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Student-Athletes' Knowledge of Athletic Trainers' Scope of Practice

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STUDENT-ATHLETES' KNOWLEDGE OF ATHLETIC TRAINERS' SCOPE OF PRACTICE

by

JESSICA PEARSON

(Under the Direction of Jody Langdon)

ABSTRACT

Context: As a member of the sports medicine team, athletic trainers serve athletes through injury prevention, evaluation, and rehabilitation. While it is imperative for members of the sports medicine team to have knowledge of scope of practice of athletic trainers, it may also be important for athletes as well, so that the athletic trainers can be properly utilized by all parties. Although previous research has been completed on how athletes' sport profile and satisfaction of care relate, no previous studies were identified that assessed athletes' knowledge of athletic trainers' scope of practice.

Objective: Determine student-athletes' knowledge of athletic trainers' scope of practice.

Design: Prospective sequential explanatory mixed methods design.

Setting: Online survey delivered through university email system; paper-pencil survey distributed at pre-participation examinations (PPE).

Participants: Convenience sample of 108 NCAA Division I student-athletes. Forty four total participants. Response rate: 41%. Groups were formed based on whether or not student-athletes had previous experience with an athletic trainer as well as sport profile.

Interventions: Survey consisted of demographic information and knowledge sections.

Independent variables: Previous experience with an athletic trainer, sport profile.

Main Outcome Measure: Demographic data were analyzed using descriptive statistics.

Knowledge questions were scored based on correct responses and a total knowledge score was calculated. Independent t-tests were completed to compare knowledge scores between athletes with or without previous experience with athletic trainer and between high- and low-profile sport groups.

Results: Approximately 91% of participants were 18 years old. 64% of participants had previous experience with an athletic trainer, while 36% had no previous experience. Independent T-tests revealed no significant differences in knowledge scores with regard to previous experience with an athletic trainer or sport profile.

Conclusion: This study provides evidence that previous experience with an athletic trainer and sport profile do not have an effect on the athlete's knowledge of athletic trainers' scope of practice. Results indicated that athletes have a moderate level of knowledge in all domains, which established that athletes have a consistent knowledge level with physicians, administrators, and coaches. Future studies could be done to assess knowledge levels across all NCAA Divisions.

INDEX WORDS: Student-athletes' knowledge, Scope of practice, Athletic training education

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PRACTICE

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	2
CHAPTER 1	5
INTRODUCTION	5
Purpose.....	8
CHAPTER 2	10
METHODS	10
Study Design.....	10
Participants.....	10
Instrument	11
Procedures.....	12
Data Analysis	13
CHAPTER 3	15
RESULTS	15
Descriptive Statistics.....	15
Means Comparisons.....	15
Open-ended Responses	19
CHAPTER 4	21
DISCUSSION	21
LIMITATIONS.....	27
CONCLUSION.....	28
APPENDIX A.....	30
APPENDIX B.....	33
APPENDIX C	48
APPENDIX D.....	51

REFERENCES	58
TABLES	62
Table 1. Demographic Characteristics of Participants.....	62
Table 2. Knowledge Questions	65
Table 3. Domain Knowledge Questions	67
Table 4. Total Knowledge Scores	71
FIGURES	72
Figure 1. Positive Experiences with Athletic Trainers	72
Figure 2. Negative Experiences with Athletic Trainers.....	72

CHAPTER 1

INTRODUCTION

As a member of the sports medicine team, athletic trainers serve athletes in a variety of ways, including taping and bracing, general medical care, injury/ illness prevention and assessment. Other members of the sports medicine team, including physicians, administrators, and coaches, rely on athletic trainers to care for athletes through injury prevention, treatment and rehabilitation, as well as return to play decisions. While it is imperative for members of the sports medicine team to have knowledge of scope of practice of athletic trainers, it may also be important for athletes to have some knowledge of scope of practice as well, so that the athletic trainers can be properly utilized by all parties. Although studies are available to indicate level of knowledge among physicians, parents, administrators, and coaches, there is little to no research evaluating knowledge of scope of practice among athletes. It has been shown that, among members of the sports medicine team, athletic trainers' scope of practice can be incorrectly narrowed due to the lack of understanding and education regarding the athletic trainers' roles and responsibilities.¹⁻⁵ In this situation, the services of an athletic trainer may be completely bypassed and athletes may not have the opportunity to receive optimal health care as a result.²

Following the pattern of knowledge found within the sports medicine team, it is possible that athletes' knowledge of the athletic trainers' scope of practice will also be limited. Based on this information, this study focused on athletes' knowledge of athletic trainers' scope of practice, including knowledge of the 5 domains of athletic training: 1) injury/illness prevention and wellness protection; 2) clinical evaluation and diagnosis; 3) emergency and immediate care; 4) treatment and rehabilitation; and 5) organization, professional health and well-being.

To determine level of knowledge in the current study, studies in the nursing literature were utilized, as indicators of level of knowledge do not currently exist in the athletic training literature. Nursing studies on urinary incontinence have described a poor level of knowledge as scoring 60% or below on a knowledge test, moderate level of knowledge as scoring between 60-80%, and a high level of knowledge at 80% or above.⁶⁻¹¹

Although there is a lack of research among athletes with regard to knowledge of scope of practice, studies focused individually on physicians, administrators and coaches indicate a poor to moderate level of knowledge of the athletic trainers' scope of practice.^{1,2,4,5,12} More specifically, orthopedic physicians who have had experience as a team physician for a sports team were more familiar with athletic trainers roles than physicians who did not have a sports medicine background or did not function as a team physician.^{2,3} For example, non-orthopedic physicians were in less agreement than orthopedic physicians of athletic trainers' skills involving injury evaluation and diagnosis as well as emergency and immediate care.² These skills are associated with acute injuries, which are one of the main reasons athletes seek care from an athletic trainer.¹³ Physicians who had been previously exposed to the athletic training profession had a better understanding of the profession than the physicians who did not have previous exposure.

From an administrative perspective, athletic trainers can reduce liability concerns through emergency care, injury prevention, and clinical evaluations.¹⁴ Yet, two studies report that only 55% of the administrators currently employ an athletic trainer.^{4,12} Similar to physicians, administrators, such as secondary school superintendents, athletic directors, and principals reported that they felt athletic trainers were the most qualified individuals to prevent and evaluate

an athletic injury.⁴ Gould and Deivert suggest that administrators have an accurate knowledge of the athletic training profession, but have an inaccurate perception of the value of athletic trainers.⁴ From this information, it can be seen that administrators may not have adequate knowledge of athletic trainers' scope of practice, which may impact how often athletic trainers are utilized.

Coaches rely on athletic trainers to evaluate and treat illnesses and injuries, provide rehabilitation, and make return to play decisions.¹⁴ One study highlighting the relationships between athletic trainers and coaches has indicated that coaches at the National Collegiate Athletic Association (NCAA) Division I level demonstrated knowledge of an athletic trainer's scope of practice by correctly identifying the required minimum degree, athletic training student clinical requirements, clinical competencies that athletic trainers perform.¹

The research on knowledge of scope of practice of athletic trainers suggests that collectively, members of the sports medicine team exhibit some knowledge. However, athletic trainers have a specific responsibility to the athlete, who is considered to be a direct consumer of the athletic training services. If the athlete does not have a good working knowledge of the athletic trainer's scope of practice, similar to patterns seen in physicians, administrators, and coaches, it is possible that the athletic trainer will be underutilized.² In addition, a lower level of athletes' knowledge of scope of practice may lead to the mismanagement of injuries and poor return to play decisions, due to not properly utilizing these athletic training services.^{1,15} Previous research has shown that individuals who have greater awareness of the athletic trainer's scope of practice more regularly utilize such services.¹⁶

Although the data on athlete's knowledge is scarce, there is research on athletes' perceptions of satisfaction of care. Athletes have previously reported that overall, they are satisfied with the quality of care that they received from their athletic trainer.¹⁷ As athletes' satisfaction increases, a positive environment is created and can result in greater patient outcomes.¹⁷⁻¹⁹ Further, athletes in high-profile sports, such as football, men's basketball or baseball, and women's basketball have reported the highest amount of satisfaction.^{20,21} Those athletes that reported being satisfied with their quality of care also indicate that accurate diagnoses, taping skills, clinical evaluations, availability at practice and for treatment, compassion, professionalism, and providing comfort after injury are all desirable characteristics of an athletic trainer.¹⁷ Previous literature has shown that athlete's perceptions of future athletic trainers is not affected by past experience.²² Due to the previous research on athletes' satisfaction, quality of care, perceptions of athletic trainers, athletes' knowledge of the athletic trainers' scope of practice should be evaluated to help determine the current knowledge level of athletes.

In the college setting, if an athlete has never had experience with an athletic trainer in secondary school, it is possible that the athlete will not have a sufficient knowledge of an athletic trainers' scope of practice when they enter the collegiate setting. Without this knowledge, athletic trainers could seem of limited use. Determining the level of athletes' knowledge of athletic trainers' scope of practice could help to direct athletic trainers to better serve their athletes in the future. Therefore, the purpose of this study was to determine athletes' knowledge of athletic trainers' scope of practice based on their previous experience with athletic trainers and sport profile. It was hypothesized that the majority of participants would not have moderate level of knowledge of athletic trainers' scope of practice, and that differences in knowledge would

exist between participants with previous experience with an athletic trainer and those without experience. Further, those that participated in a high profile sport would show a difference in knowledge scores of athletic trainers' scope of practice when compared to those in low profile sports.

CHAPTER 2

METHODS

STUDY DESIGN

The purpose of this study was to determine student-athletes' knowledge of athletic trainers' scope of practice. To fulfill the aim of this study, a prospective sequential explanatory mixed method design was used.

PARTICIPANTS

A total of 118 NCAA Division I student-athletes and cheerleaders (collectively referred to as student-athlete) entered the university during the 2016-2017 school year. Eight student-athletes were excluded due to being a transfer student athlete and 2 were excluded due to being under the age of 18. Therefore, 108 student-athletes who were under the care of the athletic training department from a university in southeast Georgia were recruited for this study. From that pool, 44 student-athletes completed the study. Only incoming freshmen student-athletes were assessed in order to obtain a baseline for student-athletes entering the collegiate athletics department. Transfer student-athletes were excluded because they would likely have had previous experience with collegiate athletic training services. Anyone under the age of 18 was also excluded due to potential difficulty in obtaining parental consent.

The majority (90%) of participants were 18 years old, with the rest being 19 years old. The majority of participants were female (N=26). Geographically speaking, 64% of participants were from the state of Georgia, with the next highest percentages coming from Florida (11.9%) and Virginia (7.1%). The majority (91%) of the participants had over 5 years of experience playing their sport in middle/high school, with 41% of participants coming from either a 5A or

6A class high school. Cheerleading (27%) had the highest response rate. Full demographic characteristics are listed in Table 1.

INSTRUMENT

The survey that was used for this study was originally written and designed by the primary researcher and adapted from a study of NCAA Division I coaches' knowledge of athletic trainers.¹ The primary researcher of this study adapted the survey for student-athletes rather than coaches. It was then reviewed for face validity by graduate student athletic trainers, former cheerleading student-athletes, and committee members. The open-ended questions were written and designed by the primary researcher along with committee members. The survey was used to assess participant demographics, previous history of athlete's experience with an athletic trainer, knowledge of an athletic trainer's required educational background, and participant knowledge of athletic training competencies.

Five questions assessed participant demographics such as sport, age, and gender, years of sport participation, and high school division. In addition, 5 questions assessed previous experience with an athletic trainer. For example, participants were asked if they have previously been treated by an athletic trainer. Four questions were used to assess the participant's knowledge of the educational background required of athletic trainers. In this section, participants were asked what the minimum degree requirement is for an athletic trainer. Five questions assessed the participant's knowledge of the athletic training competencies as outlined by the role delineation study, whereby participants were asked to check all competencies that apply within the 5 domains of athletic training.²³ Finally, short-answer questions assessed the

connection between athlete knowledge and experience with an athletic trainer. Individuals who have had experience with an athletic trainer prior to college were asked the following questions:

1. Based on your answers to the questions concerning athletic trainer's scope of practice, describe your experience with any athletic trainer you have interacted with. Did that person seem like they possessed the skills and abilities you believe they needed to have? Please explain your answer.
2. What influence does this knowledge of scope of practice have on your respect and/or confidence in the athletic trainer you worked with?

Individuals who have not had experience with an athletic trainer prior to college were asked the following question:

1. Based on your answers to the questions concerning athletic trainers' scope of practice, what do you expect your interactions with an athletic trainer to be like?
2. What are you basing these expectations on?
3. If you were to have access to an athletic trainer in high school, how might your experience be different?
4. What are your expectations of the athletic trainer assigned to your team at GSU?

PROCEDURES

The study design was a prospective, sequential explanatory mixed methods.¹ Pilot testing was completed with graduate athlete training students and former cheerleaders. Pilot tested participants were sent an email with the link to the online survey. They were asked to complete the survey and then reply to the primary investigator regarding any problems they faced or with any suggestions on how to improve the survey. This ensured face validity. During the pilot testing, participants did not report any issues with the survey or any problems understanding any

of the questions. For the main study, recruitment was done at a single NCAA Division I university in southeast Georgia. All incoming student-athletes were given the opportunity to participate in the study either prior to their pre-participation examination (PPE) at the university using an online version or during their PPE using a paper-pencil survey. Members of the athletic training staff or graduate assistant athletic trainers administered the surveys during the team's PPE. For the online version, the primary researcher sent a link to the potential participants prior to their PPE. All participants were given the opportunity to ask questions prior to administration of the survey. Eighteen participants completed the paper-pencil survey and 26 completed the online version of the survey. No incentive was offered to participants.

DATA ANALYSIS

SPSS v.23 was used to analyze all statistics. The first 13 questions were analyzed using descriptive statistics. The knowledge section (questions 14-22) was scored based on correct responses in accordance with the role delineation study.²³ A total score was calculated for knowledge, which was used to analyze differences between groups via independent t-test. Before running the t-test, statistical assumptions were tested. This included verifying that the dependent variable was being measured on a continuous scale; the independent variable consisting of 2 categorical, independent groups; independence of observations between groups; no significant outliers; dependent variable being normally distributed; and homogeneity of variances. No violations of statistical assumptions were found. An alpha level of .05 was pre-determined for all statistical tests. Questions 23-25 were analyzed for common themes using constant comparison. Open ended responses were categorized into positive and negative experiences, with different questions asked based on participants' previous experience with an athletic trainer. More specifically, student-athletes with previous experience were asked whether or not their previous

athletic trainers seemed like they possessed the skills and abilities they needed, and what influence the knowledge of athletic trainer's scope of practice had on their respect and/or confidence in their athletic trainer. The student-athletes who did not have previous experience were asked what they expected their interactions with an athletic trainer to be like, what their expectations were based on, how their experience may have been different if they had access to an athletic trainer in high school, and what their expectations of the current athletic trainer would be. Three different members of the research team independently analyzed responses for commonalities and then discussed individual findings together as a group. If the 3 researchers all independently identified a word or phrase as a common, it was included in as a common response. These responses were used to enhance the understanding of the participants' answers within the knowledge section of the survey.

CHAPTER 3

RESULTS

DESCRIPTIVE STATISTICS

Sixty-four percent of participants had previous experience with an athletic trainer, while the remaining 36% of participants had none. Among the sample, 15% of participants were either unsure or unaware that they had an athletic trainer at their current university. Of the participants that had previous experience with an athletic trainer, 41% interacted with their athletic trainer 1-2 times per week, while 26% interacted with their athletic trainer 3-6 times per week. Twenty-four percent of participants reported that they either did not have an athletic trainer in high school or they did not have regular interaction with their athletic trainer throughout the week. Of the participants that had previous experience with an athletic trainer, the highest percentage (28.6%) of participants predominantly interacted with an athletic trainer for injury evaluation, treatment and rehab, and injury prevention. Participants that did not have an athletic trainer instead reported their injuries to their parents and coaches (33%), as well as physicians (20%).

MEANS COMPARISONS

Means comparisons revealed no significant differences in knowledge of scope of practice scores with regard to previous experience with an athletic trainer [$t(42) = 0.46, p = 0.650$] or sport profile [$t(41) = 0.19, p = 0.384$]. In examining individual responses to these knowledge questions, several were answered incorrectly by the majority of participants and fell below the moderate knowledge threshold (60%).⁷ For example, 91% of participants were unable to correctly identify the meaning of the ATC credential. However, 59% of participants demonstrated a correct understanding of the certification process. On the other hand, participants did achieve a moderate score (60 - 80%) on several other knowledge questions. For example,

70% of participants were able to correctly respond to athletic training student's clinical education requirements.

When knowledge scores were analyzed in total, participants had an average score of 73%. This average score qualifies as a moderate knowledge score. The majority (88%) of participants had a total score greater than or equal to 60% on the domain knowledge questions. However, of that majority, only 41% of participants were able to demonstrate an overall good knowledge ($\geq 80\%$) on the domain questions. A low level of knowledge was seen in only 12% of participants. When scores were analyzed per domain, total average scores for all domains were within the moderate score range. Further, means comparisons by previous experience revealed no significant differences. Values for these tests are outlined within each domain below.

Domain 1 (Injury/Illness Prevention, $t(42) = 0.48$, $p = 0.491$) had an average score of 71%. Half of the participants ($N=22$) incorrectly assumed that athletic trainers were responsible for sending athletic equipment to the appropriate re-certification agencies, which demonstrates a low score for this question. Participants collectively exhibited a moderate knowledge in regards to athletic trainers' ability to educate patients on supplements/vitamins, as well as monitoring environmental conditions. The majority (61%) also recognized that athletic trainers are not responsible maintaining the area of play.

In domain 2 (clinical evaluation/diagnosis, $t(42) = 0.54$, $p = 0.466$), participants recorded an average score of 68%. A poor level of knowledge (56%) was observed in regards to athletic trainers' ability to use special tests to evaluate and formulate clinical diagnoses of neurologic impairments and conditions, such as concussions and nerve injuries. A moderate level of knowledge was exhibited by participants when questioned about athletic trainers' ability to use observational and palpating techniques to determine the type and extent of an injury (72%), as

well as using special tests to evaluate and formulate clinical diagnoses of musculoskeletal injuries (61%). The majority of participants correctly identified that athletic trainers are not trained to perform diagnostic imaging (61%) or provide prescriptions for such testing (70%). Lastly, participants' scores indicated a good understanding of athletic trainers' skill in assessing athletes' injuries by obtaining a thorough history (81%) and interpreting signs, symptoms, and predisposing factors of injuries and illnesses (88%).

Participants displayed an average score of 67% in Domain 3 (immediate and emergency care, $t(42) = 0.02$, $p = 0.898$). In this domain, participants demonstrated a low understanding of an athletic trainers' role in providing care while en route to a medical facility (59%) and athletic trainers' ability to prevent exacerbation of life-threatening and non-life-threatening conditions to reduce risk factors for morbidity and mortality (36%). On the other hand, participants showed a moderate level of knowledge in regards to athletic trainers' ability to coordinate and apply immediate and emergency care of individuals (77%), performing CPR and using an AED (77%), and demonstrating how to implement and direct immediate care strategies using established communication and administrative practices (70%). The majority of participants correctly identified that drawing blood from a patient in an emergency situation (79%) and providing airway intubation when a patient is not breathing (75%) are not within an athletic trainers' scope of practice.

Domain 4 (Treatment and Rehabilitation of Injuries/Illnesses, $t(42) = 1.06$, $p = 0.309$) presented an average score of 72%. A low level of knowledge was observed when participants were questioned regarding athletic trainers' ability to prescribe orthotics and other preventative equipment (59%) and the use of ultrasound therapy as a treatment modality to assist recovery and return to function after an injury (54%). Participant's exhibited moderate knowledge in

athletic trainers' skills in administering therapeutic exercises (79%), manual therapy treatments (75%), electrical stimulation and other electrical modalities (63%); assessing injury status to assist in determining time of return to play (77%); and providing referral to specialists when athlete is in need of additional injury specific assistance (65%). The majority of participants also correctly identified that the following skills are not included in an athletic trainers' scope of practice: determining the need for surgical intervention for an injury (68%), prescription of medications such as albuterol inhalers and pain medications (79%), and aspirating wounds (63%). Participants demonstrated a good understanding of athletic trainers' ability to apply braces and other assistive devices for injury protection and function (93%) and their inability to administer medication via injection (83%).

Finally, domain 5 (organization, professional health and well-being, $t(42) = 0.49$, $p = 0.488$) had a total average score of 67%. No questions within this domain were answered with a low or good level of knowledge by participants. A moderate level of knowledge was exhibited when participants were questioned regarding the organization of medical coverage and staffing for athletic events (65%), properly maintaining/storing records and medical documentation (65%), demonstrating an understanding of statutory and regulatory provisions and professional standards of the practice of athletic training (70%), and developing a referral process to address unhealthy lifestyle behavior (63%). Seventy two percent of participants correctly responded that the role delineation study does not include billing insurance companies for services provided in the athletic training facility.

Knowledge scores and domain totals are listed in Tables 2 and 3.

OPEN-ENDED RESPONSES

The overarching commonality observed in the open-ended responses was that athletic trainers were helpful. Participants who had previous experience with an athletic trainer described positive interactions including receiving services such as stretching, rehabilitation, return to play decisions, modalities, taping, and emotional support. In regards to a positive experience with an athletic trainer, one participant stated, “I was able to recover quicker with an athletic trainer, as well as learn stretching techniques I could use at home for my injury.” Common responses are listed in Figure 1. When asked about the negative experiences, participants commented on the athletic trainer not taking either the athlete or the injury seriously, not providing emotional support, or not treating the injury properly. For example, one participant stated, “My athletic trainer sometimes wouldn’t listen to what my needs were and I would have a muscle strain but he would just say to ice it and wouldn’t actually treat it properly.” Common negative responses are listed in Figure 2. Participants who had previous experience with an athletic trainer also reported that they possessed the skills and abilities needed, were knowledgeable, highly trained and experienced. When participants were asked about if they believed their athletic trainer possessed the skills and abilities they needed, one participant stated, “All of the athletic trainers seem to know what they are doing, they are so helpful when you have questions and always know how to help you the best they can.” In addition, when asked what influence the knowledge of scope of practice has on their respect and/or confidence in the athletic trainer they worked with, one participant stated, “Makes me very comfortable knowing that I am surrounded by staff that are properly trained in sports medicine and rehab.” Participants who had not had previous experience with an athletic trainer reported that they expected athletic trainers to be able to treat their injury properly and to have a positive experience with them. When participants were asked

what they expected their interactions with their athletic trainer to be like, one stated, “He is the person to go to if I get injured. I expect the trainer to help me as much as they can, and get me back in a position to where I can play again.” When probed further on what their expectations were based on, one participant reported, “My knowledge of athletic trainers.” Further, when questioned about how their experience might have been different if they had access to an athletic trainer in high school, one participant stated, “I would have been properly guided during games concerning injuries.” Lastly, participants were asked to explain what their expectations of the athletic trainer assigned to them at their current university. One participant stated, “I expect them to know what’s best for the team to stay healthy, recover well, and take care of themselves.”

CHAPTER 4

DISCUSSION

The purpose of this study was to determine athletes' knowledge of athletic trainers' scope of practice based on their previous experience with athletic trainers and sport profile. We found no significant difference in athletes' knowledge of scope of practice between groups who had previous experience with an athletic trainer and those who did not. We also found no significant differences between those who participated in high versus low profile sports. Athletic trainers' scope of practice was categorized and assessed in 5 different domains, as described in the role delineation study.²³ As such, this enabled athletic trainers to identify the areas of athletic trainers' clinical practice that athletes are most knowledgeable. Based on all 5 domains, participants in the current study displayed a moderate amount (73%) of knowledge of scope of practice.⁷ In addition, participants reported that athletic trainers were helpful, knowledgeable, highly trained, and experienced.

It was hypothesized that athletes who had previous experience with an athletic trainer would have a differing knowledge of athletic trainers' scope of practice. However, no significant differences were found in this study. Pryor et al. reported that 70% of secondary school athletes have athletic training services at their schools, while 86% of athletes have access to athletic training services.²⁴ These rates are higher than what the current study showed with only 64% of student-athletes having previous experience with an athletic trainer. This may be influenced by a lower rate of athletes having had previous experience with an athletic trainer in the current study than the average.²⁴ The number of athletes having previous experience could also be influenced by the availability of athletic trainers in the secondary school setting.^{24,25} In this setting, athletic trainers can be hired in a variety of different ways including full-time employment by the school

or an outreach clinic, part-time employed by the school or an outreach clinic, or per diem.

Furthermore, athletic trainers who are not full-time may have limited hours at the secondary school itself. A common breakdown of how athletic trainers from outreach clinics may provide their services at the school include full practice coverage every afternoon, only game coverage and/or only football coverage.^{24,25}

The national average of athletic trainers who are employed full time in a secondary school is between 37-47%, part time rates are between 10-31%.^{24,25} These statistics may also help to explain why 15% of the participants were unaware or unsure that they would have an athletic trainer at their current university. In addition, of the participants that had previous experience with an athletic trainer, 41% interacted with their athletic trainer between 1-2 times per week, while 26% interacted with their athletic trainer between 3-6 times per week. Consistent with previous literature (70%), the majority (67%) of incoming freshmen interacted with an athletic trainer at least on a weekly basis.¹⁷

When asked about their confidence in their athletic trainer, participants reported that as their comfort level with the athletic trainer increases, their confidence in the athletic trainer also increases. It is likely that as athletes spend more time with their athletic trainer, their comfort and confidence in the athletic trainer's skills will increase. These limited rates of interaction between athletic trainers and athletes may play a factor in the underutilization of athletic training services and thereby limit the athletic trainer's scope of practice.⁵ Participants in this study interacted with an athletic trainer predominantly for injury evaluation, treatment and rehab, and injury prevention. These tasks are included in domains 1, 2, and 4.²³ In previous literature, coaches were most familiar with tasks within domains 1 and 3, while orthopedic physicians were most familiar with domains 2 and 3.¹⁻³ Despite participants interacting with athletic trainers for

reasons mostly associated with domains 1, 2, and 4, only a slight increase in overall knowledge scores for domains 1 and 4 were observed.

Due to not all participants having access to an athletic trainer, it is important to observe who injuries are being reported to in the absence of an athletic trainer. Parents, coaches, and physicians were reported to be the top 3 people participants reported their injury to if they did not have an athletic trainer. It is not surprising that these are people to be notified of an injury. Parents and coaches have a need to know that their child is injured and cannot participate. In addition, parents are likely the people who are referring their children to physicians. As athletes' knowledge of scope of practice increases, it is possible that the athletes will further utilize the athletic trainers' services.¹⁶

MEANS COMPARISONS

As discussed previously, athletes demonstrated a moderate knowledge level of athletic trainers' scope of practice. Although sport profile had previously been found to be a significant predictor of athletes' satisfaction scores, results from the current study indicate that it has no effect on athletes' knowledge of scope of practice.^{20,21} In addition, previous experience with an athletic trainer did not affect athletes' perceptions of future athletic trainers.²² Participants demonstrated a poor understanding of athletic trainers' certification and education background. For example, participants were least familiar with the meaning of the athletic trainer's credential with only 9% answering correctly. As previously stated, athletic trainers' scope of practice may be incorrectly narrowed due to this lack of education.⁵

Coaches' familiarity with athletic trainer's certification has been previously assessed and it was found that only 45% of high school coaches were aware that athletic trainers had to complete and maintain a national certification.⁵ However, 67% of coaches at the collegiate level

were able to identify the correct certification process for athletic trainers.¹ When collegiate coaches' knowledge of the certification process was compared to the participants in this study, it was found that the knowledge was inconsistent. This is important because participants who had previous experience with an athletic trainer stated that they believed their athletic trainer was very knowledgeable and highly trained, which gave the athlete the confidence to trust their athletic trainer. As coaches and athletes knowledge of athletic trainers' certification process increases, it may increase their interaction with an athletic trainer in the future.¹⁶

Consistent with previous literature on members of the sports medicine team, participants in this study were also able to demonstrate a moderate (73%) knowledge score of athletic trainer's scope of practice in this study. Although still consistent within the moderate level of knowledge, participants knowledge level is slightly higher than what was previously observed in collegiate coaches (nearly 60%).¹ As scores were analyzed per domain, all average domain scores were within the moderate range for knowledge. Domain 1 (injury/illness prevention) had an average score of 71%. This domain includes skills that athletes most frequently seek. Athletes exhibited a poor level of knowledge in regards to athletic trainers' responsibility for sending equipment to the appropriate recertification agencies, which is consistent with what was observed in collegiate coaches as well. Coaches and athletes both exhibited a moderate level of knowledge when asked about providing education on supplements/vitamins, monitoring environmental conditions, and maintaining the area of play.¹ Throughout domain 1, coaches at the NCAA D1 level and athletes demonstrate a similar level of knowledge of scope of practice.

Participants recorded a slightly lower average score (68%) in domain 2 (clinical evaluation/diagnosis) when compared to domain 1. A poor level of knowledge was observed in regards to athletic trainers' ability to evaluate and formulate clinical diagnoses of neurological

impairments and condition, such as a concussion. In addition, a moderate level of knowledge was seen when questioned about athletic trainers' ability to determine the type and extent of an injury using observational and palpating techniques, as well as evaluating and clinically diagnosing musculoskeletal injuries. Participants did have a good level of knowledge (above 80%) about athletic trainers' ability to assess injuries by obtaining a thorough history and interpreting signs, symptoms, and predisposing factors of injuries and illnesses. But, athletes are missing the full scope of skills that athletic trainers possess in this domain. This could be a result of several factors. For example, in the high school setting, it is unlikely for team physicians to participate in clinic hours at the school, which may lead athletic trainers to refer athletes to more outside physicians and/or parents taking the athlete to the physician themselves.²⁶ This could potentially lead the athlete to believe that athletic trainers are not trained to diagnose injuries.

Athletes also reported that negative experiences with an athletic trainer in regards to domain 2 include the misdiagnosis of injuries and not treating injuries properly. Hoppel et al. reported that as trust in the athletic trainer's opinion decreases, the likelihood of athletes being evaluated and diagnosed by a physician increases rather than an athletic trainer, hence the lack of knowledge of scope of practice in the second domain.²⁶ The lack of knowledge in this domain could have potential negative effects on the athletes and their return to play in a safe manner.¹⁵ Lastly, although administrators were not tested on what specific skills athletic trainers possessed in this domain, they did report that athletic trainers were the most qualified to evaluate an injury when compared to other allied health professionals.⁴

Domain 3 contains athletic trainers' skills in immediate and emergency care. While orthopedic physicians were most familiar with these skills, nearly 80% of these physicians agreed that athletic trainers were responsible for employing life-saving techniques through

standard emergency procedures.² Despite increased physician knowledge, participants in the current study displayed a lower average score in this domain when compared to the other domains in this study. Participants were only familiar with athletic trainers' abilities to coordinate and apply immediate and emergency care, perform CPR and use an AED, as well as establishing immediate care strategies. In comparison, previous literature has shown that parents who had limited interaction with an athletic trainer scored highest in this domain when compared to other domains. This was attributed to parents only observing athletic trainers in an acute injury or emergency scenario.¹⁶ These same scenarios could be a factor in the current study's participants' decreased levels of knowledge in this domain.

Participants in this study also scored a moderate level of knowledge within the fourth domain (72%), which involved treatment and rehabilitation. Valovich McLeod et al. reported that treatment (60%) and rehabilitation (39%) of injuries were 2 of the 3 most common tasks completed by secondary school athletic trainers.²⁵ In addition, previous literature states that 96% of injuries seen by an athletic trainer in the secondary school setting were acute injuries.¹³ As such, participants in this study exhibited a moderate level of knowledge in regards to athletic trainers' skills in administering therapeutic exercises, manual therapy techniques, electrical modalities, providing referrals to specialists when needed, and assisting in return to play decisions. Lastly, domain 5 (organization, professional health and well-being) also had a lower average score (67%) when compared to other domains. This specific domain includes responsibilities that are most commonly completed behind the scenes, which could lead to participants simply being unaware that these tasks even need to be completed.²³ However, participants did demonstrate a moderate level of knowledge in all questions in this domain.

OPEN-ENDED RESPONSES

Participants most often described athletic trainers as helpful. Previous literature has stated that athletes most often cite athletic trainers' knowledge, skills, and confidence as factors that influence their satisfaction of care.¹⁷ These factors are consistent with what was seen in the current study with participants stating that their athletic trainers' were highly trained and experienced, as well as very knowledgeable. Participants described positive experiences with an athletic trainer including receiving services such as stretching, rehabilitation, return to play decisions, modalities, taping, and emotional support. These skills are mostly seen in domain 4, which had one of the higher average total scores. Participants reported negative experiences with athletic trainers that involved them not taking the athlete or their injury seriously, and not providing emotional support. These experiences are consistent with skills in domain 2, which had one of the lower average knowledge scores. Overall, athletes' knowledge of athletic trainers' scope of practice is at a moderate level, despite the majority of participants having had previous experience with athletic trainers. This level of knowledge is surprising due to participants often describing a positive experience with athletic trainers, which would lead us to believe there was positive communication between athletes and athletic trainers in their past.

LIMITATIONS

This study had several limitations. Participants were recruited from only one university which presented a selection bias. Also, participants were incoming freshmen to the university. These factors limit the generalizability to a larger population of athletes. However, participants came from a variety of different sports and from a wide range of states which helped us overcome this limitation. Future studies could be enhanced by assessing athletes from several universities and upperclassmen. Another limitation that arose was the participants had to be in

contact with an athletic trainer in order to complete the survey. Researchers attempted to limit the prior interaction by utilizing the online version of the survey. However, the initial interaction from the athletic trainer still posed a potential influence on the way the participants responded to the survey questions due to the required interaction. The survey was completed via two separate methods – online and paper/pencil. The timing of when the participants completed the study determined what method of survey administration they completed. In this study, 26 participants completed the online version and 18 completed the paper-pencil version. Paper-pencil surveys predominantly have a higher response rate than online surveys.²⁷ However, no significant differences were found in previous literature when comparing the two methods of survey administration.^{28,29} The decreased response rate associated with online surveys versus paper surveys does still represent a limitation.²⁷ While the instrument was pilot tested to ensure face validity, it is possible that participants may not have fully understood the survey questions and what they were being asked, which could have misled their responses. Lastly, it is important to remember that because physicians, administrators, coaches, and athletes' knowledge of scope of practice has not been assessed with the same instrument or within the same population, direct comparisons of knowledge should be interpreted with caution. With this in mind, knowledge scores must be considered to be relative to each study.

CONCLUSIONS

This study provides evidence that previous experience with an athletic trainer and sport profile do not have an effect on the athlete's knowledge of athletic trainers' scope of practice. Previous research has been shown that athletic trainers' scope of practice can be incorrectly narrowed due to the lack of education regarding the athletic trainers' roles and responsibilities.² With this in mind, it was hypothesized that as participants interacted with athletic trainers more,

their knowledge level of scope of practice would increase; however, the results of this study did not support this hypothesis. Results indicated that athletes have a moderate level of knowledge in all domains, which established that athletes' have a consistent knowledge level with physicians, administrators, and coaches. Although participants sought out athletic trainers primarily for skills within domains 1, 2, and 4, they were able to demonstrate a similar knowledge level across all domains. This study implies that athletes have a sufficient knowledge of athletic trainers' scope of practice. Student-athletes have enough knowledge of athletic trainers' scope of practice to seek their help in the appropriate situations. Further research could address knowledge differences across multiple NCAA Divisions, as well as comparing collegiate upperclassmen versus underclassmen.

APPENDIX A

LIMITATIONS:

This study had several limitations. Participants were recruited from only one university which presented a selection bias. Also, participants were incoming freshmen to the university. These factors limit the generalizability to a larger population of athletes. However, participants came from a variety of different sports and from a wide range of states which helped us overcome this limitation. Future studies could be enhanced by assessing athletes from several universities and upperclassmen. Another limitation that arose was the participants had to be in contact with an athletic trainer in order to complete the survey. Researchers attempted to limit the prior interaction by utilizing the online version of the survey. However, the initial interaction from the athletic trainer still posed a potential influence on the way the participants responded to the survey questions due to the required interaction. The survey was completed via two separate methods – online and paper/pencil. The timing of when the participants completed the study determined what method of survey administration they completed. In this study, 26 participants completed the online version and 18 completed the paper-pencil version. Paper-pencil surveys predominantly have a higher response rate than online surveys.²⁷ However, no significant differences were found in previous literature when comparing the two methods of survey administration.^{28,29} The decreased response rate associated with online surveys versus paper surveys does still represent a limitation.²⁷ While the instrument was pilot tested to ensure face validity, it is possible that participants may not have fully understood the survey questions and what they were being asked, which could have misled their responses. Lastly, it is important to remember that because physicians, administrators, coaches, and athletes' knowledge of scope of practice has not been assessed with the same instrument or within the same population, direct

comparisons of knowledge should be interpreted with caution. With this in mind, knowledge scores must be considered to be relative to each study.

DELIMITATIONS:

The study was delimited by the following factors:

1. Participants were recruited from a single NCAA Division I university
2. Student-athletes under the age of 18 were excluded
3. Student-athletes who transferred to the university were excluded due to

potentially having previous experience with collegiate athletic trainers

ASSUMPTIONS:

The following assumptions were made in the course of conducting this study:

1. Participants answered the survey honestly
2. Participants read each question carefully and answered to the best of their ability

RESEARCH QUESTIONS:

1. Do incoming freshmen athletes have a moderate knowledge of athletic trainer's scope of practice?
2. Does athlete knowledge of an athletic trainers' scope of practice differ based on previous experience with an athletic trainer?
3. Does athlete knowledge of an athletic trainer's scope of practice differ based on sport profile?

HYPOTHESES:

1. Participants will not have a moderate knowledge of athletic trainer's scope of practice.
2. Participants who had previous experience with an athletic trainer will have differing knowledge of an athletic trainer's scope of practice than those who have had no previous experience with an athletic trainer.
3. Athletes who participate in high profile sports (football, men's soccer, and basketball) will have differing knowledge of an athletic trainer's scope of practice.

OPERATIONAL DEFINITIONS:

1. Athletic trainer: Athletic trainers are highly qualified, multi-skilled health care professionals who collaborate with physicians to provide preventative services, emergency care, clinical diagnosis, therapeutic intervention and rehabilitation of injuries and medical conditions.³⁰
2. Scope of practice: A broad scope of the knowledge, skills, and abilities that athletic trainers are required to possess as defined by the role of delineation study and athletic training educational competencies.³¹
3. Moderate knowledge: A level of knowledge that is 60-80% of correct answers within the knowledge section of question.⁷
4. Role delineation study: Commissioned by the NATA, the nationally recognized study determines what domains, tasks, associated knowledge and skills are necessary for entry-level athletic trainers.¹⁴

APPENDIX B

LITERATURE REVIEW

BACKGROUND/DEFINITION

Athletic participation can be an important part of any student's experience in school. As such, the National Federation of State High School Associations (NFSHSA) conducts a study annually to assess participation rates in high school sports. For the 2014-2015 academic year, NFSHSA reported that the participation rate increased for the 26th consecutive year- surpassing 7.8 million participants in high school athletics for the first time ever.³² Eleven-player football is the current leader in number of participants, followed by outdoor track and field, basketball, baseball, and soccer. Nontraditional sports, such as archery and riflery have also seen an increase in participation. The top ten states with the highest number of high school athletic participants include Texas, California, New York, Illinois, Ohio, Pennsylvania, Michigan, New Jersey, Florida, and Minnesota.³²

Participation in collegiate athletics has also continued to rise. During the 2013-2014 academic year, 19,086 teams participated in National Collegiate Athletic Association (NCAA) championship sponsored sports. Lacrosse boasted the highest amount of growth in both men's and women's sports by adding 20 new men's programs and 29 new women's programs. Overall, the number of participants in NCAA sports has increased to 472,625.³³

Increases in athletic participation at all levels have also resulted in the need for significant growth of the athletic training profession. In 1994, only 35% of high schools had access to athletic training services.³⁴ By 2005, the percentage of public high schools that employed athletic trainers grew to 42%.³⁵ Pryor et al. (2015) found that 70% of public secondary schools and 86% of all athletes have access to athletic training services.²⁴ Moreover, 37% of athletic trainers were

reported to be full-time, while 31% of athletic trainers worked on a part-time basis.²⁴ Twenty-seven percent of the secondary schools reported that they received athletic training services through outreach services of a sports medicine clinic.²⁴ With the increase in access to athletic trainers, more athletes are being exposed to athletic training services.

Athletic trainers serve many important functions, including injury/illness prevention and wellness protection, clinical evaluation and diagnosis, immediate and emergency care, treatment and rehabilitation, and organizational and professional health and well-being.³⁶ In order to be successful, an athletic trainer must be competent in a variety of skills and knowledge. Based on the aforementioned duties, the Department of Health and Human Services (HHS) and Health Resources Services Administrations (HRSA) include athletic trainers under the allied health professions category.³⁰ The title of ‘athletic trainer’ may lead people to the false belief that they only work with athletes. However, athletic trainers are also qualified to work with different populations in a variety of settings including physicians’ offices, hospitals/clinics, police and fire departments, military training sites, and industrial settings.³⁰

The National Athletic Trainers’ Association (NATA) is the largest professional organization for athletic trainers. The NATA was founded in 1950 and originally consisted of 200 members. The NATA has grown significantly and now represents nearly 43,000 members, including both certified athletic trainers and athletic training students.^{30,36}

The NATA commissioned a role delineation study in 1994 to better describe athletic trainer’s contributions to the allied health field.¹⁴ Now in its 6th revision, the nationally recognized role delineation study helps determine what domains, tasks, associated knowledge and skills are necessary for entry-level athletic trainers. The five domains, as outlined below, are products of the most current edition of the role delineation study.

Domain 1 (injury/illness prevention) focuses on minimizing the risk of injury and illnesses of both individuals and groups through awareness, education, and intervention.²³ Specific knowledge and skills included in this domain include interpreting individual and group pre-participation and other screening information; identifying and educating individuals on the appropriate use of personal protective equipment (taping, bracing, padding). This domain also involves maintaining physical activity, clinical treatment, and rehabilitation areas according to appropriate regulations; monitoring environmental conditions; maintaining or improving individual physical conditioning; implementing injury prevention programs; promoting healthy lifestyle choices and behaviors; and using appropriate communication strategies to encourage overall wellness.²³

Domain 2 (clinical evaluation/diagnosis) requires athletic trainers to obtain a proper health history; complete appropriate visual and palpation techniques and tests to determine the type and extent of condition; determine a clinical diagnosis using the information gathered; and educate the patient and appropriate personnel. This domain focuses directly on patient care that athletic trainers provide after an injury or illness is detected.

Domain 3 (immediate and emergency care) involves coordination of care for the affected individual through proper communication; implementation of appropriate immediate and emergency care procedures to prevent further harm or damage; execution of an appropriate referral strategy for the individual, while continuing to provide stabilizing/preventative care, facilitation for transfer of care; and application of direct immediate care strategies using established communication and administrative practices.

Domain 4 (treatment and rehabilitation of injuries/illnesses) requires athletic trainers to administer therapeutic and conditioning exercises, as well as therapeutic modalities to aid in the

individual's recovery and restoration of function; apply injury protection devices, such as a splint or brace; administer treatment for injury, illness, or other health-related conditions; reassess patient status and evaluate ability to return to activity; and provide referral to specialist as necessary.

Domain 5 (organizational and professional health and well-being) requires knowledge and skills to apply basic internal and external business functions, maintain proper records and documentation, plan for the coordination of resources for events and emergency action plans, understand regulations and professional practices, and develop a support/referral process for individuals with unhealthy lifestyle behaviors.²³ As such, the role delineation study encompasses all of the knowledge and skills that an entry level athletic trainer should have mastered. In order for athletic training students to earn their certification, they must pass the national Board of Certification (BOC) exam. In order to maintain one's BOC status, a total of fifty continuing education units (CEU) must be obtained every two years. In addition, ten of the total CEU's must come from the Evidence Based Practice (EBP) category. EBP has been a part of a recent push for athletic trainers to stay current on the research and ensure the best care possible for their patients.

Athletic Training Program Accreditation

To become eligible to take the national Board of Certification (BOC) examination, one must graduate from an accredited program.³⁰ The Commission on Accreditation of Athletic Training Education (CAATE) is responsible for developing, maintaining, and promoting appropriate minimum education standards for professional, post-professional, and residency athletic training programs.³⁷ CAATE is sponsored by the NATA, the American Academy of Family Physicians, the American Academy of Pediatrics, and the American Orthopaedic Society for Sports Medicine.³⁷ Much like the role delineation study, CAATE identifies 8 specific content

areas that an athletic training education program must provide extensive training in. The eight content areas that CAATE encompasses include: (1) Evidence-Based Practice, (2) Prevention and Health Promotion, (3) Clinical Examination and Diagnosis, (4) Acute Care of Injury and Illness, (5) Therapeutic Intervention, (6) Psychosocial Strategies and Referral, (7) Healthcare Administration, and (8) Professional Development and Responsibility. Athletic training education programs are required to maintain and renew accreditation every 4-10 years. Although only a bachelor's degree from an accredited program is necessary to register for the BOC exam, nearly seventy percent of athletic trainers have earned their master's or doctoral degree after certification.³⁰

Stereotypes/Myths

Athletic training is a young, growing profession and many people involved in athletics have not had access to or previous experience with an athletic trainer. Due to this fact, the athletic training profession is often misunderstood and wrongly perceived. Weitzel et al. (2015) found that 61% of parents of secondary school athletes had experience working with an athletic trainer. The parents in that study reported that they viewed athletic trainers as health care professionals and felt that they were necessary to society.¹⁶ However, 61% of parents did not always trust the athletic trainers' opinions. The lack of trust may be due to an absence of knowledge of an athletic trainer's scope of practice and experience. Parents who had minimal interactions with an athletic trainer were found to be less knowledgeable of an athletic trainer's skills and job requirements than the parent who had two or more experiences with an athletic trainer. These findings are consistent with previous studies examining orthopedic physicians and athletic directors knowledge and perceptions of athletic trainers.^{26,38}

SPORTS MEDICINE TEAM

In order to set the foundation for an effective sports medicine team, one must acknowledge the members of the team and the knowledge that they possess. This helps to provide consistent information to parties outside of the team as to the specific roles of each member of the team. Coaches, administrators, physicians, and athletic trainers are key members of the sports medicine team that typically operates within the athletics department.

In order to help determine how athletic trainers can better themselves as clinicians, multiple studies have established what characteristics are desired in an athletic trainer.³⁹ These studies have assessed the personal characteristics that athletes, coaches, administrators, and physicians find to be essential in an athletic trainer. Characteristics include caring, communication, commitment, integrity, knowledge, and availability.^{5,39,40} Communication is one of the most essential qualities and skills that an athletic trainer can develop.^{5,39,40} Mazerolle et al. and Hoppel et al. found that college coaches specifically emphasized the need to “be on the same page” as the athletic trainer when communicating about athletes.^{26,38,41} In addition, athletes and coaches desire their athletic trainer to be upfront and honest with them from the start. In order to improve communication between athletic trainers and members of the sports medicine team, Raab et al. suggests that athletic trainers should not elude questions and be sure to give clear answers.⁴⁰ Alexander indicates that while knowledge is not the most paramount quality that is desired by athletes and coaches, it is still a key piece of being a successful athletic trainer.¹ Coaches, administrators, and athletes have emphasized that they want their athletic trainer to be able to educate them on the injuries and illnesses they may have. This requires athletic trainers to have a strong knowledge base, which begins in the athletic training education program and continues through the fulfillment of continuing education credits.⁴⁰ Previous research suggests

that improving communication skills as well as showing commitment, integrity, knowledge, availability, and care will enhance the athletic trainer's relationship with their athletes and other members of the sports medicine team.^{5,39,40} By maintaining a good relationship, athletic trainers will be able to better educate all members of the sports medicine team and athletes on the roles and responsibilities associated with the athletic training profession.

Physicians/Surgeons

Athletic trainers are required to work under the direction and supervision of a physician.² Physicians and athletic trainers must have an adequate working relationship and mutual trust to ensure that their patients get the best possible care. In line with this, McRae (2013) examined the specific roles of an athletic trainer that are misunderstood by physicians as well as determined potential differences in knowledge levels between physicians with and without a background in sports medicine.² McRae found that only 46.1% of participants had experience working with an athletic trainer. Further, 65.6% of participants reported that they were not familiar with the educational requirement for athletic trainers. After categorizing, the sample of 128 physicians into two groups based on sports medicine experience (orthopedic and non-orthopedic physicians), orthopedic physicians demonstrated that they had a more thorough understanding of the scope of practice of an athletic trainer. Survey questions were based on the five domains of the role delineation study. Further, statistically significant differences were found in three categories: evaluation and diagnosis ($p= 0.014$), immediate care ($p= 0.032$), organization and administration (p value not reported). Orthopedic physicians showed a higher level of agreement with tasks that athletic trainers are qualified to complete than the non-orthopedic physicians. Such tasks include obtaining a proper injury history, inspection and palpation of involved area, formulation of a clinical diagnosis, and performance of emergency care skills. Establishing

emergency action plans, policies and procedures, and interpreting pre-participation screening information are also tasks that orthopedic physicians see athletic trainers doing.² It is interesting to note that both orthopedic and non-orthopedic physicians were in strong agreement that athletic trainers have the ability to prevent injuries. In conclusion, orthopedic physicians have a better overall understanding of the athletic training profession than physicians without a sports medicine background.²

Athletic trainers have also expanded their practice into physician's offices working as a physician extender. Storch et al. assessed orthopedic surgeon's perceptions of athletic trainers as physician extenders. Orthopedic surgeons demonstrated an overall 78% accurate perception on what tasks athletic trainers are qualified to do. Also, orthopedic physicians who had served as a team physician and had previously worked with an athletic trainer had more accurate perceptions (80.9%) than those who had not previously served as a team physician.³ These studies represent a gap in knowledge regarding the scope of practice of an athletic trainer.² Even team physicians who have had experience working with athletic trainers do not have a firm understanding of the roles and responsibilities associated with the profession. The lack of education and understanding of athletic trainers can limit the expansion of the profession, have negative impacts on reimbursement for services rendered, or eliminate current or future employment opportunities. Current research shows that physicians must be better educated on the scope of practice that comprise the athletic training profession.

Administrators

Athletic trainers are commonly hired by the athletic administration.⁴² However, not all administrators understand the value of having an athletic trainer on staff.⁴ Gould and Deivert examined the extent of knowledge and the nature of perceptions of athletic trainers among

secondary school superintendents, principals, and athletic directors.⁴ Approximately 93% of the administrators reported previous personal contact with an athletic trainer, but only 55% currently employed an athletic trainer.⁴ Compared to secondary school superintendents, the athletic directors and principals consistently reported the greatest amount of correct responses when asked about the functions of athletic trainers. Overall, athletic directors were the most familiar of all groups with the functions of athletic trainers. All administrators in this study acknowledged that an athletic trainer would be the most qualified person to prevent and treat athletic injuries.

Athletic directors were particularly concerned about the liability issues that they faced without an athletic trainer. Nearly half of the administrators thought that hiring an athletic trainer would moderately reduce their risk of legal-liability issues.⁴ Dance program administrators have shown that they believe that athletic trainers would be of direct benefit to their students.

However, these students do not typically have the same access to athletic trainers that organized sports teams do.¹² Dance program administrators demonstrated that they understood the value and benefit that athletic trainers could bring to their students.¹² Gould and Deivert suggested that administrators have an accurate knowledge of the athletic training profession, but have an inaccurate perception of the value of athletic trainers.⁴ While administrators have demonstrated that they understand the value of having an athletic trainer on staff, further research should be done to determine the next step.

Coaches

Coaches and athletic trainers work together as a part of the sports medicine team. They interact with athletic trainers frequently and can be considered an asset to the athletic trainer.⁵ In 2013, Alexander surveyed National Collegiate Athletic Association (NCAA) Division I coaches to assess professional relationships with their athletic trainer and investigate the coaches'

knowledge of the athletic trainer's role and responsibilities.¹ In total, 31 head coaches responded to the survey, four of which participated in a follow-up phone interview. The coaches demonstrated that they were fairly knowledgeable of the athletic training profession and the scope of practice required of athletic trainers by the role delineation study. All coaches indicated that they were currently working with an athletic trainer and communicated with them at least once per week. Nearly 60% of the coaches communicated with their athletic trainer over five times per week. With regards to knowledge, nearly 60% of coaches were able to correctly identify the athletic training competencies under each domain of the profession.¹

Coaches who participated in a semi-structured phone interview emphasized the importance of communication and updates in regards to athletes. Athletic trainers were viewed as an extension of the coaching staff.¹ Participants spoke of the need for mutual respect and trust between the coach and athletic trainer, the importance of effective communication, and passion for the job and success of the team. Coaches also identified personality traits that were considered desirable in an athletic trainer. Some of the desired qualities include being personable and well respected, having a strong knowledge base but not egotistical, being flexible and accessible to the athlete, having a strong work ethic, and providing a support system and education to the athletes.¹ While at least some conflict is expected in every relationship, coaches identified several factors that led to conflict in their past. The primary causes of conflict included: an inexperienced or egotistical athletic trainer, misdiagnosed injuries and long recoveries. Young athletic trainers can be difficult for coaches to work with due to a lack of experience. Coaches at the NCAA Division I level have demonstrated a good understanding of roles and responsibilities of athletic trainers.¹

The expectations of an athletic trainer by a coach differ between the NCAA Division I and high school levels. Mensch et al. assessed the differing perspectives/expectations of high school coaches and athletic trainers toward the role of an athletic trainer throughout the different phases of a sport season.⁵ The study included a semi-structured interview of 20 high school basketball coaches and ten athletic trainers. The coaches demonstrated a general lack of knowledge of the profession of athletic training. Over half of the coaches were unaware of their athletic trainers' credentials. Nearly all of the coaches were completely unaware of any previous experience of the athletic trainer. During the pre- and off-season, the coaches' expectation was that their athletic trainer simply be available to coaches and athletes.

During the season, coaches expected their athletic trainers to complete tasks such as taping, stretching, and caring for injured athletes. Coaches also expected their athletic trainer to be available both before and after the game, as well on the sideline during the competition for whatever the athletes may need. Coaches wished their athletic trainer would provide services such as implementing a weight room conditioning program, nutrition program, consistent stretching routine, coaches' clinics, and traveling to away games. However, only one of the coaches reported that they were doing anything to accomplish the items on their wish list. Overall, the coaches had minimal expectations for athletic trainers, regardless of the time of season.

The athletic trainers' self-perception of pre- and off-season duties differed from the coaches. The athletic trainers' described their pre- and off-season duties as implementing strength and conditioning programs as well as providing rehabilitation for injured athletes. During the pre- and off-seasons, the athletic trainers considered injury prevention to be their most important task. Athletic trainers reported that their in-season duties included taping,

stretching, dealing with injured athletes, providing and setting up water prior to the game, as well as being a liaison for the athletics department to the visiting team.⁵ This study highlights that, in some cases, high school coaches are unaware of the extent of an athletic trainers' scope of practice. Overall, collegiate coaches have higher expectations of their athletic trainer and depend on them to be more involved with the athletes than a high school coach. This may be due to the increased level of competition and intensity at the collegiate level.

ATHLETES' PERCEPTION OF ATHLETIC TRAINERS

Athletic trainers, coaches, and athletes must all work together to ensure the athlete's health and safety. Included in this, athletes' perceptions and knowledge of their athletic trainer's skills, abilities, and scope of practice are major components of building their relationship. As explained in the role delineation study, an athletic trainer will interact with their athletes on a variety of levels. The quality of care that an athlete receives is influential in building a trustworthy relationship between the athlete and the athletic trainer.¹⁷ As with the coaching staff, athletic trainers and athletes must have good communication in order to work well together.⁴³ Injury and rehabilitation compliance can be increased by clearly explaining an injury to the athlete and having them repeat back what they heard.⁴³ Athletic trainers must have the athlete's overall health and safety in mind, while also finding a way to return them to competition. Foster (2015) examined the perceived quality of care collegiate athletes received from full-time and graduate assistant athletic trainers.¹⁷ The majority (81.4%) of athletes in this study were satisfied with the care that they received from their athletic trainer. Seventy percent of the athletes interacted with their athletic trainer on a weekly basis. Athletes reported knowledge/skills, availability, and communication as the top three characteristics that they desire in their athletic trainer.¹⁷ Athletes expect their athletic trainers to be knowledgeable in their field in order to give

a satisfactory level of care. Availability was also a desirable characteristic. Most athletic trainers work long and abnormal hours, but being available to their athletes is important in maintaining a trusting relationship. Athletes and coaches agree that their athletic trainer needs to be available to provide service as needed.^{1,17} As was mentioned previously, communication is one of the most important skills that an athletic trainer must possess. Athletic trainers should possess the ability to speak and explain things clearly, as well as be able to listen to their athletes at appropriate times.¹⁷

Athletic trainers are often called upon to provide social support for athletes. Injured athletes specifically look to their athletic trainer more than their coaches and teammates for needed support.⁴⁴ Athletes have reported that the social support they receive from athletic trainers is more satisfying, more available, and contributed more to their overall well-being than the support that they received from coaches, teammates, and parents.^{44,45} Athletic trainers have been referred to as “the most trusted people within the athletic community” and typically are the ones to interact with injured athletes at their most vulnerable state.⁴⁴ Multiple studies have found that athletes were most satisfied with the listening and emotional support, task appreciation, and task challenge that they received from their athletic trainer.⁴⁴⁻⁴⁶ Also, athletes have reported that they need to have someone that will listen to them vent and support them without necessarily giving advice or judging them.^{44,46} In addition to listening support, athletes need to be challenged in their rehabilitation, but also praised when they are working hard and doing their job well.⁴⁶ Athletic trainers are sometimes called upon to be a mediator between injured athletes and coaches. Athletic trainers should talk to and explain the injury clearly to their coaches, as well potentially advise them on how to support the athlete.⁴⁵

SATISFACTION OF ATHLETES WITH ATHLETIC TRAINERS

Athlete satisfaction of care given by athletic trainers was examined by Unruh in 1998. Both male and female student-athletes from NCAA Division I and II member institutions were surveyed. The study was based on high- vs. low-profile sports teams. Male athletes who played football, basketball, or baseball and female athletes who played basketball were categorized as high-profile athletes. Athletes in any other sports were considered to be low-profile athletes.²¹ Unruh's study showed that athletes in low-profile sports perceived their athletic trainers less favorably than most male athletes and high-profile athletes. Female athletes in low-profile sports at Division II schools represented the group with the lowest mean cumulative perception score. Unruh argues that all student-athletes do not perceive their athletic trainers the same way and that athletes in low-profile sports consistently show lower mean perception scores.²¹ Using the same methods from the 1998 study, Unruh conducted a follow-up study in 2005 that again investigated athlete satisfaction with athletic trainers. However, in this study, females demonstrated a higher satisfaction score than males did, which contradicts the previous study. Women in high-profile sports were shown to have the highest satisfaction scores.²⁰ In both studies, sport profile was found to be a significant predictor of satisfaction scores.

GAP IN RESEARCH

As previously indicated, many studies have assessed physicians', coaches', and administrators' knowledge of the scope of practice of athletic trainers. Athlete satisfaction and perception of care have also been assessed. However, there have been no studies that have investigated athlete's knowledge of an athletic trainer's scope of practice. The lack of knowledge of the athletic training profession could contribute to incorrect stereotypes and myths. For example, athletic trainers are commonly referred to as the person in khakis and polo, the one who

tapes ankles, or a personal trainer.⁴⁷ Despite common misconceptions, athletic trainers are a valuable part of the health care profession. Determining the lack of knowledge that athletes possess regarding athletic trainer's scope of practice should be a primary goal of the athletic training profession. As the profession of athletic training expands, an increased number of athletes will have access to athletic training services. With an increased rate of athletes receiving services from an athletic trainer, care must be taken to ensure that athletes know the services that are available to them by athletic trainers. The current study will be a first step in that process, by identifying potential differences in athletes' knowledge of athletic trainers' scope of practice by previous experience in working with athletic trainers and sport profile.

APPENDIX C

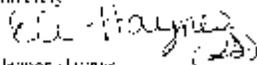
Georgia Southern University Office of Research Services & Sponsored Programs Institutional Review Board (IRB)		
Phone: 912-478-5465		Yeezy Hall 5000
Fax: 912-478-6719	IRB@GeorgiaSouthern.edu	PO Box 8005 Statesboro, GA 30460
To:	Pearson, Jessica Langdon, Judy, Hunt, Lavanch, Mackesy, Barry	
From:	Office of Research Services and Sponsored Programs Administrative Support Office for Research Oversight Committees (AAC/IRB/IRB)	
Initial Approval Date:	5/25/2016	
Expiration Date:	4/30/2017	
Subject:	Status of Application for Approval to Utilize Human Subjects in Research Expedited	

After a review of your proposed research project, numbered **H16-433** and titled "**Athlete's Knowledge of Athletic Trainers' Scope of Practice**," it appears that (1) the research subjects are at minimal risk, (2) appropriate safeguards are planned, and (3) the research activities involve only procedures which are allowable. You are authorized to enroll up to a maximum of **150** subjects.

Therefore, as authorized in the Federal Policy for the Protection of Human Subjects, I am pleased to notify you that the Institutional Review Board has approved your proposed research. Description:

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

Sincerely,



Helen Lavanch
Compliance Officer



COLLEGE OF HEALTH AND HUMAN SCIENCE

DEPARTMENT OF HEALTH AND KINESIOLOGY

INFORMED CONSENT

My name is Jessica Pearson and I am a current graduate student at Georgia Southern University. I am conducting this research to meet the partial requirements of completing my master's degree. Athletes are at an increased risk of injury. In order to provide care for the athletes, most athletic teams have access to an athletic trainer. Athletic trainers are considered to be healthcare professionals. The purpose of this research is to determine the current knowledge levels of athletes in regards to an athletic trainer's scope of practice.

Participation in this research will include completion of a 25 item survey, which should take no longer than 20 minutes and will be administered in a group setting. Prior to completion of the survey, you will be given an opportunity to ask questions. You understand that you are at a minimal risk for this study. No embarrassing or sensitive issues will be discussed. Participants are not at risk for any physical injury. You understand that you will receive no direct benefit from this study.

Confidentiality of the completed survey will be maintained by storing the data in a locked office. Access to the completed surveys will be restricted to the primary researcher and her committee members. Completed surveys will be destroyed 3 years post-completion of this study. De-identified data from this study may be placed in a publically available repository for study validation and further research. You will not be identified by name in the data set or any reports using information obtained from this study, and your confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions.

You understand that you have the right to ask questions and have those questions answered. If you have questions about this study, please contact the researcher named above or the researcher's faculty advisor, whose contact information is located at the end of the informed consent. For questions concerning your rights as a research participant, contact Georgia Southern University Office of Research Services and Sponsored Programs at 912-478-5465.

Participation in this study is voluntary. At any point in time, you may end your participation by telling the person in charge or by not returning the survey. In addition, you understand that you do not have to answer any questions that you do not want to answer. There is no penalty for deciding not to participate in the study and if you decide at any time that you do not want to participate further, you may withdraw without penalty or retribution. If you experience any distress as a result of this study, please contact the Counseling Center at Georgia Southern University (912-478-5541).

All information will be treated confidentially. There is one exception to confidentiality that we need to make you aware of. In certain research studies, it is our ethical responsibility to report situations of child or elder abuse, child or elder neglect, or any life-threatening situation to appropriate authorities. However, we are not seeking this type of information in our study nor will you be asked questions about these issues.

If you meet any of the following criteria, please discontinue the survey now: 1) Under the age of 18, 2) Previously completed one or more seasons of collegiate athletics, 3) Speak English as a second language.



You must be 18 years of age or older to consent to participate in this research study. If you consent to participate in this research study and to the terms above, please sign your name and indicate the date below.

You will be given a copy of this consent form to keep for your records. This project has been reviewed and approved by the GSU Institutional Review Board under tracking number H16433.

Title of Project: Athletes' Knowledge of Athletic Trainers' Scope of Practice

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 Participant Signature

 Date

I, the undersigned, verify that the above informed consent procedure has been followed.

 Investigator Signature

 Date

APPENDIX D

SURVEY: ATHLETES' KNOWLEDGE OF ATHLETIC TRAINERS' SCOPE OF
PRACTICE

This study is being done to assess your knowledge of athletic training health care. Please base your answers on the experiences you had previous to entering collegiate athletics.

Please read each question carefully and answer to the best of your ability.

Demographic questions:

1. Gender
 1. Male
 2. Female
2. What is your age?
 1. 18
 2. 19
 3. 20
 4. 21
 5. 22
 6. 23
 7. 24
 8. 25
3. What state are you from?

4. How long have you been participating in your sport, please only count from middle school-present?
 1. <2 years
 2. >2 and <5 years
 3. >5 and <8 years
 4. >8 and <10 years
 5. >10 years
5. What sports did you play in middle/high school? **Select all that apply**

1. Soccer	10. Swim/Dive
2. Basketball	11. Rifle
3. Softball	12. Cheerleading
4. Baseball	13. Cross Country
5. Lacrosse	14. Track and Field
6. Wrestling	15. Golf
7. Football	16. Gymnastics
8. Volleyball	17. None
9. Tennis	18. Other: _____
6. What sports did you play at the club level since middle/high school? (club level – any organized sport outside of high school association)

Select all that apply

- | | |
|---------------|---------------------|
| 1. Soccer | 10. Swim/Dive |
| 2. Basketball | 11. Rifle |
| 3. Softball | 12. Cheerleading |
| 4. Baseball | 13. Cross Country |
| 5. Lacrosse | 14. Track and Field |
| 6. Wrestling | 15. Golf |
| 7. Football | 16. Gymnastics |
| 8. Volleyball | 17. None |
| 9. Tennis | 18. Other: _____ |
7. What division/class was your high school?
- | | |
|---------|-----------------|
| 1. A | 5. AAAAA |
| 2. AA | 6. AAAAAA |
| 3. AAA | 7. Other: _____ |
| 4. AAAA | 8. Unsure |
8. Have you previously had experience being treated by an athletic trainer?
- | | |
|--------|-------|
| 1. Yes | 2. No |
|--------|-------|
9. If you answered yes to Question 8, why did you see/interact with the athletic trainer?
- | | |
|-------------------------------------|---|
| 1. Illness | 6. Medical tent at competition/tournament |
| 2. Injury evaluation | 7. Mental Health |
| 3. Treatment and rehabilitation | 8. Social Reasons |
| 4. First aid/emergency care | 9. I did not sustain an injury |
| 5. Injury prevention (taping, etc.) | |
10. What sport are you participating in here at Georgia Southern?
- | | |
|-----------------|--------------|
| 1. Football | 8. M Tennis |
| 2. W Basketball | 9. W Tennis |
| 3. M Basketball | 10. Baseball |
| 4. W Soccer | 11. Softball |
| 5. M Soccer | 12. W Golf |
| 6. Volleyball | 13. M Golf |
| 7. Cheerleading | 14. Rifle |
11. Do you currently have an athletic trainer working with your team here at Georgia Southern?
- | | |
|--------|-----------|
| 1. Yes | 3. Unsure |
| 2. No | |
12. On a normal basis, how many times a week did you interact with your athletic trainer in middle/high school?
- | | |
|--|--------------|
| 1. I did not have an athletic trainer working with my team | |
| 2. 0 times | 3. 1-2 times |

4. 3-4 times
5. 5-6 times
6. 7 or more times
13. Besides an athletic trainer, who did you report your injuries to? (select all that apply)
- | | |
|---|---------------------------------------|
| 1. I did not have any injuries | 5. School nurse |
| 2. I did not report my injuries to anyone | 6. Physician |
| 3. Parents | 7. Emergency Medical Technician (EMT) |
| 4. Coach | 8. Friends |

The following section will assess your knowledge of athletic training health care. Please read each question carefully and answer to the best of your ability. Choose the BEST answer.

14. What does "ATC" stand for?
- | | |
|-------------------------------|---------------------------------|
| 1. Clinical athletic trainer | 3. Conditional athletic trainer |
| 2. Certified athletic trainer | 4. Athletic training clinician |
15. What is the minimum degree an athletic trainer is required to complete before becoming an athletic trainer?
- | | |
|-------------------------------|--------------------|
| 1. No college degree required | 4. Masters degree |
| 2. Associates degree | 5. Doctoral degree |
| 3. Bachelors degree | |
16. What are the clinical experience requirements for undergraduate students in an athletic training education program?
1. Athletic training students must only observe athletic trainers to see what athletic trainers' daily duties are
 2. Athletic training students are NOT allowed to treat or work with athletes in any setting during their undergraduate education because they are not certified
 3. Athletic training students are required to complete and show evidence of hours of clinical experience in various settings of athletics as a part of their undergraduate education
 4. Athletic training students have the option to participate in additional hours of experience or not participate
17. What is the certification process for athletic trainers?
1. There is no certification process for athletic trainers
 2. Athletic trainers are automatically certified upon graduation
 3. Athletic trainers are required to achieve a Master's degree or higher before becoming certified

4. Athletic trainers are required to graduate from a Commission on Accreditation of Athletic Training Education (CAATE) accredited program and pass a national board exam before becoming certified

Athletic trainers are educated and competent in 5 domains of health care. Please check any and all skills that you believe that athletic trainers are able to perform.

18. Injury/illness prevention and wellness protection:
 1. Recognize appropriate and inappropriate fitting athletic equipment (i.e. helmets, shoulder pads etc.)
 2. Educate patients on supplements/vitamin
 3. Maintenance of the area of play (i.e. field, court etc.)
 4. Monitor environmental conditions (i.e. weather, field inspection) and ensuring group safety based on those conditions
 5. Maintain or improve physical condition for an athlete to minimize risk of injury
 6. Sending equipment to the appropriate certification agencies to ensure safety
19. Clinical evaluation and diagnosis:
 1. Assessing current injuries by obtaining a patient's thorough history of injury
 2. Using observational and palpating techniques to determine the type and extent of an injury
 3. Performing diagnostic imaging tests
 4. The use of special tests to evaluate and formulate clinical diagnoses of the musculoskeletal conditions (i.e. muscle strains, joint sprains)
 5. The use of special tests to evaluate and formulate clinical diagnoses of the neurological impairments and/or conditions (i.e. concussions, nerve injuries)
 6. Interpreting signs, symptoms, and predisposing factors of injuries and illnesses
 7. Providing prescriptions for diagnostic imaging (MRI, X-ray, CT scan, EKG, etc.)
20. Emergency and immediate care:
 1. Coordinate and apply immediate and emergency care of individuals
 2. Perform Cardiopulmonary resuscitation (CPR) and use of an Automated External Defibrillator (AED)
 3. Providing care while in route to a medical facility
 4. Prevent exacerbation of life-threatening and non-life-threatening conditions to reduce risk factors for morbidity and mortality
 5. Demonstrate how to implement and direct immediate care strategies (e.g., first aid, Emergency Action Plan) using established communication and administrative practices to provide effective care.
 6. Drawing blood from a patient in an emergent situation
 7. Providing airway intubation when a patient is not breathing

21. Treatment and rehabilitation
 1. Application of braces and other assistive devices for injury protection and function
 2. Prescription of orthotics and other protective equipment
 3. Determining the need for surgical intervention of an injury
 4. Administration of therapeutic exercise using appropriate techniques to aid recovery and function
 5. Prescription of medications such as albuterol inhalers and pain medications
 6. Use of manual therapy as treatment to assist recovery and return to function
 7. Use of electrical stimulation and other electronic modalities as treatment to assist recovery and return to function
 8. Aspirating/removing fluid from wounds
 9. Use of ultrasound therapy as treatment to assist recovery and return to function
 10. Assessment of injury status to assist in determining time of return to play
 11. Provide referral to specialists when athlete is in need of additional injury specific assistance
 12. Administering medication via injection
22. Organization, professional health and well-being
 1. Organize medical coverage and staffing for athletic events
 2. Properly maintain/store records and medical documentation
 3. Demonstrate an understanding of statutory and regulatory provisions and professional standards of the practice of Athletic Training in order to provide for the safety and welfare of individual(s) and groups.
 4. Development of a referral process to address unhealthy lifestyle behavior
 5. Bill insurance for services provided in the athletic training facility

Short Answer

23. Please briefly describe any positive experiences you have previously had with an athletic trainer.
24. Please briefly describe any negative experiences you have previously had with an athletic trainer.

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TABLES

Table 1. Demographic Characteristics of Participants

Characteristic	Number	Percentage
Age		
18	40	90.9
19	4	9.1
Gender		
Male	18	40.9
Female	26	59.1
State		
California	1	2.4
Florida	5	11.9
Georgia	27	64.3
Maine	1	2.4
Mississippi	1	2.4
New Jersey	1	2.4
Oklahoma	1	2.4
Texas	1	2.4
Virginia	3	7.1
International	1	2.4
Years of Participation in Sport High/Middle School		
<2	2	4.5
>2 and <5	2	4.5
>5 and <8	26	59.1
>8 and <10	10	22.7
>10	4	9.1
High School Division		

A	7	15.9
AA	0	0
AAA	5	11.4
AAAA	5	11.4
AAAAA	9	20.5
AAAAAA	9	20.5
Other	5	11.4
Unsure	4	9.1
Middle/High School Sport		
Football	10	9.6
Basketball	13	12.5
Soccer	13	12.5
Volleyball	9	8.7
Cheerleading	12	11.5
Tennis	7	6.7
Softball	3	2.9
Baseball	8	7.7
Swim/Dive	6	5.8
Track and Field	9	8.7
Lacrosse	1	1.0
Cross Country	7	6.7
Golf	2	1.9
Gymnastics	3	2.9
Club Sport		
Football	4	6.3
Basketball	6	9.5
Soccer	8	12.7
Volleyball	8	12.7
Cheerleading	10	15.9

Tennis	3	4.8
Softball	2	3.2
Baseball	7	11.1
Swim/Dive	1	1.6
Track and Field	3	4.8
Cross Country	2	3.2
Gymnastics	5	7.9
None	3	4.8
Other	1	1.6
Current Sport Participation		
Football	5	11.4%
Men's Basketball	2	4.5%
Women's Soccer	2	4.5%
M Soccer	3	6.8%
Volleyball	7	15.9%
Cheerleading	12	27.3%
Women's Tennis	1	2.3%
Men's Tennis	2	4.5%
Softball	1	2.3%
Baseball	5	11.4%
Swim/Dive	1	2.3%
Track and Field	3	6.8%

Table 2. Knowledge Questions

Knowledge Questions	Number	Percentage
Credential		
Clinical athletic trainer	1	2.3
<i>Certified athletic trainer</i>	4	9.1
Conditional athletic trainer	0	0
Athletic training clinician	39	88.6
Minimum degree		
No college degree required	1	2.3
Associates degree	7	15.9
<i>Bachelor's degree</i>	27	61.4
Master's degree	9	20.4
Doctoral degree	0	0
Clinical experience requirements for undergraduate athletic training students		
Observation only	6	15.0
No clinical experience requirements	2	5.0
<i>Required to complete and show evidence of clinical experience</i>	31	77.5
Optional participation	1	2.5
Certification process		
No certification	1	2.3
Automatically certified after graduation	5	11.6
Must achieve a Master's degree or higher before certification	11	25.6
<i>Graduation from CAATE</i>	26	60.5

accredited program and pass
a national board exam prior
to certification

**Italicized answers indicate the correct answer*

Table 3. Domain knowledge questions

Knowledge Questions	Number correct	Percentage correct
Domain 1: Injury/Illness prevention and wellness protection		
Recognize appropriate fitting athletic equipment	37	84.1
Educate patients on supplements/vitamins	33	75.0
Maintenance of area of play	27	61.4
Monitor environmental conditions and ensure group safety	29	65.9
Maintain or improve physical condition for an athlete to minimize risk of injury	41	93.2
Send equipment to certification agencies to ensure safety	22	50.0
Domain 2: Clinical evaluation and diagnosis		
Assess current injury by obtaining patient history	36	81.8
Use observational and palpating techniques to determine type and extent of injury	32	72.7
Perform diagnostic imaging tests	27	61.4
Use special tests to evaluate and formulate clinical diagnoses of musculoskeletal	27	61.4

conditions		
Use special tests to evaluate and formulate clinical diagnoses of neurological conditions	25	56.8
Interpret signs, symptoms, and predisposing factors of injuries and illnesses	39	88.6
Provide prescription for diagnostic imaging	31	70.4
Domain 3: Emergency and immediate care		
Coordinate and apply immediate and emergency care individuals	34	77.3
Perform CPR and use of an AED	34	77.3
Provide care while in route to a medical facility	26	59.1
Prevent exacerbation of life- and non-life threatening conditions to reduce risk factors for morbidity and mortality	16	36.4
Demonstrate how to implement and direct immediate care strategies (First Aid/EAP)	31	70.5
Drawing blood from a patient in an emergent situation	35	79.5
Providing airway intubation	33	75.0

when a patient is not breathing		
Domain 4: Treatment and rehabilitation		
Application of braces and other assistive devices for injury protection and function	41	93.2
Prescription of orthotics and other protective equipment	26	59.1
Determine need for surgical intervention of an injury	30	68.2
Administration of therapeutic exercises	35	79.5
Prescription of medications (ex. Inhalers and pain medication)	35	79.5
Use of manual therapy	33	75.0
Use of electrical stimulation and other electronic modalities	28	63.6
Aspirating/removing fluid from wounds	28	63.6
Use of ultrasound therapy	24	54.5
Assessment of injury status to assist in determining time of return to play	34	77.3
Provide referral to specialist when needed	29	65.9
Administer medication via injection	38	86.4
Domain 5: Organization, professional health and well-being		
Organize medical coverage	29	65.9

and staffing for athletic events		
Properly maintain/store records and medical documentation	29	65.9
Demonstrate an understanding of statutory and regulatory provisions and professional standards of the practice of athletic training	31	70.5
Development of referral process to address unhealthy lifestyle behaviors	28	63.6
Bill insurance for services provided in the athletic training facility	32	72.7

*Number and percentages are expressed as number of correct responses per question

Table 4. Total Knowledge Scores

Question	Percentage correct
Total Score	73.1
Domain 1	71.2
Domain 2	68.5
Domain 3	67.9
Domain 4	72.2
Domain 5	67.7

