with concussions.

Definition of Terms

The following definitions of terms will be defined for this study:

1) Concussion – A complex neuro-pathophysiological process affecting the brain, induced by traumatic biomechanical forces, which include a traumatic alteration in brain function that is manifested by an alteration in awareness of consciousness.
2) Continuing Education - An instructional program that brings participants up to date in a particular area of knowledge or skills.
3) Confidence - Belief in oneself and one's powers or abilities.
4) Athletic Training Competencies - A set of required teaching guidelines an ATEP has to follow.
5) Baseline Concussion Testing - A pre-season exam used to assess a patients' balance, brain function, and any concussion symptoms.

Basic Assumptions

The following are basic assumptions of this study:

1) The subjects will be honest when they complete their demographic sheets.
2) Subjects will not receive outside help from any other

individual or outside source on any question.

3) The sample is a representation of the population of athletic trainers.

Limitations of the Study

The following are possible limitations of the study:

1) The response rate of the survey could be low due to busy schedules of the athletic trainers.

2) As with any anonymous survey, answers might not be answered honestly by the subjects.

Significance of the Study

Athletic Trainers should possess all the current knowledge when it comes to concussion. The injury has proven to be an issue that is frequent in the athletic training profession. By assessing the athletic training profession's current knowledge level, any possible deficiencies may be detected by this study. If any deficiencies are identified, it would allow for an extravagant learning opportunity for both continuing education practice and athletic training education curriculums.

Continuing education opportunities can also be improved depending on the results of this study. Continuing education awareness for the athletic trainer in regards to

concussion management may reveal opportunities to improve educational programs. The significance of this study aims to improve the athletic training profession by identifying the relation between continuing education awareness, current knowledge and the confidence the athletic trainer has in regards to concussion management.

APPENDIX C

Additional Methods

APPENDIX C1

Institutional Review Board –

California University of Pennsylvania

California University of Pennsylvania

Proposal Number
Date Received

PROTOCOL for Research Involving Human Subjects

Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects

(Reference IRB Policies and Procedures for clarification)

Project Title ***Continuing Education Participation Effecting Concussion Management Confidence in Athletic Trainers***

Researcher/Project Director ***Zak M Christie/ Dr. Linda Platt Meyer***

Phone # ***224-392-1762*** ***E-mail Address*** ***CHR8755@calu.edu***

Faculty Sponsor (if required) _____

Department ***Health Science***

Project Dates ***Febuary 8th 2013*** ***to*** ***January 31st 2014***

Sponsoring Agent (if applicable) _____

Project to be Conducted at *California University of Pennsylvania*

Project Purpose: ☒ ***Thesis*** ☐ ***Research*** ☐ ***Class Project*** ☐ ***Other***

Keep a copy of this form for your records.

Please attach a typed, detailed summary of your project AND complete items 2 through 6.

1. *Provide an overview of your project-proposal describing what you plan to do and how you will go about doing it. Include any hypothesis(ses)or research questions that might be involved and explain how the information you gather will be analyzed. For a complete list of what should be included in your summary, please refer to Appendix B of the IRB Policies and Procedures Manual.*

   The purpose of this study is to examine levels of confidence when managing concussion and its relation to the ATs' continuing education participation. Additionally, this study will evaluate current knowledge of concussion protocols. A descriptive design will be used for this study. The dependent variable is the confidence of ATs in regards to concussion management. The independent variable is continued education participation that ATs have with regards to concussion.

   One-thousand ATs will be asked to volunteer in a survey for this study. Subjects will be randomly selected from the ten national districts by the National Athletic Trainers' Association membership database. This professional organization will distribute surveys to its members free of charge for graduate students. Subjects will imply informed consent with the completion and return of the survey. Participation in the study will be voluntary based upon completion of the survey. The study will be approved by the Institutional Review Board at California University of Pennsylvania.

   A panel of experts has been organized before any research is conducted. The panel consists of ATs with experience and knowledge of concussions and survey research construction. The panel members were sent the Concussion Knowledge Survey and instructions on their responsibilities regarding the survey. The panel members reviewed the survey instrument and cover letter. They added to the content validity and made recommendations for improvement. After reviewing the survey, the panel members provided critiques and changes that will be reviewed for potential revision to the instrument. Necessary changes have been made to the survey based on critiques by a panel of experts.

   An original survey has been created and entitled "Confidence and Knowledge in Concussion Management". The survey consists of questions regarding overall confidence level in concussion evaluation, evaluation techniques, managing tools, any deficiencies perceived by the AT, and utilized return-to-play protocols. A link will be sent to potential subjects by the NATA and the data will be automatically collected by Survey Monkey and placed into spreadsheet format for the researcher to utilize in analysis. The survey consists of 36 questions and requires approximately ten minutes to complete. Variables are measured by exploring the effects of educational experiences and current knowledge ATs' have on concussion. A cover letter (via email) explaining the risks involved, informed consent and instructions of the confidence and knowledge study will also accompany the survey.

   The researcher will allow three weeks for the ATs' to complete the survey. Once every week, during the three weeks, a follow up e-mail will be sent to the survey subjects explaining the study and providing a link to the survey. This e-mail will remind the subjects that the survey is still open and able to be completed. The e-mail will also state if the subject had already taken the survey, then they do not need to take it again. At the end of the survey period, the survey will be closed and all data will be downloaded in an Excel spreadsheet for import to SPSS 18.0. Data analysis will then be performed on the surve.

   The following hypothesis is based previous research and the researcher's intuition based on a review of the literature:

   Athletic trainer's participation in continuing education with regards to concussion management will influence the Athletic trainer's concussion management confidence.

   The research hypotheses will be analyzed using T-test to measure for means.

2. *Section 46.11 of the Federal Regulations state that research proposals involving human subjects must satisfy certain requirements before the IRB can grant approval. You should describe in detail how the following requirements will be satisfied. Be sure to address each area separately.*

a. *How will you insure that any risks to subjects are minimized? If there are potential risks, describe what will be done to minimize these risks. If there are risks, describe why the risks to participants are reasonable in relation to the anticipated benefits.*

There are minimal risks to subjects participating in this survey. All subjects' answers will be kept confidential through the use of subject numbers and not names or other identifiable information. Subject responses are not of a sensitive nature.

b. *How will you insure that the selection of subjects is equitable? Take into account your purpose(s). Be sure you address research problems involving vulnerable populations such as children, prisoners, pregnant women, mentally disabled persons, and economically or educationally disadvantaged persons. If this is an in-class project describe how you will minimize the possibility that students will feel coerced.*

The selection of subjects will include 1,000 certified members of the National Athletic Trainers' Association. From this category the NATA will randomly select the subjects from their data base and distribute the survey cover letters. All participating subjects will be over the age of 18 which is identified in question 1 of the survey, if under 18 they will be disqualified from the study.

c. *How will you obtain informed consent from each participant or the subject's legally authorized representative and ensure that all consent forms are appropriately documented? Be sure to attach a copy of your consent form to the project summary.*

The cover letter that will be attached to the survey will state the subjects have the right to choose not to participate in the study. Therefore, informed consent is implied upon completing and returning the survey to the researcher. At any time during the survey, the subject may opt out without penalty. Any incomplete survey data will be excluded from analysis.

d. *Show that the research plan makes provisions to monitor the data collected to insure the safety of all subjects. This includes the privacy of subjects' responses and provisions for maintaining the security and confidentiality of the data.*

The information of the participants will be kept confidential as neither their e-mail address nor name will be attached to their answers. All survey results will be collected by the survey monkey database, and all results will be stored on CalU servers in password protected files. The only people that will have access to the data will be the researcher's advisor and the researcher.

3. *Check the appropriate box(es) that describe the subjects you plan to use.*

☒ *Adult volunteers*	☐ *Mentally Disabled People*
☐ *CAL University Students*	☐ *Economically Disadvantaged People*
☐ *Other Students*	☐ *Educationally Disadvantaged People*
☐ *Prisoners*	☐ *Fetuses or fetal material*
☐ *Pregnant Women*	☐ *Children Under 18*
☐ *Physically Handicapped People*	☐ *Neonates*

4. *Is remuneration involved in your project?* ☐ *Yes or* ☒ *No. If yes, Explain here.*

5. *Is this project part of a grant?* ☐ *Yes or* ☒ *No* *If yes, provide the following information:*

   Title of the Grant Proposal _____

   Name of the Funding Agency _____

   Dates of the Project Period _____

6. *Does your project involve the debriefing of those who participated?* ☐ *Yes or* ☒ *No*

   If Yes, explain the debriefing process here.

7. *If your project involves a questionnaire interview, ensure that it meets the requirements of Appendix___in the Policies and Procedures Manual.*

California University of Pennsylvania Institutional Review Board
Survey/Interview/Questionnaire Consent Checklist (v021209)

This form MUST accompany all IRB review requests

Does your research involve ONLY a survey, interview or questionnaire?
☒ **YES**—Complete this form
☐ **NO**—You MUST complete the "Informed Consent Checklist"—skip the remainder of this form

Does your survey/interview/questionnaire cover letter or explanatory statement include:

☒ (1) Statement about the general nature of the survey and how the data will be used?

☒ (2) Statement as to who the primary researcher is, including name, phone, and email address?

☒ (3) FOR ALL STUDENTS: Is the faculty advisor's name and contact information provided?

☒ (4) Statement that participation is voluntary?

☒ (5) Statement that participation may be discontinued at any time without penalty and all data discarded?

☒ (6) Statement that the results are confidential?

☒ (7) Statement that results are anonymous?

☒ (8) Statement as to level of risk anticipated or that minimal risk is anticipated? (NOTE: If more than minimal risk is anticipated, a full consent form is required—and the Informed Consent Checklist must be completed)

☒ (9) Statement that returning the survey is an indication of consent to use the data?

☒ (10) Who to contact regarding the project and how to contact this person?

☒ (11) Statement as to where the results will be housed and how maintained? (unless otherwise approved by the IRB, must be a secure location on University premises)

☒ (12) Is there text equivalent to: "Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm"? (the actual dates will be specified in the approval notice from the IRB)?

☒ (13) FOR ELECTRONIC/WEBSITE SURVEYS: Does the text of the cover letter or explanatory statement appear before any data is requested from the participant?

☒ (14) FOR ELECTONIC/WEBSITE SURVEYS: Can the participant discontinue participation at any point in the process and all data is immediately discarded?

California University of Pennsylvania Institutional Review Board
Informed Consent Checklist (v021209)

This form MUST accompany all IRB review requests

Does your research involve ONLY a survey, interview, or questionnaire?
☒ **YES**—DO NOT complete this form. You MUST complete the "Survey/Interview/Questionnaire Consent Checklist" instead.
☐ **NO**—Complete the remainder of this form.

1. **Introduction** (check each)
   - ☐ (1.1) Is there a statement that the study involves research?
   - ☐ (1.2) Is there an explanation of the purpose of the research?

2. **Is the participant.** (check each)
   - ☐ (2.1) Given an invitation to participate?
   - ☐ (2.2) Told why he/she was selected.
   - ☐ (2.3) Told the expected duration of the participation.
   - ☐ (2.4) Informed that participation is voluntary?
   - ☐ (2.5) Informed that all records are confidential?
   - ☐ (2.6) Told that he/she may withdraw from the research at any time without penalty or loss of benefits?
   - ☐ (2.7) 18 years of age or older? (if not, see Section #9, Special Considerations below)

3. **Procedures** (check each).
   - ☐ (3.1) Are the procedures identified and explained?
   - ☐ (3.2) Are the procedures that are being investigated clearly identified?
   - ☐ (3.3) Are treatment conditions identified?

4. **Risks and discomforts**. (check each)
   - ☐ (4.1) Are foreseeable risks or discomforts identified?
   - ☐ (4.2) Is the likelihood of any risks or discomforts identified?
   - ☐ (4.3) Is there a description of the steps that will be taken to minimize any risks or discomforts?
   - ☐ (4.4) Is there an acknowledgement of potentially unforeseeable risks?
   - ☐ (4.5) Is the participant informed about what treatment or follow up courses of action are available should there be some physical, emotional, or psychological harm?
   - ☐ (4.6) Is there a description of the benefits, if any, to the participant or to others that may be reasonably expected from the research and an estimate of the likelihood of these benefits?
   - ☐ (4.7) Is there a disclosure of any appropriate alternative procedures or courses of treatment that might be advantageous to the participant?

5. **Records and documentation**. (check each)
   - ☐ (5.1) Is there a statement describing how records will be kept confidential?
   - ☐ (5.2) Is there a statement as to where the records will be kept and that this is a secure location?
   - ☐ (5.3) Is there a statement as to who will have access to the records?

6. For research involving more than minimal risk (check each),

☐ (6.1) Is there an explanation and description of any compensation and other medical or counseling treatments that are available if the participants are injured through participation?

☐ (6.2) Is there a statement where further information can be obtained regarding the treatments?

☐ (6.3) Is there information regarding who to contact in the event of research-related injury?

7. Contacts.(check each)

☐ (7.1) Is the participant given a list of contacts for answers to questions about the research and the participant's rights?

☐ (7.2) Is the principal researcher identified with name and phone number and email address?

☐ (7.3) FOR ALL STUDENTS: Is the faculty advisor's name and contact information provided?

8. General Considerations (check each)

☐ (8.1) Is there a statement indicating that the participant is making a decision whether or not to participate, and that his/her signature indicates that he/she has decided to participate having read and discussed the information in the informed consent?

☐ (8.2) Are all technical terms fully explained to the participant?

☐ (8.3) Is the informed consent written at a level that the participant can understand?

☐ (8.4) Is there text equivalent to: "Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm"? (the actual dates will be specified in the approval notice from the IRB)

9. Specific Considerations (check as appropriate)

☐ (9.1) If the participant is or may become pregnant is there a statement that the particular treatment or procedure may involve risks, foreseeable or currently unforeseeable, to the participant or to the embryo or fetus?

☐ (9.2) Is there a statement specifying the circumstances in which the participation may be terminated by the investigator without the participant's consent?

☐ (9.3) Are any costs to the participant clearly spelled out?

☐ (9.4) If the participant desires to withdraw from the research, are procedures for orderly termination spelled out?

☐ (9.5) Is there a statement that the Principal Investigator will inform the participant or any significant new findings developed during the research that may affect them and influence their willingness to continue participation?

☐ (9.6) Is the participant is less than 18 years of age? If so, a parent or guardian must sign the consent form and assent must be obtained from the child

- ☐ Is the consent form written in such a manner that it is clear that the parent/guardian is giving permission for their child to participate?
- ☐ Is a child assent form being used?
- ☐ Does the assent form (if used) clearly indicate that the child can freely refuse to participate or discontinue participation at any time without penalty or coercion?

☐ (9.7) Are all consent and assent forms written at a level that the intended participant can understand? (generally, 8th grade level for adults, age-appropriate for children)

California University of Pennsylvania Institutional Review Board
Review Request Checklist (v021209)

This form MUST accompany all IRB review requests.
Unless otherwise specified, ALL items must be present in your review request.

Have you:

☒ (1.0) FOR ALL STUDIES: Completed ALL items on the Review Request Form?
Pay particular attention to:

- ☒ (1.1) Names and email addresses of all investigators
  - ☒ (1.1.1) FOR ALL STUDENTS: use only your CalU email address)
  - ☒ (1.1.2) FOR ALL STUDENTS: Name and email address of your faculty research advisor
- ☒ (1.2) Project dates (must be in the future—no studies will be approved which have already begun or scheduled to begin before final IRB approval—NO EXCEPTIONS)
- ☒ (1.3) Answered completely and in detail, the questions in items 2a through 2d?
  - ☒2a: NOTE: No studies can have zero risk, the lowest risk is "minimal risk". If more than minimal risk is involved you MUST:
    - ☒ i. Delineate all anticipated risks in detail;
    - ☒ ii. Explain in detail how these risks will be minimized;
    - ☒ iii. Detail the procedures for dealing with adverse outcomes due to these risks.
    - ☒ iv. Cite peer reviewed references in support of your explanation.
  - ☒ 2b. Complete all items.
  - ☒ 2c. Describe informed consent procedures in detail.
  - ☒ 2d. NOTE: to maintain security and confidentiality of data, all study records must be housed in a secure (locked) location ON UNIVERSITY PREMISES. The actual location (department, office, etc.) must be specified in your explanation and be listed on any consent forms or cover letters.
- ☒ (1.4) Checked all appropriate boxes in Section 3? If participants under the age of 18 years are to be included (regardless of what the study involves) you MUST:
  - ☒ (1.4.1) Obtain informed consent from the parent or guardian—consent forms must be written so that it is clear that the parent/guardian is giving permission for their child to participate.
  - ☒ (1.4.2) Document how you will obtain assent from the child—This must be done in an age-appropriate manner. Regardless of whether the parent/guardian has given permission, a child is completely free to refuse to participate, so the investigator must document how the child indicated agreement to participate ("assent").
- ☒ (1.5) Included all grant information in section 5?
- ☒ (1.6) Included ALL signatures?

☐ (2.0) FOR STUDIES INVOLVING MORE THAN JUST SURVEYS, INTERVIEWS, OR QUESTIONNAIRES:

- ☐ (2.1) Attached a copy of all consent form(s)?
- ☐ (2.2) FOR STUDIES INVOLVING INDIVIDUALS LESS THAN 18 YEARS OF AGE: attached a copy of all assent forms (if such a form is used)?
- ☐ (2.3) Completed and attached a copy of the Consent Form Checklist? (as appropriate—see that checklist for instructions)

☒ (3.0) FOR STUDIES INVOLVING ONLY SURVEYS, INTERVIEWS, OR QUESTIONNAIRES:

- ☒ (3.1) Attached a copy of the cover letter/information sheet?
- ☒ (3.2) Completed and attached a copy of the Survey/Interview/Questionnaire Consent Checklist? (see that checklist for instructions)
- ☒ (3.3) Attached a copy of the actual survey, interview, or questionnaire questions in their final form?

☒ (4.0) FOR ALL STUDENTS: Has your faculty research advisor:

- ☒ (4.1) Thoroughly reviewed and approved your study?
- ☒ (4.2) Thoroughly reviewed and approved your IRB paperwork? including:
  - ☒ (4.2.1) Review request form,
  - ☒ (4.2.2) All consent forms, (if used)
  - ☒ (4.2.3) All assent forms (if used)
  - ☒ (4.2.4) All Survey/Interview/Questionnaire cover letters (if used)
  - ☒ (4.2.5) All checklists
- ☒ (4.3) IMPORTANT NOTE: Your advisor's signature on the review request form indicates that they have thoroughly reviewed your proposal and verified that it meets all IRB and University requirements.

☒ (5.0) Have you retained a copy of all submitted documentation for your records?

Project Director's Certification
Program Involving HUMAN SUBJECTS

The proposed investigation involves the use of human subjects and I am submitting the complete application form and project description to the Institutional Review Board for Research Involving Human Subjects.

I understand that Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects. If the Board grants approval of this application, I agree to:

1. Abide by any conditions or changes in the project required by the Board.
2. Report to the Board any change in the research plan that affects the method of using human subjects before such change is instituted.
3. Report to the Board any problems that arise in connection with the use of human subjects.
4. Seek advice of the Board whenever I believe such advice is necessary or would be helpful.
5. Secure the informed, written consent of all human subjects participating in the project.
6. Cooperate with the Board in its effort to provide a continuing review after investigations have been initiated.

I have reviewed the Federal and State regulations concerning the use of human subjects in research and training programs and the guidelines. I agree to abide by the regulations and guidelines aforementioned and will adhere to policies and procedures described in my application. I understand that changes to the research must be approved by the IRB before they are implemented.

Professional Research

Project Director's Signature

Department Chairperson's Signature

Student or Class Research

Student Researcher's Signature

Supervising Faculty Member's Signature if required

Department Chairperson's Signature

ACTION OF REVIEW BOARD (IRB use only)

The Institutional Review Board for Research Involving Human Subjects has reviewed this application to ascertain whether or not the proposed project:

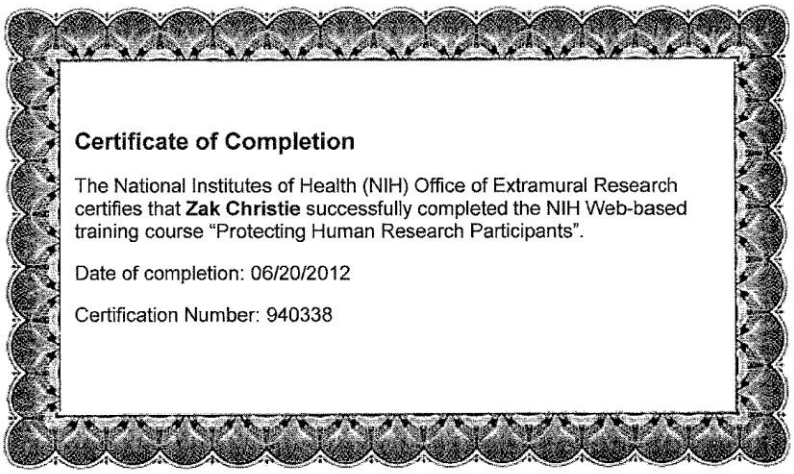
1. provides adequate safeguards of the rights and welfare of human subjects involved in the investigations;
2. uses appropriate methods to obtain informed, written consent;
3. indicates that the potential benefits of the investigation substantially outweigh the risk involved.
4. provides adequate debriefing of human participants.
5. provides adequate follow-up services to participants who may have incurred physical, mental, or emotional harm.

☐ Approved[_____] ☐ Disapproved

Chairperson, Institutional Review Board

Date

Approved, September 12, 2005 / (updated 02-09-09)



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Zak Christie** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 06/20/2012

Certification Number: 940338

Home » Research Survey Service

Research Survey Service

User login

Please use your member ID and password to login.

Don't know your member ID or password? Click here.

Member Id: *

Password: *

Remember me

..Log In..

- Home
- About NATA
- Annual Meeting
- Athletic Training
- Board of Certification
- Business Opportunities
- Career Center
- Education
- Emerging Practices
- Gov't Affairs/Advocacy
- Hall of Fame
- Honors & Awards
- Informational Materials
- Membership
- NATAPAC
- NATA Foundation
- NATA Store
- Press Room
- Quiz Center
- Revenue Resources
- Statements

Navigation

- Home
- Glossary
- Frequently Asked Questions

Guidelines

Process:

For student members, NATA will broadcast email student surveys to a maximum of 1,000 participants. If a follow-up reminder is desired, NATA will transmit a second letter to the same members selected for the original broadcast.

For professional members, NATA will provide address or email lists at the lowest rate (9¢/ name). Prepayment and a signed one-time use agreement are required in addition to the documents below There is no limit to the number of contact names a professional member can request for a project. NATA does not offer an email broadcast service for professional members.

Disclaimer:

The following disclaimer is required:
"This student survey is not approved or endorsed by NATA. It is being sent to you because of NATA's commitment to athletic training education and research."

Requirements:

1. Completed application form (next page).
2. Institutional Review Board approval - upload as part of form.
3. Informed Consent form, if applicable - upload as part of form.
4. Word (.doc) version of survey invitation email to participants - upload as part of form. See Sample-Cover-Letter for more information.
5. Description / criteria identifying targeted survey participants - see 'Research-Survey-Criteria' document for more information.

Proceed to the Research Survey Request form

Search this site:

Institutional Review Board
California University of Pennsylvania
Morgan Hall, Room 310
250 University Avenue
California, PA 15419
instreviewboard@calu.edu
Robert Skwarecki, Ph.D., CCC-SLP,Chair

Dear Mr. Christie:

Please consider this email as official notification that your proposal titled "Continuing Education Participation Effecting Concussion Management Confidence in Athletic Trainers" (Proposal #12-037) has been approved by the California University of Pennsylvania Institutional Review Board as submitted.

The effective date of the approval is 2-11-2013 and the expiration date is 2-10-2014. These dates must appear on the consent form.

Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

(1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)

(2) Any events that affect the safety or well-being of subjects

(3) Any modifications of your study or other responses that are necessitated by any events reported in (2).

(4) To continue your research beyond the approval expiration date of 2-10-2014 you must file additional information to be considered for continuing review. Please contactinstreviewboard@calu.edu
Please notify the Board when data collection is complete.

Regards,
Robert Skwarecki, Ph.D., CCC-SLP
Chair, Institutional Review Board

APPENDIX C2

Panel of Experts Letter

Hello,

My name is Zak Christie, I am a graduate Athletic Trainer at California University of Pennsylvania. I am conducting research with Dr. Linda Meyer and am using a survey. You were highly recommended as an expert in the field of concussion. I am asking for you to sit on my panel of experts for this survey.

Please let me know if you are NOT able to assist me with this survey. If you are able to assist, I kindly ask if you would please reply no later than Monday, November 23, 2012.

Either way, thank you for your time; I greatly appreciate it. Thank you for your time and consideration.

Very Respectfully,
Zak Christie

APPENDIX C3

Concussion Knowledge and Confidence Survey

***1. Are you 18 or older?**

- ◯ YES
- ◯ NO

***2. What is your age?**

***3. What is your gender?**

- ◯ Female
- ◯ Male

***4. How many years have you been practing as a Certified Athletic trainer?**

- ◯ 0-1 Year
- ◯ 1-5 Years
- ◯ 5-10 Years
- ◯ 10-15 Years
- ◯ 15-20 Years
- ◯ 25 or more

***5. What is your current work setting?**

- ◯ College/University
- ◯ Hospital/Clinical
- ◯ Occupational/ Industrial
- ◯ Military
- ◯ Performing Arts
- ◯ Professional Sports
- ◯ Public Safety
- ◯ Clinic/Secondary School
- ◯ Hospital/Secondary School
- ◯ Other (please fill in the blank)

***6. What NATA district is your current work setting located in?**

- ◯ District 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)
- ◯ District 2 (Delaware, New Jersey, New York, Pennsylvania)
- ◯ District 3 (District of Columbia, Maryland, North) Carolina, South Carolina, Virginia, West Virginia)
- ◯ District 4 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)
- ◯ District 5 (Iowa, Kansas, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota)
- ◯ District 6 (Arkansas, Texas)
- ◯ District 7 (Arizona, Colorado, New Mexico, Utah, Wyoming)
- ◯ District 8 (California, Hawaii, Nevada)
- ◯ District 9 (Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee)
- ◯ District 10 (Alaska, Idaho, Montana, Oregon, Washington)

***7. What is your highest level of education?**

- ◯ Bachelors
- ◯ Masters
- ◯ Doctorate
- ◯ Other (please list)

***8. Please list any credentials you hold:**

- ☐ ATC
- ☐ EMT
- ☐ PA-C
- ☐ RN
- ☐ LPN
- ☐ Nurse Practitioner
- ☐ LMT
- ☐ DC
- ☐ MD/DO
- ☐ DPT
- ☐ CSCS
- ☐ PES
- ☐ Not Available
- ☐ Other (please list)

***9. When reporting your continuing education hours to the BOC this past session, in which one of the following categories did you report the most CEUs?**

- ◯ Category A – BOC Approved Provider Programs
- ◯ Category B – Professional Development
- ◯ Category C – Post-Certification College/University Coursework
- ◯ Category D – Individualized Options

***10. Which one of the following do you find most beneficial in terms of providing 'quality continuing education' in concussion management?:**

- ◯ Small Seminars
- ◯ Professional Journals
- ◯ National Conferences
- ◯ Home study
- ◯ Webinar
- ◯ Other (please fill in the blank)

***11. How likely are you to search for current peer-reviewed literature to improve your concussion management skills?**

- ◯ Very unlikely
- ◯ Not likely
- ◯ Somewhat likely
- ◯ Very likely

***12. Rank in order (1-best to 5 being least), which of the following opportunities you found most beneficial for concussion management continuing education?**

	1	2	3	4	5
Please Rank					

13. In reference to the previous question, can you provide any opportunity for concussion management continuing education not mentioned? If so please list it below , If not please skip this question:

14. Which of the following do you find to be most helpful in identifying continuing education opportunities related to concussion management? (check all that apply):

- [ ] Professional memberships
- [ ] Professional journals
- [ ] Browsing the internet
- [ ] Employer
- [ ] Other (please fill in the blank)

***15. Does your employer reimburse you for continuing education opportunities?**

- ◯ YES- My employer pays for all CEU opportunities
- ◯ NO- My employer does not pay for any CEU opportunities
- ◯ My employer gives me a CEU allowance
- ◯ Other (please specify)

***16. How many concussions you have directly managed within the past 12 months?**

***17. Do you use other health care professionals to assist you throughout the management of concussion?**

- ◯ YES
- ◯ NO

***18. Please check all of the following who are a part of your concussion management team (check all that apply):**

- [ ] School Nurse
- [ ] MD/DO
- [ ] Physician assistant
- [ ] Nurse practitioner
- [ ] Neurologist
- [ ] Neuropsychologist
- [ ] Other (please specify)

***19. How confident are you in recognizing the signs and symptoms of concussion?**

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not confident
- ◯ Very unconfident

***20. How confident are you in describing the mechanism(s) of injury for concussion?**

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not confident
- ◯ Very unconfident

***21. Are you aware of proper return to play protocol for concussion?**

- ◯ YES
- ◯ NO

***22. Do you use electronic based concussion testing software? If no, please skip to question 26.**

- ◯ YES
- ◯ NO

23. Please check the following concussion software that you use MOST OFTEN:

- ◯ CogState Sport
- ◯ Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT™)
- ◯ Concussion Resolution Index(CRI)
- ◯ Concussion Sentinel
- ◯ I do not use any concussion software
- ◯ Other (please list)

***24. How confident are you in preforming a sideline evaluation on concussion.**

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not confident
- ◯ Very unconfident

***25. Which of the following do you include for your sideline evaluation of concussion? (Choose all that apply):**

- [ ] Sport Concussion Assessment (SCAT)
- [ ] Sport Concussion Assessment Tool 2 (SCAT2)
- [ ] Balance Error Scoring System (Bess)
- [ ] Rhomberg special test
- [ ] Myotome evaluation
- [ ] Dermatome evaluation
- [ ] Cranial Nerve Evaluation
- [ ] Symptom Scoring
- [ ] Standardized Assessment of Concussion (SAC)
- [ ] Physical Examination
- [ ] Other (please specify)

***26. The term "mild traumatic brain injury (mTBI)" and "concussion" are interchangeable terms.**

- ◯ True
- ◯ False

***27. Signs and symptoms of concussion always present immediately after the mechanism of injury.**

- ◯ True
- ◯ False

***28. Please list all the potential signs and symptoms of concussion.**

- [ ] Headache
- [ ] Dizziness
- [ ] Drowsiness
- [ ] Photophobia
- [ ] Tinnitus
- [ ] Amenorrhea
- [ ] Feeling like in a fog
- [ ] Blurred vision
- [ ] Paresthesia in extremities
- [ ] Overly emotional
- [ ] Abnormal sleeping patterns
- [ ] Referred pain
- [ ] Balance issues
- [ ] Difficulty concentrating
- [ ] Other (please specify)

***29. It is more important for the patient to physically rest, rather than to cognitively rest within the first few days after sustaining concussion.**

- ◯ True
- ◯ False
- ◯ Physical and cognitive rest are equally important in the initial stages.

***30. There is equipment, suggested by evidence based research, that can prevent concussion.**

- ◯ True
- ◯ False

***31. Special considerations should be taken when treating children or adolescents (under 18 years old) who have sustained a concussion.**

- ◯ True
- ◯ False

***32. Does your concussion management protocol permit you to advise your patients to take medication (like analgesics) after sustaining a concussion?**

- ◯ YES
- ◯ NO

***33. Which of the following best describes your return to play protocol for concussion:**

- ◯ Full release to activity if there is minimal signs and symptoms
- ◯ No activity for 1 week (7 days), then full release to activity
- ◯ I rely mostly on my computer program testing outcomes
- ◯ A step-wise progression that gradually increases the patient's activity per every 24 hours
- ◯ I do not use a return to play protocol

34. During a step wise-return to play protocol, how long should each step be placed apart?

- ◯ 30 minutes
- ◯ 1 hour
- ◯ 3 hours
- ◯ 24 hours
- ◯ 48 hours
- ◯ I do not use a return to play protocol.

***35. If a patient becomes symptomatic during a phase of your step-wise return to play protocol, what action would you take?**

- ◯ Advise the patient to keep performing the activity that he/she is doing.
- ◯ Have the patient stop for 30 minutes, then retry the activity.
- ◯ Stop all activity and refer the patient to a neurologist.
- ◯ Drop the patient back to the previous step in the graduated return to play protocol, then retest after 24 hours of rest.
- ◯ Other

***36. Has your concussion protocol program been reviewed, approved, and signed off by your supervising physician?**

- ◯ YES
- ◯ NO

***37. Which of the following do you use as your reference for current concussion management guidelines?**

- ◯ Zurich Consensus statement of Concussion in Sport.
- ◯ NATA position statements.
- ◯ Summary and agreement statement of 1st international conference in sport, Vienna.
- ◯ Summary and agreement statement of the 2nd International Conference on Concussion in sport, Prague.
- ◯ Other (please specify)

APPENDIX C4

Cover Letter

3/18/2013
Dear Fellow Certified Athletic Trainer:

My name is Zachary Christie and I am currently a graduate student at California University of Pennsylvania pursing a Master of Science in Athletic Training. Part of the graduate study curriculum is to complete a research thesis through conducting research. I am conducting survey research to determine the current knowledge level of concussion and the educational factors effecting confidence in certified athletic trainers. This Data will allow the Athletic Training profession to further our own knowledge in regards to concussion management.

Certified athletic trainers whom are members of the National Athletic Training Association are being asked to participate in this research; however, your participation is voluntary and you do have the right to choose not to participate. You also have the right to discontinue participation at any time during the survey without penalty; however your data will be discarded. The California University of Pennsylvania Institutional Review Board has reviewed and approved this project. The approval is effective (2/11/2013 and expires 2/10/2014).

All survey responses are anonymous and will be kept confidential, and informed consent to use the data collected will be assumed upon return of the survey. Aggregate survey responses will be housed in a password protected file on the CalU campus. Minimal risk is posed by participating as a subject in this study. I ask that you please take this survey at your earliest convenience as it will take approximately 10 minutes to complete. If you have any questions regarding this project, please feel free to contact the primary researcher, Zak Christie at CHR8755@CalU.edu. You can also contact the faculty advisor for this research, Linda Platt Meyer, EdD, LAT, ATC at Meyer@calu.edu. Thanks in advance for your participation. Please click the following link to access the survey (www.surveymonkey.com/s/RXRJMYZ).

Thank you for taking the time to take part in my thesis research. I greatly appreciate your time and effort put into this task.

This student survey is not approved or endorsed by NATA. It is being sent to you because of NATA's commitment to athletic training education and research.

Sincerely,
Zachary Christie LAT, ATC
California University of Pennsylvania
250 University Ave
California, PA 15419
CHR8755@CalU.edu

REFERENCES

1. Centers for Disease Control and Prevention. (2010). Nutrition. Retrieved from http://www.cdc.gov/traumaticbraininjury/. Accessed July 20,2012.

2. Day JR, Hanson MR, Reding MJ. Neurocognitive Testing Following Resolution of Concussion Symptoms. *IJATT* 2012;17(2):9-33.

3. Ragan BG, Herrmann SD, Kang M, et al. Psychometric Evaluation of the Standardized Assessment of Concussion: Evaluation of Baseline Score Validity Using Item Analysis. *Atshc* 2009;1(4):180-187.

4. Falconer EK, Geffen GM, Olsen SL, et al. The rapid screen of concussion: An evaluation of the non-word repetition test for use in mTBI research. *Brain Inj* 2006;20(12):1251–1263.

5. Beaumont LD, Mongeon D, Tremblay S, et al. Persistent Motor System Abnormalities in Formerly Concussed Athletes. *J Athl Train* 2011;46(3):234-240.

6. Eckner JT, Kutcher JS, Richardson JK. Between-Seasons Test-Retest Reliability of Clinically Measured Reaction Time in National Collegiate Athletic Association Division I Athletes. *J Athl Train* 2011:46(4):409.

7. Allen BJ, Gfeller JD. The Immediate Post-Concussion Assessment and Cognitive Testing battery and traditional neuropsychological measures: A constructed concurrent validity study. *Brain Inj* 2011;25(2):179-191.

8. Broglio SP, Ferrara MS , Macciocchi SN, et al. Test-Retest Reliability of Computerized Concussion Assessment Programs. *J Athl Train* 2007;42(4):509-514.

9. Brown CN, Guskiewicz KM, Bieiberg J. Athlete Characteristics and Outcome Scores for Computerized

Neuropsychological Assessment: A Preliminary Analysis. *J Athl Train* 2007;42(4);515-523.

10. Thomas DG, Collins MW, Saladino RA, et al. Identifying Neurocognitive Deficits in Adolescents Following Concussion. *AEM* 2011;18(3):246-254.

11. Broglio SP, Ferrara MS, Pinland SG, et al. Concussion history is not a predictor of computerized neurocognitive performance. *Br J Sports Med* 2006;40(9):802–805.

12. Broglio SP, Macciocchi SN, Ferrara MS. Neurocognitive Performance of Concussed Athletes When Symptom Free. *J Athl Train* 2007;42(4):504-508.

13. Guskiewicz K, Bruce S, Cantu R, et al. National Athletic Trainers' Association position statement: Management of sport-related concussion. / Management of sport-related concussion. *J Athl Train.* [serial online]. July 2004;39(3):280-297. Available from: SPORTDiscus with Full Text, Ipswich, MA. Accessed June 22, 2012.

14. McCrory P, Meeuwisse W, Johnson K, et al. Consensus Statement on Concussion in Sport: The 3rd International Conference on Concussion in Sport Held in Zurich, November 2008. *J Athl Train.* [serial online]. July 2009;44(4):434-444. Available from: SPORTDiscus with Full Text, Ipswich, MA. Accessed June 22, 2012.

15. Noteaert AJ, Guskiewicz KM. Current Trends in Athletic Training Practice for Concussion Assessment and Management. *J Athl Train* 2005;40(4):320-325.

16. Hunt TN, Trombley A. Physician Management of Sport-Related Concussions at the Collegiate Level. *Atshc* 2010;2(5):227-234.

17. Covassin T, Elbin R, Kontos AP, et al. Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) Practices of Sports Medicine Professionals. *J Athl Train* 2009;44(6):639-644.

18. McLeod TC. Register-Mihalik JK. Clinical Outcomes Assessment for the Management of Sport-Related Concussion. *J SPORT REHABIL* 2011;20(1):46-60.

19. Hecimovich M, Volet S. Tracing the evolution of chiropractic students' confidence in clinical and patient communication skills during a clinical internship: a multi-methods study.*BMC Medical Education.*June 2012;19;12:42.

20. Scorza KA, Raleigh MG, O'Connor FG. Current Concepts in Concussion: Evaluation and Management. *American Family Physician.* 2012;85(2):123-132.

21. Harmon KG, Drezner J, Gammons M, et al. American Medical Society for Sports Medicine Position Statement: Concussion in Sport. Clin J Sport Med 2013;(23):1-18.

22. Martinez DE. Bloodless Concussion: The Misunderstood Injury. *J Am Chiropractic Assoc* 2011;(7):16-36.

23. Pelletier J. Sports injuries in contact sports: concussion and spinal injuries (invited presentation); 2005 Aug 4l Ottawa, Canada. Available from: jcp@ca.inter.net.

24. Eckner JT, Kutcher JS. Concussion Symptom Scales and Sideline Assessment Tools: A Critical Literature Update. *ACSM* 2010;9(1):8-15.

25. Reddy CC ,Collins MW. Sports Concussion: Management and Predictors of Outcome. *ACSM* 2009;8(1):10-15.

26. Purcell L, Carson J. Sport-Related Concussion in Pediatric Athletes. *CLIN PEDIATR* 2008;47(2):106-113.

27. DeKosky ST, Ikonomovic MD, Gandy S. Traumatic brain injury—football, warfare, and long-term effects. *N Engl J Med*. 2010;363(14):1293-1296.

28. Piland SG, Ferrara MS, Macciocchi SN, et al. Investigation of Baseiine Seif-Report Concussion Symptom Scores.*J Athl Train 2*010;45(3):273-278.

29. Majerske CW, Mihalik JP, Ren D, et al. Concussion in Sports: Postconcussive Activity Levels, Symptoms, and Neurocognitive Performance. *J Athl Train* 2008;43(3):265-274.

30. Mailer BJ, McLeod TC, Bay RC. Healthy Youth Are Reliable in Reporting Symptoms on a Graded Symptom Scale. *J SPORT REHABIL* 2008;17(1):11-20.

31. Fox ZG, Mihalik JP, Blackburn T, et al. Return of Postural Control to Baseline After Anaerobic and Aerobic Exercise Protocols. *J Athl Train* 2OO8;43(5):456-463.

32. Broglio SP, Zhu W, Sopiarz K, et al. Generalizability Theory Analysis of Balance Error Scoring System Reliability in Healthy Young Adults. *J Athl Train* 2009;44(5):497-502.

33. NATA ATEP contempencies (2006) National Athletic Trainers' Association (NATA). *Athletic Training Educational Competencies.*4th ed. Dallas,TX:NATA; 2006.

34. Covassin T, Elbin R, Stiller-Ostrowski SL. Current Sport-Related Concussion Teaching and Clinical Practices of Sports Medicine Professionals. *J Athl Train* 2005;44(4):400-404.

35. Hankemeier DA, Van Lunen BL. Approved Cljnical Instructors' Perspectives on Implementation Strategies in Evidence-Based Practice for Athletic Training Students. *J Athl Train* 2011:46(6):655-664.

36. Manspeaker S, Lunen BV. Overcoming Barriers to Implementation of Evidence-Based Practice Concepts In Athletic Training Education: Perceptions of Select Educators. *J Athl Train* 2011;46(5);514-522.

37. Chiang YZ, Tan KT, Chiang YN, et al. Evaluation of educational methods in dermatology and confidence levels: a national survey of UK medical students. *INT J DERMATOL* 2011;50(2):198-202.

ABSTRACT

TITLE: CONTINUING EDUCATION AWARNESS EFFECTING CONCUSSION MANAGEMENT CONFIDENCE IN ATHLETIC TRAINERS

RESEARCHER: Zak M Christie, LAT, ATC

ADVISOR: Dr. Linda Platt Meyer

PURPOSE: To discuss the continuing education practices of AT's along with their concussion management confidence and knowledge.

DATE: May, 2013

Design: Descriptive Survey

Settings: Population-Based Survey

Participants: One-thousand ATs were asked to volunteer. Subjects were randomly selected from the ten districts through the NATA database. The final response rate was 169.

INTERVENTIONS: The dependent variable is the confidence of ATs in regards to concussion management. The independent variable is continued education awareness that ATs have with regards to concussion.

RESULTS: There was no significance found in the hypothesis. However there were additional findings which could lead to further research in concussion knowledge throughout Athletic Trainers.

CONCLUSIONS: Based on the results of this study, we can conclude that continuing education awareness does not relate to concussion management knowledge and confidence.