ATHLETE AND ATHLETIC TRAINER PERCEPTIONS OF ANKLE SPRAINS AND CLINICAL PRACTICE PATTERNS

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by

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ABSTRACT

Ankle sprains are a common musculoskeletal injury that occur in the athletic population. These injuries are known to affect a patient's function as well as quality of life. While physiological deficits have been documented in the literature in this population the perception patients have regarding the injury has not been studied in depth. Athletic Trainers play an essential role in providing care to athletes when an ankle sprain is sustained. Recommendations made by the National Athletic Trainers' Association inform the care Athletic Trainers provide when treating and managing ankle sprain and their long-term consequences. Evaluating the knowledge of ankle sprain epidemiology, attitudes towards clinical practice recommendations, and barriers faced when implementing best practice allows for the perception possessed by clinicians relative to ankle sprains treatment. Documentation of ankle sprain treatment by Athletic Trainers not only allows the clinician to track rehabilitation progress, but when done within an electronic medical records system allows the care provided to patients to be examined which could offer insight into how ankle sprains are treated. Therefore, the purpose of this project was to identify current perceptions and understanding surrounding the treatment and management of ankle sprains by student athletes and Athletic Trainers and evaluate current clinical practices to identify trends in treating and managing ankle sprains.

The first manuscript evaluated the understanding and perception intercollegiate athletes have regarding ankle sprains. Additionally, the second manuscript evaluated Athletic Trainers' perceptions, and understanding of ankle sprains treatment and attitudes and obstacles to implementing clinical care recommendations. Lastly, the purpose of manuscript three was to assess characteristics of Athletic Training services provided when treating an ankle sprain. This project has shown a majority of the student-athletes surveyed displayed a high understanding of basic ankle sprain information, and also understood ankle sprains to be prevalent. In contrast to other common sports injuries, ankle sprains were perceived to be of lower importance. Although Athletic Trainers of all settings, education levels and years certified expressed confidence in the NATA position statement regarding ankle sprain treatment, challenges and pressures were also reported to effectively implementing its recommendations. Most of the services provided were conducive to the recommendations made to inform clinical practices. Future research should explore ways to improve the perception held by student athletes regarding ankle sprains and ways to address challenges and pressure faced by clinicians.

SIGNATURE PAGE

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APPROVAL OF THE DISSERTATION

This dissertation, Athlete and Athletic Trainer Perceptions of Ankle Sprains and Clinical Practice Patterns has been approved by the Graduate Faculty of the Curry School of Education in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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INTERCOLLEGIATE ATHLETES' PERCEPTIONS OF ANKLE SPRAINS

CONTEXT: Ankle sprains are a prevalent injury for athletes to sustain. Although ankle sprains occur often, athletes on average return to play within one week of injury. This short return to play timeline may impact the perception athletes have concerning the seriousness of their injury and the importance of seeking and complying with adequate rehabilitation. Evaluating knowledge and beliefs about ankle sprains could provide additional insight into the role patients play in receiving treatment.

OBJECTIVE: To evaluate the current perception and knowledge intercollegiate athletes have in regards to the treatment, management and long-term effects of sustaining an ankle sprain.

DESIGN: Cross-sectional study.

SETTING: Online survey.

PATIENTS OR OTHER PARTICIPANTS: A convenience sample of 119 National Collegiate Athletic Association (NCAA) student-athletes within Division I and Division III (age=19.9±1.4 years old, females=82).

INTERVENTIONS: None.

MAIN OUTCOME MEASURES: Participants responded to a fifty-seven-question survey that recorded demographic information, previous ankle-related medical history, perceptions, and basic knowledge regarding ankle sprains. The survey also documented injury-related fear using the Tampa Scale for Kinesiophobia (TSK), and self-reported

level of ankle function using the Identification of Functional Ankle Instability (IdFAI) and the Foot and Ankle Ability Measure (FAAM) Sport Subscale. Pressures to return to play (RTP), and lingering symptoms following an ankle sprain were also recorded.

RESULTS: Fifty-four percent of the student-athletes exhibited a high level of understanding of basic ankle sprain information. Forty-seven percent of respondents perceived ankle sprains as being the most prevalent injury compared to ACL tears, concussions, rotator cuff tears, and hamstring strains, but only 1.8% find ankle sprains to be the most important injury in seeking care compared to those same injuries. Of the student-athletes, 76.5% reported having suffered an ankle sprain at some point in time. Within those whom have suffered an ankle sprain, 76.9% were categorized as having functional ankle instability according to the IdFAI. Ninety-five percent of student-athletes with a history of ankle sprain reported a "normal" or "nearly normal" level of function as per the FAAM. Forty-five percent of student-athletes with a history of ankle sprain reported at least one source of pressure to RTP after injury and 41% reported the presence of at least one lingering symptom.

CONCLUSION: The majority of the student-athletes surveyed displayed a high understanding of basic ankle sprain information, and also understood ankle sprains to be prevalent. In contrast to other common sports injuries, ankle sprains were perceived to be of lower importance. Student-athletes with a history of ankle sprains showed signs of functional ankle instability (FAI) and lingering symptoms, but also reported mostly

"normal" or "near normal" levels of function, which may speak to their high self-efficacy.

Word Count: 452

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INTRODUCTION

Ankle sprains are the most prevalent injury within athletics, both at the high school and collegiate levels.[1–3] An estimated 1.4 million ankle sprains happen per year in high school athletics,[4] and an estimated 16,022 ankle sprains occur in NCAA sports.[3] With its high prevalence, Athletic trainers (ATs) treating this injury have availability to best practice guidelines used to provide care.[5] While the National Athletic Trainers' Association's position statement on the treatment and management of ankle sprains[5] encourages evaluating a patient's perception of function in making return to play decisions, there appears to be little available literature assessing the overall perception experienced by injured student-athletes regarding their ankle sprain. It has been shown that college athletes with a history of ankle sprain report greater amounts of injury-related fear compared to their healthy counterparts.[6] This comparison provides insight into one of the psychological factors faced by those whom have suffered an ankle sprain, but is only one piece of the whole picture in the biopsychosocial model of sport injury and rehabilitation.[7–10] Recovery outcomes are influenced by psychological and physical factors[7,8], however the literature regarding ankle sprains is mostly composed with evaluations of physical factors and is missing a deeper assessment of what student-athletes, a population at elevated risk of injury, know and believe about ankle sprains and their long-term consequences. These beliefs could impact how they view seeking treatment and their desire to be compliant.

Athletic injury biopsychosocial models explain the framework of psychological responses to sport injury and the rehabilitation process.[7,9,10] There are theorized factors that exist prior to sustaining an injury that speak to the stress response particular to each individual.[7] These factors include the athlete's personality, history of stressors, coping resources, and psychological skills training interventions.[9,11,12] Knowledge and beliefs surrounding an injury, and the role those may play in a patient's desire to seek and comply with treatment are not a part of these models and has not yet to be examined. The previous knowledge and beliefs held by student-athletes regarding ankle sprains, could impact their recovery outcomes, both psychological and physical. Recovery outcomes include a cognitive appraisal of their injury[9], and if an ankle sprain is not previously viewed as a serious injury, it may not be treated as such by those sustaining the ankle sprain. This notion is the basis of the first theory the development of chronic ankle instability (CAI), as hypothesized by the International Ankle Consortium,[13] where ankle sprains are viewed as innocuous or harmless injuries, wherein treatment is not sought. Recovery outcomes also cause behavioral and emotional responses to injury;[9] such as fear of reinjury,[6] use of the social support available and their use of psychological skills training strategies which can boost sport performance, and allow a positive approach to return to play.[9,11,12] Having a better understanding of the knowledge and beliefs that exists within a population with a high prevalence of ankle sprains, could give insight into what might impact the outcomes seen regarding ankle sprains and their long term consequences.

A subset of athletes are at risk for developing CAI since there is a 19% prevalence of CAI among intercollegiate athletes.[14] Anywhere from one-third to two-thirds of individuals whom have suffered an ankle sprain will report residual symptoms one year following their injury.[15,16] With high school athletes also showing a high prevalence of ankle sprains and a 31% prevalence of CAI,[2,4,14] there are some athletes that are entering their college athletic careers with lingering and chronic symptoms resulting from their ankle sprain history. While clinicians have information on the special considerations that should be taken into account when addressing long term consequences like CAI[5], little is currently known about what student-athletes believe they should do to address their chronic or lingering symptoms, and if playing with these condition affects their ability to function and perform.

Although ankle sprains occur frequently, RTP on average occurs one to seven days post injury.[3] Most athletes are back to stressing their affected joint within one week of their injury. Little information is known about the factors that may influence athletes to comply with these short RTP timelines. There are intrinsic and extrinsic factors that go into the culture of athletics.[8] These factors may also play a part in the way an athlete RTP. There are five stages of RTP: initial return, recovery confirmation, return of physical and technical abilities, high intensity training, and return to competition.[9,10] Since a majority of athletes RTP within a week of injury, they may not get the chance to go through all five stages. This expedited processing of stages may impact the emotional

and behavioral response and cognitive appraisal[7,8] athletes have regarding their ankle sprain and the way the rehabilitation process should run.

Overall little is known about student-athletes' understanding and beliefs regarding ankle sprains and the injury rehabilitation process. Therefore, the purpose of this study was to evaluate the current perception and knowledge of intercollegiate student-athletes in regards to the treatment, management and long-term effects of an ankle sprain. Factors influencing if and why they seek treatment, pressures to RTP, injury-related fear, and ankle function were also evaluated.

METHODS

Participants

Athletic Directors, Directors of Sports Medicine, and Head ATCs employed at 145 NCAA sanctioned institutions were contacted for approval to allow their student-athletes to complete the survey, and four institutions (2 Division I and 2 Division III) agreed to participate. A total of 2,190 student-athletes were contacted. One hundred and nineteen National Collegiate Athletic Association student-athletes (age=19.9±1.4 years old, females=82, years played=9.9±4.8 years, response rate = 5.4%) completed the survey. Athletes from 15 of the 25 NCAA sports responded to the survey. (Table 1.1) Prior to having their response to the survey recorded, participants consented to anonymously contribute their responses. The study was approved by the University of Virginia Institutional Review Board (IRB).

Instruments

Data were collected using the UVA Qualtrics Research Suite. A 57-question survey (refer to Appendix C for the survey document) was used to record demographic information, previous ankle related medical history, basic knowledge and their beliefs about ankle sprains. Questions regarding what factors influence if and why student-athletes seek treatment, pressures they are faced with to return to play (RTP), and lingering symptoms following an ankle sprain were also asked. The survey was developed within the Exercise and Sport Injury Lab at the University of Virginia by expert Sports Medicine researchers, and pilot data was collected from student-athletes competing at a Division I institution to assess feasibility and to improve the clarity of the questions being asked on the survey.[17]

The IdFAI is a 10-question research tool used to categorize functional ankle instability (FAI).[18] The TSK- 11 is an 11 question survey used to asses kinesiophobia.[19] The FAAM Sport is an eight item valid tool used to assess sport-related foot and ankle function.[20]

Procedures

Institutions were initially contacted a total of two times in an attempt to gain permission. Once permission was granted by an institution, an email containing a link to the survey and IRB required information was sent to the point of contact made at each institution to send to their student-athletes. An additional email was sent to the initial

contact person to gather student-athlete population size and to request an additional reminder email to be sent to student-athletes, two weeks after receiving permission.

After providing consent, participants were asked for demographic information including age, sex, sport played, years playing their sport, and ankle sprain history. Six questions assessing fundamental ankle epidemiology knowledge were asked of all participants. These questions were created using relevant research articles concerning basic ankle sprain statistics. Participants were asked to express how prevalent and important ankle sprains to be compared to other musculoskeletal injuries. Participants completed the TSK-11 to compare injury-related fear between those with and without a history of ankle sprains. Those participants that reported having sustained an ankle sprain were asked to report information regarding if and why they sought treatment, if they are currently receiving treatment for their ankle sprain, sources of pressure placed on them to RTP, and if and what type of lingering symptoms they may be experiencing. Participants with a history of ankle sprain were also asked to complete the IdFAI and the FAAM Sport to assess their ankle function. Participants were not required to answer every question, as per IRB regulations.

STATISTICAL ANALYSIS

Data Processing

Data regarding sport type were recoded to create three groups based on the amount of contact experience in their sport. The three groups were recoded into “high

contact" (n=51), "limited contact" (n=18), and "no contact" (n=49). The student-athletes grouped in the high contact sport group included basketball, field hockey, football, lacrosse, and soccer. Those grouped in the limited contact sport group included baseball, gymnastics, and softball. The no contact sport group included cross country, golf, swimming and diving, tennis, track and field and volleyball.

The six ankle epidemiology knowledge questions were summed to create a cumulative score of knowledge. These scores were used to group student athletes into three groups of low, mid and high levels of knowledge. Student-athletes in the low level of knowledge group answered two or less of the six questions correctly. Those in the mid-level group answered three or four questions correctly, and those in the high-level group answered five or six questions correctly. The cumulative scores were used to find the average number of questions answered correctly by the entire group of participants and frequencies were calculated to show how many student-athletes fit into each group of knowledge level.

Statistical Tests

Descriptive statistics were calculated for age, sex, sport type played, years playing their sport, ankle sprain history, and scores for the TSK-11, IdFAI, and FAAM Sport. Descriptive statistics were calculated regarding if and why treatment was sought, current treatment status, sources of pressure to RTP, and lingering symptoms experienced (frequency, mean, median and standard deviation). Percentages were calculated to

evaluate how prevalent and important student-athletes thought ankle sprains to be in comparison to other injuries.

One-way analysis of variance was run to evaluate the mean differences between more than two unrelated groups. The independent variables of sport type (high contact, limited contact, no contact) were assessed for differences on TSK-11 scores, ankle sprain knowledge, as well as IdFAI scores, and FAAM Sport Subscale scores, of those athletes within each sport type that reported an ankle sprain history. The independent variable of years playing their sport (5 years and under, 6-10 years, 11-15 years, 16-20 years) were assessed for differences in ankle sprain knowledge. One-way analysis of variance was also performed to note any differences in the number of lingering symptoms based on time since last injury; question two on the IdFAI. Tukey's post hoc tests were performed to reveal which groups specifically differed from one another.

Independent t-tests were performed to evaluate the mean differences between two unrelated groups: sex (female, male), and division (Division I, Division III) on the dependent variables of TSK-11 scores, ankle sprain knowledge, and FAAM Sport Subscale scores. Independent t-tests were also run for those with and without a history of ankle sprain, and those with and without FAI, on the same continuous, dependent variable of TSK-11 scores, ankle sprain knowledge, FAAM Sport Subscale scores, and the number of lingering symptoms felt. The level of statistical significance was set a priori at $p<0.05$ for all analyses.

RESULTS

Descriptive statistics for age, sex, sport type played, years playing their sport, ankle sprain history, and ankle sprain knowledge are in Table 1.2, while descriptive statistics regarding scores of the TSK-11, IdFAI, and the FAAM Sport Subscale are in Table 1.3. Ninety-one (76.5%) of the student-athletes reported having a history of ankle sprain. Of those with a history of ankle sprain whom completed the IdFAI (n=65), 50 (76.9%) had FAI and 15 (23.1%) did not. Ten of the 91 participants were receiving treatment for an ankle sprain at the time they completed the survey, with half of those being classified as having FAI. Out of the 91 student-athletes with a history of ankle sprain, 55 (60.4%) of them reported spraining their ankles at their current institutions, all of whom reported the ankle sprain to their athletic trainer. When asked what caused the student-athletes to report their ankle sprain to their ATC, "symptoms being too severe to ignore" (42%) and "ATC witnessed the injury" (25%) were the top two reasons. Student-athletes with a history of ankle sprain reported an average of 1.22±1.32 sources of pressure to RTP, with the top two being Coaches (38.74%) and Teammates (24.32%). (Figure 1.2) Participants with an ankle sprain history reported an average of 1.70±1.64 lingering symptoms (Figure 1.1), with the top two symptoms reported "snapping or popping" (18.4%), and "stiffness" (16.67%), with "weakness" (15.52%) as a close third. When asked to categorize their current level of function, 95.3% student-athletes reported "normal" or "near normal" levels of function.

Fifty-one of the student-athletes (43.2%) played high contact sport, with the no contact sport type being made up of 49 student-athletes (41.5%), and the limited contact sport type making up remainder of the participants (15.3%), with one student-athlete that did not report their sport. Athletes that had played their sport for ten years or less accounted for 54.6% of participants. Those student-athletes that played for 11 to 20 years accounted for the other 45.4%. Fifty-four percent of student-athletes exhibited a high level of understanding of basic ankle sprain information, with the overall average number of questions answered correctly being 4.20±1.19.

Forty-seven percent of student-athletes reported ankle sprains to be the most prevalent injury to occur compared to ACL tears, concussions, rotator cuff tears, and hamstring strains. Student-athletes reported ankle sprains to be over two times more prevalent than the next injury they believed to be most prevalent; hamstring strain (18.42%), but only 1.8% of student-athletes expressed ankle sprains to be the most important injury in seeking care compared to those same injuries. Similar to the entire sample of respondents, 51% of those with a history of ankle sprain expressed ankle sprains to be the most prevalent injury, but only 1% thought it to be the most important injury to seek care for.

ANOVA results for the dependent variables of ankle sprain knowledge, TSK-11, IdFAI, or FAAM Sports Subscale scores revealed no group differences for years playing

their sport, and sport type. No group differences were seen in the number of lingering symptoms reported based on time since last injury.

Independent t-test revealed no group differences in TSK-11 scores and ankle sprain knowledge between those with and without a history of ankle sprains. (Table 1.3) No group differences were seen on ankle sprain knowledge, TSK-11, IdFAI, or FAAM Sport Subscale scores between the two Divisions represented in this study. No group differences were observed in TSK-11 scores, ankle sprain knowledge, current level of function reported as a percentage from the FAAM Sport between those determined to have FAI and those without as per the IdFAI discriminant score of 10. (Table 1.3) Statistically significant differences were seen between the cumulative FAAM scores calculated for those with and without FAI, those with FAI exhibiting lower mean scores. (Table 1.3) Statistically significant differences were observed regarding the number of lingering symptoms experienced by those with and without FAI, those with FAI experiencing more lingering symptoms (Table 1.3). No sex differences were seen on ankle sprain knowledge, or TSK-11 scores. Statistically significant sex differences were shown on the dependent variables of IdFAI and FAAM Sports Subscale scores, with female student-athletes having worse scores compared to their male counterparts. (Table 1.3)

DISCUSSION

Overall student-athletes showed a substantial understanding of basic ankle sprain

information, and understand ankle sprains to be a prevalent injury, but do not believe ankle sprains to be important in seeking treatment based on how it was ranked compared to other common sports injuries. The high level of understanding that was observed, paired with the low level of importance given to ankle sprains may reveal a disconnect that could impact an athlete's perceived need to seek treatment following an ankle sprain. Exploring how this discrepancy between knowledge and criticalness exists could inform changes that might need to be made to ensure student-athletes are seeking the care they need. It is shown that more than half of those whom played competitive sports and sprained their ankle did not seek out any type of treatment.[21] With varying levels of strain placed on ATCs working in the collegiate setting[22], they might not be able to witness every injury that occurs, especially when responsible for multiple teams at once. If student-athletes are not witnessed suffering an ankle sprain, and are not affected enough by the severity of their symptoms are they less likely to report their injury? While some of the findings of this study go along with previous research, with athletes not considering an ankle sprain important enough to seek treatment, all of the student athletes that sustained an ankle sprain at their current institution reported telling their ATC about their injury. Reasons as to why 100% of this sample reported their injury may provide some insight into ways to encourage injury reporting, which could positively impact treatment received. It is important to consider how duration of ankle sprain treatment is viewed by student-athletes. This perception of duration of care may impact patient compliance, but further examination is needed.

Student-athletes reported an average of 1.22±1.32 sources of pressure being placed on them to RTP, with 45% reporting at least one source of pressure. Knowing specifically where those pressures are coming from, Coaches and Teammates, could inform ways to help decrease the pressure felt, to encourage the seeking of treatment and positively impacting RTP timelines to the benefit of the student-athletes. The culture of athletics would need to better accommodate the biopsychosocial model of injury recovery in order for that shift to occur. Student-athletes would be given the chance to go through the five stages of RTP[9,10] free of extrinsic pressures, which were shown to be the top sources of pressure in the study, in the form of Coaches and Teammates. Athletic teams come with their own structures and normative expectations, and navigating them may be compromised while injured. The team dynamic is a socioculture[7] all its own that can influence a student-athletes response to injury. Proposing changes to these sociocultural influences could be to the benefit of the patient's joint health and overall well-being.

A majority of the student-athletes in this study reported having a history of ankle sprain, with 40% reporting suffering an ankle sprain prior to their participation at that current institution, and of those 40% only one reported currently receiving treatment. This leaves a subset of athletes coming into their new institution with the possibility of having lingering symptoms that may need to be addressed with injury prevention programs to reduce the risk of ankle injury, and mechanical and functional deficits, such as those experienced by individuals with CAI.[5] Considering those with a history of ankle sprain reported an average of 1.70±1.64 lingering symptoms, two of the top symptoms

reported can be addressed with treatment (stiffness and weakness)[5,23], however only one of those with a previous ankle sprain history that precede their current location are receiving treatment. Understanding exact reasons as to why that number is low is outside the scope of this study, but is important to consider since identifying patients with chronic symptoms is a recommendation made in the most recent position statement regarding ankle sprains.[5] Tools such as the IdFAI, which was used in this study are explicitly suggested to be used in order to identify such patients.[5] Based on those whom completed the IdFAI, the results of this study showed 76.9% of student-athletes with a history of ankle sprain to have FAI, with only 10% of those with FAI reporting to currently receive treatment. It is important to consider that 29% of those with a history of ankle did not complete the IdFAI and while it is not known why those athletes chose not to complete it, those who did might be individuals whom are more inclined to report their injuries. However, this shows large amounts of student-athletes suffering from long-term consequences but low amounts of them receiving treatment. This difference between prevalence and treatment may speak to the importance placed on the injury and its sequela, but further investigation is needed to confirm this notion. Those shown to suffer from FAI also showed statistically significant differences in self-reported function as per the FAAM Sport scores (Table 1.3). This difference may speak to underlying deficits that might need to be addressed. In direct contrast to the mean score differences seen between those with and without FAI, a large majority of student-athletes reporting to have a history of ankle also reported normal or near normal levels of overall function, as

revealed by the FAAM Sport. This may speak to the self-efficacy exhibited in sport culture.[7] This high self-efficacy, while commendable, may mask deficits that need to be addressed, since performing through pain is also a part of sport culture.[7,9]

It is also important to note the sex differences seen on the IdFAI and the FAAM Sport Subscale. Firstly, of those whom reported sustaining an ankle sprain 64 of the 91 respondents were female athletes, in comparison to the 27 male athletes. A review of literature regarding the incidence and prevalence of ankle sprains conducted in 2013[24] showed the incidence rate of ankle sprains to be 13.6 per 1,00 athlete exposures for females and 6.94 per 1,000 athlete exposures for males. It has also been shown in basketball athletes that female athletes were at 25% greater risk of sustaining an ankle sprain. While our study showed only a slightly higher number of sprains occurring in female athletes when viewed in proportion to the male athletes (78% of females, 73% of males), the female athletes did report poorer scores on the ankle function questionnaires used in this study. While female athletes have a higher prevalence and risk of injury as it relates to ankle sprains, could the higher number seen be indicative of a greater intrinsically motivated ability to report their injury. A study regarding concussions showed female college athletes had a greater intention to report a future concussion compared to their male counterparts.[25] While this information may not currently be available regarding ankle sprains, it might be something to investigate further in future research.

Regardless of sport culture, patient perception of function should be taken into consideration when making RTP decisions, through the usage of patient reported outcome measures.[5] Without evaluating student-athletes perception of function, how are they able to assess their own recovery confirmation, which is the second stage of return to sport.[9,10] Short RTP timelines[3] may be indicative of that stage not being conducted, which again could be influenced by team dynamics. Confirming these proposed ideas warrant further investigation to better understand the entirety of the biopsychosocial model of recovery from injury specific to ankle sprains.

Limitations

This study was performed utilizing an anonymous survey, and while surveys can gather large amounts of quantitative data, something as subjective as perceptions toward injury and recovery may warrant deeper investigation into the intricacies that go into form those beliefs. There is also a potential bias regarding who agrees to complete the survey. Those with a history of ankle sprain, and with lingering symptoms might be more inclined to participate. Additionally, a low response rate was noted for institutional participation and from student-athletes so that the generalizability of these findings may be limited.

CONCLUSION

Intercollegiate student-athletes exhibited a high knowledge regarding ankle sprain injuries including prevalence and consequences. However, the respondents ranked ankle

sprains as low in priority to seek treatment compared to other common sports injuries. Student-athletes with a history of ankle sprains showed signs of functional ankle instability (FAI) and lingering symptoms, but reported also mostly “normal” or “near normal” levels of function, which may speak to their resilience as athletes, and the layered complexity influencing their response to injury.

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and conformity to traditional gender norms in young adults. *J Adolesc*. 2017;54(2017):110-119. doi:10.1016/j.adolescence.2016.11.002

Table 1.1 Distribution of student-athletes based on sex.

Sport	Sex	
	Male	***Female***
Basketball	4	0
Baseball	5	0
Cross Country	3	8
Field Hockey	0	5
Football	15	0
Golf	1	1
Gymnastics	0	1
Lacrosse	4	8
Rifle	0	0
Rowing	0	17
Skiing	0	0
Soccer	2	17
Softball	0	7
Swimming & Diving	2	2
Tennis	0	3
Track & Field	4	15
Volleyball	0	5

Table 1.2 Descriptive statistics for age, sex, sport type played, NCAA Division, years playing their sport, ankle sprains knowledge groups, and ankle sprain history

Age (*years)*	19.87±1.64
Sex	Female: 82 Male: 37
Sport Type Played	High Contact: 51 Limited Contact:18 No Contact:49
Division	Division I: 86 Division III: 32
Years Playing Their Sport	5 years & under: 29 6 – 10 years: 36 11- 15 years: 36 16 – 20 years: 18
Ankle Sprain Knowledge Group	High Level: 64 Mid Level: 37 Low Level: 14
Ankle Sprain History	+Ankle Sprain Hx: 91 - Ankle Sprain Hx: 28
Ankle Sprain History Based on Sex	(+) Female: 64 (+) Male: 27

Table 1.3 Group differences between those with and without a history of ankle sprain and those with and without FAI.

		TSK-11 Scores	Ankle Sprain Knowledge	FAAM Sport Subscale Scores	Lingering Symptoms	IdFAI Scores
Previous Ankle Sprain History	+ Ankle Sprain Hx	20.38±5.88	4.20±1.21			
	- Ankle Sprain Hx	22.31±5.77	4.19±1.11			
	p-value	.15	.94			
Presence of FAI	+ FAI	20.96±5.90	4.26±1.21	82.65±19.85 (%)	2.02±1.57	
	- FAI	17.73±5.405	4.67±.72	97.62±7.35 (%)	.80±1.08	
	p-value	.065	.22	.006*	.007*	
Sex						
	Female	21.25±5.50	4.21±1.22	81.35±23.20 (%)		18.49±7.62
	Male	19.71±6.84	4.18±1.11	95.45±6.81(%)		12.94±6.04
	p-value	.24	.89	.006*		.010*
Sport Type						
	No Contact	20.49±5.15		82.70±25.43		18.72±8.52
	Limited Contact	22.22±6.25		87.80±15.11		16.33±6.80
	High Contact	20.73±6.46		85.63±19.3		16.13±7.16
	p-value	.57		.74		.44
NCAA Division	Division I	20.89±5.48		84.32±22.64		17.72±7.24
	Division III	21.03±6.79		86.43±16.25		15.64±8.81
	p-value	.91		.70		.37
Time Since Last Ankle Sprain	> 2 years					1.21±1.48
	1-2 years					2.04±1.80
	6-12 months					1.70±1.49
	1-6 months					1.46±1.26
	< 1 month					3.00±2.45
	p-value					.15
Grand Mean *(Mean±SD)*		20.85±5.88	4.20±1.19	85±21.16 (%)	1.70±1.64	17.12±7.61

** Denotes *p-values* that are statistically significant; $p < .05$.

Figure 1.1 Lingering Symptoms following an ankle sprain.

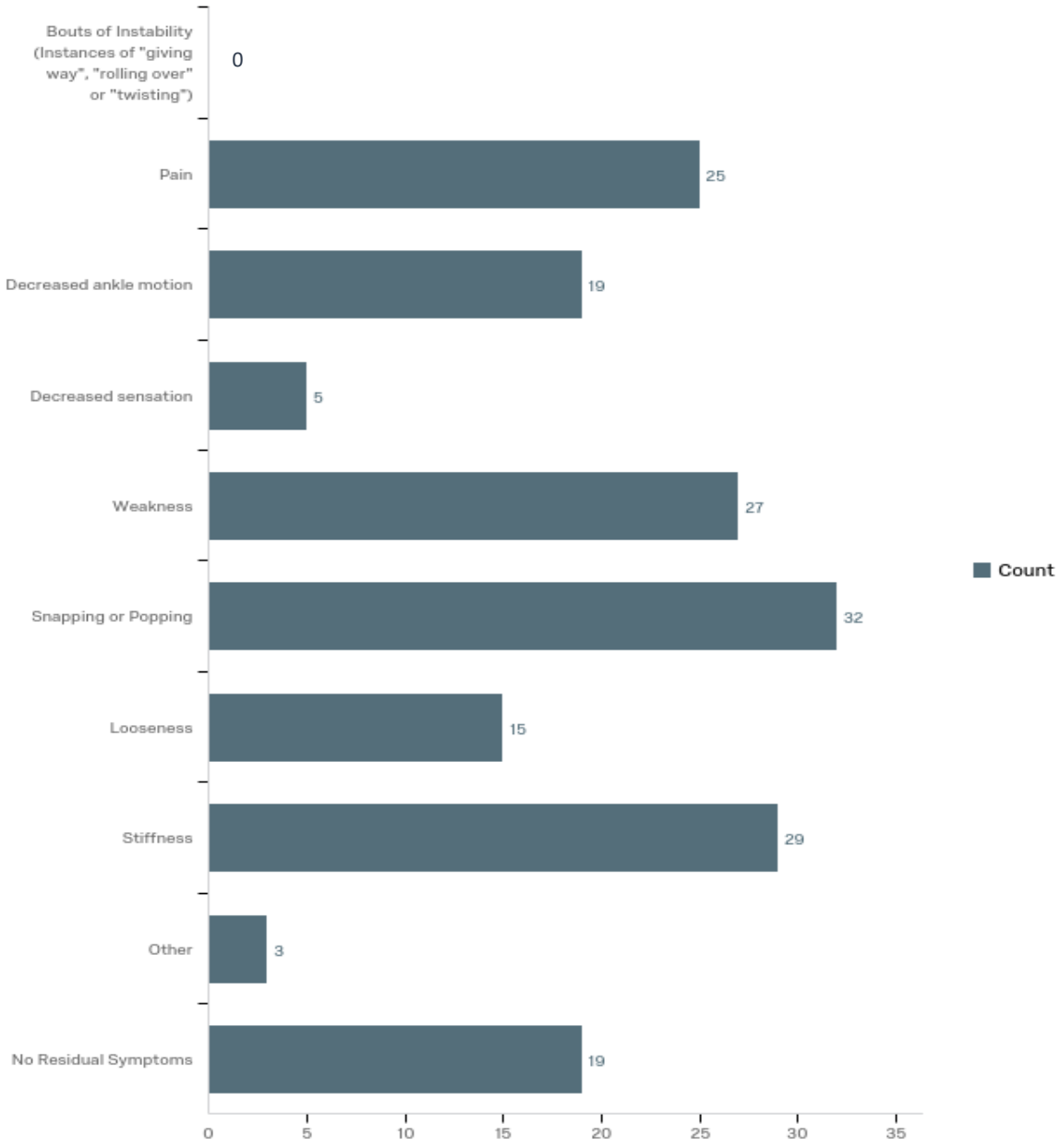
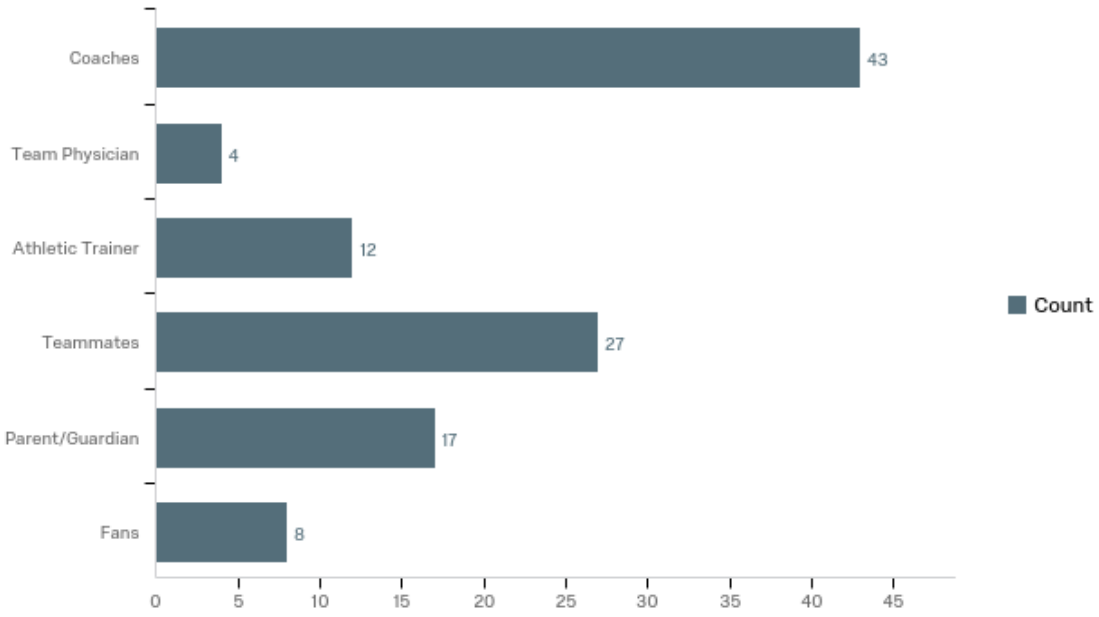


Figure 1.2 Sources of pressure to RTP following an ankle sprain.



SECTION III: MANUSCRIPT II

ATHLETIC TRAINERS' PERCEPTION ON TREATING AND MANAGING ANKLE SPRAINS

CONTEXT: Ankle sprains are a common occurrence in athletes and the general population. The high volume of ankle sprains places an elevated clinical burden on Athletic Trainers (AT). While there is a position statement from the National Athletic Trainers' Association (NATA) regarding the treatment and management of ankle sprains, there may be factors that impact an AT's ability to effectively implement the recommendations.

OBJECTIVE: To evaluate the current understanding, perceptions and difficulties ATs have regarding the treatment, management, and long-term effects of sustaining an ankle sprain.

DESIGN: Cross-sectional study.

SETTING: Online survey instrument.

PATIENTS OR OTHER PARTICIPANTS: Seven hundred and ninety-six ATs across all athletic training job settings (years certified=12.1±9.2 years, setting).

INTERVENTIONS: None.

MAIN OUTCOME MEASURES: Participants completed a thirty-eight-question survey that recorded demographic information, as well as perceptions and knowledge on the epidemiology, treatment, and management of ankle sprains. The survey also documented participants' patient education practices, attitudes regarding the NATA position statement concerning ankle sprains, and any challenges and pressures to its implementation.

Descriptive statistics and analyses of variance were used to analyze the data collected and evaluate group differences.

RESULTS: Eighty-three percent of the participants answered four to six out of nine questions regarding ankle sprain epidemiology correctly. Group differences were seen between education levels, years certified, and job setting in the way patient education was emphasized. Overall, 38.1% of ATs were either unsure or unaware of the existence of the NATA position statement, but those aware of it expressed it to be a 3.89 on a scale from one to five, regarding usefulness; with a one being "Not Useful at All", three being "Neutral" and five "Very Useful". There were, on average, 1.9±0.88 unique challenges documented to implementing effective treatment and management practices, and an average of 2.0±0.95 different pressures reported to returning athletes to play following an ankle sprain, with the top two pressures coming from coaches and student-athletes, respectively.

CONCLUSION: Nearly 40% of ATs were either unaware or unsure of the current recommendations available to inform how ankle sprains are treated, which could impact how care is delivered. Although ATs of all settings, education levels and years certified expressed confidence in the NATA position statement, challenges and pressures were also reported to effectively implementing its recommendations.

Word Count: 404

Key Words: ankle sprains, perceptions, epidemiology

INTRODUCTION

Ankle sprains occur at high rates in both athletic and general populations.[1–4] Being that athletic trainers (ATs) have the potential of working with both patient populations, their clinical burden is heavily impacted by the rates at which ankle sprains occur. The National Athletic Trainers' Association (NATA) published a position statement with 37 recommendations that instruct ATs on how to treat and manage ankle sprains[5]. The position statement used the best evidence present at the time of publication in 2013 to inform the clinical practices ATs employ when treating patient whom have suffered an ankle sprain. The recommendations are broken down into a three-tiered strength level based on the evidence collected to support the suggestions made. Given the current level of research produced on ankle sprain prevention, management, rehabilitation and return to play, the majority of the recommendations posed in the position statement were at the lowest strength level. This low level of evidence used to create the recommendations may affect the way that ATs perceive treating and managing ankle sprains.

Aside from the symptoms that come with the initial injury, there are known lingering effects and consequences that patients need to be educated about when being treated[6]. The NATA position statement makes no mention of patient education and what practices ATs should utilize with patients in relation to their ankle sprains. Within the general population, about half of individuals whom suffer an ankle sprain do not seek formal medical care[7], and those who did seek treatment receive an average of 4.45 days

of physical therapy[4]. On the athletic side, more than half of recreationally active and competitive-level athletes who sprain their ankle do not seek out any type of treatment[8]. For those athletes that were treated they typically return to play (RTP) within seven days of injury[2,9,10], with 44% of the lateral ankle sprain (LAS) reported as non-time loss (NTL) injuries, which meant RTP occurred within 24 hours of injury[10]. Additionally, ATs may not have enough time to adequately express the importance of ankle sprain injury to their patients. In addition to not having enough time due to expedited RTP timelines there currently is no uniform way to emphasize patient education in the rehabilitation process according to the most recent position statement regarding ankle sprains.

As healthcare professionals, ATs are expected to have an understanding of the healing process and how to track that process during rehabilitation. Initial healing of the lateral ligaments can take six to twelve weeks r[11] to where the inflammatory response has been addressed and the tensile strength of the ligaments are able to support the load received in athletic activity.[12] This timeframe is longer than the recent RTP timelines reported for athletes who incur an ankle sprain. Aside from the role patients play in these shortened timelines there may be other constraints and barriers ATs face when treating and managing ankle sprains. Athletic settings are known to be high intensity environments and outside factors like coaches or higher-ranking officers, teammates, and the time of season may influence the ways ankle sprains are managed. Currently, the rest, ice, compression, and elevation method of treatment is the universally accepted gold standard for ATs for treating ankle sprains[5], which also shows the emphasis placed on

addressing acute symptoms, quite possibly in hopes of returning to activity sooner. Depending on the particular setting there may also be limitations on resources available to efficiently treat every ankle sprain that occurs through the true length of the ligamentous healing process. Pressures and challenges should be acknowledged and quantified to gain insight into ways ATs may struggle to implement best practices.

As ankle sprains continue to be a widespread occurrence, it is important to evaluate ways in which ATs can better treat their patients. Part of that evaluation includes critiquing the usefulness of the current position statement used to inform clinical decisions and gauging the confidence ATs have in applying those recommendations into their practice. It is also important to assess what kind of emphasis ATs are making in regards to patient education, considering there is no standardized recommendations made for them to follow. Therefore, the purpose of this study was to evaluate AT's current understanding of the NATA Position Statement regarding the treatment and management of ankle sprains, perceptions of and difficulties with treatment, management and long-term effects of sustaining an ankle sprain.

METHODS

Participants

ATs were contacted if they were known to work with a patient population; this excluded ATs that worked strictly in the research or higher education field. Ten thousand of the 19,626 ATs that fit that criteria were randomly selected and emailed an invitation

to participate via the NATA Research Survey Service. Seven hundred and ninety-six ATs across various athletic training settings had their responses recorded (7.96% response rate). Job settings included college, high school and professional athletics, clinic, industrial, hospital and the military. Participants were also given the opportunity to enter any other job setting that was not offered as an option. Prior to answering questions on the survey, participants consented to anonymously contribute their responses. The study was approved by the University of Virginia Institutional Review Board (IRB).

Instruments

Data were collected using the UVA Qualtrics Research Suite. A 38-question survey was used to record demographic information, perceptions and knowledge on the epidemiology, treatment, and management of ankle sprains. Questions regarding patient education practices, attitudes toward the current NATA position statement and obstacles in executing the recommendations are also asked. The survey was developed within the Exercise and Sport Injury Lab at the University of Virginia by expert Sports Medicine researchers. Pilot data was collected from ATs within clinical and research settings all of which have experience working clinically, to garner feedback on the ways questions and answers could be interpreted. This pilot testing was performed to assess feasibility and improve the clarity of the survey.[13] Please refer to Appendix C for the survey document.

Procedures

After providing informed consent, participants were asked demographics

information including their highest level of education, how long they have been certified, and their job setting. Following demographic information, nine questions assessing fundamental ankle epidemiology were asked. These questions were created using the NATA position statement[5], the evidence review from the International Ankle Consortium consensus statement on the prevalence, impact and long-term consequences of lateral ankle sprains[14], as well as other research articles concerning essential ankle statistics. ATs were also asked to describe their rehabilitation and treatment practices, along with how they disseminated patient education. Questions regarding attitudes toward the NATA position statement included their awareness of its existence, how useful they felt the position statement was for them as clinicians, how confident they felt in implementing the recommendations presented, and how well they understand them. Additionally, questions about the pressures and challenges they faced as ATs when treating and managing ankle sprains were asked. Participants were not required to answer every question, as per IRB regulations.

Data Processing

Data regarding job setting were recoded to create four groups based on the patient population being served. The four groups were recoded into athletic, general, both, and other patient populations served. The ATs grouped in the athletic group included college, high school and professional athletics, military, dance or performing arts. Those grouped in the general group included clinic, industrial, hospital and any entry that included variations of those three settings. The group serving both athletic and general patient was

named for that duality, and the group denoted as other included any AT that chose that option but did not specify its meaning. Frequencies were calculated to express how many ATs were in each group.

The nine ankle epidemiology questions were recoded and added together to create a cumulative score of knowledge. These scores were used to group ATs into three groups of low, mid and high levels of knowledge. Athletic trainers in the low level of knowledge group answered three or fewer of the nine questions correctly. Those in the mid-level group answered four to six questions correctly and those in the high-level group answered seven to nine questions correctly. The cumulative scores were used to find the average number of questions answered correctly by the entire group of participants and frequencies were calculated to show how many ATs fit into each group of knowledge level.

Confidence in the NATA position statement was calculated using a 25-point scale. ATs reported their confidence in executing the five separate sections of the position statement on a scale from one to five; with one being “Very Confident”, three being “Neutral” and five being “Not Confident at All”. The points across the five sections were added together to report an overall confidence score with a total of five points being most confident and a total of 25 points being the least confident in implementing the recommendations. The total scores were used to find the average number confidence felt by the entire group of participants.

Importance placed on patient education was determined using a 20-point scale. The four questions regarding patient education practices were added together to express and overall emphasis made by ATs concerning patient education in their clinical practice. A value of four points equated to the highest emphasis made and a value of 20 points equated to the lowest emphasis made by ATs about patient education. The total values were used to calculate the average emphasis made involving patient education by the entire group of participants.

Statistical Tests

Descriptive statistics were calculated for the participant's highest level of education, years certified, job setting as well as for the pressures, challenges, awareness, and usefulness of the NATA position statement (frequency, mean, median and standard deviation).

One-way analysis of variance was run to evaluate the mean differences between the independent variables of education levels (Bachelors, Masters, Doctorate), years certified (separated into five groups broken up into five year intervals starting at five years and under with the last group being those certified 25 years or more), and job setting on the dependent variables of patient education emphasis, confidence in, and usefulness of the NATA position statement, and challenges and pressures expressed by ATs when treating and managing ankle sprains. Tukey's post hoc tests were performed to reveal which groups specifically differed from one another. Chi-square analysis were

performed to evaluate associations between categorical variables. The variables included in this analysis included the three categorical variables of ankle epidemiology knowledge levels, education levels, and years certified. Alpha was set to a level of $p \leq 0.05$ for all analyses.

RESULTS

Descriptive Statistics

Descriptive statistics for highest level of education, years certified, and job setting are in Table 2.1, and those regarding pressures, challenges, and usefulness of the NATA position statement are in Table 2.2. ATs serving an athletic patient population were the largest group within the job setting variable with 506 ATs making up 69.7% of the ATs that offered job setting information. A masters level education was reported by 557 out of the 778 ATs, making it the highest level of education for 71.6% of those whom offered education information. On average ATs were certified for 12.12±9.15 years, however the group of ATs certified for 5 years or less was the largest with 33.1% of participants belonging to this group.

Eighty-three percent of ATs possessed a mid-level understanding of ankle epidemiology, with the overall average number of questions answered correctly being 4.86±1.13. There was an average of 1.9±.88 challenges to implementing effective clinical practices (Figure 2.2) reported by the 419 respondents that offered their responses to this question; the top two challenges reported were “Pressure to Return the Athlete to

Competition" (46.85%) and "Not Enough Time" (34.56%) respectively. Additionally, the 377 ATs that responded reported an average of 2.0±0.95 pressures (Figure 2.1) when returning athletes to play following an ankle sprain; the top two pressures coming from Coaches (39.39%) and the Student Athletes (32.23%), respectively. Lastly, 38.1% of ATs were either unsure or unaware of the NATA position statement and those who were aware averaged a 3.89±.79 on a scale from one to five, regarding usefulness of the NATA position statement; with a one being "Not Useful at All", three being "Neutral" and five being "Very Useful". ATs mindful of the NATA position statement expressed a high level of confidence at 7.68±2.87 in implementing the five sections of the position statement; a score of five represented the highest level of confidence and a score of 25 represented the lowest level of confidence.

Group Comparisons

ANOVA results for the dependent variables of patient education emphasis, confidence in, and usefulness of the NATA position statement can be seen in Table 2.2. No group differences were seen in the confidence ATs had in implementing the NATA position statement or its usefulness. Between group differences were observed in the grouping variables of education levels, years certified, and job setting in relation to how patient education was emphasized. ATs that possessed a doctorate placed the most emphasis on patient education with a composite score of 5.56±2.65 out of twenty points, where twenty points denoted poor patient education practices. Those ATs that were

certified for over 25 years placed greater emphasis on patient education than other groups with a score of 6.22±2.44. ATs that serve general population patients placed a higher emphasis on patient education compared to those in other job settings with a score of 6.70±2.62.

No group differences were seen in the confidence ATs had in NATA position statement or its usefulness. Chi squared analysis revealed no statistically significant association between any of the categorical variables of ankle epidemiology knowledge levels, education levels, and years certified.

DISCUSSION

Overall ATs showed a moderate understanding of ankle epidemiology and while the direct impact this has on clinical practice cannot be confirmed it is important to consider. The moderate level of understanding that was observed, coupled with almost 40% of ATs being unaware or unsure of the NATA position statement regarding ankle sprains, leaves a large number of ATs ill-equipped to handle this highly prevalent injury. Considering the 60% of ATs that were aware of the NATA position statement, they reported it to be more useful than not and were highly confident in implementing the recommendations. Similarly, a study conducted in 2009 reported about 61% of ATs used the NATA position statement regarding the management of sport-related concussion in their respective clinical settings.[15] While this is positive in nature, 40% of ATs being unaware or unsure of the position statement is an alarmingly high percentage of clinicians

possibly unaware of its recommendations. The 2009 study regarding the sport-related concussion position statement also revealed about 80% of program directors in AT programs accredited by the Commission on Accreditation of Athletic Training Education (CAATE) claimed the position statement to be taught in their programs.[15] While the scope of the current study did not evaluate if the position statement regarding ankle sprains were taught in CAATE-accredited education programs it might be something to look into in future research to compare the number of programs teaching ATs about the position statement to those reporting their awareness of its existence. Investigating to find where the breakdown in knowledge and awareness occur could inform changes that might need to be made to ensure ATs are following evidence-based recommendations. Continuing education courses might be a way to ensure professional development in this context. Similarly a study conducted in 2010[16] evaluating the knowledge, attitudes and practices regarding heat illness showed 77% of ATs were aware of the 2002 NATA position statement regarding exertional heat illness,[17] but the lower percentages of ATs reported using the most valid tools (19%) and following the best practices (50%) when addressing exertional heat illness. Difference in recommended care and actual care are important to address since the recommendations from the NATA position statements encourage uniform care to be given to the patients being treated.

While most ATs found the NATA position statement regarding ankle sprains to be useful and are confident in implementing its recommendations, they also reported an average of two challenges and two sources of pressure being placed on them when

treating ankle sprains. Identifying specifically where and what those challenges and pressures are, could lead to the creation of solutions clinicians can use to help offset those barriers to best practice. Pressure to return an athlete to competition was the top challenge faced by ATs, and this along with other factors outside the scope of this study, could be influencing such short RTP timelines. Coupling this challenge with coaches and student athletes being the top two sources of pressure, could also give further insight into the overall perception other stakeholders may have about treating and managing ankle sprains. This application of pressure to return athletes to play could be an unfortunate part of sport culture, as it was also found that coaches and athletes were the top two sources of pressure placed on clinicians to prematurely return athletes to play following a sport-related concussion.[18] These compounding obstacles may work against an AT's ability to adequately treat injuries when they occur. Educating those invested in a patient's recovery from an ankle sprain may be to the benefit of an AT's ability to treat. This proposed culture shift may benefit the patient's long-term joint health and overall well-being.

Patient education is not mentioned in the NATA position statement regarding ankle sprains. While this lack of acknowledgement may not be the cause of the differences in the way ATs emphasize patient care, a lack of a uniform recommendation for ATs to follow may account for the varying ways it is carried out. Educating patients that suffer an ankle sprain is an essential part of treatment. This education should in fact fit into three out of the five sections of recommendations in the position statement:

Diagnosis, Treatment and Rehabilitation, and *Special Considerations*. A patient should be informed the severity of the injury and what deficits they have. Importance should be placed on any recurring symptoms that linger and long-term consequences should be explained so they have an understanding of what they may face even after RTP[19,20].

Limitations

This study was not without limitations. Firstly, only ATs that were a part of the NATA were contacted. While this covers a large percentage of the AT population, not every AT is required to be a member. Additionally, surveys are mostly quantitative in nature and while large amount of responses are able to be collected, something as complex as perceptions and attitudes toward clinical practice and injury may warrant deeper investigation into the intricacies that go into form those beliefs.

CONCLUSION

A high percentage of ATs have a mid-level understanding of basic ankle epidemiology. Across all settings, education levels and years certified, most ATs expressed confidence in the NATA position statement and found it to be useful, but there are ATs whom are unsure or unaware of the position statement. ATs also reported challenges and pressures to effectively implementing the recommendations. These difficulties may play a role in how ankle sprains are viewed and subsequently treated. Patient education emphasis differed between groups based on settings, education levels

and years certified, which may warrant further investigation on ways to equalize the information received by patients across the field.

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Table 2.1 Descriptive statistics for education level, years certifies and job setting.

Level of Education	N	Years Certified	N	Job Setting	N
Bachelors	191	5 years & under	235	Athletic Population	506
Masters	557	6-10 years	154	General Population	129
Doctorate	30	11-15 years	99	Both Populations	65
		16-20 years	94	Other	26
		21-25 years	61		
		Over 25 years	103		

Table 2.2 Education level, years certified and job setting group differences on patient education emphasis, confidence in, and usefulness of the NATA position statement.

		Patient Education Emphasis *High 4 – 20 Low*	Confidence in the NATA Position Statement *Most 5 – 25 Least*	NATA Position Statement Usefulness *Not 1 – 5 Very*
Education Level	Bachelors	7.06±2.31†	8.04±2.88	4.03±.60
	Masters	7.48±2.41‡	7.58±2.86	3.84±.84
	Doctorate	5.56±2.65†‡	7.17±3.25	4.00±.707
	p-value	<.001⁑	.55	.44
Years Certified	5 years & under	7.28±2.20	7.47±2.27	3.94±.71
	6-10 years	7.76±2.43	8.33±3.44	4.08±.72
	11-15 years	7.50±2.23	7.82±3.38	3.56±.96
	16-20 years	7.40±2.72	8.31±2.85	3.69±.95
	21-25 years	7.69±2.68	7.00±2.87	3.69±.87
	Over 25 years	6.22±2.44⁕	6.76±2.62	4.17±.62
	p-value	<.001⁑	.28	.70
Job Setting	Athletic Population	7.47±2.36†	7.75±2.85	3.88±.75
	General Population	6.70±2.62†	7.68±3.22	3.88±1.01
	Both Populations	7.29±2.40	7.40±2.84	3.94±.73
	Other	7.18±2.40	7.20±2.44	3.80±.84
	p-value	.026⁑	.91	.98
Grand Mean±SD		7.31±2.43	7.68±2.87	3.89±

⁑ Denotes *p-values* that are statistically significant; $p < .05$.

†, ‡ Denotes groups revealed to be significantly different as per post-hoc tests.

⁕ Denotes sole group revealed to be significantly different from all other groups

Figure 2.1 Pressures reported by ATs to returning athletes with ankle sprains to play.

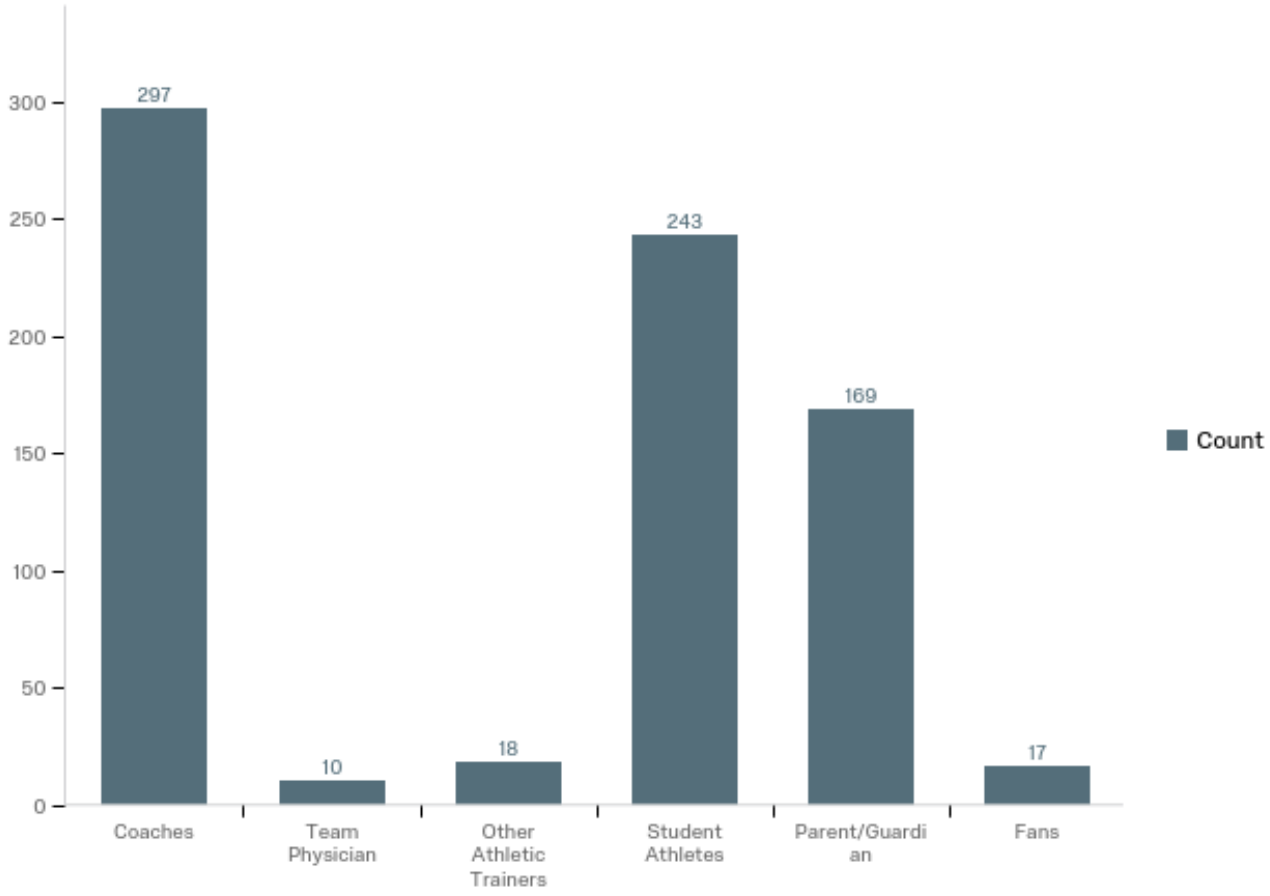
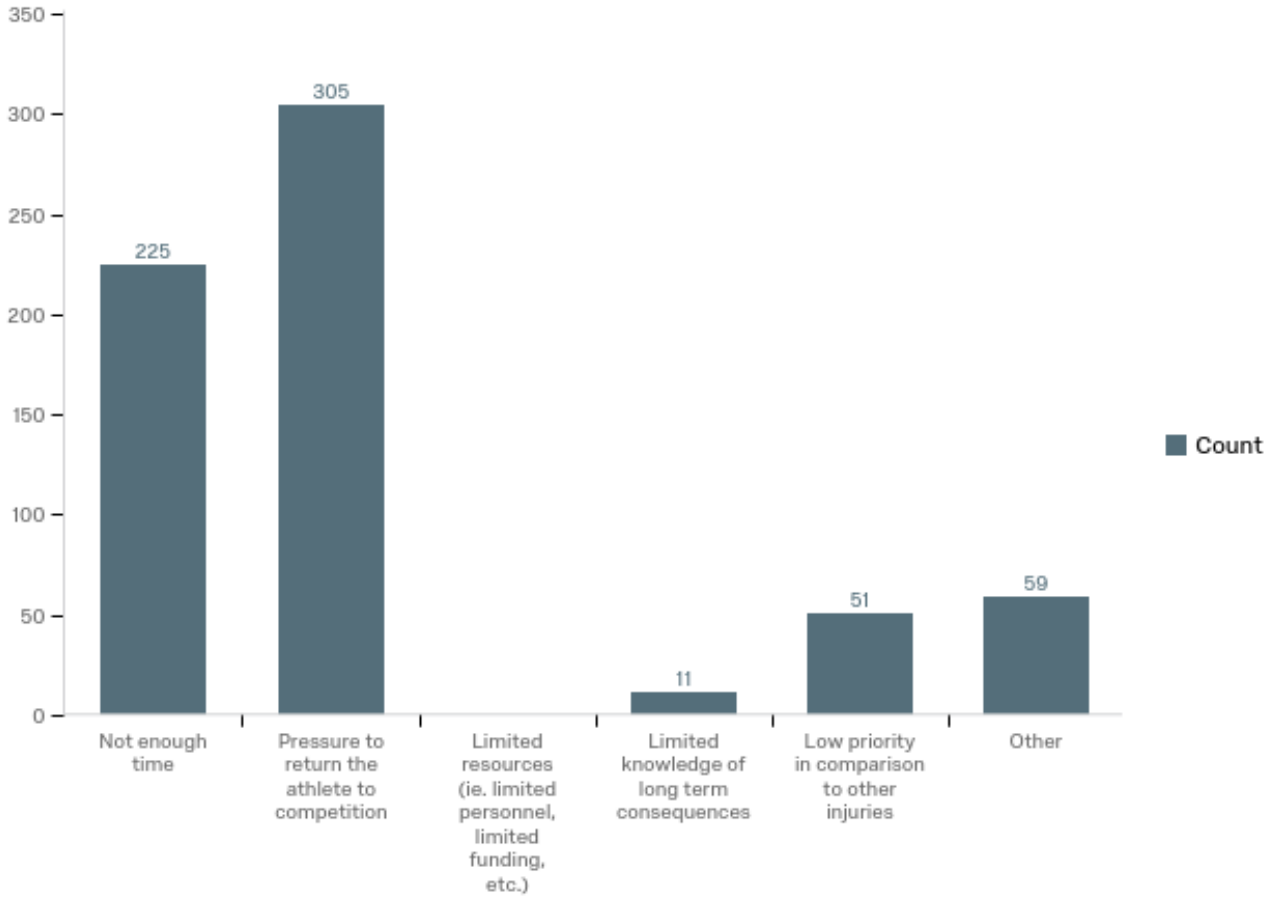


Figure 2.2 Challenges reported by ATs to implementing best practice when treating ankle sprains.



SECTION IV: MANUSCRIPT III

EVALUATING CLINICAL CARE OF ANKLE SPRAINS:

A REPORT FROM THE ATHLETIC TRAINING PRACTICE-BASED RESEARCH NETWORK

CONTEXT: Ankle sprains have a high prevalence within the athletic population. Patient-centered data can be collected and trends can be observed regarding the treatment and management of ankle sprains administered by athletic trainers (AT).

OBJECTIVE: To evaluate the current clinical practice in treating and managing ankle sprains utilizing a practice-based research network.

DESIGN: Retrospective descriptive study.

SETTING: Data collected from 209 athletic training facilities (high school=174, college=30, clinic=5) were retrospectively analyzed.

PATIENTS OR OTHER PARTICIPANTS: Two thousand one hundred and forty-four ankle sprains were recorded. Patients were an average of 16.33±2.31 years old.

INTERVENTIONS: Clinical care was administered at the discretion of the ATs who provided care to the patients.

MAIN OUTCOME MEASURES: Data regarding clinical services provided by ATs during evaluations, daily episodes of care (EOC), and at time of discharge in patients with ankle sprains were evaluated.

RESULTS: Two thousand one hundred and forty-four patient cases were identified: sprain/strain =78.5%, tibiofibular ligament sprain=15.6%, deltoid ligament sprain=5=4.3%. Of those ankle sprains reported, 69.3% of those reported as either mildly or moderately severe. Sharp (52.3%) and aching (20.5%) accounted for the pain

description most reported, and overall the top two mechanisms of injury (MOI) were twisting (37.8%) and from contact (23.2%). Athletic Trainers documented 5.2±7.2 EOC per patient case, with patients receiving on average 11.2±15.4 athletic training services over that time span. Of the most common AT services provided, 59.7% of the documented patient cases received an AT Re-evaluation, 57.32% used hot or cold packs, and 54.66% performed therapeutic exercises at least one time during their rehabilitation.

CONCLUSION: Most of the services provided were conducive to the recommendations laid out in the NATA position statement regarding ankle sprains, which were made to inform ATs clinical practices. Unique findings showed a high percentage of patients that received a re-evaluation of their injury. This new finding might shine some light on the need for reassessment through the rehabilitation of ankle sprains to improve outcomes experienced by patients following an ankle sprain.

Word Count: 329

Key Words: ankle sprains, practice-based research, clinical care

INTRODUCTION

Ankle sprains are a prevalent musculoskeletal injury within athletic populations.[1,2] Athletic trainers (ATs) play an essential role in maintaining the health and well-being of athletes. With ankle sprains occurring at high rates ATs care for patients with this injury often. Current return to play (RTP) timelines following an ankle sprain average from a same day return to up to seven days. [3,4] Sixty-five percent of the athletic training facility visits for ankle sprains occurring in high school athletics and 44% of the ankle sprains in college athletics are non-time loss (NTL) ankle sprain.[2,5] indicating that an athlete's RTP occurred within 24 hours of reporting the injury. Ankle sprain documentation not only tracks the progress of the ankle sprain, but when this documentation is linked to an electronic medical record system it also serves as a way to retrospectively evaluate is the interventions that are typically performed when an ankle sprain is treated.

Practice-based research allows for an evaluation of clinical practice and helps to fuel evidence-based practice within the athletic training profession.[6] A variety of practice sites and different clinical settings can be used to characterize injuries, and athletic training services can be collected as part of normal clinical practice.[6–9] Problems that may exist in clinical practice can be identified using practice-based research networks. The process of care can be studied, the way conditions are diagnosed to the ways in which they are treated.[10] Data collected throughout the duration of an injury can be gathered together to show what clinicians are collectively doing when treating an ankle sprain.

Trends in treatment provided can be measured and their effectiveness and sustainability can be assessed. Previous studies utilizing a practice-based research approach found ankle injuries to be the most prevalent injury reported in secondary and collegiate school athletics, with a variety of athletic training services used to provide care.[2,5,8,9] Although therapeutic activities or exercise has been primarily provided when treating ankle sprains,[5] which is a recommendation support by the literature,[11] manual therapy, which is also supported by research, was not reported as being frequently provided.[11] A continual evaluation of clinical practice will allow any disconnect between recommended care and actual care can be evaluated and solutions can be designed to reduce the gap.[10,12] With known recommendations for ATs to use when treating and managing ankle sprains, data collected in practice based research networks can be compared to identify gaps.

The National Athletic Trainers' Association published a thirty-seven recommendation position statement in 2013 to inform the treatment and management practices ATCs employ when caring for an ankle sprain.[11]The International Ankle Consortium also has an eight recommendation consensus statement to encourage the prevention and management of lateral ankle sprains.[13] As ankle sprains remain a commonly occurring injury, especially in athletics, it is important to continually evaluate the current trends in treatment to consider ways to update recommendations used to guide clinical decisions. Ankle sprains continue to show negative outcomes in the form of high recurrence rates, development of chronic ankle instability, and lingering symptoms.[14–16] Identifying what treatment is being provided to patients with ankle sprains may provide

insight into how less than ideal outcomes are being experienced following an ankle sprain being sustained. Therefore, the purpose of this study was to evaluate the current clinical practice in treating and managing ankle sprains by ATs utilizing the Athletic Training Practice-Based Research Network.

METHODS

Clinicians

A total of 227 ATs practicing at 209 clinical practice sites (high school = 174, college = 30, clinic = 5) between September 2009 and September 2018 were included during the study period within the Athletic Training Practice-Based Research Network (ATPBRN).[8] Most athletic trainers were female (59.9%) and, on average, were 28.5±7.2 years old, certified for 4.0±5.2 years, and employed at their current site for 1.3±3.3 years.

Patients

Patients who were diagnosed with an ICD-9 diagnosis code for ankle sprain (845.0: Sprain/Strain, 845.01: Deltoid Ligament Sprain, 845.03: Tibiofibular Ligament Sprain), between September 2009 and September 2018 were included in this report. Although the anterior talofibular ligament is the most commonly injured ligaments in ankle sprains[1,17], there is not a corresponding ICD-9 code, therefore the code for ankle sprain/strain (845.01) gets commonly used. All patients were under the care of an AT within the AT-PBRN. Patients were diagnosed with an ankle sprain by an AT or

team/directing physician. The A.T. Still University Institutional Review Board exempted the study because the study was a retrospective analysis of de-identified patient records. The study was also approved as being exempt by the University of Virginia Institutional Review Board (IRB).

Instruments

All data were collected using a web-based electronic medical record system (CORE-AT EMR) by an athletic trainer within the AT-PBRN. Clinicians using the CORE-AT EMR were trained to increase data consistency and quality. CORE-AT EMR training have been previously reported in detail.[6] Clinicians within the AT-PRBN use the EMR as a routine documentation system to record initial injury evaluations, daily treatment notes, injury reevaluations, and discharge summaries.

STATISTICAL ANALYSIS

Data Processing

Descriptive statistics were computed for diagnosis, injury characteristics, episodes of care (EOC) per case and AT services provided. The EMR system utilizes ICD-9-CM diagnosis codes for conditions that are commonly seen by athletic trainers.[6] In addition to the ICD-9-CM codes, American Medical Association Current Procedural Terminology (CPT)17 codes for athletic trainer evaluation and reevaluation (CPT codes 9005 and 9006, respectively) and for physical medicine and rehabilitation treatment codes used by

AT are integrated in the documentation system to optimize data acquisition making it easier for ATs to use.[6]

RESULTS

Two thousand one hundred and forty-four ankle sprain patient cases were identified: sprain/strain =79.8%, tibiofibular ligament sprain=15.8%, deltoid ligament sprain=5=4.4%. Nine hundred and eighty-four (46%) of those documented ankle sprains were coded as having an evaluation CPT code with an average of 2.24±.99 athletic training services provided at the time of evaluation. The top two services provided following the AT evaluation itself were hot or cold packs and strapping-ankle and/or foot (Table 3.1). Eight hundred and seventy-five (41%) of the reported ankle sprains were coded as having a discharge evaluation with an average of 1.18±.53 athletic training services provided. The top two services provided at time of discharge were AT re-evaluation, and strapping-ankle and/or foot. Six hundred and thirteen of the patient cases (%) had both an evaluation and discharge note (Figure 3.1).

Of the 2,144 ankle sprains documented, 3.3% were documented as severe, 36.6% as moderate, and 60.2% as mild. Athletes reported a score of 4.83±2.29 out of ten on a pain scale upon initial injury documentation, with a zero meaning no pain felt and a ten being the most pain felt relative to their pain tolerance. “Sharp” (52.3%) and “aching” (20.5%) were the most commonly reported pain descriptors (Table 3.2). The top two mechanisms of injury (MOI) were twisting (37.8%) and from contact (23.2%), with the

remaining 39% stemming from other mechanisms (Table 3.3). Approximately 40% of the ankle sprains documented occurred during an in-season practice and 36% occurred during an in-season game with the remaining sprains occurring during other activities (Table 3.4).

Athletic trainers documented 5.2±7.2 EOC per patient case, with 591 (27.57%) of the patient cases receiving the mode amount of one EOC, the median being three EOC (IQR: 1 to 6). Patients received on average 11.2±15.4 athletic training services over their total recorded EOC, with the mode amount for 263 (12.27) patient cases being two, the median being six athletic training services provided over their duration of care (IQR: 3 to 10). The three athletic training services (Table 3.1) documented as being provided the most were therapeutic exercise (18.5% of all services provided), hot or cold packs (16.1%), and therapeutic activities (13.9%). Concurrently, 59.7% of patient cases were documented as receiving and AT Re-evaluation, 57.32% using hot or cold packs, and 54.66% performing therapeutic exercises at least one time during their rehabilitation. Only 17% of patients received manual therapy at least one time during their rehabilitation.

DISCUSSION

The NATA has a set of guidelines to inform documentation and coding within the profession.[18] Documentation of patient treatment is regarded as necessary and required for each EOC, and is even considered to be the practice standard by many states

regulatory organizations.[18] Although documentation is seen as necessary, when asked for conditions identified to warrant injury documentation, ATs listed injury severity, injuries requiring follow-up, time loss injuries, and the need for a referral as reasons why they would document injury treatment.[19] Some of these criterion may be some of the reasons as to why so many within this study did not have a discharge plan entered; a lack of motive to document the injury further. While this does not account for patient compliance, it may be part of why inconsistencies are observed. While guidelines exist to inform documentation practices, a lack in standardized practices was reported by ATs as to why inconsistencies occurred in clinical practice.[20] A need to improve education of how documentation is to be conducted was also expressed by ATs as ways to improve consistency.[20] These proposed improvements could allow for a better assessment of clinical care provided, Which could properly identify gaps in actual care and recommendations made to inform clinical care.

While the top service provided coincides with the top service provided in a recent study[5] (therapeutic exercise), there were some differences seen with the recommendations given in the NATA position statement. For instance, manual therapy only accounted for 3.9% of all of the services provided, and was provided to about 17% of the patient cases an average of three times during their rehabilitation. Manual therapy consisting of joint mobilization is recommended to be performed to increase ankle dorsiflexion and improve function[11] and is categorized within the position statement to be a *B* strength level, which means it is supported by lower levels of evidence according to

the strength definitions.[11] This demonstrates a difference in recommended care and actual care provided and manual therapy is similarly shown to be underutilized in athletic training facilities as in previous research.[5] In contrast 52% of patients receiving care for an ankle sprain in physical therapy clinics received manual therapy.[21] On par with the results of this study patients receiving care for an ankle sprain in a physical therapy clinic, therapeutic exercise[21] was provided to majority of patients, although the percentage of patients was higher in the clinic setting. This difference in services provided could possibly speak to setting differences, with the sites in this study being athletic training facilities.

Also, within the top ten overall services provided it is shown that the rest, ice, compression and elevation (RICE) treatment method was used to treat the patient cases through the use of hot or cold packs, electrical stimulation, vasopneumatic devices, and whirlpool. While the services were provided in large volumes, only hot or cold packs were provided to majority of the patient cases treated (57.32%). Twenty percent of patient cases received electrical stimulation, which is a higher percentage seen in previous research regarding its use in clinical care.[5] Electrical stimulation is regarded as a *C* strength level in the NATA position statement regarding ankle sprain, which means it is considered usual care performed by clinicians.[11] In contrast to past research evaluating athletic training services provided following an ankle sprain[5], all four treatments accounted for higher percentages of patients receiving those treatments. RICE is the universally accepted gold standard by ATs immediately after a patient sustains an acute

ankle sprain to minimize symptoms of swelling, and pain, and recommendations in the NATA position statement regarding ankle sprain support its usages.[11,22–24]

A unique finding of this study was the 60% of patients that received a re-evaluation of their injury. This finding is also different from previous research that showed 10% of patient cases received either an AT evaluation or re-evaluation.[5] While re-evaluation is not explicitly mentioned in the NATA position statement regarding ankle sprains, it has been noted that clinicians assess an athletes range of motion, perform special tests and palpate and observe a patient's injury site to evaluate structures injured by the ankle sprain.[11,13] ATs treating ankle sprains within the sites of this study were taking the time to reevaluate their athlete's injury. While outside the scope of this study, examining the role a reevaluation plays in the rehabilitation process particular to ankle sprains could provide insight into how patients are cleared to play.

The results of this study showed that the services provided by ATs to athletes following an ankle sprain are supported by the recommendations of the NATA position statement about treating and managing ankle sprains.[11] ATs might want to consider utilizing more aspects of the gold standard of RICE to facilitate better outcomes It is important to consider the need to increase the use of manual therapy[11] (supported by *B* strength level evidence), and functional performance testing[11] (supported by *B* strength level evidence) which was not even in the top ten services provided.

Limitations

The data utilized for this study relied on previously collected treatment information. Although the ATCs using the CORE-AT EMR were trained on how to use the system there could be human error and variance in how data was entered, with some information not being entered at all. Unfortunately, due to the scope of system used and the data collected, additional concerns like patient compliance were not tracked and cannot be used in the analysis of data. Future research needs to investigate the spread and timing of treatment, and factors that might impact how treatment is conducted.

CONCLUSION

An array of AT services was used to treat ankle sprains. Much of the services provided were conducive to the recommendations made to inform ATs clinical practices. Unique to this study was the high percentage of patients that received a re-evaluation of their injury. This new finding might elucidate the need for reassessment through the rehabilitation of ankle sprains to improve outcomes experienced by patients following an ankle sprain.

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Figure 3.1 Results of patient cases

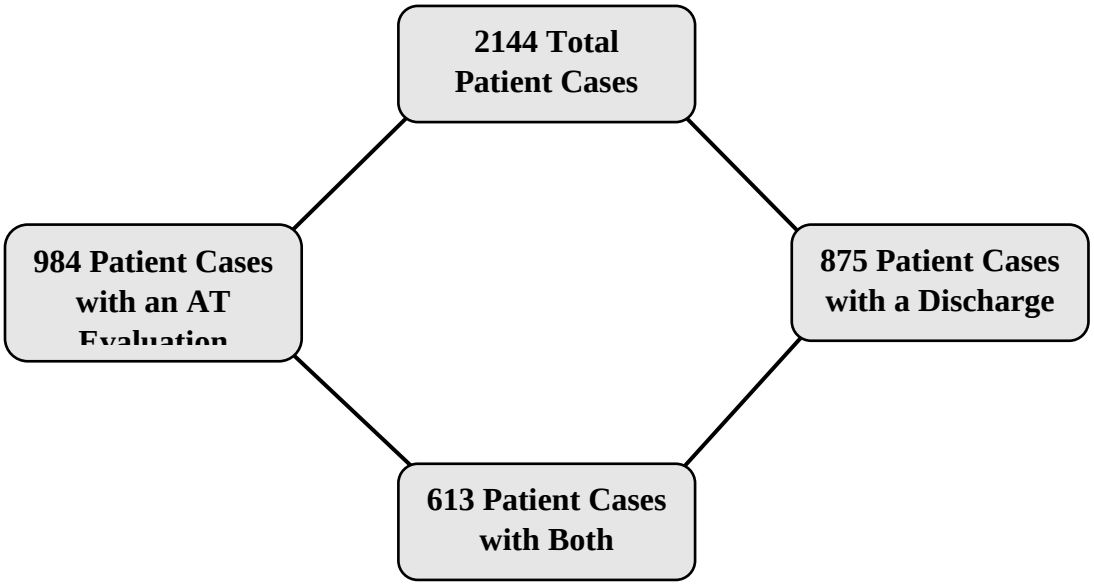

Table 3.1 Top Ten Athletic Training Services Provided

Athletic Training Services Provided	Frequency *(% of all treatments provided)*	Percentage of Patient Cases Receiving This Service	Number of Times the Service Provided Per Patient Case *(Mean±SD)*
97110 - Therapeutic Exercise	4443 *(18.5)*	55.66	3.79±4.49
97010 - Hot or Cold Packs	3871 *(16.1)*	57.32	3.15±3.81
97530 - Therapeutic Activities	3337 *(13.9)*	33.58	4.63±6.10
29540 - Strapping - Ankle and/or Foot	2988 *(12.4)*	44.96	3.10±3.84
97006 - Athletic Trainer Re-Evaluation	2630 *(10.9)*	59.70	2.50±3.00
97014 - Electrical Stimulation	1450 *(6.0)*	19.82	3.41±3.50
97022 - Whirlpool	1222 *(5.1)*	15.76	3.62±4.27
97016 - Vasopneumatic Devices	996 *(4.1)*	13.20	3.52±3.53
97140 - Manual Therapy Techniques	936 *(3.9)*	17.07	2.56±2.33
97124 – Massage	713 *(3.0)*	15.07	2.21±2.31

Table 3.2 Pain Description

Descriptor	Number of Patients Reporting
Sharp	1121
Ache	440
Throbbing	383
Dull	114
No Pain	29
Burn	20
Not Reported	37
Total	2144

Table 3.3 Mechanism of Injury

Mechanisms	Number of Patients Presenting
Twisting	811
Contact	498
Fall	402
Non-Contact	327
Insidious Onset (unknown)	69
Fall From Height	1
Ruck March	1
Not Reported	35
Total	2144

Table 3.4 Time ankle sprains were sustained.

Timepoint	Number of Patients Injured
In Season Practice	853
In Season Game	771
Non-Sports Related	172
Off Season Practice	93
Pre-Season Conditioning	57
Pre-Season Scrimmage	49
Off Season Conditioning	36
Sports Activity	30
Post-Season Game	20
Post-Season Practice	11
PT (Physical Training)	9
Non-ROTC Related	4
Pre-Season Weights	2
Non-traditional ROTC-PT	1
Off Season Weights	1
Not Reported	35
Total	2144

SECTION III: APPENDICES

APPENDIX A

THE PROBLEM

STATEMENT OF THE PROBLEM

Ankle Sprains are one of the most prevalent injuries among college athletes[1,3,52,53,54]. With 40% of those suffering an ankle sprain shown to develop chronic ankle instability (CAI)[55], a large number of college athletes have the potential to suffer impairments long after their athletic career is over. The current literature shows that student athletes being treated for ankle sprains are returning to play within one to seven days of their injury[2,26], while improvements in mechanical instability do not begin to be seen until anywhere from six weeks to three months after injury[27]. Certified Athletic Trainers (ATC) serve as athletes' first line of defense when injuries occur. Currently ATCs have guidelines laid out in the position statement disseminated by the National Athletic Trainers Association. Even with the 37 recommendations on how to treat and manage ankle sprains, short return to play timelines may be indicative that the importance of properly treating this injury is being overlooked by the high demands that athletic competition brings. Within the position statement, patient education was not mentioned at all, which leaves it up to clinicians to administer per their discretion. This oversight may affect the way athletes who suffer an ankle sprain interpret their injury and its severity. It is theorized that the development of CAI stems from an ankle sprain being thought of,

and treated as an innocuous injury[29] that will resolve on its own. Rest, ice, compression, and elevation (RICE) are currently the universally accepted gold standard for ATCs when treating an ankle sprain[4]. This sequence of treatment only addresses the acute phase of injury following an ankle sprain, and could take away from the overall perception of the injury as one deserving of extended rehabilitation.

In order to gauge the impact of how our athletes are being currently treated on their understanding of their injury, it is important to survey our patients to record their current perceptions of ankle sprains. There is currently a void in the literature in regard to how college student-athletes and ATCs view ankle sprains. Our study provides insight into what patient education looks like in a population where ankle sprains are suffered at a high rate. This study was the first step in evaluating current treatment and management practices and their impact on the overall perception of ankle sprains in college student-athletes and Certified Athletic Trainers.

RESEARCH QUESTIONS

MANUSCRIPT 1

1. Are Student Athletes aware of the long-term consequences that can possibly occur from suffering an ankle sprain?

2. Are there negative perceptions and behavioral patterns that can be identified within the student-athlete population specific to treating and managing ankle sprains?

MANUSCRIPT 2

3. Are Athletic Trainers aware of the current position statement? Is there enough consistent information available for Athletic Trainers to make sound clinical decisions in treating and managing ankle sprains?

4. Are Athletic Trainers putting an emphasis on educating their patients of the seriousness of their injury and its long-term sequela?

5. Are there barriers to implementation of effective treatment and management procedures?

6. What resources are available for Athletic Trainers to treat ankle sprains?

MANUSCRIPT 3

7. What differences in Athletic Training services provided in different settings exist for complete and incomplete cases of ankle sprains?

8. What does current clinical practice, regarding treatment and management of ankle sprains look like among various Athletic Training settings?

EXPERIMENTAL HYPOTHESIS

MANUSCRIPT 1

1. Athletes will show high incidence of previous ankle sprains, but a low understanding of the treatment, management and long-term consequences when an ankle sprain is sustained.

2. Athletes will exhibit the perception that ankle sprains are innocuous injuries that will resolve on their own, and are not as important when compared to other injuries.

MANUSCRIPT 2

3. Athletic Trainers will have high levels of understanding of the epidemiology of ankle sprains and current treatment recommendations.

4. Athletic Trainers will have low usage of PROMs and place a low emphasis on patient education practices.

5. Athletic Trainers will have high amounts of barriers to implementing best clinical practice.

6. Athletic Trainers will report a deficit in resources, that affect the way they implement treatment and management practices for ankle sprains.

MANUSCRIPT 3

7. There will be more incomplete cases of ankle sprains reported in the Athletic Training Practice Based Network.

8. There will be more Athletic Training services provided in the College setting for ankle sprains treated. There will be more ankle sprains sustained during competition as well as during their athletes' competitive season.

ASSUMPTIONS

- All participants will be honest when completing the survey questions.
- All data entered into the Athletic Training Practice Based Network is real injury data.

DELIMITATIONS

- Participants were not required to answer every question on the surveys.
- Participants taking the survey regarding ATCs' perception of treating and managing ankle sprains were limited to NATA members.
- Data regarding actual treatment and management of ankle sprains were limited to the injuries collected on the Athletic Training Problem Based Network.

LIMITATIONS

Aside from the widely used valid and reliable questionnaires used, we did not test for the validity of the questions within the surveys disseminated.

SIGNIFICANCE OF THE STUDY

Ankle sprains are an injury that happen often but unfortunately are underrated by many as important enough to seek and provide treatment. By evaluating the perceptions held by the two major stakeholders involved; the clinician and the patient, we can identify breakdowns and highlight areas in need of improvement. Patient values can be evaluated, clinicians can critique the body of evidence used to steer their clinical practices, and insight can be provided into what is actually being done when ankle sprains are seen in athletic training facilities. This study is taking the three parts that

make up evidence-based practice and are using those parts to identify ways to improve how ankle sprains are viewed, treated and managed.

APPENDIX B

LITERATURE REVIEW

The purpose of this literature review is to report current and relevant epidemiology of lateral ankle sprains and how that impacts the student athlete population. The development of chronic ankle instability (CAI) will be explained. The National Athletic Trainers Association's (NATA) position statement regarding the treatment and management of ankle sprains will be summarized and evaluated based on its strengths and room for improvement. This literature review will also provide an overview of the current clinical paradigm that exists with regard to how ankle sprains are perceived by patients and clinicians and how that perception affects how treatment is sought and provided.

EPIDEMIOLOGY OF LATERAL ANKLE SPRAINS & DEVELOPMENT OF CAI

Ankle sprains are one of the most common musculoskeletal injury in active individuals.[1,2,23] Ankle sprains, regardless of the ligaments involved, account for about 15% of all injuries reported in college athletes.[1] Although ankle sprains are prevalent, they are often thought of as a mild and harmless injury that will resolve over time with little to no treatment.[18,43] This perception is proven to be false by the long-term consequences suffered by those who have sustained an ankle sprain at any given point in their lives.[11]

Lateral ligaments of the ankle complex generally incur most of the injury sustained when a person sprains their ankle.[13,45] Lateral ankle sprains (LAS) are the most commonly documented injury in the United States among college student-athletes.[3] LAS are the most common injury diagnosis reported in 12 of 25 National Collegiate Athletic

Association (NCAA) sanctioned sports, and ranked in the top five for nine additional NCAA sports.[3] Approximately 80% of college student athletes are returned to play (RTP) within seven days of a LAS, with non-time loss (NTL) injuries making up 44.4% of the LAS reported.[3] NTL injuries are when an injury sustained limits an athlete's ability to play for less than 24 hours.[3] Athletes sustaining a NTL injury who are returning to play quickly might not be receiving adequate treatment. The rest, ice, compression, and elevation approach is the accepted gold standard for treating ankle sprains.[4] This is the treatment of choice for the first five days following injury, to reduce pain and swelling. Athletes returning the same day as the injury might not experience the lasting effects of even the simplest of treatments. About 11 to 16% of LAS sufferers are experiencing recurrent sprains.[13,3,56] Those suffering recurrent ankle sprains might be at an elevated risk for long-term consequences or functional insufficiencies.[57] On average one-third to two thirds of those whom suffered an ankle sprain will report experiencing residual symptoms at least six months following their ankle sprain.[11,12] It has been shown that 19% of college student-athletes are currently participating while suffering from lingering conditions like chronic ankle instability (CAI)[44], CAI has a known possibility of occurrence following an initial LAS.[55]

In the general population, CAI has a 40% chance in developing at one year following initial LAS.[55] Coupling this probability of development with the high LAS prevalence rate within the athletic population, a fair number of athletes are at risk of developing or suffering from CAI. This also means there is a subset of athletes that are

playing with sensorimotor deficits.[64] CAI is characterized by these deficits which include episodes of ‘‘giving way,’’ pain, swelling, recurrent sprain, and decreased function.[58] While it is not documented the role these deficits have in an athlete’s ability to play to the best of their ability the deficits can affect their overall quality of life.[59,65] Those that go on to develop CAI have shown decreases in their health-related quality of life and have higher levels of kinesiophobia.[59,60] While these unfortunate consequences have been documented to occur, ankle sprains are thought of as innocuous injuries that will resolve on their own.[43] This perception of ankle sprains as mild and harmless injuries that do not require treatment to support the healing process is one of the theories as to how CAI develops.[43] It is important that best practices are implemented as a way of addressing this highly prevalent injury and its long lasting consequences. Assessing if this perception is persistent among Athletic Trainers and student-athletes could give more insight into the current reality of this injury and how it is treated.

NATA Position Statement on treatment & management of ankle sprains

In 2013 the NATA published a position statement[4] that outlined recommendations for Athletic Trainers (ATC) to utilize when treating and managing patients with lateral ankle sprains. The position statement includes 37 recommendations that are broken up into five sections: diagnosis, treatment and rehabilitation, RTP considerations, prevention, and special considerations. The recommendations within this statement were created using the relevant peer-reviewed evidence. Each recommendation was given a

strength level that coincides with the Strength of Recommendation Taxonomy (SORT) grading scale[61] while accounting for consistency among the evidence available. Recommendations were categorized as having a strength level of either A, B or C, with A being the based on consistent and good quality patient-oriented evidence.[4] Out of the 37 recommendations presented only five of them were ranked at an A strength level. Most of the recommendations (19 of 37) within the position statement were ranked at a C strength level which were based on consensus, usual practice, opinion, case series, or disease-oriented evidence. With the majority of the recommendations not being based on consistent, good quality patient centered evidence, it may be beneficial to evaluate the perceptions and attitudes clinicians have toward the position statement and how they believe it impacts the way care is provided.

With ankle sprains occurring at high rates, and CAI being a known risk for those whom suffer an ankle sprain, the implications on treatment provided are particular to how the injury and the patient present to the clinician. Every injury is different based on the possibilities of circumstances that exist prior to and at the time of injury, such as previous medical history, mechanism of injury or injury severity, including recurrent ankle sprains and CAI. Deficiencies particular to the injury presented need to be identified and addressed accordingly.[4] The position statement has recommendations that not only focus on assessing a patient's previous injury history, but also lays out special considerations regarding treating and managing patients that are known to have CAI and also suggests the usage of patient reported outcome measures (PROMs) to evaluate lingering

symptoms and long term consequences that may exist having suffered an ankle sprain. Aside from the known risk of CAI, up to two thirds of those whom sustain an ankle sprain will still report at least one of the following symptoms at least six months post injury such as pain, swelling, weakness or instability.[11,12]More specific to the athletic population, college student-athletes with a history of ankle sprain exhibit higher levels of injury-related fear compared to their healthy counterparts, even have been RTP and considered "healed".[60] It is important to also consider the implications ankle sprains and their long term consequences have on patients and how they should be properly educated to facilitate their role in seeking care following an ankle sprain.

Patient education is an essential part of the rehabilitation process. With the long-term consequences following an ankle sprain having a high chance of happening, it is important to educate patients throughout the recovery process. The current injury the patient is suffering from should be reviewed and the deficits suffered should be explained. Goal setting is a part of the rehabilitation process and creating these goals within the context of the impairments observed can help to put into perspective what can be expected during the course of rehabilitation.[62] For patients shown to have recurring symptoms and those with CAI should have continual treatment provided to address their ongoing impairments.[35,65] In order for this to happen with patient compliance, patients should be educated on what they can possibly expect. While patient education is an important part of the rehabilitation process[62,66], it is not mentioned at all in the NATA position statement regarding the treatment and management of ankle sprains. A lack of

standardized recommendations on how to disseminate patient education leaves it up to ATCs to decide if and how to educate their patients about their injury and its consequences. This omission could present a negative impact on patient education regarding ankle sprains, which could have a negative impact on the way ankle sprains are viewed in general.

CURRENT CLINICAL PARADIGM

As access to healthcare related information increases with the advent of telemedicine, individuals with musculoskeletal injury everywhere are able to search online for ways to address their symptoms without the use of healthcare professionals. This increase in access to information, coupled with the known perception of ankle sprains as innocuous injuries[43], may help to explain the current clinical paradigm that exists for the treatment and management of ankle sprain. Due to the nature of athletics, injury is inevitable, leaving ATCs with a continual clinical burden. Ankle sprains' high prevalence increase that burden without underestimating that of other injuries.

When thinking of ankle sprains in isolation, the current RTP timelines do not align with the ligament healing process. Initial healing of the lateral ligaments can take six to twelve weeks to occur, where the inflammatory response has been addressed and the injured ligaments can begin to support the loads place on it during activity.[27] The length of the healing process is longer than the one to seven days RTP timelines are currently. A systematic review regarding ankle ligament healing following an ankle

sprain performed in 2008 revealed ankle laxity improved between six weeks to one year following an ankle sprain.[27] The review of data also reported three to 31% of participants presented with a positive anterior drawer test six months after injury.[27] Structural impairments suffered by the ligaments involved in an ankle sprain also cause the mechanoreceptors of those ligaments to be negatively affected.[67] Injury to the mechanoreceptors due to ligament injury can cause postural control deficits at least 21 days after a LAS.[68] These deficits can have negative effects on an athlete's function[68] if they are RTP during current RTP timelines. Returning athletes to play the same day to upwards of seven days may also account for residual symptoms and the recurrence rates seen in ankle sprains due to limited time given to the healing process.[11]

It has been observed within the high school athletic population that 65% of the Athletic Training Facility (ATF) visits for ankle sprains are for NTL ankle sprains.[36] On average NTL ankle sprains resulted in about half of the athletic training facility visits seen by those whom sat out due to their ankle sprain.[36] This shows that those athletes being RTP same day accounted for most of the ATF visits for ankle sprains and received the less care. Athletes with a time loss ankle sprains were also shown to receive an average of 35 total AT services, while those with a non-time loss ankle sprain received 19 total AT services. While returning the athlete to play may be beneficial to the athletic success of the athlete and team at large, athletes being RTP quickly may be prolonging their healing by not having their impairments addressed properly, especially those sustaining NTL ankle sprains. These quick RTP timelines could possibly also negatively

impact the perception of ankle sprains as insignificant injuries. Following initial RTP, athletes should be allowed time for recovery confirmation to occur. Recovery confirmation is when athletes consider how their initial RTP from injury has gone to develop the belief that rehabilitation was successful.[8,9] This confirmation is facilitated by testing the proposed healed area.[8,9] Functional or physical performance testing accounted for around one percent of the athletic training services provided following an ankle sprain.[36] By not testing the healed area, athletes are being deprived of the second stage of the physical and psychological stages that go into returning and athlete to sport. In fact, athletes are skipping the middle three stages that go into effectively returning an athlete to sport and combining the first stage of initial return with the last stage of return to competition.[8,9] This omission and combining of stages may account for some for the injury-related fear athletes exhibit even after RTP.[60] Without changes being made to the current clinical paradigm suboptimal outcomes may threatened the overall quality of life these athletes face.[59,65,69] Clinical practice needs to be reflective of healing process, while accounting for the fast pace of athletics. Patients should be informed of what they can possibly expect from suffering an ankle sprain and encouraged to participate in the rehabilitation process, starting with seeking care following their injury.

CONCLUSION

Perception matters greatly when it comes to the treatment and management of ankle sprains. Ankle sprains have continually been documented as an undertreated trivial

injury that will resolve itself. This negative perception could be influenced by current clinical practices, as well as how patients are educated about their ankle sprain and the consequences. An updated evaluation of evidence might be needed to adequately inform clinical practice. Recommendations supported by the most current and relevant evidence could provide ATCs with additional insight on how to handle situations particular to ankle sprains within the athletic population. Athletics present a unique set of barriers and challenges to positively shifting this paradigm in favor of patient centered care. Evaluation of the overall perception of ankle sprains by both the clinicians and the patients they serve could be beneficial is initiating that shift.

APPENDIX C

ADDITIONAL METHODS

Evaluating Current Clinical Care of Ankle Sprains Survey

Start of Block: Default Question Block

Please read the following agreement carefully before you decide to participate in this study.

The purpose of this study is to gauge the current perceptions surrounding ankle sprains within the profession of Athletic Training. The following survey includes questions regarding the treatment, management and long-term consequences associated with ankle sprains. Your participation is completely voluntarily and answers are collected anonymously. You may refuse to take part in this survey. You may also skip any question that makes you feel uncomfortable or that you do not wish to answer. There are no anticipated risks in this study.

Your survey answers will be sent to a link at Qualtrics.com, where data will be stored in a password protected electronic format. Qualtrics.com does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. Your data will be anonymous which means that your name will not be collected or linked to the data. Because of the nature of the data, it may be possible for the researchers to deduce your identity; however, there will be no attempt to do so and your data will be reported in a way that will not identify you. Since the data collected are anonymous, you cannot withdraw after you submit your data.

You will receive no payment for participating in the study. The study will require about 15-25 minutes of your time. **You may print a copy of this page for your records.** ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. Clicking on the "Agree" button indicates that You have read the above information You voluntarily agree to participate You are 18 years of age or older UVA SBS-IRB #2017-0554-00.

If you have questions about the study, contact: Revay O. Corbett; 434-924-6184, roc2ab@virginia.edu**.**

If you have questions about your rights in the study, contact:
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Charlottesville, VA 22908-0392
Telephone: (434) 924-5999
Email: irbsbshelp@virginia.edu
Website: www.virginia.edu/vpr/irb/sbs
Reference IRB-SBS Study #2017-0554-00

- ○ Agree (1)
- ○ Disagree (2)

Skip To: End of Survey If Please read the following agreement carefully before you decide to participate in this study. The... = Disagree

Page Break

What is your highest level of education completed?

- ○ Bachelors (1)
- ○ Masters (2)
- ○ Doctorate (3)

What is your ethnicity?

- ○ American Indian/ Alaskan Native (1)
- ○ Asian (2)
- ○ Black (Not of Hispanic/Latino Origin) (3)
- ○ Hispanic/ Latino (4)
- ○ Multi- Ethnic (5)
- ○ Other (6)
- ○ White (Not of Hispanic/Latino Origin) (7)

What other credentials do you have other than ATC?

- [ ] DPT (1)
- [ ] MPT (2)
- [ ] CSCS (3)
- [ ] PA (4)
- [ ] Other (5) _____

What year were you certified as an Athletic Trainer?

▼ 2017 (1) ... 1989 (29)

Are you currently working in a setting with a patient population?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Are you currently working in a setting with a patient population? = No

What is your current work setting?

- ☐ College-Division I (1)
- ☐ College-Division II (2)
- ☐ College-Division III (3)
- ☐ High School (4)
- ☐ Professional (5)
- ☐ Military (6)
- ☐ Physical Therapy Clinic (7)
- ☐ Industrial (8)
- ☐ Hospital (9)
- ☐ Other (10) _____

Display This Question:

If What is your current work setting? = College-Division I

Or What is your current work setting? = College-Division II

Or What is your current work setting? = College-Division III

Or What is your current work setting? = High School

Or What is your current work setting? = Professional

Or What is your current work setting? = Physical Therapy Clinic

Or What is your current work setting? = Other

What sport(s) are you currently supervising? Check all that apply.

- [ ] Basketball (1)
- [ ] Baseball (2)
- [ ] Beach Volleyball (3)
- [ ] Bowling (4)
- [ ] Cross Country (5)
- [ ] Fencing (6)
- [ ] Field Hockey (7)
- [ ] Football (8)
- [ ] Golf (9)
- [ ] Gymnastics (10)
- [ ] Ice Hockey (11)
- [ ] Lacrosse (12)
- [ ] Rifle (13)
- [ ] Rowing (14)

- [ ] Skiing (15)
- [ ] Soccer (16)
- [ ] Softball (17)
- [ ] Swimming & Diving (18)
- [ ] Tennis (19)
- [ ] Track & Field (20)
- [ ] Volleyball (21)
- [ ] Water Polo (22)
- [ ] Wrestling (23)

How many athletes or patients are you responsible for?

- ○ 0-50 (1)
- ○ 51-150 (2)
- ○ 151-300 (3)
- ○ 301-500 (4)
- ○ 501-700 (5)
- ○ 701-900 (6)
- ○ over 900 (7)

Page Break

Ankle sprains are the most common injury in college athletics.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

Ankle sprains are a common musculoskeletal injury.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

Athletes typically return to play after an ankle sprain, during which of the following time frames?

- ○ Less than 24 hours (1)
- ○ 1-6 days (2)
- ○ 7-21 days (3)
- ○ More than 21 days (4)

How long do you believe a typical ankle sprain should take to heal?

- ○ 1-7 days (1)
- ○ 1-2 weeks (2)
- ○ 2-4 weeks (3)
- ○ 4-6 weeks (4)
- ○ >6 weeks (5)

How long does the acute inflammatory phase of the healing process typically last?

- ○ 1-2 days (1)
- ○ 3-7 days (2)
- ○ 2-3 weeks (3)
- ○ 4 or more weeks (4)

RICE is currently the best practice by ATCs and other health care professionals following an ankle sprain.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

Having a history of an ankle sprain increases your chances of suffering another ankle sprain.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

What are the chances of developing chronic ankle instability after suffering an initial ankle sprain.

- ○ 25% (1)
- ○ 40% (2)
- ○ 65% (3)
- ○ 80% (4)

Suffering repeated ankle sprains may increase the risk of developing ankle osteoarthritis.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

How often do you provide patient education to your injured patients regarding treating and managing their ankle sprain?

- ○ Always (1)
- ○ Most of the time (2)
- ○ About half the time (3)
- ○ Sometimes (4)
- ○ Rarely (5)
- ○ Never (6)

How do you provide patient education to those suffering from an ankle sprain?

- ○ In person (1)
- ○ Handouts/Brochures (2)
- ○ Website (3)
- ○ Other (4) _____

How often do you provide patient education to your injured athletes regarding long term consequences regarding their ankle sprain?

- ○ Always (1)
- ○ Most of the time (2)
- ○ About half the time (3)
- ○ Sometimes (4)
- ○ Rarely (5)
- ○ Never (6)

I use patient reported outcome measures (ie. questionnaires and scales) to assess my athlete's ankle history, perception of pain, function or instability _____.

- ○ All of the time (1)
- ○ Most of the time (2)
- ○ Some of the time (3)
- ○ Rarely or Never (4)

How often do you utilize supervised rehabilitation when treating athletes who've suffered an ankle sprain?

- ○ Always (1)
- ○ Most of the time (2)
- ○ About half the time (3)
- ○ Sometimes (4)
- ○ Rarely (5)
- ○ Never (6)

How often do you prescribe home exercise programs to your athletes dealing with an ankle sprain?

- ○ Always (1)
- ○ Most of the time (2)
- ○ About half the time (3)
- ○ Sometimes (4)
- ○ Rarely (5)
- ○ Never (6)

What types of treatment do you normally use to treat ankle sprains? Check all that apply.

- [ ] Rest (1)
- [ ] Ice (2)
- [ ] Compression (3)
- [ ] Elevation (4)
- [ ] Athletic Tape (5)
- [ ] Ankle Brace (6)
- [ ] Electrical Stimulation (7)
- [ ] Ultrasound (8)
- [ ] Moist Heat Pack (9)
- [ ] Whirlpool (10)
- [ ] Massage (11)
- [ ] Strengthening Exercises (12)
- [ ] Stretching Exercises (13)
- [ ] Balance Exercises (14)

- [ ] Hopping/Jumping Exercises (15)
- [ ] Cast (16)
- [ ] Walking Boot (17)
- [ ] Crutches (18)
- [ ] Cane (19)
- [ ] Supervised Rehabilitation (20)
- [ ] Medication (21)
- [ ] Splint (22)
- [ ] Joint Mobilization/Manipulation (23)

Page Break

The NATA has a position statement outlining recommended guidelines in the management and preventions of ankle sprains.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

Display This Question:

If The NATA has a position statement outlining recommended guidelines in the management and preventi... = True

How confident do you feel in implementing the different sections of the NATA position statement on treating and managing ankle sprains?

	Very Confident (1)	Somewhat Confident (2)	Neutral (3)	Somewhat Not Confident (4)	Not Confident At All (5)
Diagnosis (1)	○	○	○	○	○
Treatment & Rehabilitation (2)	○	○	○	○	○
Return to Play Considerations (3)	○	○	○	○	○
Prevention (4)	○	○	○	○	○
Special Considerations (5)	○	○	○	○	○

Display This Question:

If The NATA has a position statement outlining recommended guidelines in the management and preventi... = True

What is your attitude toward how useful the NATA position statement is as a whole to your clinical practice?

	Not useful at all	Neutral	Very Useful
	1	3	5
()			

What are the challenges you face when trying to treat and manage ankle sprains? Check all that apply

- [ ] Not enough time (1)
- [ ] Pressure to return the athlete to competition (2)
- [ ] Limited resources (ie. limited personnel, limited funding, etc.) (3)
- [ ] Limited knowledge of long term consequences (4)
- [ ] Low priority in comparison to other injuries (5)
- [ ] Other (6) _____

Special tests such as the anterior drawer and inversion talar tilt tests have more diagnostic accuracy 5 days after injury than they do 2 days after injury.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

Page Break

When immobilizing a Grade III sprain, which of the following do you use with your patient population?

- ○ Rigid Stirrup Brace (1)
- ○ Walking Boot (2)
- ○ Below Knee Cast (3)
- ○ Ankle AirCast (4)
- ○ I do not immobilize (5)

How often are you implementing injury prevention programs for those suffering from an ankle sprain or a history of ankle sprains?

- ○ Always (1)
- ○ Most of the time (2)
- ○ About half the time (3)
- ○ Sometimes (4)
- ○ Never (5)
- ○ Not Applicable (6)

The anterior drawer and inversion talar tilt test are more diagnostically accurate 5 days after injury than.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

How often are diagnostic images used to evaluate the severity of joint damage following an ankle sprain?

- ○ Always (1)
- ○ Most of the time (2)
- ○ Sometimes (3)
- ○ Depends on severity of injury (4)
- ○ Never (5)
- ○ Not applicable (6)

Balance training should be performed throughout rehabilitation and follow-up management of ankle sprains to reduce re-injury rates.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

In your practice how often are patients with Chronic Ankle Instability identified, and the severity of their condition evaluated and treated?

- ○ Always (1)
- ○ Most of the time (2)
- ○ About half the time (3)
- ○ Sometimes (4)
- ○ Never (5)

The patient's perception of their function should be considered in the return to activity decision.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

I feel pressure to return athletes to play following an ankle sprain from the following: (Check all that apply)

- ☐ Coaches (1)
- ☐ Team Physician (2)
- ☐ Other Athletic Trainers (3)
- ☐ Student Athletes (4)
- ☐ Parent/Guardian (5)
- ☐ Fans (6)

End of Block: Default Question Block

Athlete's Perceptions of Ankle Sprains Survey

Start of Block: Default Question Block

Please read the following agreement carefully before you decide to participate in this study.

The purpose of this study is to gauge the current perceptions surrounding ankle sprains within the current college student athlete population .
The following survey includes questions regarding the treatment, management and long-term consequences associated with ankle sprains. Your participation is completely voluntarily and answers are collected anonymously. You may refuse to take part in this survey. You may also skip any question that makes you feel uncomfortable or that you do not wish to answer. There are no anticipated risks in this study.

Your survey answers will be sent to a link at Qualtrics.com, where data will be stored in a password protected electronic format. Qualtrics.com does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. Your data will be anonymous which means that your name will not be collected or linked to the data. Because of the nature of the data, it may be possible for the researchers to deduce your identity; however, there will be no attempt to do so and your data will be reported in a way that will not identify you. Since the data collected are anonymous, you cannot withdraw after you submit your data.

You will receive no payment for participating in the study. The study will require about 15-25 minutes of your time. **You may print a copy of this page for your records.**
ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. Clicking on the "Agree" button indicates that You have read the above information You voluntarily agree to participate You are 18 years of age or older

UVA SBS-IRB #2017-0554-00.

If you have questions about the study, contact: Revay O. Corbett; 434-924-6184, roc2ab@virginia.edu**.**

If you have questions about your rights in the study, contact:
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Website: www.virginia.edu/vpr/irb/sbs
Reference IRB-SBS Study #2017-0554-00

- ○ Agree (1)
- ○ Disagree (2)

Skip To: End of Survey If Please read the following agreement carefully before you decide to participate in this study. The... = Disagree

Page Break

Demographics

What is your biological sex?

- ○ Male (1)
- ○ Female (2)

What is your ethnicity?

- ○ American Indian/ Alaskan Native (1)
- ○ Asian (2)
- ○ Black (Not of Hispanic/Latino Origin) (3)
- ○ Hispanic/ Latino (4)
- ○ Multi- Ethnic (5)
- ○ Other (6)
- ○ White (Not of Hispanic/Latino Origin) (7)

What is your current age?

- ○ 18 (1)
- ○ 19 (2)
- ○ 20 (3)
- ○ 21 (4)
- ○ 22 (5)
- ○ 23 (6)
- ○ 24 (7)
- ○ 25 (8)
- ○ 26 (9)
- ○ 27 (10)
- ○ 28 (11)

What is your family's current household income? (all information collected is anonymous)

- ○ Less than $25,000 (1)
- ○ $25,000 - $34,999 (2)
- ○ $35,000 - $49,999 (3)
- ○ $50,000 - $74,999 (4)
- ○ $75,000 - $99,999 (5)
- ○ $100,000 - $124,999 (6)
- ○ More than $125,000 (7)

What division of college athletics are you currently participating in?

- ○ Division I (1)
- ○ Division II (2)
- ○ Division III (3)

What NCAA sport(s) are you currently competing in? Check all that apply.

- [ ] Basketball (1)
- [ ] Baseball (2)
- [ ] Beach Volleyball (3)
- [ ] Bowling (4)
- [ ] Cross Country (5)
- [ ] Fencing (6)
- [ ] Field Hockey (7)
- [ ] Football (8)
- [ ] Golf (9)
- [ ] Gymnastics (10)
- [ ] Ice Hockey (11)
- [ ] Lacrosse (12)
- [ ] Rifle (13)
- [ ] Rowing (14)

- [ ] Skiing (15)
- [ ] Soccer (16)
- [ ] Softball (17)
- [ ] Swimming & Diving (18)
- [ ] Tennis (19)
- [ ] Track & Field (20)
- [ ] Volleyball (21)
- [ ] Water Polo (22)
- [ ] Wrestling (23)

How many years have you been playing your sport?

_____

What is your eligibility year?

- ○ 1st (Freshman) (1)
- ○ 2nd (Sophomore) (2)
- ○ 3rd (Junior) (3)
- ○ 4th (Senior) (4)
- ○ 5th (5)
- ○ Other (6) _____

Have you ever sprained your ankle? (If yes, please answer the following questions based on the WORST ankle sprain you've suffered.)

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Have you ever sprained your ankle during your time at your institution as a student athlete?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Have you ever sprained your ankle during your time at your institution as a student athlete? = Yes

Did you report that sprain to an Athletic Trainer?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Did you report that sprain to an Athletic Trainer? = No

Did you self treat?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Did you report that sprain to an Athletic Trainer? = Yes

What caused you to tell your Athletic Trainer about the sprain?

- ☐ Team Policy to report injuries (1)
- ☐ Desire to return to play (2)
- ☐ Symptoms were too severe to ignore (3)
- ☐ Pressure to return to play (4)
- ☐ Athletic Trainer witnessed the injury (5)
- ☐ Other (6) _____

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Which ankle have you suffered a sprain?

- ○ Right (1)
- ○ Left (2)
- ○ Both (3)

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Were you seen by any of the following healthcare providers for your ankle sprain? Check all that apply.

- ☐ Athletic Trainer (1)
- ☐ Physician (MD, DO) (2)
- ☐ Physician's Assistant (3)
- ☐ School Nurse (4)
- ☐ Nurse Practitioner (5)
- ☐ Physical Therapist (6)
- ☐ None (7)
- ☐ Other (8) _____

Display This Question:

If Were you seen by any of the following healthcare providers for your ankle sprain? Check all that... = Athletic Trainer

Or Were you seen by any of the following healthcare providers for your ankle sprain? Check all that... = Physician (MD, DO)

Or Were you seen by any of the following healthcare providers for your ankle sprain? Check all that... = Physician's Assistant

Or Were you seen by any of the following healthcare providers for your ankle sprain? Check all that... = School Nurse

Or Were you seen by any of the following healthcare providers for your ankle sprain? Check all that... = Nurse Practitioner

Or Were you seen by any of the following healthcare providers for your ankle sprain? Check all that... = Physical Therapist

Or Were you seen by any of the following healthcare providers for your ankle sprain? Check all that... = Other

Did your athletic trainer, team physician, or other health care provider talk to you about the consequences that ankle sprains can have on your long term health and ankle function?

- ○ Yes (1)
- ○ No (2)
- ○ N/A (3)

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

What type of treatment did you receive following your ankle sprain? Check all that apply.

- [ ] Rest (1)
- [ ] Ice (2)
- [ ] Compression (3)
- [ ] Elevation (4)
- [ ] Athletic Tape (5)
- [ ] Ankle Brace (6)
- [ ] Electrical Stimulation (7)
- [ ] Ultrasound (8)
- [ ] Moist Heat Pack (9)
- [ ] Warm Whirlpool (10)
- [ ] Massage (11)
- [ ] Strengthening Exercises (12)
- [ ] Stretching Exercises (13)
- [ ] Balance Exercises (14)

- [ ] Hopping/Jumping Exercises (15)
- [ ] Cast (16)
- [ ] Walking Boot (17)
- [ ] Crutches (18)
- [ ] Cane (19)
- [ ] Supervised Rehabilitation (20)
- [ ] Medication (21)
- [ ] Splint (22)
- [ ] Joint Mobilization/Manipulation (23)
- [ ] Other (24) _____

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Are you currently receiving any treatment for your ankle sprain?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If What type of treatment did you receive following your ankle sprain? Check all that apply. = Ankle Brace

Or What type of treatment did you receive following your ankle sprain? Check all that apply. = Athletic Tape

Do you continue to tape or brace your ankle?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Did you have to sit out from competition or practice due to your ankle sprain?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Did you have to sit out from competition or practice due to your ankle sprain? = Yes

If you've had to sit out from competition due to your ankle sprain, how long were you out? (If you've suffered multiple sprains please report the longest time you've sat out)

_____

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

I felt pressure to return to play following my ankle sprain from the following: (Check all that apply)

- ☐ Coaches (1)
- ☐ Team Physician (2)
- ☐ Athletic Trainer (3)
- ☐ Teammates (4)
- ☐ Parent/Guardian (5)
- ☐ Fans (6)

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Are there any of the following symptoms that you are still suffering from? Please check all that apply.

- [ ] Bouts of Instability (Instances of "giving way", "rolling over" or "twisting") (1)
- [ ] Pain (2)
- [ ] Decreased ankle motion (3)
- [ ] Decreased sensation (4)
- [ ] Weakness (5)
- [ ] Snapping or Popping (6)
- [ ] Looseness (7)
- [ ] Stiffness (8)
- [ ] Other (9) _____
- [ ] No Residual Symptoms (10)

Page Break

Health Literacy

	Describes me extremely well (1)	Describes me very well (2)	Describes me moderately well (3)	Describes me slightly well (4)	Does not describe me (5)
I have the ability to actively engage with healthcare providers (1)	○	○	○	○	○
I am able to navigate the healthcare system (2)	○	○	○	○	○
I have the ability to find good health information (3)	○	○	○	○	○
I can understand health information well enough to know what to do (4)	○	○	○	○	○

Please answer the question based on how much you agree with the statement.

	Strongly agree (1)	Somewhat agree (2)	Neither agree nor disagree (3)	Somewhat disagree (4)	Strongly disagree (5)
I feel understood and supported by healthcare providers (1)	○	○	○	○	○
I have sufficient information to manage my health (2)	○	○	○	○	○
I am actively managing my health (3)	○	○	○	○	○
I have social support to manage my health (4)	○	○	○	○	○
I am able to appraise health information to manage my health (5)	○	○	○	○	○

Please answer the question based on how much it describes you in relation to the statement.

Perceptions

An ankle sprain involves stretching or tearing to the ligaments in your ankle.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

How long do you believe an ankle sprain should take to heal?

- ○ 1-7 days (1)
- ○ 1-2 weeks (2)
- ○ 2-4 weeks (3)
- ○ 4-6 weeks (4)
- ○ >6 weeks (5)

It is okay to play or practice when I feel pain in my ankle.

- ○ Yes (1)
- ○ No (2)
- ○ Not sure (3)

Damage to your ligaments following an ankle sprain might cause long term consequences.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

Playing with a swollen ankle is not a big deal as long as it it taped or braced.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

Having a history of an ankle sprain increases your chances of suffering another ankle sprain.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

There is a chance of developing chronic ankle instability following an ankle sprain.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

Suffering repeated ankle sprains may increase your risk of developing ankle arthritis.

- ○ True (1)
- ○ False (2)
- ○ Not sure (3)

Please rank the following injuries (by grabbing and dragging the injury and placing it) in an order based on how common you believe them to occur in your sport.

_____ ACL tear (1)
_____ Ankle Sprain (2)
_____ Concussion (3)
_____ Rotator Cuff Tear (4)
_____ Hamstring Strain (5)

Please rank the injuries (by grabbing and dragging the injury and placing it) in an order based on how important you believe it is to seek treatment when they occur.

_____ ACL tear (1)
_____ Ankle Sprain (2)
_____ Concussion (3)
_____ Rotator Cuff Tear (4)
_____ Hamstring Strain (5)

Page Break

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Foot and Ankle Ability Measure Sports Subscale

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

	No Difficulty at all (1)	Slight Difficulty (2)	Moderate Difficulty (3)	Extreme Difficulty (4)	Unable to do (5)	N/A (6)
Running (1)	○	○	○	○	○	○
Jumping (2)	○	○	○	○	○	○
Landing (3)	○	○	○	○	○	○
Starting and stopping quickly (4)	○	○	○	○	○	○
Cutting/lateral movements (5)	○	○	○	○	○	○
Ability to perform activity with your normal technique (6)	○	○	○	○	○	○

Ability to participate in your desired sport as long as you like (7)	○	○	○	○	○	○

Because of your foot and ankle, how much difficulty do you have with:

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

How would you rate your current level of function during your sports related activities from 0 to 100 with 100 being your level of function prior to your foot or ankle problem and 0 being the inability to perform any of your usual daily activities?

	0	10	20	30	40	50	60	70	80	90	100
Click to write Choice 1 ()											

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Overall, how would you rate your current level of function?

- ○ Normal (1)
- ○ Nearly Normal (2)
- ○ Abnormal (3)
- ○ Severely Abnormal (4)
- ○ Other (5) _____

Page Break

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Identification of Functional Ankle Instability

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Approximately how many times have you sprained your ankle?

_____

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

When was the last time you sprained your ankle?

	Never (1)	More than 2 years (2)	1-2 years (3)	6-12 months (4)	1-6 months (5)	Less than 1 month (6)
Please choose one. (1)	○	○	○	○	○	○

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

If you have seen an athletic trainer, physician, or healthcare provider how did he/she categorize your most serious ankle sprain?

	Have not seen someone (1)	Mild (Grade I) (2)	Moderate (Grade II) (3)	Severe (Grade III) (4)	Not sure (5)
Please choose one. (1)	○	○	○	○	○

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

If you have ever used crutches, or other device, due to an ankle sprain how long did you use it?

	Never used a device (1)	1-3 days (2)	4-7 days (3)	1-2 weeks (4)	2-3 weeks (5)	More than 3 weeks (6)
Please choose me. (1)	○	○	○	○	○	○

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

When was the last time you had "giving way" in your ankle?

	Never (1)	More than 2 years (2)	1-2 years (3)	6-12 months (4)	1-6 months (5)	Less than 1 month (6)
Please choose one. (1)	○	○	○	○	○	○

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

How often does the "giving way" sensation occur in your ankle?

	Never (1)	Once a year (2)	Once a month (3)	Once a week (4)	Once a day (5)
Please choose one. (1)	○	○	○	○	○

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Typically when you start to roll over (or twist) on your ankle can you stop it?

	Never rolled it (1)	Immeadiately (2)	Sometimes (3)	Unable to stop it (4)
Please choose one. (1)	○	○	○	○

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

Following a typical incident of your ankle rolling over, how soon does it return to "normal"?

	Never rolled over (1)	Immediately (2)	Less than 1 day (3)	1-2 days (4)	More than 2 days (5)
Please choose one. (1)	○	○	○	○	○

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

During "Activities of Daily Life" how often does your ankle feel UNSTABLE?

	Never (1)	Once a year (2)	Once a month (3)	Once a week (4)	Once a day (5)
Please choose one. (1)	○	○	○	○	○

Display This Question:

If Have you ever sprained your ankle? (If yes, please answer the following questions based on the WO... = Yes

During "Sport or Recreational Activity" how often does your ankle feel UNSTABLE?

	Never (1)	Once a year (2)	Once a month (3)	Once a week (4)	Once a day (5)
Please choose one. (1)	○	○	○	○	○

Page Break

Tampa Scale of Kinesiophobia

This is a list of phrases which other patients have used to express how the view their condition. Please choose the option that best describes how you feel about each statement.

	Strongly Disagree (1)	Somewhat disagree (2)	Somewhat agree (3)	Strongly agree (4)
I'm afraid I might injure myself if I exercise. (1)	○	○	○	○
If I were to try and overcome it, my pain would increase. (2)	○	○	○	○
My body is telling me I have something dangerously wrong. (3)	○	○	○	○
People aren't taking my medical condition serious enough. (4)	○	○	○	○
My accident/problem has put my body at risk for the rest of my life. (5)	○	○	○	○
Pain always means I have injured my body. (6)	○	○	○	○
By being careful that I don't make unnecessary movements is the safest way I can prevent more pain. (7)	○	○	○	○
I wouldn't have this much pain if there wasn't something potentially dangerous going on in my body. (8)	○	○	○	○

Pain lets me know when to stop exercising so that I don't injure myself. (9)	○	○	○	○
I can't do all the things normal people do because it's too easy for me to get injured. (10)	○	○	○	○
No one should have to exercise when he/she is in pain. (11)	○	○	○	○

Page Break

End of Block: Default Question Block

IRB DOCUMENTS

Institutional Review Board
for SOCIAL & BEHAVIORAL SCIENCES
UNIVERSITY of VIRGINIA

Protocol Form

Using this document:

- The purposed of this document is to provide you with a guide for providing the information that the IRB-SBS needs in order to review your protocol. Each question provides instructions as well as suggestions for completing the question. After every **Instruction** section, there is a **Response** area; please provide your answer in **Response** area.
- In addition, any blue underlined text is linked to related areas in our Researcher's Guide on our website. If you have questions about how to respond to a question, start with the Researcher's Guide and then contact our office for additional help.

Submitting a protocol:

- This document has three parts: **Section A "Investigator's Agreement," Section B "Protocol Information," and Section C "Description of the Research Study."** To submit a protocol, complete this document and email it and any accompanying materials (i.e. consent forms, recruitment materials, instruments) to irbsbs@virginia.edu. For more information on what to submit and how, please see Submitting a Protocol.
- **Please note that we can only accept forms in Microsoft Word format and in this form only. Do not submit your responses in a separate document.** We do not accept hand-written documents (with the exception of the signature on the Investigator's Agreement). Please submit the electronic form in its entirety; do not remove the signature pages from the document even though you will submit these pages as a pdf/hard copy. Do not alter this form; simply provide your responses in the **Response** area. **Forms that are not completed correctly will be returned to you and you will be required to complete them correctly before they are accepted. No exceptions!** If you need help using our form, please contact our office. For tips and suggestions for completing the protocol, please see Protocol and Informed Consent Tips.
- **Section A "Investigator's Agreement"** must also be submitted with signatures. Signed materials can be submitted by mail, fax (434-924-1992), or email (scanned document to irbsbs@virginia.edu). Signed materials can also be submitted in person to our office.
- In order to not delay your review, make sure that you (and any researcher listed on the protocol) have completed the CITI training in human subjects research.
- You will be contacted in 3-7 business days regarding your submission (depending on the protocol queue). Please see Protocol Review Process for more information.

Institutional Review Board for Social & Behavioral Sciences

Protocol Form

B. Protocol Information

IRB-SBS Protocol Number (assigned by SBS office, leave blank):	
IRB-SBS Grant Approval number: (If you received a Grant Approval prior to submitting a protocol, please include the number issued by our office. If you did not submit a Grant Approval Form, please leave this line blank.)	
Submission Type (delete all those that don't apply):	New Protocol
Protocol Title:	Perception of Ankle Sprains
Principal Investigator:	Revay O. Corbett, MS, ATC, PES
Professional Title:	Certified Athletic Trainer
School (Curry, Medical, Arts & Sciences, etc):	Curry School of Education
Department (CISE, Family Medicine, Psychology, etc):	Kinesiology
Campus Box number:	400407
Mailing Address (only if campus box number is not available):	210 Emmet Street S, Charlottesville VA 22903
Telephone:	434-924-6184
UVA e mail address (no aliases, please): *Your computing ID is used for tracking your IRB CITI training.*	roc2ab@virginia.edu
Preferred e mail address for correspondence (if applicable):	roc2ab@virginia.edu
You are (delete all those that don't apply):	Graduate Student
This research is for (delete all those that don't apply):	Doctoral Dissertation
Primary contact for the protocol (if other than the principal investigator):	Revay O. Corbett, MS, ATC, PES

Contact's Email:	rpc2ab@virginia.edu
Contact's Phone:	434.924.6184

Faculty Advisor:

	Jay Hertel, PhD, ATC
School (Curry, Medical, Arts & Sciences, etc):	Curry School of Education
Department (CISE, Family Medicine, Psychology, etc):	Kinesiology
Campus Box number:	400407
Telephone:	434-243-8673
UVA e mail address (no aliases, please): *Your computing ID is used for tracking on-line human subjects training.*	jnh7g@eservices.virginia.edu

Other Researchers*:

Please list all other researchers in this study that are associated with UVA.* Please provide the following information for each researcher: Name, UVA email address (no aliases, please.)	
Please list all other researchers not associated with UVA.* Please provide the following information for each researcher: Name, Institution, Phone Number, Mailing Address, Email Address.	

Funding Source: If research is funded, please provide the following:

Name of the funding source (NIH, NIS, Robert Wood Johnson Foundation, etc)	Curry IDEAs Grant
Type of funding source (delete all that don't apply):	UVa Grant
Describe the funding source (optional unless you selected "sub contract" above)	The Curry School Research and Development (R&D) Fund was established and funded by donors who want to provide the Dean of the Curry School with a funding source to be used in part to support dissertation research by Curry School doctoral students. The research projects to be supported will be those that have significant potential impact on the field of education and possibly have a longer-term economic value. Doctoral Student Dissertation IDEAs are

	intended for Curry doctoral students (PhD or EdD) interested in furthering a career path in research through original data collection directly related to their dissertation.
funding period (month/year):	
grant number:	PTAO# 145211 ROC2AB FA00012 31200
Paying Participants: If you are paying participants using State or UVa funds (including grants), you are required to complete the **UVa or State Funds Study Payment Procedures Form.** (Please describe your payment process in question 3-b in the next section.) **Please mark an "x" in the appropriate box (to the right):**	I am paying participants using State or UVa funds (including grants) and will include the UVa or State Funds Study Payment Procedures Form. ☐ I am not paying participants or I am not using State or UVa funds (including grants). ✓
Anticipated start date for collecting and analyzing data:	**December 2017**
Anticipated completion date for collecting and analyzing data:	**May 2019**

*** Please only list researchers that are working directly with human subjects and/or their data. All researchers listed on the protocol must complete the IRB-SBS Training or provide proof of completing IRB training at their institution. If you have any questions about whether a researcher should be listed on the protocol or if a researcher has completed training, please contact our office (irbsbshelp@virginia.edu). Proof of training can be submitted to our office via fax (434-924-1992), by mail (PO Box 800392 Charlottesville, VA 22908-0392) or by email (irbsbs@virginia.edu).**

C. Description of the Research Study

1. **Study Overview:** Give a brief overview of your project. Consider the following when framing your response:
    - What is your purpose in conducting this research? What makes the project interesting and worth doing?
    - Include information about the study's logistics (where and when it will be conducted, what instruments you will use, etc). What will you be asking participants to do, and what do you hope to learn from these activities?
    - If your study has more than one phase, please clearly map out the different phases.
    - If your study is a multi-site study, please describe.

Response 1: (enter response below this header)

Ankle Sprains are one of the most prevalent injuries among college athletes[1,2,3,4,5]. With 40% of those suffering an ankle sprain shown to develop chronic ankle instability (CAI)[5] a large number of college athletes have the potential to suffer impairments long after their athletic career is over. The current literature shows that student athletes being treated for ankle sprains are returning to play within one to seven days of their injury[7,8], while improvements in mechanical instability do not begin to be seen until anywhere from six weeks to three months after injury[9]. Certified Athletic Trainers (ATC) serve as the athletes first line of defense when injuries occur. Currently ATC's have guidelines laid out in the position statement disseminated by the National Athletic Trainers Association. Even with the 37 recommendations on how to treat and manage ankle sprains, short return to play timelines may be indicative that the importance of properly treating this injury is being overlooked by the high demands that athletic competition brings. This oversight may affect the way athletes who suffer an ankle sprain interpret their injury and its severity. In order to gauge the impact of how our athletes are being currently treated on their understanding of their injury, we will need to poll our patients to record their current perceptions of ankle sprains. There is currently a void in the literature in regard to how college student-athletes and ATC's view ankle sprains. The proposed study will provide insight into what patient education looks like in a population where ankle sprains are suffered at a high rate. This study will serve as the first step in evaluating current treatment and management practices and their impact on the perception of ankle sprains in college student-athletes and Certified Athletic Trainers.

We will survey current and competing student athletes across the three divisions of the NCAA, and ATC's that are members of the National Athletic Trainers Assoc. using an online survey program. The surveys will be filled out anonymously to ensure data security. Questions will inquire with student-athletes about their previous medical history, in particular if they have a history of ankle sprains. Questions will also evaluate what athletes currently know about the damage sustained when suffering an ankle sprain. ATC's will be asked about the understanding of the position statement outlined by their national governing association regarding ankle sprains. They will also be asked questions to display their perceived understanding of the treatment, management and long-term sequalae of ankle sprains. All student-athletes will fill out the Foot and Ankle Ability Measure as well as the Identification of Functional Ankle Instability questionnaires. These scales evaluate the function of the foot and ankle and are commonly used in ankle sprain populations. Student-athletes that have reported a previous medical history of ankle sprains will also complete the Tampa Scale of Kinesiophobia, to record any fear of movement and/or re-injury that the athletes with a history of ankle sprains may still face as competitive athletes.

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2. Agel J, Evans TA, Dick R, Putukian M, Marshall SW. Descriptive epidemiology of collegiate men's soccer injuries: National Collegiate Athletic Association Injury Surveillance System, 1988-1989 through 2002-2003. J Athl Train. 2007;42(2):270-277.
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4. Dick R, Ferrara M, Agel J. Descriptive epidemiology of collegiate men's football injuries: National Collegiate Athletic Association Injury Surveillance System, 1988-1989 through 2003-2004. J Athl Train. 2007;42:221-233.
5. Hootman JM, Dick R, Agel J. Epidemiology of collegiate injuries for 15 sports: summary and recommendations for injury prevention initiatives. J Athl Train. 2007;42:311-319.
6. Doherty C, Bleakley C, Hertel J, Caulfield B, Ryan J, Delahunt E. Recovery From a First-Time Lateral Ankle Sprain and the Predictors of Chronic Ankle Instability: A Prospective Cohort Analysis. Am J Sports Med. 2016 Apr;44(4):995-1003.
7. Nelson AJ, Collins CL, Yard EE, Fields SK, Comstock RD. Ankle injuries among United States high school sports athletes, 2005-2006. J Athl Train. 2007 Jul-Sep;42(3):381-7.
8. Medina McKeon JM, Bush HM, Reed A, Whittington A, Uhl TL, McKeon PO. Return-to-play probabilities following new versus recurrent ankle sprains in high school athletes. J Sci Med Sport. 2014 Jan;17(1):23-8.
9. Hubbard TJ, Hicks-Little CA. Ankle ligament healing after an acute ankle sprain: an evidence-based approach. J Athl Train. 2008 Sep-Oct;43(5):523-9.

2. **Participants: Please describe as best you can the population(s) you plan to work with.** Please describe them in the terms that are most pertinent to your project. We need to understand how working with them will further your research objectives and what steps need to be taken in order to minimize risk to them. **Please respond to questions a-e in this section.**
    a. Please fill in the following blanks below. If you are working with more than one population, please provide information for each group.

Response 2-a: (enter response below this header)

Student Athletes: A sample of convenience of currently competing college student-athletes, participating in the 25 sports across the three divisions of the NCAA, will be surveyed. Participants included will be between the ages of 18-28. Participants will be included regardless of current injury status or previous orthopedic medical history. A minimum of at least 2000 student-athletes from at least 20 different colleges and universities will be surveyed although our aim will be to survey as many athletes and schools as possible.
Certified Athletic Trainer: A sample of current and practicing ATC's from various settings will be surveyed. A minimum of at least 1000 ATC's from various settings will be surveyed although our aim will be to survey as many ATC's as possible.

    b. Describe how participants will be identified and selected to participate in the study. Are there specific populations that you will be targeting and if so, why? Are there potential participants that you will exclude from the study and if so, why?

Response 2-b: (enter response below this header)

Student-athletes and Certified Athletic Trainers (ATC) are the populations being targeted for participation. Current student-athletes within the three divisions of the NCAA will be asked for voluntarily participation in this study. ATC's that are members of the National Athletic Trainers Assoc. will be asked for voluntarily participation in this study. Both groups will be approached via email. These two targeted groups include

Those who suffer the pathology being studied at high rates, the student-athletes and the healthcare providers who treat the patient and the pathology, the ATC's.

c. Is the population and/or individual participant "risk-sensitive"? (You will have an opportunity to discuss the risks in more detail in the "Risks" section.) Is the population and/or individual participant "vulnerable"? (This issue relates to the participant's capacity consent; you will have an opportunity to discuss your consent procedures in more detail in the "Consents" section.)

Response 2-c: (enter response below this header)

No, the population involved in this study are not risk sensitive or vulnerable.

d. Will you deceive and/or withhold information from the participants about the study? If so, please justify why deception and/or withholding information from the participants is necessary and describe the deception. Using deception requires specific consent forms and processes; please describe this process in the **Consent section** under **Response 3-a** and **3-b**.

Response 2-d: (enter response below this header)

No, this study does not involve deception of any kind.

e. What special experience or knowledge do you have that will allow you to work productively and respectfully with your participants? What special experience or knowledge does your faculty sponsor have in relation to your research participants?

Response 2-e: (enter response below this header)

Both myself and the Faculty Supervisor are Certified Athletic Trainers whom are worked with student-athletes. Jay Hertel, PhD, ATC is an expert in the field of Foot and Ankle research and Revay O. Corbett, MS, ATC, PES is a doctoral student studying under Dr. Hertel.

3. **Consent:** Consent is an on-going process that starts when you first inform your participant about the study through your recruitment/advertising efforts and ends when the participant's data are no longer needed. The federal regulations require a formal consent process takes place where you provide participants with specific information about the study (usually provided in the consent form, see General Consent Template) and the participants are required to sign the form. Not every study will fit this mold and there are some alternative methods for conducting the formal consent procedure. **In general, the Board needs to understand how participants will be recruited and consented to participate in the study.** Please note that if your study qualifies for exemption, you will not be required to follow the federal regulations for consent, but the Board may require that you provide information about the study to the participant. **Please respond to questions a-d in this section.**

   a. How will you approach/recruit participants to participate in your research? **Please provide all materials used to contact participants in this study. These materials could include letters, emails, flyers, advertisements, etc. If you will contact participants verbally, please provide a script that outlines what you will say to participants.**

Response 3-a: (enter response below this header)

Participants will be sent an email explaining the study and the reason it is being conducted. They will be informed that their participation will be anonymous and voluntary. An email template is attached.

   b. What is your consent process? Who will present the consent information and how will it be presented? How will you document consent? Are your participants able to sign a form, and if not, how will you document consent? Will you use more than one form (if you use more than one version of the consent form, each form needs to have a unique title in order for our staff to keep track of the different forms)?

When and where will participants receive the consent form? Who will give them the consent form? Will you pay participants?

Response 3-b: (enter response below this header)

Consent will be retrieved with the first question of the surveys. The participants who choose to participate will check yes that they under their responses are being recorded anonymously and that by checking yes, they are voluntarily agreeing to participate in the study. If they do not provide consent they will not be asked to complete any parts of the survey.

c. Are any of your participants unable to consent (i.e. vulnerable population)? These populations include (but are not limited to): minors (participants under the legal age of consent), prisoners, and participants with diminished mental capacity. These participants generally need a parent (or surrogate) consent form and a participant assent form (prisoners being the likely exception unless they are minors too).

Response 3-c: (enter response below this header)

The participants we are targeting will not include vulnerable populations.

d. What is your relationship to your participants? Do you know them personally or hold any position of authority over them? Do any of the researchers (including the faculty advisor) have positions of authority over the participants, such as grading authority, professional authority, etc.? Are there any relevant financial relationships?

Response 3-d: (enter response below this header)

All members of the study team have no relationship with the intended participants.

4. **Materials/Data collected**: For most SBS studies, the risk to participants often lies in the information that is collected from them. Thus the manner in which the data are collected, how they are stored, and how the data are reported in your research is an important part of determining the risk to participants. When you develop your procedures, consider **minimizing or eliminating the collection of identifying information** where possible and **provide justification** as to why it needs to be collected. **Please respond to questions a-d in this section.**

   a. Are any of the data already collected? (If you are only using archival data, please use the Archival Data protocol form instead of this form.) Are the data publicly available or part of a private collection? Please describe the data set(s) and provide a list of data fields you will use (when applicable). What will you do to protect the confidentiality of the pre-existing data?

Response 4-a: (enter response below this header)

None of the data being used for the study has been previously collected.

   b. What will you do to protect the privacy of your participants? Describe the process for collecting data from your participants. What will you do to protect the confidentiality of your participants? Describe the kinds of information you will gather and the material forms it will take. Describe the level to which the participant's identity will be known, if that information will be collected (and why), and how the identifying information will be linked with the participant's data. If you don't intend to collect identifying information, describe your process for keeping the data anonymous.

Response 4-b: (enter response below this header)

Data collected is done anonymously, so any information shared will have no way of being traced back to its owner.

c. Will you use audio recordings, photographs, video recordings or other similar data recording devices? Please justify why it is necessary to use these devices, how you will use them, and what you will do with the data after they are collected.

Response 4-c: (enter response below this header)

No, we will not use any of the mentioned recording devices.

d. How will your materials be stored? Discuss both how you plan to store it while you are collecting and actively analyzing it, and your long-term plan for maintaining it when the active research phase is finished. How will your data be reported in your study? Will you report the results in aggregate or will individual data be discussed?

Response 4-d: (enter response below this header)

Anonymously completed surveys will be stored within the online survey software, UVa Qualtrics. The surveys will be printed, so the hard copies can be stored with the Exercise and Sports Injury Lab (EaSIL), behind two layers of locked protection.

5. **Risks**: Almost any intervention into other people's lives carries with it the potential to cause them social, psychological, physical, or legal harm. However, not every interaction will put a participant at risk beyond what is considered minimal. **Please describe to the Board the potential risks and the probability of harm to the participants in your study.** In this section, consider the following when framing your response:
   - Describe the risks to the participants in your study. Does your study include "risk-sensitive" participants (as identified in the Participants section)? What is the probability that harm could occur?
   - Describe what you will do to minimize those risks. Describe what you will do if a harmful situation occurs.
   - Would a loss of confidentiality of any of your materials put participants at risk? If so, how will you prevent this from happening?

Response 5: (enter response below this header)

There is no risk to the participant since they will complete the survey anonymously. The survey is not collecting identifiable data and cannot be traced back to who completed it.

6. **Benefits**: Benefits help to outweigh the risks to the participants, though not every study will have direct benefits to the participants. In this section, consider the following when framing your response:
   - Will there be any benefits to the participants in your study? If so, what are they?
   - What is the general importance of the knowledge you expect to gain?

Response 6: (enter response below this header)

The proposed study is a unique approach at gauging patient education and current clinical practice, which are critical portions of the rehabilitation process. The student-athlete population in particular is constrained with high demands to perform and small amounts of time to allow for any set-backs, including injuries. Ankle sprains, are unfortunately one of the injuries that are not given proper healing time. It is important that we as clinicians know what message we are conveying to our patients about tending to this injury. The proposed study will allow more attention to be paid to patient centered outcomes. If we know what our patient population currently believes to be true about an injury that is suffered at a high rate, we can tailor our patient education to fill in the gaps noted from the findings of this study.

UNIVERSITY of VIRGINIA

OFFICE OF THE VICE PRESIDENT FOR RESEARCH
INSTITUTIONAL REVIEW BOARD FOR THE SOCIAL AND BEHAVIORAL SCIENCES

In reply, please refer to: Project # 2017-0554-00

December 11, 2017

Revay Corbett and Jay Hertel
Kinesiology
PO Box 400407

Dear Revay Corbett and Jay Hertel:

Thank you for submitting your project entitled: "Perception of Ankle Sprains" for review by the Institutional Review Board for the Social & Behavioral Sciences. The Board reviewed your Protocol on December 11, 2017.

The first action that the Board takes with a new project is to decide whether the project is exempt from a more detailed review by the Board because the project may fall into one of the categories of research described as "exempt" in the Code of Federal Regulations. Since the Board, and not individual researchers, is authorized to classify a project as exempt, we requested that you submit the materials describing your project so that we could make this initial decision.

As a result of this request, we have reviewed your project and classified it as exempt from further review by the Board for a period of four years as this study involves the study of anonymous data and is therefore Exempt under 45 CFR §46.101(b)(2). This means that you may conduct the study as planned and you are not required to submit requests for continuation until the end of the fourth year.

This project # 2017-0554-00 has been exempted for the period December 7, 2017 to December 6, 2021. If the study continues beyond the approval period, you will need to submit a continuation request to the Board. If you make changes in the study, you will need to notify the Board of the changes.

Sincerely,

Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences

One Morton Drive, Suite 500 • Charlottesville, VA 22903
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APPENDIX D

ADDITIONAL RESULTS

Athlete's Perceptions of Ankle Sprains
Question Response Count

Q1 - Please read the following agreement carefully before you decide to participate in this study. The purpose of this study is to gauge the current perceptions surrounding ankle sprains within the current college student athlete population . The following survey includes questions regarding the treatment, management and long-term consequences associated with ankle sprains. Your participation is completely voluntarily and answers are collected anonymously. You may refuse to take part in this survey. You may also skip any question that makes you feel uncomfortable or that you do not wish to answer. There are no anticipated risks in this study. Your survey answers will be sent to a link at Qualtrics.com, where data will be stored in a password protected electronic format. Qualtrics.com does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. Your data will be anonymous which means that your name will not be collected or linked to the data. Because of the nature of the data, it may be possible for the researchers to deduce your identity; however, there will be no attempt to do so and your data will be reported in a way that will not identify you. Since the data collected are anonymous, you cannot withdraw after you submit your data. You will receive no payment for participating in the study. The study will require about 15-25 minutes of your time. You may print a copy of this page for your records. ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. Clicking on the "Agree" button indicates that You have read the above information

You voluntarily agree to participate You are 18 years of age or older UVA SBS-IRB #2017-0554-00. If you have questions about the study, contact: Revay O. Corbett; 434-924-6184, roc2ab@virginia.edu. If you have questions about your rights in the study, contact: Tonya R. Moon, Ph.D. Chair, Institutional Review Board for the Social and Behavioral Sciences One Morton Dr Suite 500 University of Virginia, P.O. Box 800392 Charlottesville, VA 22908-0392 Telephone: (434) 924-5999 Email: irbsbshelp@virginia.edu Website: www.virginia.edu/vpr/irb/sbs Reference IRB-SBS Study #2017-0554-00

#	Question	Total
1	Agree	119
2	Disagree	0

Q2 - What is your biological sex?

#	Question	Total
1	Male	37
2	Female	82

Q55 - What is your ethnicity?

#	Question	Total
1	American Indian/ Alaskan Native	0
2	Asian	0
3	Black (Not of Hispanic/Latino Origin)	10
4	Hispanic/ Latino	4
5	Multi- Ethnic	5
6	Other	1
7	White (Not of Hispanic/Latino Origin)	99

Q3 - What is your current age?

#	Question	Total
1	18	23
2	19	28
3	20	27
4	21	25
5	22	15
6	23	0
7	24	1
8	25	0
9	26	0
10	27	0
11	28	0

Q56 - What is your family's current household income? (all information collected is anonymous)

#	Question	Total
1	Less than $25,000	9
2	$25,000 - $34,999	4
3	$35,000 - $49,999	8
4	$50,000 - $74,999	12
5	$75,000 - $99,999	21
6	$100,000 - $124,999	24
7	More than $125,000	41

Q4 - What division of college athletics are you currently participating in?

#	Question	Total
1	Division I	85
2	Division II	1
3	Division III	32

Q5 - What NCAA sport(s) are you currently competing in? Check all that apply.

#	Question	Total
1	Basketball	4
2	Baseball	5
3	Beach Volleyball	0
4	Bowling	0
5	Cross Country	11
6	Fencing	0
7	Field Hockey	5
8	Football	15
9	Golf	2
10	Gymnastics	1
11	Ice Hockey	0
12	Lacrosse	12
13	Rifle	0
14	Rowing	17
15	Skiing	0
16	Soccer	19
17	Softball	7
18	Swimming & Diving	4
19	Tennis	3
20	Track & Field	19
21	Volleyball	5

22	Water Polo	0
23	Wrestling	0

Q6 - How many years have you been playing your sport?

How many years have you been playing your sport?
7
9 years
12
11
7
3
9
7
11
1
10
12
11
1
2
7
17
9
15
17
17 years

17

5

1

13

16

11

16

17

10

15

10

19

9

14 years

9

16

5

15

8

15

5

11

6

14

12

15
5
3
16
13
13
12
2
14
4
6
4
16
16
8
10
10
14
10 years
13
15
14
8
15
5

8
11
5
7
16
16
8
7
1
11
10
9
8
14
15
6
10
4
13
5
5
10
4
6
13

4
13
3
4
17
4
15
15
8
2
3
5
16
9
9
5
20
3
10
14
9
12
16

Q7 - What is your eligibility year?

#	Question	Total
1	1st (Freshman)	40
2	2nd (Sophomore)	25
3	3rd (Junior)	27
4	4th (Senior)	22
5	5th	3
6	Other	2

Other - Text
recent college graduate (may 2018)

Q8 - Have you ever sprained your ankle? (If yes, please answer the following questions based on the WORST ankle sprain you've suffered.)

#	Question	Total
1	Yes	91
2	No	28

Q9 - Have you ever sprained your ankle during your time at your institution as a student athlete?

#	Question	Total
1	Yes	55
2	No	36

Q10 - Did you report that sprain to an Athletic Trainer?

#	Question	Total
1	Yes	55
2	No	0

Q11 - Did you self treat?

#	Question	Total
1	Yes	0
2	No	0

Q12 - What caused you to tell your Athletic Trainer about the sprain?

#	Question	Total
1	Team Policy to report injuries	8
2	Desire to return to play	19
3	Symptoms were too severe to ignore	36
4	Pressure to return to play	1
5	Athletic Trainer witnessed the injury	21
6	Other	0

Q13 - Which ankle have you suffered a sprain?

#	Question	Total
1	Right	29
2	Left	25
3	Both	37

Q14 - Were you seen by any of the following healthcare providers for your ankle sprain? Check all that apply.

#	Question	Total
1	Athletic Trainer	80
2	Physician (MD, DO)	0
3	Physician's Assistant	6
4	School Nurse	5
5	Nurse Practitioner	4
6	Physical Therapist	18
7	None	4
8	Other	0

Q15 - Did your athletic trainer, team physician, or other health care provider talk to you about the consequences that ankle sprains can have on your long term health and ankle function?

#	Question	Total
1	Yes	32
2	No	50
3	N/A	5

Q16 - What type of treatment did you receive following your ankle sprain? Check all that apply.

#	Question	Total
1	Rest	83
2	Ice	91
3	Compression	74
4	Elevation	79
5	Athletic Tape	74
6	Ankle Brace	62
7	Electrical Stimulation	28
8	Ultrasound	32
9	Moist Heat Pack	18
10	Warm Whirlpool	26
11	Massage	26
12	Strengthening Exercises	71
13	Stretching Exercises	58
14	Balance Exercises	60
15	Hopping/Jumping Exercises	47
16	Cast	2
17	Walking Boot	31
18	Crutches	28
19	Cane	0
20	Supervised Rehabilitation	22
21	Medication	21

22	Splint	6
23	Joint Mobilization/Manipulation	16
24	Other	3

Other - Text
Game Ready Cold Therapy
Dry needling
Deep massage into ankle

Q17 - Are you currently receiving any treatment for your ankle sprain?

#	Question	Total
1	Yes	10
2	No	81

Q18 - Do you continue to tape or brace your ankle?

#	Question	Total
1	Yes	29
2	No	57

Q19 - Did you have to sit out from competition or practice due to your ankle sprain?

#	Question	Total
1	Yes	62
2	No	29

Q20 - If you've had to sit out from competition due to your ankle sprain, how long were you out? (If you've suffered multiple sprains please report the longest time you've sat out)

If you've had to sit out from competition due to your ankle sprain, how long were you out? (If you've suffered multiple sprains please report the longest time you've sat out)
1 week
1 month
2 weeks
Whole Practice
5 days
1 week
1 day
3 months
1 day
A few days
2 practices
6 weeks
2 weeks
2 days
Two weeks
1 week
Longest I have been out was 3-4 weeks
2 weeks
A week
1 week

2 Months
2 weeks
3 weeks
1 year
2 months from competition
2 months
3 months
1 week
2 weeks
1 month
1 week
7 days
4 weeks
Approx 2-3 weeks
2 weeks
3 weeks
played rest of tournament then out for 3 months
1 month
3 days
2 weeks
2 weeks
4
4 months
5 days
3 days

3 months
4 weeks
few weeks
1 day at a time, if it is particularly sore or swollen.
A week
2 weeks
5 months
5 days
20 days
2weeks
a few weeks, but continued to play when it wasn’t exactly healed
A week
3 days

Q60 - I felt pressure to return to play following my ankle sprain from the following: (Check all that apply)

#	Question	Total
1	Coaches	43
2	Team Physician	4
3	Athletic Trainer	12
4	Teammates	27
5	Parent/Guardian	17
6	Fans	8

Q21 - Are there any of the following symptoms that you are still suffering from? Please check all that apply.

#	Question	Total
1	Bouts of Instability (Instances of "giving way", "rolling over" or "twisting")	0
2	Pain	25
3	Decreased ankle motion	19
4	Decreased sensation	5
5	Weakness	27
6	Snapping or Popping	32
7	Looseness	15
8	Stiffness	29
9	Other	3
10	No Residual Symptoms	19

Other - Text
Balance
swelling
Swelling

Q59 - Please answer the question based on how much you agree with the statement.

Imported

#	Question	Strongly agree		Somewhat agree		Neither agree nor disagree		Somewhat disagree		Strongly disagree		Total
1	I feel understood and supported by healthcare providers	49.57%	57	33.91%	39	9.57%	11	4.35%	5	2.61%	3	115
2	I have sufficient information to manage my health	49.12%	56	39.47%	45	7.02%	8	2.63%	3	1.75%	2	114
3	I am actively managing my health	63.48%	73	30.43%	35	1.74%	2	3.48%	4	0.87%	1	115
4	I have social support to manage my health	59.13%	68	33.04%	38	4.35%	5	3.48%	4	0.00%	0	115
5	I am able to appraise health information to manage my health	53.04%	61	35.65%	41	6.09%	7	4.35%	5	0.87%	1	115

Q61 - Please answer the question based on how much it describes you in relation to the statement.

Imported

#	Question	Describes me extremely well		Describes me very well		Describes me moderately well		Describes me slightly well		Does not describe me		Total
1	I have the ability to actively engage with healthcare providers	41.59%	47	38.94%	44	15.04%	17	4.42%	5	0.00%	0	113
2	I am able to navigate the healthcare system	32.74%	37	30.97%	35	24.78%	28	8.85%	10	2.65%	3	113
3	I have the ability to find good health information	40.71%	46	31.86%	36	19.47%	22	6.19%	7	1.77%	2	113
4	I can understand health information well enough to know what to do	41.07%	46	36.61%	41	16.07%	18	3.57%	4	2.68%	3	112

Q23 - An ankle sprain involves stretching or tearing to the ligaments in your ankle.

#	Question	Total
1	True	98
2	False	3
3	Not sure	14

Q24 - How long do you believe an ankle sprain should take to heal?

#	Question	Total
1	1-7 days	14
2	1-2 weeks	42
3	2-4 weeks	34
4	4-6 weeks	21
5	>6 weeks	4

Q25 - It is okay to play or practice when I feel pain in my ankle.

#	Question	Total
1	Yes	49
2	No	43
3	Not sure	23

Q26 - Damage to your ligaments following an ankle sprain might cause long term consequences.

#	Question	Total
1	True	100
2	False	1
3	Not sure	14

Q27 - Playing with a swollen ankle is not a big deal as long as it it taped or braced.

#	Question	Total
1	True	34
2	False	66
3	Not sure	15

Q28 - Having a history of an ankle sprain increases your chances of suffering another ankle sprain.

#	Question	Total
1	True	107
2	False	3
3	Not sure	5

Q29 - There is a chance of developing chronic ankle instability following an ankle sprain.

#	Question	Total
1	True	92
2	False	2
3	Not sure	21

Q30 - Suffering repeated ankle sprains may increase your risk of developing ankle arthritis.

#	Question	Total
1	True	82
2	False	1
3	Not sure	32

Q31 - Please rank the following injuries (by grabbing and dragging the injury and placing it) in an order based on how common you believe them to occur in your sport.

#	Question	1		2		3		4		5		Total
1	ACL tear	9.65%	11	16.67%	19	22.81%	26	29.82%	34	21.05%	24	114
2	Ankle Sprain	46.49%	53	22.81%	26	10.53%	12	15.79%	18	4.39%	5	114
3	Concussion	16.67%	19	20.18%	23	26.32%	30	18.42%	21	18.42%	21	114
4	Rotator Cuff Tear	8.77%	10	10.53%	12	15.79%	18	22.81%	26	42.11%	48	114
5	Hamstring Strain	18.42%	21	29.82%	34	24.56%	28	13.16%	15	14.04%	16	114

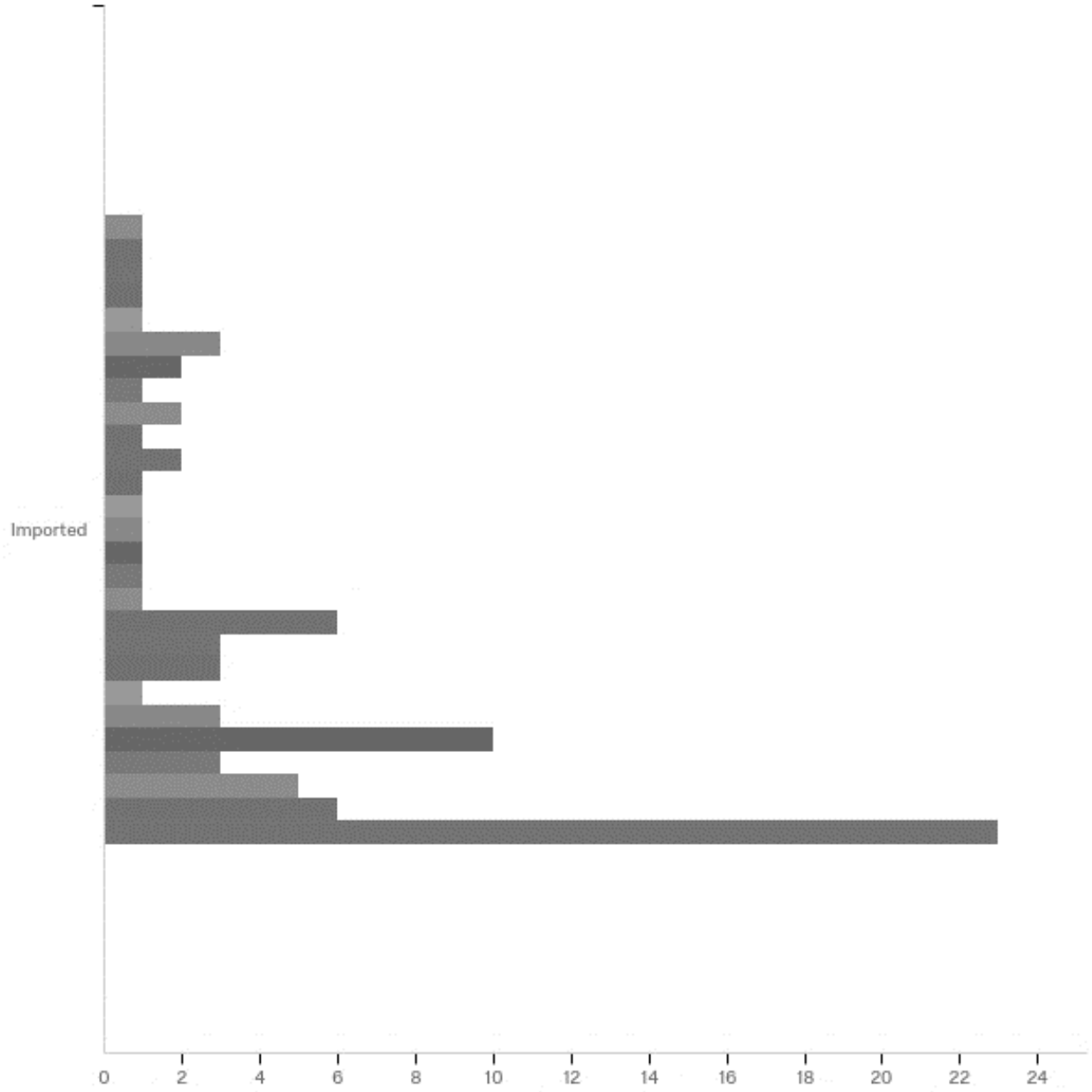
Q34 - Please rank the injuries (by grabbing and dragging the injury and placing it) in an order based on how important you believe it is to seek treatment when they occur.

#	Question	1		2		3		4		5		Total
1	ACL tear	46.49%	53	43.86%	50	7.89%	9	1.75%	2	0.00%	0	114
2	Ankle Sprain	1.75%	2	3.51%	4	20.18%	23	46.49%	53	28.07%	32	114
3	Concussion	49.12%	56	27.19%	31	14.91%	17	6.14%	7	2.63%	3	114
4	Rotator Cuff Tear	2.63%	3	22.81%	26	45.61%	52	16.67%	19	12.28%	14	114
5	Hamstring Strain	0.00%	0	2.63%	3	11.40%	13	28.95%	33	57.02%	65	114

Q35 - Because of your foot and ankle, how much difficulty do you have with:

#	Question	No Difficulty at all		Slight Difficulty		Moderate Difficulty		Extreme Difficulty		Unable to do		N/A		Total
1	Running	62.79%	54	24.42%	21	9.30%	8	0.00%	0	3.49%	3	0.00%	0	86
2	Jumping	63.95%	55	25.58%	22	6.98%	6	0.00%	0	3.49%	3	0.00%	0	86
3	Landing	52.33%	45	29.07%	25	12.79%	11	2.33%	2	3.49%	3	0.00%	0	86
4	Starting and stopping quickly	61.63%	53	16.28%	14	13.95%	12	5.81%	5	2.33%	2	0.00%	0	86
5	Cutting/lateral movements	53.49%	46	24.42%	21	13.95%	12	2.33%	2	4.65%	4	1.16%	1	86
6	Ability to perform activity with your normal technique	66.28%	57	27.91%	24	3.49%	3	0.00%	0	2.33%	2	0.00%	0	86
7	Ability to participate in your desired sport as long as you like	75.58%	65	18.60%	16	2.33%	2	1.16%	1	2.33%	2	0.00%	0	86

Q36 - How would you rate your current level of function during your sports related activities from 0 to 100 with 100 being your level of function prior to your foot or ankle problem and 0 being the inability to perform any of your usual daily activities?



Q37 - Overall, how would you rate your current level of function?

#	Question	Total
1	Normal	55
2	Nearly Normal	27
3	Abnormal	2
4	Severely Abnormal	1
5	Other	1

Other - Text

suffered other broken bones which complicates that

Q38 - Approximately how many times have you sprained your ankle?

Approximately how many times have you sprained your ankle?
1
2
3
4
2
2
5
1
5
4
1
1
4
1
5
10
2/3
1
4
3
3

6-8
10
6-7
1
1
4
4
1
3
4
4
10
3
4
6
1
5
3
1
1
4
1
4
7
At least once every season, /2 times a year

1
2
3
3
2
15
3
7
5
1
3
twice
3
2
1
5/6
1 and broke my right ankle
5
2
2
3
1 major sprain on each ankle
4
1
1

3
once on each side
3
1
4
3
2
5
4
too many times to count
5
3

Q39 - When was the last time you sprained your ankle?

#	Question	Total
1	Never	0
2	More than 2 years	19
3	1-2 years	23
4	6-12 months	10
5	1-6 months	28
6	Less than 1 month	5

Q40 - If you have seen an athletic trainer, physician, or healthcare provider how did he/she categorize your most serious ankle sprain?

#	Question	Total
1	Have not seen someone	2
2	Mild (Grade I)	26
3	Moderate (Grade II)	25
4	Severe (Grade III)	14
5	Not sure	17

Q41 - If you have ever used crutches, or other device, due to an ankle sprain how long did you use it?

#	Question	Total
1	Never used a device	31
2	1-3 days	14
3	4-7 days	16
4	1-2 weeks	11
5	2-3 weeks	8
6	More than 3 weeks	5

Q42 - When was the last time you had "giving way" in your ankle?

#	Question	Total
1	Never	16
2	More than 2 years	7
3	1-2 years	9
4	6-12 months	9
5	1-6 months	22
6	Less than 1 month	22

Q43 - How often does the "giving way" sensation occur in your ankle?

#	Question	Total
1	Never	34
2	Once a year	15
3	Once a month	17
4	Once a week	12
5	Once a day	6

Q44 - Typically when you start to roll over (or twist) on your ankle can you stop it?

#	Question	Total
1	Never rolled it	3
2	Immediately	20
3	Sometimes	51
4	Unable to stop it	11

Q45 - Following a typical incident of your ankle rolling over, how soon does it return to "normal"?

#	Question	Total
1	Never rolled over	4
2	Immediately	14
3	Less than 1 day	19
4	1-2 days	30
5	More than 2 days	17

Q46 - During "Activities of Daily Life" how often does your ankle feel UNSTABLE?

#	Question	Total
1	Never	42
2	Once a year	13
3	Once a month	10
4	Once a week	11
5	Once a day	8

Q47 - During "Sport or Recreational Activity" how often does your ankle feel UNSTABLE?

#	Question	Total
1	Never	28
2	Once a year	13
3	Once a month	20
4	Once a week	13
5	Once a day	11

Q53 - This is a list of phrases which other patients have used to express how the view their condition. Please choose the option that best describes how you feel about each statement.

#	Question	Strongly Disagree		Somewhat disagree		Somewhat agree		Strongly agree		Total
1	I'm afraid I might injure myself if I exercise.	48.62%	53	30.28%	33	19.27%	21	1.83%	2	109
2	If I were to try and overcome it, my pain would increase.	34.86%	38	28.44%	31	32.11%	35	4.59%	5	109
3	My body is telling me I have something dangerously wrong.	46.79%	51	24.77%	27	23.85%	26	4.59%	5	109
4	People aren't taking my medical condition serious enough.	53.21%	58	29.36%	32	13.76%	15	3.67%	4	109
5	My accident/problem has put my body at risk for the rest of my life.	55.96%	61	20.18%	22	21.10%	23	2.75%	3	109
6	Pain always means I have injured my body.	46.30%	50	40.74%	44	10.19%	11	2.78%	3	108
7	By being careful that I don't make unnecessary movements is the safest way I can prevent more pain.	28.70%	31	28.70%	31	38.89%	42	3.70%	4	108
8	I wouldn't have this much pain if there wasn't something potentially dangerous going on in my body.	36.11%	39	30.56%	33	31.48%	34	1.85%	2	108
9	Pain lets me know when to stop	18.52%	20	33.33%	36	39.81%	43	8.33%	9	108

	exercising so that I don't injure myself.									
10	I can't do all the things normal people do because it's too easy for me to get injured.	72.22%	78	16.67%	18	11.11%	12	0.00%	0	108
11	No one should have to exercise when he/she is in pain.	23.15%	25	45.37%	49	23.15%	25	8.33%	9	108

Evaluating Current Clinical Care of Ankle Sprains

Question Response Count

Q1 - Please read the following agreement carefully before you decide to participate in this study. The purpose of this study is to gauge the current perceptions surrounding ankle sprains within the profession of Athletic Training. The following survey includes questions regarding the treatment, management and long-term consequences associated with ankle sprains. Your participation is completely voluntarily and answers are collected anonymously. You may refuse to take part in this survey. You may also skip any question that makes you feel uncomfortable or that you do not wish to answer. There are no anticipated risks in this study. Your survey answers will be sent to a link at Qualtrics.com, where data will be stored in a password protected electronic format. Qualtrics.com does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. Your data will be anonymous which means that your name will not be collected or linked to the data. Because of the nature of the data, it may be possible for the researchers to deduce your identity; however, there will be no attempt to do so and your data will be reported in a way that will not identify you. Since the data collected are anonymous, you cannot withdraw after you submit your data. You will receive no payment for participating in the study. The study will require about 15-25 minutes of your time. You may print a copy of this page for your records. ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. Clicking on the "Agree" button indicates that You have read the above information You voluntarily agree to participate You are 18 years of age or older UVA SBS-IRB #2017-0554-00. If you have questions about the study, contact: Revay O. Corbett; 434-924-6184, roc2ab@virginia.edu. If you have questions about your rights

in the study, contact: Tonya R. Moon, Ph.D. Chair, Institutional Review Board for the Social and Behavioral Sciences One Morton Dr Suite 500 University of Virginia, P.O. Box 800392 Charlottesville, VA 22908-0392 Telephone: (434) 924-5999 Email: irbsbshelp@virginia.edu Website: www.virginia.edu/vpr/irb/sbs Reference IRB-SBS Study #2017-0554-00

#	Answer	%	Count
1	Agree	100.00%	795
2	Disagree	0.00%	0
	Total	100%	795

Q2 - What is your highest level of education completed?

#	Answer	%	Count
1	Bachelors	24.55%	191
2	Masters	71.59%	557
3	Doctorate	3.86%	30
	Total	100%	778

Q37 - What is your ethnicity?

#	Answer	%	Count
1	American Indian/ Alaskan Native	0.13%	1
2	Asian	1.56%	12
3	Black (Not of Hispanic/Latino Origin)	1.43%	11
4	Hispanic/ Latino	3.24%	25
5	Multi- Ethnic	1.95%	15
6	Other	1.30%	10
7	White (Not of Hispanic/Latino Origin)	90.40%	697
	Total	100%	771

Q3 - What other credentials do you have other than ATC?

#	Answer	%	Count
1	DPT	3.95%	13
2	MPT	3.95%	13
3	CSCS	22.49%	74
4	PA	0.91%	3
5	Other	68.69%	226
	Total	100%	329

Q3_5_TEXT - Other

Other - Text
Oec t
OTC, OT-SC
EMT-B
ITAT
GCS
CES
CKTP
Pes
EMT-I
NASM PES/CES/FNS
MS, CES, PES

PTA
LAT
MA, CES
CES
MPM
teaching certificate
Teaching
EMT-I
MAT
PTA
LAT
CKPT
LAT, MS, NASM-CPT
Licensed higg school teacher
CES
PTA
CES, PES
MBA, CKTP
NASM-PES, USAW-L1
MPH
EMT/FF
LAT
MA
AEMT
NRP

AEMT
PES
MBA
Teacher and Educational Administrator Certification
Msc
OTC
RMA
LAT
MBA; PT
CES, ART
CES
CES
CES
LAT
OTC
PTA
ROT
PES, CES
LAT, PES
none
MS
EMT
PES, CES, XPS
AHA BLS instructor
CES

Health education, fms
LAT
PES, CES, ART
N/A
EMT
PES, ITAT
CES
DAT
None
CEIS
FMS-C
CES
LAT
PES
LAT
ROT
CES
MS
ITAT, pursuing DPT currently
MBA
MBA
LAT
FAFS
MS, LAT, GT
EMT

FMS
MBA
none
CMT
EMT, SCS
MAE, LAT
PTA
CES
PES, CES
OTC
CISSN
ITAT
Cert. MDT
USAW - L1
LAT
Lat
LAT
CES, PES
None
OTC
PES
CEAS
Paramedic/paramedic instructor
OTC
Emt

Ope-c
RN
LAT
LAT, MPA
LAT
Lat
Hospital Corpsman-US
CES
LAT
CES, PES, ITAT
NREMT
MEd
PES
No
PTA
AEMT
CES
MAT
PES, RCEP, cPED, COF
EMT
NASM PES
MEd
LMT
CES, PES
PES, TSAC-F

NSCA-CPT; CWcHP, USAW
LAT
teaching
BS of PT
Certified Kinesio Taping Instructor
ROT
EP-C
MAT, FMS, ITAT
ITAT, NSCA-CPT
ITAT
CEAS I
PES
PES, CES
LAT
CES
Certified Speed and Agility Coach
CEASII, CEFE
NASM-CES
EMT
DHS
PES, CES (NASM)
CES
PES, CES, CKTP, ITAT
LAT, CPT-NSCA, CES-NASM
CEIS

LAT
MEd
Teacher
none
LAT
EMT
PTA
PES, SFMA I
LAT
CES PES
MEd
CES. PES
LAT
EMT
Otc
emt advanced
LAT
OTC
PES
MHA
PES
LAT
PES, CMMSS, CEAS
DC
EMT-B

LAT
CHT, OCS
ITAT
DAT
PES, CES
CES
PES
CEAS
SFMA, TSAC-F
LAT
PTA, ITAT
LAT, CKTP, GTS, CIDN, SMTC
EP-C
Ces, pes
DC
N.a.
PES, CES, YES, AASDN

Q4 - What year were you certified as an Athletic Trainer?

#	Answer	%	Count
1	2017	5.86%	42
2	2016	7.11%	51
3	2015	7.95%	57
4	2014	8.09%	58
5	2013	6.28%	45
6	2012	5.30%	38
7	2011	4.46%	32
8	2010	4.04%	29
9	2009	4.18%	30
10	2008	3.49%	25
11	2007	4.18%	30
12	2006	3.07%	22
13	2005	2.09%	15
14	2004	2.65%	19
15	2003	1.81%	13
16	2002	2.93%	21
17	2001	3.77%	27
18	2000	2.09%	15
19	1999	2.23%	16
20	1998	2.09%	15
21	1997	2.23%	16

22	1996	0.70%	5
23	1995	1.53%	11
24	1994	2.23%	16
25	1993	1.81%	13
26	1992	1.53%	11
27	1991	2.23%	16
28	1990	1.39%	10
29	1989	2.65%	19
	Total	100%	717

Q42 - Are you currently working in a setting with a patient population?

#	Answer	%	Count
1	Yes	93.43%	725
2	No	6.57%	51
	Total	100%	776

Q5 - What is your current work setting?

#	Answer	%	Count
1	College-Division I	13.59%	109
2	College-Division II	5.74%	46
3	College-Division III	7.98%	64
4	High School	31.17%	250
5	Professional	5.49%	44
6	Military	2.74%	22
7	Physical Therapy Clinic	8.10%	65
8	Industrial	3.62%	29
9	Hospital	8.85%	71
10	Other	12.72%	102
	Total	100%	802

Q5_10_TEXT - Other

Other - Text
Clinic Outreach
concussion clinic
Middle school
Physician Private Practice
Clinic
NAIA
Middle schools
Performing Arts
Doctor's Office
College-2 year
NAIA
High School and Junior College
Elite Youth Sports
WWE
PER DIEM
Elite Sport Training
Clinical outreach
primary care sports medicine
Clinic
College- NAIA
Physician Owned Orthopedic Clinic
Orthopedic Clinic and outreach (PRN)
K-12

Youth sports
Junior College
PT Clinic/Outreach
Hospital based orthopedic clinic
College: Club and Rec Sports.
Junior College
Orthopedic Clinic
Outpatient Rehabiliation Clinic - Don't like the term PT clinic.
Sports Med Clinic
College-NAIA
NAIA
Physician Practice
Clinic
Professional performing arts and college ROTC
College-NAIA
College - NAIA
NJCAA
Orthopedic and Sports Medicine Clinic
Ortho Clinic
Clinic
Research Coordinator
Physician clinic
Occupational Medicine Clinic
Clinic
junior college

Orthopedic Clinic
NAIA
Family Practice Clinic
Clinic-Orthopedic
NJCAA (junior college)
AT in sports med practice
Orthotic Clinic
Semi-professional
Family/Sports medicine practice
Junior college-2 year institution
Junior College
Community College
NJCAA
Junior College
Research (Ankles)
College-NAIA
College NAIA
Orthopedic Clinic
Pain Clinic and Outreach
Junior College
Orthopedic office
Federal Law Enforcement
NJCAA
Military boarding school with athletics
Orthopedic clinic

Junior college
University- sport clubs
Orthopaedic Surgeons Office
Clinic based with some outreach responsibility
Collegiate General Population
Clinic/Gym
Clinic
Middle School
Junior College
NAIA
Law enforcement
Physician's office
Performing Arts
Orthopedic clinic
Private orthopedic clinic
Junior College
Outpatient Chiropractic/Physiotherapy Clinic
Clinic out reach

Q6 - What sport(s) are you currently supervising? Check all that apply.

#	Answer	%	Count
1	Basketball	10.13%	381
2	Baseball	7.47%	281
3	Beach Volleyball	0.29%	11
4	Bowling	1.06%	40
5	Cross Country	7.97%	300
6	Fencing	0.24%	9
7	Field Hockey	2.10%	79
8	Football	8.43%	317
9	Golf	5.64%	212
10	Gymnastics	1.17%	44
11	Ice Hockey	1.99%	75
12	Lacrosse	3.54%	133
13	Rifle	0.37%	14
14	Rowing	0.72%	27
15	Skiing	0.43%	16
16	Soccer	8.67%	326
17	Softball	7.07%	266
18	Swimming & Diving	4.52%	170
19	Tennis	6.17%	232
20	Track & Field	7.18%	270
21	Volleyball	8.48%	319

22	Water Polo	0.88%	33
23	Wrestling	5.50%	207
	Total	100%	3762

Q43 - How many athletes or patients are you responsible for?

#	Answer	%	Count
1	0-50	18.71%	130
2	51-150	29.21%	203
3	151-300	21.01%	146
4	301-500	15.11%	105
5	501-700	7.34%	51
6	701-900	2.73%	19
7	over 900	5.90%	41
	Total	100%	695

Q7 - Ankle sprains are the most common injury in college athletics.

#	Answer	%	Count
1	True	56.78%	385
2	False	14.60%	99
3	Not sure	28.61%	194
	Total	100%	678

Q8 - Ankle sprains are a common musculoskeletal injury.

#	Answer	%	Count
1	True	93.37%	634
2	False	5.15%	35
3	Not sure	1.47%	10
	Total	100%	679

Q9 - Athletes typically return to play after an ankle sprain, during which of the following time frames?

#	Answer	%	Count
1	Less than 24 hours	0.15%	1
2	1-6 days	48.08%	326
3	7-21 days	50.44%	342
4	More than 21 days	1.33%	9
	Total	100%	678

Q10 - How long do you believe a typical ankle sprain should take to heal?

#	Answer	%	Count
1	1-7 days	8.11%	55
2	1-2 weeks	39.38%	267
3	2-4 weeks	34.22%	232
4	4-6 weeks	12.68%	86
5	>6 weeks	5.60%	38
	Total	100%	678

Q11 - How long does the acute inflammatory phase of the healing process typically last?

#	Answer	%	Count
1	1-2 days	57.21%	389
2	3-7 days	41.18%	280
3	2-3 weeks	1.47%	10
4	4 or more weeks	0.15%	1
	Total	100%	680

Q12 - RICE is currently the best practice by ATCs and other health care professionals following an ankle sprain.

#	Answer	%	Count
1	True	54.51%	369
2	False	36.19%	245
3	Not sure	9.31%	63
	Total	100%	677

Q13 - Having a history of an ankle sprain increases your chances of suffering another ankle sprain.

#	Answer	%	Count
1	True	96.61%	656
2	False	2.06%	14
3	Not sure	1.33%	9
	Total	100%	679

Q14 - What are the chances of developing chronic ankle instability after suffering an initial ankle sprain.

#	Answer	%	Count
1	25%	32.00%	216
2	40%	44.15%	298
3	65%	18.67%	126
4	80%	5.19%	35
	Total	100%	675

Q15 - Suffering repeated ankle sprains may increase the risk of developing ankle osteoarthritis.

#	Answer	%	Count
1	True	86.89%	590
2	False	2.21%	15
3	Not sure	10.90%	74
	Total	100%	679

Q16 - How often do you provide patient education to your injured patients regarding treating and managing their ankle sprain?

#	Answer	%	Count
1	Always	61.91%	421
2	Most of the time	31.18%	212
3	About half the time	2.35%	16
4	Sometimes	3.38%	23
5	Rarely	0.74%	5
6	Never	0.44%	3
	Total	100%	680

Q17 - How do you provide patient education to those suffering from an ankle sprain?

#	Answer	%	Count
1	In person	93.82%	638
2	Handouts/Brochures	3.97%	27
3	Website	0.15%	1
4	Other	2.06%	14
	Total	100%	680

Q17_4_TEXT - Other

Other - Text
In person and handouts
Multiple ways: in person, handouts, and websites
all of the above
Sometime I will show them Evidence based studies on proprioception
In person and handouts
In person & handouts
Combination of above
in person, as well as, providing patient education reading materials via EMR and/or web based
In Person and with printed handouts
In person and handouts
work in concussion clinic, don't treat ankle sprains
All of the above

In person and handouts
I don’t currently treat ankle sprains

Q18 - How often do you provide patient education to your injured athletes regarding long term consequences regarding their ankle sprain?

#	Answer	%	Count
1	Always	23.34%	158
2	Most of the time	29.54%	200
3	About half the time	13.15%	89
4	Sometimes	20.83%	141
5	Rarely	11.37%	77
6	Never	1.77%	12
	Total	100%	677

Q19 - I use patient reported outcome measures (ie. questionnaires and scales) to assess my athlete's ankle history, perception of pain, function or instability .

#	Answer	%	Count
1	All of the time	11.65%	79
2	Most of the time	17.55%	119
3	Some of the time	22.27%	151
4	Rarely or Never	48.53%	329
	Total	100%	678

Q20 - How often do you utilize supervised rehabilitation when treating athletes who've suffered an ankle sprain?

#	Answer	%	Count
1	Always	41.15%	279
2	Most of the time	41.45%	281
3	About half the time	7.82%	53
4	Sometimes	4.57%	31
5	Rarely	4.28%	29
6	Never	0.74%	5
	Total	100%	678

Q21 - How often do you prescribe home exercise programs to your athletes dealing with an ankle sprain?

#	Answer	%	Count
1	Always	44.54%	302
2	Most of the time	33.63%	228
3	About half the time	7.82%	53
4	Sometimes	8.85%	60
5	Rarely	4.13%	28
6	Never	1.03%	7
	Total	100%	678

Q22 - What types of treatment do you normally use to treat ankle sprains? Check all that apply.

#	Answer	%	Count
1	Rest	6.09%	554
2	Ice	6.50%	591
3	Compression	6.90%	627
4	Elevation	6.25%	568
5	Athletic Tape	5.59%	508
6	Ankle Brace	5.24%	476
7	Electrical Stimulation	3.43%	312
8	Ultrasound	1.85%	168
9	Moist Heat Pack	1.44%	131

10	Whirlpool	3.73%	339
11	Massage	4.22%	384
12	Strengthening Exercises	7.34%	667
13	Stretching Exercises	5.83%	530
14	Balance Exercises	7.28%	662
15	Hopping/Jumping Exercises	6.15%	559
16	Cast	0.11%	10
17	Walking Boot	3.87%	352
18	Crutches	3.99%	363
19	Cane	0.06%	5
20	Supervised Rehabilitation	6.57%	597
21	Medication	2.94%	267
22	Splint	0.45%	41
23	Joint Mobilization/Manipulation	4.17%	379
	Total	100%	9090

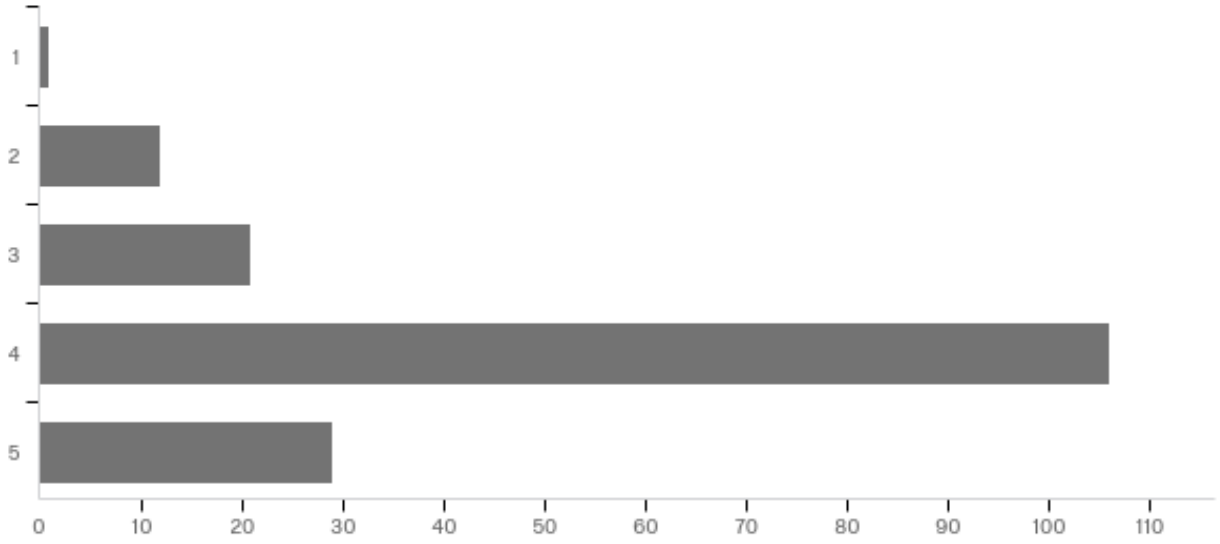
Q23 - The NATA has a position statement outlining recommended guidelines in the management and preventions of ankle sprains.

#	Answer	%	Count
1	True	61.89%	419
2	False	4.58%	31
3	Not sure	33.53%	227
	Total	100%	677

Q24 - How confident do you feel in implementing the different sections of the NATA position statement on treating and managing ankle sprains?

#	Question	Very Confident		Somewhat Confident		Neutral		Somewhat Not Confident		Not Confident At All		Total
1	Diagnosis	70.97%	154	23.50%	51	5.07%	11	0.46%	1	0.00%	0	217
2	Treatment & Rehabilitation	65.12%	140	28.37%	61	5.58%	12	0.93%	2	0.00%	0	215
3	Return to Play Considerations	64.35%	139	28.70%	62	6.48%	14	0.46%	1	0.00%	0	216
4	Prevention	50.00%	108	41.67%	90	6.94%	15	1.39%	3	0.00%	0	216
5	Special Considerations	35.02%	76	45.62%	99	17.05%	37	2.30%	5	0.00%	0	217

Q25 - What is your attitude toward how useful the NATA position statement is as a whole to your clinical practice?



Q26 - What are the challenges you face when trying to treat and manage ankle sprains? Check all that apply

#	Answer	%	Count
1	Not enough time	34.56%	225
2	Pressure to return the athlete to competition	46.85%	305
3	Limited resources (ie. limited personnel, limited funding, etc.)	0.00%	0
4	Limited knowledge of long term consequences	1.69%	11
5	Low priority in comparison to other injuries	7.83%	51
6	Other	9.06%	59
	Total	100%	651

Q26_6_TEXT - Other

Other - Text
Don’t get to see athletes long term
Don’t have any challenges
Patient following directions
limitations in regard to setting
None
Patient compliance
The subjective conditions for different types of ankle sprains and the individual patient.
parents, coaches, and athletes often believe ankle sprains aren't serious at all or have any long-term repercussions
patient compliance with treatment/rehab
non compliance

Military often doesn't consider an LAS to be a big deal. Therefore, many patients with LAS are never brought in for evaluation/treatment
Mis-guided expectations/understanding of coaches/players
Patient understanding that most ankle sprains take 2-3 months to recover fully from
athlete compliance
Athlete accountability to come in for treatment and rehab
sometimes lack of commitment by the student athlete to perform rehabilitation.
athlete's perception of state of healing
none
Athlete compliance & conservative doctors when athletes go to doctor after our eval
Patient compliance
Athlete discontinuing rehab with asymptomatic and not continuing exercises for a preventative reason.
No pressure, I do what I feel it right for each athlete and each situation.
Kids get used to injury so they don't come in for follow up. Also, PT in town will treat kids for minor injuries with dry needling or other modality and won't put responsibility on kids to take care of their own injury.
Compliance
Compliance of athlete
Patient doesn't return for rehabilitation
Patient compliance
patient compliance
Athlete and family expectations to return to play
athlete compliance
kid's compliance
I am never pressured to return a service member back to duty but sometimes mission is critical and all levels of care and command can accept a less than 100% ankle.
Space and equipment
athlete compliance

demands of sport specific activity
NOn compliant athletes
Lack of rehab compliance in athletes
athlete compliance
Patient compliance
none
Pt compliance
None
Patient isn't always compliant
Patient Compliance
Compliance from the athlete
I call on schools with no AT, so lack of day to day managment is my main problem
All of the above can be true, it varies so much from case to case
athlete compliance
demands of the sport
Athlete compliance and participation
Athlete compliance
Having to educate athlete and parents that RICE tx is not effective.
Human body
Dont really find any
Patient compliance
I don’t see that injury

Q27 - Special tests such as the anterior drawer and inversion talar tilt tests have more diagnostic accuracy 5 days after injury than they do 2 days after injury.

#	Answer	%	Count
1	True	33.33%	152
2	False	22.15%	101
3	Not sure	44.52%	203
	Total	100%	456

Q28 - When immobilizing a Grade III sprain, which of the following do you use with your patient population?

#	Answer	%	Count
1	Rigid Stirrup Brace	4.07%	18
2	Walking Boot	79.86%	353
3	Below Knee Cast	1.81%	8
4	Ankle AirCast	6.33%	28
5	I do not immobilize	7.92%	35
	Total	100%	442

Q29 - How often are you implementing injury prevention programs for those suffering from an ankle sprain or a history of ankle sprains?

#	Answer	%	Count
1	Always	19.55%	87
2	Most of the time	38.20%	170
3	About half the time	13.71%	61
4	Sometimes	20.67%	92
5	Never	2.47%	11
6	Not Applicable	5.39%	24
	Total	100%	445

Q30 - The anterior drawer and inversion talar tilt test are more diagnostically accurate 5 days after injury than.

#	Answer	%	Count
1	True	26.32%	115
2	False	16.70%	73
3	Not sure	56.98%	249
	Total	100%	437

Q31 - How often are diagnostic images used to evaluate the severity of joint damage following an ankle sprain?

#	Answer	%	Count
1	Always	3.60%	16
2	Most of the time	12.61%	56
3	Sometimes	19.37%	86
4	Depends on severity of injury	59.46%	264
5	Never	2.48%	11
6	Not applicable	2.48%	11
	Total	100%	444

Q32 - Balance training should be performed throughout rehabilitation and follow-up management of ankle sprains to reduce re-injury rates.

#	Answer	%	Count
1	True	100.00%	445
2	False	0.00%	0
3	Not sure	0.00%	0
	Total	100%	445

Q33 - In your practice how often are patients with Chronic Ankle Instability identified, and the severity of their condition evaluated and treated?

#	Answer	%	Count
1	Always	6.56%	29
2	Most of the time	31.45%	139
3	About half the time	18.55%	82
4	Sometimes	37.78%	167
5	Never	5.66%	25
	Total	100%	442

Q34 - The patient's perception of their function should be considered in the return to activity decision.

#	Answer	%	Count
1	True	94.61%	421
2	False	4.04%	18
3	Not sure	1.35%	6
	Total	100%	445

Q41 - I feel pressure to return athletes to play following an ankle sprain from the following: (Check all that apply)

#	Answer	%	Count
1	Coaches	39.39%	297
2	Team Physician	1.33%	10
3	Other Athletic Trainers	2.39%	18
4	Student Athletes	32.23%	243
5	Parent/Guardian	22.41%	169
6	Fans	2.25%	17
	Total	100%	754

APPENDIX E

BACK MATTER

RECOMMENDATIONS FOR FUTURE RESEARCH

- Further investigation of the biopsychosocial model of recovery from injury specific to ankle sprains.
- Patient education practice should be examined more to find ways to equalize the information received by patients across the field.
- Future studies should evaluate the spread and timing of ankle sprain treatment provided.

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