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Utilization of emergency policies and procedures by Division I-A and Division I-AA intercollegiate athletic programs

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UTILIZATION OF EMERGENCY POLICIES AND PROCEDURES BY DIVISION I-A AND DIVISION I-AA INTERCOLLEGIATE ATHLETIC PROGRAMS

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ABSTRACT

"Utilization of Emergency Policies and Procedures by Division I-A and I-AA Intercollegiate Athletic Programs"

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The need for an established emergency policy and procedures plan in the college and university setting has been confirmed by various organizations such as: National Safety Council (NSC), Federal Emergency Management Agency (FEMA), National Emergency Management Association (NEMA), National Athletic Trainers' Association (NATA), National Collegiate Athletic Association (NCAA), and the American College of Sports Medicine (ACSM). The duty of these emergency policies and procedures is twofold. The first is to provide immediate care to student-athletes in an emergency situation. The second purpose is to avoid liability issues that may arise following an emergency situation. The premise behind the establishment and implementation is to have a well established emergency policies and procedures manual to aid in the appropriate and most immediate care to the student-athlete in an emergency or life-threatening situation. The objective of this study is to establish what Division I-A and I-AA athletic training programs are implementing or have implemented to accommodate these recommendations and whether smaller universities have difficulty upholding the guidelines set forth by the NATA due to the decreased budgets.

DEDICATION

I would like to dedicate this paper to my family. I have reached the end of my list of goals established in the fifth grade and I owe this to ya'll. I have strived and worked endlessly for eight years and half years and couldn't have made it without all of the encouragement. Thank you for raising me with the proper morals and guidance in my life that leads to the determination I have today. To my mama, I owe you everything. I am the person I am today because of you and the person you are today.

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CHAPTER I

Introduction

There is no way of knowing when an emergency situation will arise, being prepared to provide the best possible care to the athletes is essential when faced with an emergency situation. Developing and implementing emergency policies and procedures aid in the most immediate and proficient care of the athletes. The National Safety Council (NSC), Federal Emergency Management Agency (FEMA), National Emergency Management Association (NEMA), National Athletic Trainers' Association (NATA), National Collegiate Athletic Association (NCAA), and the American College of Sports Medicine (ACSM) have stated the need and importance of an established emergency policy and procedures plan in the college and university athletic setting. The duty of these emergency policies and procedures is twofold. The first is to provide immediate care to the student-athlete in an emergency situation. The second purpose is to avoid liability issues that may arise following an emergency situation. The premise behind the establishment and implementation of these policies is to have a well-established emergency plan to aid in the appropriate and most immediate care to the student-athlete in an emergency or life-threatening situation. The objective of this study is to determine what Division I-A and I-AA athletic training programs are implementing or have currently enforced to accommodate these recommendations and to determine if smaller

universities have difficulty meeting these fixed guidelines due to considerably lower budgets.

Purpose

Should colleges and universities be meeting the standards established by these numerous organizations? Court cases and agencies say yes that all Division I-A and I-AA universities need to implement emergency plans in order to prepare for any possible emergency or life threatening situation that pertains to student-athletes. Are these universities practicing various methods and putting forth adequate effort in order to prepare in attempt to meet these standards? The reaction of the sport medicine/athletic training staff is what makes the difference in achieving a positive outcome for the student-athlete. So, what are universities doing in attempt to prepare to meet the standards that have been established? Emergencies cannot be predicted, but plans can be made in anticipation of emergencies in order to make a difference with an effective emergency response plan.

The emergency care plan is defined by Rankin & Ingersoll as a "written document that defines the standard of care required in every conceivable event during an emergency on the practice or playing field (Rankin et al., 2001)." Andersen et al published an article declaring the NATA position statement on emergency planning in athletics (Andersen et al., 2002). The authors' objective was to "educate athletic trainers and others about the need for emergency planning, to provide guidelines in the development of emergency plans, and to advocate documentation of emergency planning." It was also stated that the emergency plan is what makes the difference in each university as to whether an

emergency situation is handled effectively or not. The sports medicine and athletic training professions are constantly evolving through continuous research and studies. Emergency procedures are a topic of such continuing evaluation; however, no further research has to be conducted to inform those of this profession of the necessity of an emergency plan. One of the primary goals of this study is to identify what Division I-A and I-AA collegiate athletic programs' emergency policies and procedures include according to set guidelines and what improvements can be made. Providing updated information to athletic trainers allows them the opportunity to improve their emergency policies and procedures.

This study compares the specifics of emergency policies and procedures throughout the NCAA Division I-A and I-AA universities. The results of this study will include descriptive statistical analysis of chosen questions from the questionnaire, regression tables to identify statistical significance, and suggestions for improvements and further studies.

Significance of Study

Emergency situations can arise at any given time, some to include environmental disasters to serious medical conditions that can be extremely unfortunate or, in very severe circumstances, in a fatal outcome. Organizations have been involved in the development of aiding in the prevention, preparedness, and implementation of treatment and care to provide the most appropriate method of care in these emergency situations. Life-threatening situations can turn from bad to worse within a matter of seconds, a quick plan of action is essential when preventing the worse. This study is significant because it

attempts to answer some questions such as: 1) what are major universities doing to utilize the guidelines set forth in developing an emergency policies and procedures plan? 2) are smaller universities "short-changed" due to smaller budgets, does this provide a detrimental situation preventing the development and implementation of emergency polices and procedures, in turn neglecting the student-athletes of the university/college? 3) What kind of improvements need to be made in those universities/colleges that have existing emergency polices and procedures to benefit the care of an injured athlete in an emergency situation? The knowledge of current medical trends that exist specifically for the reasoning behind emergency policies and procedures is significant, not only for improvements but establishment of an emergency plan as well.

This study is also significant because the research can be used to change the way universities/colleges organize and develop their emergency policies and procedures to a more effective process to better serve the health care of the student-athlete. The current methods of head athletic trainers can be changed so that the emergency polices and procedures that are developed are more specific to injury and situation allowing for greater preparedness for an emergency and all aspects of any situation that may arise.

The obtained data can be a tool for current athletic trainers and other allied health professionals to attempt to provide current trends within the profession of athletic training. Educating others within the individual university/college medical team will help make more efficient changes to the university/college's existing emergency policies and procedures.

Hypotheses

The study tests the following research hypotheses:

1. There is significance between smaller and larger universities as to whether or not a particular institution has an established emergency policies and procedures plan.
2. There is significance between a university/college with established emergency polices and procedures, and having access to the essential equipment needed in the event an emergency should arise.
3. There is no significance difference among the amount of members or the particular professional status of the established medical team of each university/college.

Definitions

1. **NCAA** – The National Collegiate Athletic Association is voluntary association of approximately 1,200 colleges and universities, athletic conferences and sport organizations developed to the administration of intercollegiate athletics and athletes (Potss & Dick, 2002-03).
2. **ATC** – The Certified Athletic Trainer (ATC) is a competent individual that is vastly knowledgeable and trained in prevention, treatment and rehabilitation of injuries (Prentice, 2003). "An athletic trainer who is certified by NATA is a highly qualified paramedical professional

educated and experienced in dealing with the injuries that occur with participation in sports (2003)." The ATC provides an integral link between the athlete and physician as well as other allied health care personnel that is supported by the National Athletic Trainers' Association.

3. **NATA** – The National Athletic Trainers' Association is a non-profit organization that was developed to enhance the quality of health care for athletes that choose to engage in physical activity. The first effort to establish the NATA came in the late 1930s by athletic trainers at the college and university level, but was slow to ignite until 1950 (Prentice, 2003). In 1950 athletic trainers again attempted to organize the NATA officially, successful this time. The primary purpose of the development of the NATA was to establish professional standards for the athletic trainer.

4. **NATABOC** – The National Athletic Trainers' Association Board of Certification was established in 1970 to implement a program that requires athletic trainers' certification. NATABOC provides standards for entry into the profession of athletic training such as requirements not only academically but a clinical experience as well. The NATABOC provides a certification exam that those interested in participating in the practice of athletic training must pass successfully to be considered a certified athletic trainer.

5. **Division IA** – A higher education institution that is a member of the National Collegiate Athletic Association that has approximately 117 university/college members with a total of 148, 614 student-athletes. A division I member has to sponsor at least seven sports for men and seven for women with two team sports for each gender. Division I-A teams have to meet minimum attendance requirement of 17,000 people in attendance per home game with 30,000 permanent seats in their stadium (NCAA, 2000).

6. **Division IAA** – A higher education institution that is a member of the National Collegiate Athletic Association that has approximately 124 active university/college members. Division I-AA teams must compete within this level for football, and do not have to meet the minimum attendance requirements. One of the main issues that distinguish Division I-A and I-AA is the amount of full scholarships allotted for football. Division I-AA schools are only allowed to award 63 scholarships. Another difference is the size of athletic programs, generally Division I-AA schools are smaller and generate less money than Division I-A (NCAA, 2000).

7. **OSHA** – Occupational Safety of Health Administration was established in 1991 to provide standards for an employer to follow to protect their employees against exposure to blood borne pathogens. OSHA was developed to prevent injuries, protect the health and possibly save lives of employees throughout the nation.

8. **NFSHSA** – National Federation of State High School Association is an organization that was developed to provide information and coordination to the members and their related professional groups on interscholastic activities that exist to enhance educational experiences of high school students.
9. **NATA NEWS** – is a news magazine of the National Athletic Trainers' Association that is published monthly to keep the athletic training profession up to date of the current medical trends and business within the association that pertains to the members of the NATA.

Assumptions

A decision was made to use a survey as the most appropriate method to obtain the necessary data. The head athletic trainer should be the individual responsible for coordinating the implementation of the university's emergency policies and procedures, so it was concluded they would be the most appropriate individual to complete the survey. The assumptions were made that the head athletic trainers would know whether or not their university utilized emergency policies and procedures and the extensiveness of their content. It was also assumed the head athletic trainers at the various universities/colleges would understand the survey in its entirety and completed the questionnaire as intended by the researcher.

The questionnaire was reviewed by a committee that was made up of a certified athletic trainer teaching in a Division I-A university CAAHEP accredited athletic training

program, the chair of an academic department in a Division I-A university with a CAAHEP accredited athletic training program and a statistician. Suggestions were made to the content of the questionnaire and changes were made according to these suggestions in order to provide more accurate results.

Limitations of the Study

1. This study did not represent all higher education institutions. Since only Division I-A and I-AA universities were included in this study, the results cannot apply to other institutions at the lower divisions or any other institutions that belong to different collegiate associations.

2. The questionnaire was mailed addressed to the 'Head Athletic Trainer' of each university; it is understood that another individual could have completed the questionnaire other than the 'Head Athletic Trainer.'

3. The validity of this study was limited to certain circumstances that exist for all survey research that include questionnaires:

a) Not all questionnaires were returned, therefore, there is a slight possibility that all Division I-A and I-AA universities/colleges were not represented within the scope of this study.

b) Certain aspects of the study could have been misunderstood or misinterpreted by the reader. It could be that not all athletic trainers completing the questionnaire dealt with such situations, and did not feel it necessary to include certain topics in their emergency policies and procedures.

c) The questionnaire did not require the institution to specify in the Division in which they participated, so no real distinction could be made in the level of each school that returned their survey other than the enrollment size.

d) Not all questionnaires were completed in their entirety.

CHAPTER II

Review of Literature

The purpose of this review is to reveal what universities should be doing to carry out the guidelines of the NATA's position statement regarding emergency policies and procedures. The review will also be organized around some important injuries and/or situations that seem to be more common or serious for athletic trainers to deal with on the athletic court/field. Concussions, heat-related illnesses, lightning threats, cardiac arrest, spinal injury, and suicide among athletes are frequent or life threatening situations that must be addressed and have a formulated plan in the possibility of their occurrence, some universities might even apply these particular situations specifically within their emergency policies and procedures. Court cases that have resulted directly from the absence of an organized, formulated emergency policies and procedures will also be discussed in order to educate the reader in the consequences and dangers of not developing an emergency plan.

What kind of protection would universities have for the actions of their first responders, such as athletic trainers, without a written emergency policies and procedures? What kind of lawsuits will develop against schools if emergency policies and procedures were not put into effect in universities? Are schools providing the best possible health care for student-athletes if emergency policies and procedures are not put into action? Emergency policies and procedures help the athletic training and medical staffs provide prompt and appropriate response to emergency situations for their student-athletes. The plan provides an allowance for the athletic trainer to act quickly and

without second-guessing as to what is to be done in an emergency situation. The policies also serve as a written guide that would prove to be the university's bookmark to say whether they responded appropriately to the given situation. We know as a medical society that we need the policies and procedures, but how are universities responding to this need? Are they taking it upon themselves to organize and facilitate the organization needed for emergency policies and procedures, or are they waiting for traumatic event to happen to put their emergency policies and procedures to action? There is significant responsibility by the sports medicine staff to the university but there is a further responsibility to the student-athlete in order to provide a sense of safety in case of an emergency.

In developing standardized plans, the National Athletic Trainers' Association's position statement provides guidelines to educate athletic trainers and others on being prepared for an emergency situation. The guidelines listed begin by confirming that universities must have a written plan that should be able to adapt to any emergency medical situation that may arise involving athletic activities (Andersen et al., 2002). The National Safety Council states that, "Emergency Response Plans are also the law (Griffith et al., 2001)." The Occupational Safety and Health Administration (OSHA) state that "In order to minimize the consequences for the workplace and those inside it, effective emergency response plans are the answer (OSHA, 2002)." The Committee Chair of the Secondary School Athletic Trainers' Committee, Almquist (2001) stated, "I think that everybody knows they should have an emergency action plan. Whether it was actually in writing and whether it was complete and thorough is another story. I'm hoping people are taking a little bit better look at those things."

The NCAA Sports Medicine Handbook reads, "Each scheduled practice or contest of an institution-sponsored intercollegiate athletics event, as well as all out-of-season practices and skills sessions, should include an emergency plan (Potts & Dick, 2002-03)." Within the NCAA Sports Medicine Handbook guidelines are listed to help athletic trainers and team physicians to provide the best immediate care for the student-athletes. The NCAA Committee on Competitive Safeguards and Medical Aspects of Sports also developed to keep universities that are members of the NCAA informed on current trends and developments within the sports medicine profession (Potts & Dicks, 2002-03). Detailed within this handbook is a section specific to emergency care and coverage, stating guidelines for an on-field serious injury. The guidelines included in this handbook are listed as follows:

1. Players and coaches should go to and remain in the bench area once medical assistance arrives. Adequate lines of vision between the medical staffs and all available emergency personnel should be established and maintained.

Making sure that excess players and coaches are away from the emergency scene helps to reduce the amount of confusion that may arise in determining which player is injured and/or in immediate danger. Most universities have emergency medical personnel on site at the athletic facility, during competition, specifically for collision sports such as football games. During other scenarios, team physicians are normally present in case of an emergency. The athletic trainers or other medical personnel that are first to arrive on the scene to attend to the injured player must be able to visibly identify and summon

emergency personnel or team physician present at the game/competition if their assistance is needed without interference from bystanders.

2. Players, parents and non-authorized personnel should be kept a significant distance away from the seriously injured player or players.

It is also important for not only players to stay a significant distance away from the injured teammate, but parents as well. In an emergency situation it is common for those teammates and family and friends to show a great amount of concern, however, the medical staff has an important job to do. Interference caused by too many people talking at once with emotional distress can hinder their ability to work on the injured player and (can increase alarm) calm the family member at the same time.

3. Players or non-medical personnel should not touch, move or roll an injured player.

A teammate or coach that attempts to move the athlete that is injured could make a serious situation a critical situation, or mean the difference in that person walking or becoming paralyzed. You must leave the injured athlete as found to diminish the risk of injuring the player further.

4. Players should not try to assist a teammate who is lying on the field (i.e. removing the helmet or chin strap, or attempting to assist breathing by elevating the waist).

The helmet and chin strap of a football player aide in providing an automatic stabilization method for the player. In circumstances where there is a possibility of a cervical or spinal cord injury, removing the chinstrap will decrease the stability of the helmet, in turn causing the head to shift that would cause some spinal movement. The NCAA Sports

Medicine Handbook reports, "Unless there are special circumstances such as respiratory distress coupled with an inability to access the airway, the helmet should never be removed during the pre-hospital care of the student-athlete with a potential head/neck injury unless: helmet does not hold the head stable, airway is compromised due to design of helmet after facemask is removed, if facemask cannot be removed, or immobilization is compromised due to helmet (Potts & Dick, 2002-03)." Even more detrimental, removing the helmet without removing the shoulder pads will further increase spinal movement in an already unstable situation.

5. Players should not pull an injured teammate or opponent from a pile-up.

Teammates should not attempt to pull an injured player up from the ground or a pile-up; unless they are certain there is no injury.

6. Once the medical staff begins to work on an injured player, they should be allowed to perform services without interruption or interference.

The athletic trainers on site, as well as the medical personnel, are trained specifically to deal with emergency situations; anything that might come in the way of this medical assistance could be detrimental to the safety of the injured athlete. The more interruptions and complications from surrounding parties the slower and less efficient they can perform their duties.

7. Players and coaches should avoid dictating medical services to the athletic trainers or team physicians or taking up their time to perform such services.

It is common and understandable for coaches to become concerned for their players, but the coaches should never be dictate the sequence of events or actions by medical staff in

an emergency situation. Again, athletic trainers and emergency personnel on site have been trained and educated for these particular situations, the more they are interrupted by the emotional outburst of a coach the less likely they will be in getting their tasks completed quickly.

These again are guidelines set forth in order to provide guidance to athletic trainers and sports medicine personnel in providing the utmost care to athletes whom suffer from an injury or a life-threatening situation. Courson with the University of Georgia provides a template for an emergency policies and procedures that include three major components to include emergency personnel, emergency communication and emergency equipment (*NATA News*, 2001). Prentice (2003) reports that all sports programs should have an emergency plan that is prearranged and used to implement emergency procedures when necessary. Specific issues must be addressed according to Prentice (2003) that range from accessibility of phones, role delineation for the EMS activation and unlocking necessary gates or padlocks, to accompany the injured athlete to the hospital. Setting guidelines can only help direct the medical personnel responsible for the health and safety of the athlete what the athletic trainers, physicians or other sports medicine personnel do during their time of coverage cannot be controlled**.**

It is important that these emergency plans be dispersed and discussed among those considered to be part of the medical team. These individuals should also be involved in the development and annual revision of the emergency plans (Andersen et al., 2002; Prentice, 2003). An annual revision of the emergency policies and procedures is pertinent in order to keep records updated to new findings and research that occurs regarding emergency situation management. The NATA also state that those who are to

carry out these policies and procedures, such as the athletic trainers and physicians, should be specified in the plans along with qualifications that give them the skills to perform such emergency duties (Andersen et al., 2002). The major qualifications needed to deliver the emergency health care are, but not limited to, "cardiopulmonary resuscitation, first aid, and prevention of disease transmission (Rankin et al., 2001)." However, these are not the only qualifications; the knowledge of proper use of emergency equipment is also essential. In order to provide the timeliest emergency health care, the proper equipment needs to be readily accessible to emergency personnel. It is important to have emergency equipment on site at an athletic event, but it is also necessary to have a list available or direct knowledge as to its location for immediate retrieval.

The communication process between onsite medical staff and those needed for continued care is another fundamental factor to an emergency policies and procedures plan that needs to be in writing (Andersen et al., 2002). Communication with the athletic training staff, physicians, campus police, athletic facility staff, local police and fire departments, emergency rescue teams and emergency hospital personnel is relevant when an athlete must be cared for and/or transported to a particular facility. The method of this communication is also an integral component with obvious attention given towards the chain of command. There should be someone specifically assigned to activating EMS, this person can differ from day-to-day, but giving that role to an individual as a duty for the day at practice is important. Rankin et al. (2001) define the chain of command as "…lists of the emergency care team members and their rank in the emergency care decision-making process." Dependant on the emergency, it is not always necessary to

notify all members of the emergency team with every situation. If an athlete suffers from his/her teeth being fractured, the athletic training staff does not need to notify the EMS, but in turn if that athlete suffers from a compound fracture in addition to a fractured tooth, EMS should be notified. Due to this need for clarity, it should be specified within the emergency policies and procedures plan as to when each member of the medical team will be implemented according to the situation at hand. It is common for major universities to have multiple sites in which athletes are participating in daily athletic events. The communication between the sites is also crucial when dealing with the management of an emergency situation (Rankin et al., 2001). Rankin et al. (2001) describes methods of communication between athletic trainers on the field and those in the athletic training room facility such as telephones, cell phones, beepers and two-way radios. The type of method used, is not as important as having the actual ability to communicate. Another aspect of communication that is equally important if not more so is the person at the head of an athlete maintaining cervical stabilization. If cervical stabilization is deemed necessary on the field due to the extent of injury that that athlete has undergone, the person maintaining that stabilization should be the one in command. It is this person giving the commands and issuing what is to be done step-by step when spine boarding the athlete. No one person should attempt to speak over the person at the position of the head, nor should anyone try to relay duties to others themselves. This is crucial in a life-threatening situation because only one person should be giving out duties in order to provide the quickest and most effective emergency care.

Some universities have more than one hospital at their disposal for an emergency; in these situations it is imperative to know which hospital specializes in

particular traumas. Some hospitals do not have the equipment or the manpower to deal with severe trauma cases which leads them to refer to another hospital. If a referral is necessary to the limitations of one hospital, the travel time could be crucial in a life-threatening situation. Time is of the essence in an emergency situation; any delays can be detrimental to the survival of the athlete (Prentice, 2003). In knowing the capabilities of each hospital and what they can offer the university's trauma cases, time can be saved in not transporting the athlete a second time. The sports medicine/athletic training personnel must be aware of which hospital can deal with specific emergencies and which cannot. If a university has the capability to chose between trauma centers, it must be specified within the emergency policies and procedures plan which hospital will be utilized for the transportation of the athlete, specific to the situation being an orthopedic emergency versus a spinal or internal emergency (Andersen et al., 2002).

The NATA position statement states that an emergency policies and procedures should "be reviewed and rehearsed annually (Andersen et al., 2002; Prentice, 2003)." During this annual meeting, any modifications for improvement or correction must be accurately documented for record keeping and liability issues. Throughout the year, plans for improvement are common in the university environment; routes to particular facilities might have to be altered in order to maintain a quick route for emergency personnel. For this reason, annual revisions must address the situation at hand. The position statement also discusses that the personnel involved in the organization and sponsorship of athletic activities share a legal duty and responsibility in developing, implementing, evaluating, and providing emergency care to the student-athlete (Andersen et al., 2002). It is also recommended that university administration and legal counsel be

included in the annual reviewing of the emergency policies and procedures plan (Andersen et al., 2002). The presence of legal counsel will aide in any clarification or modifications that need to take place during this meeting as well.

Concussions

Concussions can serve as one of the most commonly and most difficultly assessed injuries by athletic trainers. At the collegiate level, Sturmi et al. (1998), state that there is an estimation of 5.3 to 8.2 % of incidence of concussions per four-year career period. Warren and Bailes (1998) report that 70% of the players in American football that get "knocked out" return to play in the same day and ice hockey players who sustained a concussion during play only 8% were seen in a follow-up visit with a physician. Some of the most common sports in which concussions occur are American football, boxing, lacrosse, ice hockey, rugby football, gymnastics, wrestling, soccer, motor racing, equestrian, martial arts, horse riding recreational, cycling, alpine skiing, diving and motorcycling (Sturmi et al., 1998). The American Academy of Neurology defines concussion as, "a traumatic induced alteration in mental status that may or may not be accompanied by a loss of consciousness (AAN)." Giza and Hovda (2001) describe concussions as, "any transient neurologic dysfunction resulting from a biomechanical force." Cerebral concussions have also been defined as an "immediate and transient impairment of neural functions, such as an alteration of consciousness, disturbance of vision and equilibrium due to brain stem involvement (Oliaro et al., 2001). Wojtys et al. (1999) defines concussion as "…any alteration in cerebral function caused by a direct or

indirect (rotation) force transmitted to the head resulting in one or more of the following acute signs or symptoms: a brief loss of consciousness, light-headedness, vertigo, cognitive and memory dysfunction, tinnitus, blurred vision, difficulty concentrating, amnesia, headache, nausea, vomiting, photophobia, or a balance disturbance." Delayed signs and symptoms may also include sleep irregularities, fatigue, personality changes, and an inability to perform usual daily activities, depression, or lethargy." There are various definitions of concussions printed in today's literature, but in essence all are correct.

A concussion should be evaluated, assessed and treated to the utmost of one's ability, the different types of Grades then becomes important. One should not dismiss a Grade I Mild concussion just because it's not a Grade III. It's not being suggested that a Grade III concussion is not serious, but there are tendencies to dismiss a Grade I causing a certain type of negligence. Warren and Bailes (1998) state, "It must be remembered that an athlete who is rendered unconscious may have only a mild concussion and be safe to return to play, whereas an alert athlete may have a developing subdural hematoma or other intracranial process that will evolve into an emergency."

In order to provide the most prompt and efficient treatment in any situation a thorough exam is crucial. Based upon signs and symptoms found during the evaluation, clarifying and classifying the severity of the concussion can be attempted. In assessing concussions, Wojtys et al. (1999) states, "The evaluation process has been subdivided into those measures that should be addressed on the playing filed, when an athlete is down, and those that can be performed on the sideline after the player has either been removed from the playing surface or has come off the field independently." A

concussion should be addressed in the same manner as any other injury. A thorough evaluation should essentially begin with the history of the athlete followed by observation, palpation, active and passive range of motion, dermatomes and myotomes which would include your manual muscle testing, and special tests. Obviously, all of these will not always apply when assessing a concussion, but overall the examination must take place in the same order as any other. Beginning with the on the field evaluation the level of consciousness must be determined first along with any other serious injuries that may be present as well. Once the athlete has been approached, whether or not the athlete is breathing, has an obstructed airway and the presence of a pulse needs to be determined. The ABC's evaluation should be performed while the athlete is in the same position in which they were found upon the initial approach in order not to jeopardize any cervical spine injury that could be present. Knowing the athlete's level of consciousness will help the medical personnel on the field determine how serious the situation is and what plan of action must be taken. "By observing the patient's eyes and motor and verbal responses, one can quantify the level of consciousness (Wojtys et al., 1999)." The Glascow Coma Scale is a means of communication and documentation between medical professions in discussion of an athlete's level of consciousness during a quick on-field evaluation (American Academy of Orthopeadic Surgeons, 1991). "Such grading not only facilitates documentation and communication but can also be used to determine prognosis and to allow for assigning a disposition according to various published protocols (American Academy of Orthopeadic Surgeons, 1991)." A Glascow Coma Scale and the Grade of the concussion once determined are crucial points to address with the arriving EMTs or the attending physician. "A severe head injury is

usually defined at a score of 8 or less; full scale is 15; lowest score is 3 (American Academy of Orthopeadic Surgeons, 1991)." A score on the Glascow Coma Scale of 11 or higher can be associated with an excellent prognosis whereas, a rating of 7 or less is considered to be serious (Wojtys et al., 1999). It is not uncommon for an athletic trainer or an EMT to have a printed card of the Glascow Coma Scale handy when performing an evaluation. When assessing the athlete is a wise to refer to the printed card to make sure that all aspects of the scale are covered. When the athletic trainer has gone through every aspect of the scale a score should be determined from each of the sections; eyes, verbal, and motor. When a score from each section is gathered each section should be added up to the overall score (E+V+M= 3-15) (Refer to Table 1).

It's very common when approaching an athlete that has been injured to conduct the history and observation parts of the evaluation together. When an athletic trainer approaches the injured athlete on the field, the position of the athlete needs to be observed immediately. "Any athlete with a period of unresponsiveness, however brief, would be considered severe, or grade 3, head injury by recent proposed schemes (American Academy of Orthopeadic Surgeons, 1991)." The posture of the athlete, as well as the verbalization coming from the athlete is an important part of the observation. If the athlete is not moving their extremities this can be a very strong indicator of a possible cervical spine injury. A decorticate or decerebrate position of an athlete are both strong indicators that the athlete is in serious danger. Decorticate is when the athlete is found with arms and hands in a flexed position whereas, decerebrate is when the athlete is found with arms and hands and legs extended rigidly. Noting the position of the athlete is something that is usually done as the athletic trainer is making their way onto

the field to assist the athlete. Upon arrival an important aspect to observe is whether or not the athlete is vomiting, bleeding, has any facial deformities, head deformities, rhinorrea (clear fluid coming from the nose), anisocoria (unequal pupils), ecchymosis behind the ears (Battle signs), otorrhea (cerebral spinal fluid from the ear), nystagmus (twitching of the eyes in their regular movement pattern), Palsy signs, and convulsions. Along with the level of consciousness, the mechanism of injury must be determined. The mechanism of injury is important in order to determine the cause of the concussion. If the athletic trainer did not witness the mechanism of injury for themselves the next option would be to question anyone who did see the incident or talking to the involved athlete, if conscious. When dealing with head injuries its essential to determine what caused the injury to the athlete. Concussions can occur by a direct impact of the head against a hard surface or from a forceful rotational or a shearing that can be transmitted to the brain (Wojtys et al., 1999). The brain can usually tolerate a forceful blow to the head from a direct compressive force unless it results in a fracture or other focal pathology (Sturmi et al., 1998). A rotational force with acceleration and/or deceleration creates a tensile and shearing force to the brain and surrounding tissue, this in turn causes a more serious injury to structures other than the area of impact (1998). When an athlete's head strikes a fixed object injury is inflicted on that particular area of the brain, however, the brain continues to move within the skull, striking the opposite side of the skull causing a forceful deceleration. This is known as countercoup injury. The brain can undergo further trauma resulting in a concussion due to a forceful fall or sharp blow to the athlete's chest or pelvis. At the time of the fall or blow to the chest, the strength of the athlete's neck muscles might not be what they need to be to reduce the brain from the

absorption or dissipation of the forces transmitted to the head. The tensile strength of the neck muscles can aid in decreasing the amount of trauma the brain receives with this particular mechanism of injury (Sturmi et al., 1998). Sturmi et al. (1998) states, "The athlete's equipment, base line neck strength and ability to tense their neck muscles may reduce the potential for serious injury by absorption or dissipation of these forces. Those forces not absorbed are transmitted to the brain and concussive injury can result."

If an athlete is unconscious upon immediate examination, the athletic trainer should automatically assume a cervical spine injury and implement proper immobilization until it can be otherwise proven. Once immobilization has been established, the decision to move the athlete to the sidelines or transport to the nearest emergency facility must be determined. The decision to spine board the injured athlete must be made and executed once cervical stabilization has been established. In this circumstance, the chain of command begins with the individual providing cervical stabilization. The specifics of cervical stabilization will be discussed later in the paper with spinal injuries. When an athlete is considered to be unstable and spine boarding is necessary, that athlete will be immediately transported to the nearest emergency facility. At this point, continued evaluation is taken over by emergency personnel to be completed en route to the emergency facility, as well as, upon arrival. Any pertinent information obtained on the field during examination should be immediately communicated with the emergency personnel upon their arrival. If the athlete is declared to be in stable condition, the decision to move the athlete off the field can be made as long as such movement does not compromise the safety of the athlete. The athlete should be moved to the sidelines or courtside to complete a more thorough evaluation.

Once the risk of cervical spinal injury has been eliminated, the level of consciousness has been established, and the athlete is alert and cognizant of his/her surroundings, the athlete can then be moved from their original position to an upright sitting position. Wojtys et al. (1999) state that the sitting position will often decrease any intracranial pressure that in turn will help clear up the athlete's confusion and apprehension. When the athlete is able to comprehend the situation better, they can then be assisted to a standing position and taken to the sidelines or courtside where a thorough history must taken to gather pertinent information. "The athlete's orientation to time, place, and person should be determined by asking the date, month, day of the week, the score, the period of the game, or the play in which he or she was injured (Wojtys et al., 1999)." Questions should be asked of the athlete to evaluate whether the injured athlete is experiencing symptoms such as: confusion, dizziness, headache, blurred vision, diplopia, fatigue, nausea, and photo/phonophobia. The NCAA Sports Medicine Handbook states that symptoms of concussion are as follows: "headache, confusion/disorientation, tinnitus, dizziness, nausea, amnesia, irritability, hyperexcitability, loss of consciousness, unsteadiness, visual disturbance and concentration difficulty (Potts & Dick, 2002-03)." These particular symptoms can also be present along with signs such as: altered levels of consciousness, dazed appearance, facial appearance, amnesia, papillary concordance, papillary accommodation, poor concentration ability, apprehension, increased symptoms with exertion (Sturmi et al., 1998). During this time the presence of amnesia can also be established and whether it is retrograde amnesia or antegrade amnesia. Retrograde amnesia is if the athlete cannot remember events after the time of the injury whereas, antegrade amnesia is when the

athlete is unable to remember events prior to the injury. The history and observation should be obtained as quickly as possible, followed immediately by the neurological. The neurological exam should include the examination and evaluation of the cranial nerves. The twelve cranial nerves must be assessed according to their motor and sensory distribution; some of the cranial nerves have both motor and sensory endpoints, while others have just one. The twelve cranial nerves are listed as follows: olfactory, optic, oculomotor, trochelar, trigeminal, abducens, facial, auditory, glossopharyngeal, vagus, spinal accessory, and the hypoglossal (Seidel et al., 2003). The cranial nerves and their function are listed in Table 2.

Along with the testing of the twelve cranial nerves other cognitive testing must be conducted. On the field quick cognitive tests should be performed that include asking the athlete to remember three words in the order in which the examiner says them and then return to the athlete frequently to ask those three words. Sideline evaluation for cognitive testing consists of an assessment of orientation to time, place, person, situation and memory and concentration tests. "The Standardized Assessment of Concussion (SAC) was developed to establish a valid, standardized, systematic sideline evaluation for the immediate assessment of concussion in athletes (Wojtys et al., 1999)." SAC is an attempt to measure orientation, immediate memory, concentration and delayed recall from conducting a series of tests from three different forms. The purpose behind the formation of SAC was to provide follow-up testing of the athlete who suffered from a concussion to follow any signs of post-concussive signs and symptoms.

Unfortunately, when assessing concussions the standard of care is hard to determine due to the lack of a universally accepted standards of care for the assessment

and treatment of concussions. "Several concussion grading scales and return-to-play guidelines have been proposed in the literature; however, none has emerged as a "gold standard" (Osborne, 2001)." The Sports Medicine Handbook reads, "Based on the current lack of consensus among the medical community on management of concussions, the NCAA does not endorse any specific concussion grading scale or return-to-play criteria (Potts & Dick, 2002-03)." The majority of the established concussions scales are based upon the number of and length of symptoms that the athlete experiences. Osborne (2001) states that a primary criticism in regards to grading scales is that they are based on loss of consciousness and amnesia, when in reality the majority of the concussions suffered does not involve symptoms of this severity. Osborne (2001) also continues by stating, "Another problem is that the scales rely heavily on anecdotal clinical evidence and limited scientific data. Symptoms are measured based on the athlete's input, which often underreport symptoms because of a strong desire to return to play." The three most widely used grading scales for concussions are the Cantu Grading Scale, the Colorado Medical Society Guidelines, and the American Association of Neurology Guidelines.

The first grading system is the Cantu Grading System was developed in 1986 by Cantu and was recently revised in 2001. Cantu's grading system has an increased emphasis on posttraumatic amnesia (PTA) and other post-concussion signs and symptoms over that of loss of consciousness (LOC) (Momsteams.com, 1997). Cantu's grading system ranges from a Grade I mild concussion to Grade III severe concussion. A Grade I concussion is that in which the athlete has no LOC present but experiences either PT or post-concussion signs and symptoms that resolve in less than 30 minutes. A Grade II or moderate concussion, according to Cantu, consists of the athlete having a LOC that

lasts less than one minute and suffers from PTA or post-concussion signs or symptoms lasting longer than 30 minutes but less than 24 hours. Cantu classifies a severe concussion as having the presence of LOC lasting more than one minute or PTA lasting longer than 4 hours. A Grade III may also include the athlete suffering from post-concussion signs or symptoms that last for longer than 7 days.

The second of the three grading systems is the Colorado Medical Society Guidelines. This scale was proposed in 1991 along with their return to play guidelines. The Colorado system primarily emphasizes mostly on PTA and LOC over the athlete's post-concussion signs and symptoms. A Grade I, mild concussion according to the Colorado system consists of the athlete suffering from a transient mental confusion, no PTA and no LOC. The Colorado system classifies a Grade II concussion as the absence of LOC but the athlete is in a state of confusion with PTA. A concussion is classified as a Grade III according to the Colorado Medical Society if the athlete suffers from any LOC, no matter how brief.

The third grading system is the American Academy of Neurology (AAN) Guidelines. A concussion under a Grade I classification according to the AAN includes no LOC, however, the athlete does experience transient confusion with symptoms or abnormalities that resolve in less than 15 minutes from the time of the onset of the concussion. A grade II is still categorized with no LOC and symptoms or abnormalities lasting longer than 15 minutes. A grade III concussion according to the AAN is when an athlete suffers from any LOC being brief in seconds or prolonged in minutes. Each system also has return to play guidelines that should be monitored to the strictest supervision.

Returning an athlete to play following a concussion can be extremely detrimental to the health of the athlete. Onate et al. (2000) state, "The return-to-play decision after a mild head injury is one of the most difficult decisions for a certified athletic trainer or team physician." After an athlete has a brain injury, mild or severe, the brain needs time to recover; returning an athlete too soon following this trauma can be catastrophic. Guidelines have not only been put into action to classify the grades of concussions, but return-to-play guidelines have also been established. An athlete's return to play can begin anywhere within the same day of the concussion to the next competitive season following the concussion, depending on the severity and duration of symptoms. Not only is the length of time symptoms are presented important, but the number of concussions the athlete has suffered as well. If an athlete has suffered from one grade one concussion, Cantu says that they can return to play after one week of being asymptomatic as long as the CT or MRI is negative. Colorado Medical Society states that the athlete should be removed from contest and may return to contest in 20 minutes as long as they have been asymptomatic for those 20 minutes. The American Academy of Neurology (AAN) states that the athlete should be removed from the contest and may return only if they have been asymptomatic for 15 minutes (Momteams.com, 1997). If an athlete has suffered from their second grade I concussion Cantu states that they can return to play in two weeks as long as they remain asymptomatic for one week prior to their return. The Colorado Medical Society states that the same athlete may not return to play until they are asymptomatic for one week; the American Academy of Neurology has the same guidelines for the second grade I concussion. For a third grade one concussion Cantu suggests that the athlete should terminate the rest of the season and only return to play the

following season as long as they are asymptomatic. The Colorado Medical Society recommends that the athlete should end that particular season but can return to play in three months as long as they remain asymptomatic. Returns to play guidelines have not been established by the American Academy of Neurology for a third grade one concussion.

A first time grade two concussion Cantu, the Colorado Medical Society, and the American Academy of Neurology suggest that the athlete may return to play after one week of being asymptomatic. The AAN recommends that if an athlete with a first time grade II concussion has symptoms that persist that a CT scan and/or MRI be performed. If a second grade two concussion occurs Cantu and the Colorado Medical Society suggest that the athlete be removed from contest and are not allowed to return to play for at least one month. During the conclusion of this one-month of no practice, the athlete may be permitted to return to play if they are asymptomatic for one week. Both guidelines, Cantu and Colorado, suggest the consideration of ending the athlete's season with the second grade two concussion. The American Academy of Neurology recommend that the athlete not return to play for at least two weeks of being asymptomatic, and that the season should be terminated if a MRI or CT scan detected any abnormalities. Following a third grade two concussion, Cantu and the Colorado Medical Society suggest that the athlete be removed from play for the remainder of the season and may return to play the following season only if asymptomatic. Once again, the AAN has no recommendations were listed for return to play guidelines following a third grade II concussion.

Cantu's guidelines suggest that for a first grade three concussion that the athlete not return to play for a minimum of one month, but can be permitted to return to play

following one week of being asymptomatic. Colorado Medical Society recommends that the athlete not return to play and be immediately transported to the hospital for an evaluation. The athlete may return to play in one month after two weeks of being asymptomatic. The AAN suggests that the athlete not return to play and be transported to the hospital if unconscious or experiencing any signs of neurological abnormality. The AAN continues by suggesting that a CT or MRI be performed if post-traumatic symptoms or signs persist. If the athlete portrays any signs of LOC for a brief period of time (seconds), the AAN recommends that they be permitted to return to play after one week of no symptoms. However, if the LOC is more prolonged, into minutes, the athlete is held from participation until they are asymptomatic for two weeks. If an athlete suffers from their second grade three concussion both Cantu and Colorado Medical Society suggest that the athlete's season be ended and may return to play the following season if asymptomatic. The American Academy of Neurology suggests that the athlete who suffers from a second grade III concussion not return to play until one month of being asymptomatic. However, if a CT scan or MRI has any abnormalities, the season is to be terminated. The Colorado Medical Society is the only guideline listed for a third grade three concussion in which they suggest that the season be terminated and strongly discourage any further participation in contact or collision sports. Wojtys et al. (1999) state, "Caution should always be exercised by the medical staff responsible for making return-to-play decisions because the athlete's motivation as well as peer or coaching pressure may be significant factors." Although a headache cannot be considered a strong indication of a concussion, one must not dismiss an athlete complaining of a headache following a head injury. Wojtys et al (1999) state, "Any new headache in the first 48-72

hours after a concussion or an unusual headache should be considered a significant symptom and should preclude play; either is also an indication that further medical evaluation is needed." A physician should evaluate any athlete that suffers from a concussion whether the concussion is mild or severe.

Several topics must be addressed with regards to concussions and follow-up care of an athlete who sustains a concussion. Post-concussion syndrome occurs after an athlete has sustained a concussion and their symptoms remain for a prolonged period of time. It is important to continually evaluate the athlete as long as their symptoms are present in order to determine if the athlete's condition is improving or deteriorating. Symptoms of a post concussion syndrome are described by the NCAA guidelines as "impaired memory and concentration, persistent headache, fatigue, mood and sleep disturbances and dizziness (Potts & Dick, 2002-03)." If an athlete suffers from post-concussion syndrome, additional tests must be preformed to assist in the diagnosis of the severity of the injury and rule out any bleeding in the brain; tests that are crucial in evaluating the brains structure include the computed tomography (CT) or magnetic resonance imaging (MRI).

The presence of post-concussion syndrome symptoms are a concern, but even more of a concern is second-impact syndrome (SIS). Second-impact syndrome can be defined when an athlete suffers from a "second concussion while still having symptoms from a previous concussion (University of Pittsburgh Department of Neurosurgery, 2002)." The NCAA Sports Medicine handbook (2002-03) defines second-impact syndrome, "…when an individual sustains a second, often minor trauma to the head before the initial symptoms of the first head injury have resolved. The resulting loss of

autoregulation of the brain's blood supply could result in vascular engorgement and herniation of the lower brain, causing death." The Department of Neurological Surgery at the University of Pittsburgh (2002) state Schneider as the first to describe a situation where two athletes die after suffering from a minor head injury while recovering from a previous head injury in 1973. Then in 1984, Saunders and Harbaugh "reported the same scenario in a 19-year-old college football player and coined the term 'second-impact syndrome' (SIS) (University of Pittsburgh Department of Neurosurgery, 2002)."

Hunt (2000) reported an incidence of a 16-year-old football lineman who took a blow to the head that sent him directly to the sidelines during the game. Following the game the athlete reported that he had lost consciousness briefly, not aware of the risk to him and due to a lack of a sports medicine staff at the high school, the athlete was allowed to return to participate in practice and the game that next weekend. The athlete went in for a mild tackle, and was never able to walk again. The athlete is a patient in a neurological care center with the unable to walk, speak or think clearly. Again, significance must be placed on the mildest of concussions and the immediate reporting of these signs and symptoms to the parents or the sports medicine staff available. Hunt (2000) reports, "According to the Brain Injury Association and the Centers for Disease Control, SIS is difficult to track because many people do not report the first concussion, so a second impact is mistakenly thought to be a severe first impact. SIS, the institutions have found, is most dangerous to teens because they are least likely to take minor signs seriously or seek medical help. The University of Pittsburgh (2002) stated that twenty-six deaths have occurred due to SIS and at least twenty of those have taken place within the past ten years. A physician, coach or athletic trainer must be aware of post-

concussion syndrome to avoid returning the athlete too soon that has suffered from a concussion, and ultimately avoiding an occurrence of second-impact syndrome.

Heat-Related Illnesses

Heat-related illnesses are a common among the athletic population, and can become a serious problem if treated properly. Some heat-related illnesses can be relatively mild, while some can be serious and life threatening. One of the most common times of the year that heat-related illnesses occur is during the pre-season of outdoor sports, which normally consist of two-a-day practices. Drake and Nettina (1994) published an article that reviews the thermoregulation and pathophysiology of heat injuries that helps to clarify what happens inside the body during heat-related injuries. "Thermoregulation, or the maintenance of normal core body temperature, seeks to balance heat accumulation and heat dissipation (Drake & Nettina, 1994)." The hypothalamus, a small portion of the brain, acts as the body's temperature regulator to help guide thermoregulation in the body. The thermo receptors in the body pick up various stimuli that act on the hypothalamus to set off the body's physiologic response to increased or decreased body temperature through the cardiovascular system, skin, and muscles (Drake & Nettina, 1994). When thermoregulation is compromised due to a heat-related illness, the core body temperature increases, and heat accumulation must occur. "Heat injury occurs when the thermoregulatory balance is overtaxed and heat accumulation outweighs heat dissipation (Drake & Nettina, 1994)." Heat has to be released to maintain equilibrium; this is accomplished through thermoregulatory

physiologic changes. This occurs through heat accumulation through evaporation, convection, conduction and radiation. Evaporation is the main mechanism for cooling the body and occurs through perspiration. When the body core temperature increases, perspiration occurs due to water and electrolyte loss. The perspiration the body produces must evaporate, but in hot humid conditions the evaporation process is dramatically decreased due to the high levels of water content in the air, therefore, reducing heat dissipation. Convection is the transfer of heat through air currents, such as wind, and another important way that heat is transferred. Due to excessive amount of clothing, lack of wind and ambient air temperatures that reach and exceed the body's internal temperature, convection can be compromised. Conduction is the transfer of heat through direct contact and radiation is the transfer of heat by electromagnetic waves from one solid mass to another.

There are three classifications of heat illnesses: heat cramps, heat exhaustion, and heat stroke. Binkley et al. (2002) report, report that episodes of heat syncope and exertional hyponatremia are equally important to address in heat related illnesses. Exercise-associated muscle or heat cramps can be defined as a condition in which acute involuntary muscle cramps occur during or following intense practices. These cramps can be attributed to dehydration, electrolyte imbalances, neuromuscular fatigue or any combination of these causes (Binkley et al., 2002).

Heat syncope is a condition that happens to people who are exposed to high environmental temperatures. "This condition is attributed to peripheral vasodilation, postural pooling of blood, diminished venous return, dehydration, reduction in cardiac output, and cerebral ischemia (Binkley et al., 2002)." Heat syncope occurs more often in

several circumstances; one situation is in people with heart disease and another is with people who are taking diuretics. This heat-related illness usually occurs within the first five days of acclimatization, after a person has been standing for a long period of time after activity or after a rapid upright position from being seated or resting (Binkley et al., 2002). Listed signs or symptoms for heat syncope are as follows: dehydration, fatigue, tunnel vision, pale or sweaty skin, decreased pulse rate, dizziness, lightheadedness, and/or fainting (Binkley et al., 2002).

"Heat exhaustion is the inability to continue exercise associated with any combination of heavy sweating, dehydration, sodium loss, and energy depletion (Binkley et al., 2002)." Heat exhaustion in its most serious state is difficult to distinguish from heat stroke without taking a rectal temperature to determine the athlete's body core temperature. With heat exhaustion the body's core temperature is elevated or normal. Signs and symptoms of heat exhaustion other than a slightly elevated or normal body core temperature are as follows: dehydration, dizziness, lightheadedness, syncope, headache, nausea, anorexia, diarrhea, decreased urine output, persistent muscle cramps, pallor, profuse sweating, chills, cool and clammy skin, intestinal cramps, urge to defecate, weakness, and hyperventilation (Binkley et al., 2002).

Heat stroke can be divided into two forms: classic and exertional (Drake & Nettina, 1994). Drake and Nettina (1994) define both classic and exertional heat stroke as the following, classic heat stroke occurs "usually during periods when temperatures and humidity remain high day and night" whereas exertional "occurs when the body can no longer dissipate the heat produced during strenuous physical exertion." The NATA's position statement on heat-related illnesses states that exertional heat stroke is when the

body's core temperature is elevated to approximately 104 degrees Fahrenheit and usually occurs during physical activity. This increased body temperature is also present with signs of organ system failure due to hypothermia (Binkley et al., 2002). The organ system failure is due to the over heating of the organ tissues, which in turn causes a malfunction in the brain's temperature control center, circulatory failure or endotoxemia which is a combination of the previous two (Binkley et al., 2002). Other complications that can also occur that can contribute to the eventual death of the involved athlete are: lactic acidosis (the build up of lactic acid in the blood), hyperkalemia (the increase in the amount of potassium in the blood), acute renal failure, rhabdomyolysis (the destruction of skeletal muscle with strenuous exercise), and disseminated intravascular coagulation (a bleeding disorder) (Binkley et al., 2002). "Exertional heat stroke occurs when the temperature regulation system is overwhelmed due to excessive endogenous heat production or inhibited heat loss in challenging environmental conditions and can progress to complete thermoregulatory system failure (Binkley et al., 2002)." Heat stroke is a life threatening condition and has known to be fatal unless recognized promptly and treated quickly. Signs and symptoms of exertional heat stroke are as follows: high body-core temperature of approximately 104 degrees of Fahrenheit, central nervous system changes, dizziness, drowsiness, irrational behavior, confusion, irritability, emotional instability, hysteria, apathy, aggressiveness, delirium, disorientation, staggering, seizures, loss of consciousness, coma, dehydration, weakness, hot and wet or dry skin, tachycardia, hypotension, hyperventilation, vomiting, and diarrhea (Binkley et al., 2002). Exertional hyponatremia is described by Binkley et al (2002), as a "relatively rare condition defined as a serum-sodium level less than 130mmol/L." The low serum-

sodium levels occur when the physical activity in hot temperatures exceeds four hours. "Two, often-additive mechanisms are proposed: an athlete ingests water or low-solute beverages well beyond sweat losses (also known as water intoxication), or an athlete's sweat sodium losses are not adequately replaced. The low blood-sodium levels are the result of a combination of excessive fluid intake and inappropriate body water retention in the water-intoxication model and insufficient fluid intake and inadequate sodium replacement in the latter (Binkley et al., 2002)." It is the intracellular swelling due to excessive water intake or inadequate sodium intake that occurs that can cause fatal neurologic and physiologic dysfunction (Binkley et al., 2002). Signs and symptoms of hyponatremia are as follows: body-core temperature of 104 degrees of Fahrenheit, nausea, vomiting, extremity swelling, low blood-sodium level, progressive headache, confusion, significant mental compromise, lethargy, altered consciousness, apathy, pulmonary edema, cerebral edema, seizures, and coma (Binkley et al., 2002). Hyponatremia can be prevented just as all other the other heat-related illnesses. Hyponatremia is preventable by matching fluid intake with the sweat and urine loss that occurs from the athlete, as well as, taking in the appropriate fluids.

There are predisposing factors that can contribute to athletes suffering from heat-related illnesses. As mentioned before, athletes suffering from heart disease are more susceptible to dehydration due to their lack of free water intake (Drake & Nettina, 1994). Drugs such as diuretics that reduce the body's ability to perspire and remove excess heat correctly can also contribute to heat-related illnesses (Drake & Nettina, 1994). Binkley et al. (2002) state that there are specific medical conditions that can predispose the athlete to heat injury such as: malignant hyperthermia which increases the body's core temperature

and causes muscle rigidity, neuroleptic malignant syndrome which increases the body's core temperature, arteriosclerotic vascular disease which compromises cardiac output and blood flow, scleroderma is a skin disorder that decreases the body's ability to produce sweat, cystic fibrosis which causes an increase in salt loss in sweat that in turn increases the risk for hyponatremia, and sickle cell trait which limits blood flow distribution and decreases oxygen-carrying capacity that is exacerbated by exercise.

The job of the athletic training staff is to do their best to aide in the complete prevention of the athlete suffering from any heat-related illness. With this specific goal in mind, the NCAA and the NATA have set forth specific guidelines to help aid the athletic training staff in the proper care and prevention of heat-related illnesses. The NCAA Sports Medicine Handbook (2002-03) describes seven guidelines in prevention of heat illnesses:

1. A participating athlete should be given a complete physical examination before physical activity is permitted in order to obtain a complete medical history of the athlete and any previous history of heat-related illnesses.
2. Acclimatization various anywhere from seven to fourteen days. All training during hot/humid weather should be conducted at cooler times of day.
3. Clothing and protective equipment should also be taken into consideration. Rest periods should be taken in order to loosen all clothing and equipment to allow heat loss.

4. Regular measurements of environmental conditions are recommended.
5. Fluid replacement must be available for the athletes to avoid dehydration.
6. Recording the body weight of the athlete before and after each workout and practice can help detect dehydration. If five percent of the body weight has been lost, an evaluation should be conducted and activity restricted.
7. Some athletes should be monitored more closely than others due to their increase risk of heat-related illnesses due to inadequate acclimatization or aerobic fitness, excess body fat, a history of heat illness, a febrile condition, inadequate rehydration, and those who tend to push themselves to their physical limit.

The National Athletic Trainer's Association presented recommendations for the prevention, recognition and treatment for heat-related illness in their position statement. The "position statement provides recommendations that will enable certified athletic trainers (ATCs) and other allied health providers to (1) identify and implement preventive strategies that can reduce heat-related illnesses in sports, (2) characterize factors associated with the early detection of heat illness, (3) provide on-site first aid and emergency management of athletes with heat illnesses, (4) determine appropriate return-to-play procedures, (5) understand thermoregulation and physiologic responses to heat,

and (6) recognize groups with special concerns related to heat exposure (Binkley et al., 2002)."

The NATA's recommendations for prevention are detailed to provide the most appropriate guidelines to ensure the ultimate safety of the athlete's participating in sporting events that occur in the hot/humid environment and are as follows. The most important aspect of dealing with any emergency situation is to ensure the most appropriate medical care that is available in aiding the suffering athlete. The medical personnel, usually a certified athletic trainer, who are directly responsible for the safety and prevention of the athletes should be well trained in the prevention, recognition, and treatment specifically related to heat injuries. A thorough pre-participation screening prior to the participation is essential to identify athletes with risk factors that predispose them to heat illnesses. Athletes should be acclimatized gradually to progress the intensity and duration of the workouts slowly over a period of ten to fourteen days not exceeding 1-2 hours per session in the heat (Binkley et al., 2002). Educating the athletes and the coaches in regards to the prevention, recognition, and treatment of heat illnesses, the risks involved with exercising in the hot, humid environment and proper fluid replacement that matches the amount of sweat and urine losses to maintain hydration during exercise. Fluid replacement will be addressed later in this section. Athletes should be encouraged to sleep six to eight hours a night in a fairly cool environment, eat a well balanced meal and maintain the proper hydration status needed to practice at the strenuous intensity level in the heat. Athletes should be discouraged from skipping meals due to increase of fatigue or drowsiness. Skipping meals will only contribute to heat illnesses. The relative humidity should be taken by using a wet-bulb globe temperature measured by a sling

psychrometer to determine the risk of the environmental conditions. All activities should be modified under high-risk conditions to prevent heat illnesses. Once athletic trainers have discovered that the conditions are at high-risk recommendations to coaches discussing the situation, but practices may continue. In these high-risk conditions where the athletes are at risk for heat-related illnesses athletic trainers must be aware of the situation and adjust accordingly. Conditions should be checked before each practice and if at all possible these practices should be scheduled around the hottest time of day. Athletic trainers should make these recommendations to alter practice conditions, especially when conditions are high in risk, it is up to coaches to follow these recommendations and make the appropriate changes to their team's schedule. It's not easy to convince a coaching staff to schedule practices around the heat of the day so adequate amount of water breaks are essential during intense training sessions. Rest periods at meal times should be implemented to allow 2-3 hours for the food, fluid, nutrients, and electrolytes to move into the small intestine and bloodstream before the athletes undergo a second session. Readily available fluid during practice sessions should be accessible at any time. Weigh ins/outs for high-risk athletes before and after practices to estimate the amount of body water loss during the day, especially high-risk athletes, should be conducted and monitored.

Minimizing the amount of clothing and equipment that the athlete wears during the practice session is important because too much clothing will reduce the athlete's ability to sweat. Other measures that may aid in preventing heat illnesses in athletes are to decrease the time in which the athletes spend warming-up and, when available, find a shaded area to conduct warm-up and practice with cooling systems. Particular supplies

should be readily available on the field to aide in the prevention of heat-related illnesses and provide first aid assistance in the event of an emergency situation. These supplies are as follows: supply of cool water and/or sports drink, ice for injuries or body cooling along with drinks, rectal thermometer to assess the most accurate body core temperature, telephone to communicate with emergency personnel and a tub, wading pool, or kiddy pool in order to immerse the athlete when necessary. Notifying emergency personnel and local hospitals before these practices begin will make them aware of the possible scenarios that may arise due to the increased temperatures.

The position statement goes into further detail with the recognition and treatment of heat illnesses. The statement breaks down each heat-related illness informing the athletic trainer or medical personnel of the signs and symptoms to be aware of in case an athlete were to approach complaining of similar situations. Athletic trainers should be aware of the difference between each individual heat-related illness that could occur in athletes to provide the most efficient treatment and safety possible.

The NATA published a subsequent position statement on Fluid Replacement in 2000. Although this statement discussed similar points with that of the exertional heat illness statement it examines other important factors when dealing with heat-related injuries. The objective of this position statement was to 1) provide useful recommendations to optimize fluid replacement for athletes, 2) emphasize the physiologic, medical, and performance considerations associated with dehydration, and 3) identify factors that influence optimal rehydration during and after athletic participation (Casa et al., 2000)." A protocol should be the first thing to be established to include the sweat rate, sport dynamics, environmental factors, exercise duration and

intensity, acclimatization state and individual preferences. The hydration protocol needs to be sport-specific in order to provide the most benefits to the athletes; meaning that baseball, football and track and field, for instance, have ample opportunities to hydrate frequently so the amount that these athletes consume can be smaller in volumes at a pace that's beneficial compared to the rate they are sweating. Soccer, lacrosse and distance running have less time and frequency to hydrate, so the fluids they consume must be higher in volumes. Fluid replacement beverages must be easily accessible for athletes during both competitions and practices. Water bottles are suggested to not only give the athletic trainer the ability to monitor the amount of fluid each individual athlete is ingesting, but the athlete tends to so drink more frequently too.

The athlete should be instructed to pay attention to the color of their urine, the lighter the color the better hydrated the athlete is and the darker the urine the less hydrated. The amount of water or sports drink that the athlete should consume and how soon before each activity should consist of approximately 500-600mL of water or sports drink 2-3 hours before exercise and 200-300mL 10-20 minutes prior to play (Casa et al., 2000). To ensure proper fluid replacement the athletes should consume 200-300 mL of water or sports drink every 10-20 minutes during practice or competition. Not only is fluid-replacement important before and during competition, but afterwards is equally significant to replace within two hours following exercise. The National Athletic Trainers' Association specifies that "rehydration should contain water to restore hydration status, carbohydrates to replenish glycogen stores, and electrolytes to speed rehydration (Casa et al., 2000)." When rehydration is essential twenty-five to fifty percent more than sweat loss should be consumed in water and/or sports drink by the

athletes following practice (Casa et al, 2000). The temperature of the fluid should be about 10-15 degrees Celsius, approximately 50-59 degrees Fahrenheit for the most optimal fluid-replacement. Consumption of carbohydrates 2-3 hours prior to exercise with the normal daily diet intake can be beneficial in preventing dehydration. Another factor to be recommended is for the athletes themselves to attempt to recognize the signs of dehydration and report them to their athletic trainer so early detection can be made in order to provide the best care for the athlete. Salt ingested in the modest amounts can aid in limiting salt loss in sweat and minimizing the effects of electrolyte imbalances. It is suggested that adding 0.3 to 0.7 g/L of salt to the athlete's hydration beverages can help in the decreasing the occurrence hyponatremia (Casa et al., 2000). The athlete's sweat rate has been mentioned previously and its significance when determining a hydration protocol and can be calculated by pre-exercise body weight (–) post-exercise weight (+) fluid intake (–) urine volume/exercise time in hours (Casa et al., 2000). This calculation tells athletic trainers the amount of water the athlete is loosing during exercise. Heat acclimatization is mentioned again; as is the important factor of understanding the body's physiologic changes to heat that can cause alterations in the athlete's fluid replacement. This position statement also mentions the use of weight classes, hyperhydration prior to competition and/or practices, hydration protocols, special consideration given to adolescents, and planning for practice sessions with the proper emergency personnel to ensure careful planning and safety for the athletes.

The Gatorade Sports Science Institute met for a conference that was focused on the establishing a list of key principles and actions "to increase the safety and enhance the performance of football players exposed to hot environments (NATA News, 2002)." An

emergency care plan was discussed for the management of heat illness emergency. The NATA News (2002) reported that at the conference it was established that football teams should have a posted emergency care plan to provide guidance to athletic trainers in the event that a heat-related emergency situation arise. Because heat-related illnesses are a common injury amongst athletes during two-a-day practices and any practices that occur in hot, humid weather an emergency care plan must be developed and implemented in the universities' emergency policies and procedures.

Lightning Safety

Heat is not the only weather condition that athletic trainers have to be concerned with, lightning has contributed to deaths on playing fields throughout the United States, the right plan and care can aid in decreasing immediate danger to the athletes. There are approximately 2000 thunderstorms and 50 to 100 flashes of lightning every second around the world (Uman, 1986). The death toll from lightning strikes from 1940 to 1973 was greater than the death toll attributed to tornados and hurricanes together (Walsh et al., 2000). The National Lightning Detection Network stated that in 1997 alone nearly 27,000,000 cloud-to-ground lightning strikes occurred in the United States (Kithil, 1999). "A cloud-to-ground lightning flash is the product of the buildup and discharge of static electric energy between the charged regions of the cloud and the earth (Walsh et al., 2000)." Property damage alone caused by lighting can range from $5-6 billion due to lightning (Walsh et al., 2000). Most lightning strikes that occur are between the times of 10:00 AM to 7:00 PM, the primary practice times in intercollegiate athletics (Uman,

1986). Forty-five percent of the deaths and 80% of the casualties due to lightning occurred between the months of May and September within that later morning to early evening time frame (Walsh et al., 2000). The "National Oceanographic and Atmospheric Administration publication Storm Data for the state of Colorado over the last few decades demonstrate an increase in the number of lightning causalities in persons involved in sports and outdoor recreation (Curran et al., 1997)."

Results of a survey specifically dealing with lighting strikes and emergency plans in Division I colleges stated that "Ninety-two percent of National Collegiate Athletic Association Division I athletics departments responding to a survey did not have a formal, written lightning-safety policy (Curran et al., 1997)." Due to the abundance of athletic participation outdoors during increased risk periods, an emergency plan that specifically pertains to lightning strikes is deemed to be a necessity. The National Athletic Trainers' Association has gone as far as to develop a position statement concerned with lightning safety in athletics. The NATA presented guidelines for all outdoor activities and indoor pool activities in order to provide recommendations to educate athletic trainers and others of the hazards of lightning (Walsh et al., 2000). They recommend that a safety policy or emergency action plan be developed specifically for lightening safety. The NATA further stated that it is not necessary to develop separate emergency policies and procedures related to lightning safety, but rather that a section should specifically cover this area. Recommendations that the NATA have suggested begin with establishing a chain of command to measure the distance the storm is from the athletic facility being utilized. As with all emergency policies and procedures that deal with serious or life threatening situations on the field (other than lightening), the NATA

highly recommends that putting this plan into practice on a regular basis is essential. Knowing and understanding the implementation of the established procedure in these situations is crucial when lightning threatens the safety of athletes, staff, and spectators. During a game of high school lacrosse in 1997, a thunderstorm struck the playing area taking one life and injuring ten others. Walsh et al. (2000) states that when individuals were interviewed following this incident, people stated they were unaware of what precautions to take and where to take shelter. Walsh et al. (2000) continues by stating, "According to the basic principles of tort law, an individual has a duty to warn others of dangers that may not be obvious to a guest or subordinate of that person." Black et al. (1990) defines this warning as "foreseeability." Lightning strikes can be a life-threatening situation and though not as common as concussions a plan must be established to provide a means of care for the athletes.

Cardiac Arrest

Cardiac arrest among athletes is more common than most individuals realize. This life-threatening occurrence is a major reason why emergency policies and procedures are essential in establishing a plan of action. "The major indirect cause of death during athletics is from an arrhythmia resulting in sudden cardiac arrest (Terry et al., 2001)." Sudden cardiac death in athletes may not be as frequent as spraining an ankle, but the general frequency of such occurrences has caused a concern among the sports medicine profession. In 490 B. C., the first recorded sudden death was suffered from Pheidippides who was a young distance messenger. He had just arrived in Athens

to report the defeat of the Persian army then suddenly fell dead (Rich, 1994). More recent sudden deaths that have occurred have made the public more aware of the significance of the situation. Instances such as marathon runner Jim Fixx in 1984, Olympic volleyball player Flo Hyman in 1986, former basketball star Pete Maravich in 1988, college basketball star Hank Gathers in 1990, professional basketball All-Star Reggie Lewis, and Olympic figure skating champion Sergei Grinkov in 1995. Each athlete died from varied cardiac causes, Lewis and Gathers causing the greatest increase in public awareness about sudden cardiac death. Koester (2001) defines sudden cardiac death as, "a nontraumatic, nonviolent, unexpected death due to cardiac causes within one hour of the onset of symptoms." Through several research studies conducted that varies from the National Federation of State High School Associations, the US Air Force, Minnesota high schools and the state of Rhode Island the number of sudden cardiac deaths have been evaluated and recorded. The National Federation of State High School Associations found that sudden cardiac death occurs between 10-25 times a year and victims have been under 30 years of age, the US Air Force collected their data between the years of 1965 and 1985 where 1 of every 735,000 individuals studied suffered from sudden cardiac death and these victims were between the ages of 17 and 28 (Koester, 2001). The study conducted within the Minnesota high schools determined that 1 of every 200,000 athletes died from sudden cardiac death, whereas the Rhode Island study revealed that 1 of every 280,000 men under the age of 30 died from sudden cardiac death per year (Koester, 2001). Results from one study detailed by Maron et al. (1996) and completed between 1985 and 1995, that the average age of competitive athletes who suffered from sudden cardiac death was 17 years old, that 90% were male, and 44% were

African American. This study also revealed that 68 % of the deaths that occurred were basketball and football players. Most research indicates that male athletes are more statistically likely to suffer from a sudden cardiac death opposed to female athletes, though according to Terry et al. (2001) state, "The exact incidence of sudden cardiac arrest in athletes is unknown because no universal, standard surveillance method is used." The National Center for Catastrophic Sports Injury Research estimated that the death rates from sudden cardiac death for males compared to females is five times greater (Koester, 2001).

There are several conditions that lead to cardiac arrest, but in order to understand these conditions, the hearts' reaction to exercise must be understood. During intense exercise, the energy needed to continually fire muscles must be met by increased oxygen consumption by the body. This increased need for oxygen relates to an increase in cardiac output that allows the heart to pump an adequate amount of oxygenated blood to working muscles (Koester, 2001). Long-term aerobic training allows the heart to grow in size, increasing left ventricular mass, heart rate during exercise, increased ventricular stroke volume and increased cardiac output.

There are several conditions that are related to sudden cardiac death in young athletes that are as follows: hypertrophic cardiomyopathy, idiopathic left ventricular hypertrophy, arrhythmogenic right ventricular dysplasia, congential coronary artery disease, hypoplastic coronary arteries, tunneled coronary arteries, Marfan syndrome, myocarditis, Wolff-Parkinson-White syndrome, prolonged QT syndrome, severe valvular heart disease, idiopathic ventricular tachycardia, congenital heart disease, coarctation of the aorta, coronary artery disease, high-grade ventricular arrhythmias, illicit drugs,

performance-enhancing drugs and commotion cordis (Koester, 2001). Koester (2001) states the most common causes of sudden cardiac death in athletes are the following: hypertrophic cardiomyopathy, possible hypertrophic cardiomyopathy, aberrant coronary arteries, other coronary anomalies, ruptured aortic aneurysm, tunneled coronary artery, aortic valve stenosis, lesion consistent with myocarditis, and idiopathic myocardial scarring.

Hypertrophic cardiomyopathy is usually inherited as an autosomal dominant condition, and is the most common cause of sudden cardiac death in athletes. In most cases, individuals that suffer from sudden cardiac death have had no previous signs and/or symptoms prior to their collapse and death (Koester, 2001). In several cases, a few individuals who suffered from sudden cardiac death had a family history of sudden or unexplained death (Koester, 2001). Ten percent of sudden cardiac death cases are a result of idiopathic left ventricular hypertrophy (Koester, 2001). Idiopathic left ventricular hypertrophy is an increased level of hypertrophy of the left ventricular of the heart that is extremely excessive compared to that of an elite trained athlete. In most cases of idiopathic ventricular hypertrophy the family history will deny any signs of hypertrophic myopathy or prior occurrences of sudden cardiac death. Another leading cause of sudden cardiac death, second to hypertrophic cardiomyopathy, is a variety of congenital coronary artery anomalies in young athletes. The most common anomaly that occurs is when the left main coronary artery arises from the right sinus of Valsalva, the artery comes off the sinus at an acute angle contributing to a decrease in blood flow during dilation of the aorta during exercise (Koester, 2001). Approximately one third of the athletes that suffer from sudden cardiac death are previously symptomatic with

angina, syncope, or exertional dyspnea. Myocarditis is another common cause of sudden cardiac death. Myocarditis occurs when the myocardium becomes inflamed due to infection, fifty percent of the time from Coxsackie B virus, creating an unstable area where an arrhythmia can occur (Koester, 2001). In many individuals, no previous signs or symptoms are present prior to sudden cardiac death (Koester, 2001). Young athletes with Marfan syndrome are at an increased risk to suffer from sudden cardiac death due to a progressive dilation of the aortic root. Fatal cardiac arrhythmias may be the result of abnormalities of the conduction system in the heart which are normally classified as Wolff-Parkinson-White syndrome or a long QT syndrome which in turn results in sudden cardiac death (Koester, 2001). "Wolff-Parkinson-White syndrome represents an accessory conduction pathway within the myocardium, which, when triggered, results in symptomatic, but typically benign, atrial or ventricular arrhythmias (Koester, 2001)." QT syndrome is "a distinctive fatal arrhythmia triggered by catecholamine release (Koester, 2001)." A few other causes related to sudden cardiac death are aortic stenosis and mitral valve prolapse. Although mitral valve prolapse is relatively common the relation to sudden cardiac death remains controversial and a contributor to death is uncertain (Koester, 2001). Commotio cordis, a cardiac concussion that results from an impact to the chest cavity, can cause a fatal dysrhythmia which can lead sudden cardiac death (Koester, 2001). Terry et al. (2001) report a study conducted by The American Heart Association of common causes they discovered that can result in sudden cardiac death with 36% due to hypertrophic cardiomyopathy, 10% due to hypertrophic cardiomyopathy-structural changes, 10% due to anomalous origin of the left main coronary artery, 9% due to other coronary anomalies, 6% due to myocarditis, 5% due to

ruptured aortic aneurysm, another 5% due to tunneled left anterior descending artery, 4% due to aortic valve stenosis, 3% due to dilated cardiomyopathy and 2% due to arrhythmogenic right ventricular dysplasia.

Mandatory pre-participation examinations can aid in the screening of athletes to obtain a thorough medical and family history that can determine at risk athletes. Even a thorough physical examination and patient history cannot always detect if the person is susceptible to sudden cardiac death. A complete cardiac examination can detect any physical or electrical abnormalities that could be present in the individual's heart. Terry et al. (2001) state that when attempting to prevent sudden cardiac death in athletes a 12-lead electrocardiogram, stress rhythm ECG or both can be performed to identify any risk factors the athlete may not be aware of prior to exam. Risk factors that could appear would include chest pain, shortness of breath, arrhythmia, high blood pressure, murmurs, bruits, and/or arrhythmias. If these signs are present, a more thorough evaluation should be conducted. Italy has a long-running screening program that proves that a thorough cardiac specific evaluation can detect abnormalities in athletes prior to participation. Koester (2001) reports that from 1979 to 1996 this screening was conducted on 33, 735 young athletes below the age of 35, approximately 3,016 individuals were referred for an electrocardiogram due to family history, abnormal physical examination findings or ECG abnormalities. In 22 of the individuals screened, 20 of them being male and 2 of them being females, hypertrophic cardiomyopathy was detected and diagnosed which disqualified them from competition (Koester, 2001). A total of 621 individuals were disqualified from participation due to cardiovascular conditions (Koester, 2001). The Italian government has screened all of their athletes between the ages of 12 and 35 years

of age since 1971 on an annual basis that includes a history and physical examination, exercise and pulmonary functional testing and an ECG (Koester, 2001). Italian government screens every one of their athletes between the ages of 12 and 35 years of age since 1971 on an annual basis that includes a history and physical examination, exercise and pulmonary functional testing and an ECG (Koester, 2001). This screening process is funded by the country's National Health Service and any physician that clears an athlete that later suffers from death or impaired health can be held liable in civil and criminal court (Koester, 2001). Although the Italians have a lower incidence of sudden cardiac death as a direct result of hypertrophic cardiomyopathy their incidence of sudden cardiac death is similar to the rate calculated in the United States (Koester, 2001). The American Heart Association recognized the limitations of a thorough examination without screening every athlete with an ECG or echocardiography. A panel of expert assembled by the AHA recommended that all high school and college athlete undergo a cardiovascular evaluation before being permitted to participate in athletics (Koester, 2001). This screening should be performed by a physician every two years and include the following: 1) family history of premature or sudden death or heart disease in any surviving relatives; 2) personal history of heart murmur, systemic hypertension, excessive fatigue, exertional chest pain, exertional syncope, or excessive shortness of breath; 3) physical assessment for heart murmur, femoral pulses, stigmata of Marfan syndrome, and brachial artery blood pressure; and 4) parental verification of history form by signature for high school athletes (Koester, 2001). A great deal of emphasis is placed upon the significance of a thorough examination that includes a medical history, but only through moral and ethical responsibility of the institution's athletic trainers and physicians can an

objective decision be made before an athlete participates in athletics. There is no legal precedent for conducting full cardiac examinations as part of the annual physical examination, and unfortunately athletes' sports physical is still taken lightly (Koester, 2001). Koester (2001) reports that the pre-participation screening that is conducted at the high school and college level in the United States does not meet the standards set forth by the American Heart Association. When compared only 26% of NCAA schools were conducting adequate pre-participation medical history for their athletes that coincided with the American Heart Association's guidelines (Koester, 2001). Division II and III schools were found to be less compliant with the guidelines set by the American Heart Association compared to Division I schools (Koester, 2001). When involving the lives of the athletes in which the university is responsible these facts and statistics are difficult to explain and understand. It is this reason that it is important to include sudden cardiac death as a feature in the university's emergency policies and procedures as a key factor. It's disheartening to know that the proper screening does not take place within intercollegiate programs, but its also understood that even with the proper screening not all abnormalities can be detected; including a particular plan that specifically pertains to sudden cardiac death in athletes can aide the sports medicine staff as to sufficient care in the case an emergency should arise.

Providing effective treatment for the athlete that suffers from sudden cardiac arrest can make the difference in saving the life of the athlete. Terry et al. (2001) writes of a "chain of survival" when treating an athlete suffering from sudden cardiac arrest. This "chain of survival" addresses the necessary steps taken by medical personnel, including physicians and athletic trainers to provide the most efficient and timely

response to the emergency situation. The "chain of survival" includes the following: 1) prompt emergency medical system (EMS) activation, 2) early cardiopulmonary resuscitation (CPR) by a first or target responder (less than 2 minutes); 3) early defibrillation (2 to 4 minutes); 4) early advanced life support (less than 8 minutes); and 5) late advanced life support (Terry et al., 2001). The amount of time that lies between each step is crucial in increasing the survival rate of the athlete. Within the emergency policies and procedures each step in this "chain of survival" needs to be detailed specifically to clarify any confusion that may be present. Summoning EMS directly or through a bystander begins the first step of basic life support (Terry et al., 2001). "The chance of survival of a person experiencing sudden cardiac arrest is reported to decline by 5% to 10% each minute the condition is left untreated; therefore, the sooner basic life support, including defibrillation, is activated, the better the athlete's chance of survival (Terry et al., 2001)." Terry et al. (2001) address both horizontal and vertical delays when EMS is activated. Horizontal delay initiates with the activation of EMS and ends with their arrival at the site of the athlete in distress. The vertical delay refers to the amount of time that it takes EMS to park and ends with the initiation of the fist defibrillation. The vertical delay seems to be more of a problem in terms of time to treatment by EMS than the horizontal delay. The response time in most communities ranges between 12 and 15 minutes, but it is not this period of time that becomes crucial. It is when you add this horizontal time adding with the vertical component that it becomes too long to provide a survival rate for the athlete (Terry et al., 2001). It has been established that early detection and treatment can be the difference in an athlete's survival or not. Athletic trainers that have access to automated external defibrillators (AED) prove to have an

impact on the amount of time it takes to treat an athlete suffering from cardiac arrest. By providing an AED to athletic trainers and qualifying them as a "target responder" for athletic care, survival probabilities in an event that an athlete experiences cardiac arrest can be increased (Terry et al., 2001). Terry et al. (2001) addresses the "chain of survival" with early CPR initiation that allows the heart to survive longer during fibrillation. Again, the sooner the initiation of this critical care better! CPR can only provide 60-80 mm Hg of pressure to the heart that only generates about 30% of cardiac output; because of this small cardiac output early defibrillation is necessary (Terry et al., 2001). Ninety-five percent of individuals that receive defibrillation in the first minute of their cardiac arrest have shown to survive (Terry et al., 2001). Athletic trainers should be trained in the proper usage of AEDs and CPR for basic life support training. If athletic trainers are to be considered a "target responder" then their abilities need to prove just that when a life-threatening situation arises. Not all emergency cardiac situations can be resolved through AED usage and an athletic trainer needs to be aware of this and the situation addressed within the university's emergency policies and procedures. If an athlete's heart goes into asystole the heart has no electrical activity present and the AED will not shock due to the lack of activity that the machine cannot pick up, pulseless electrical activity can occur quickly (Terry et al., 2001). CPR in this situation should be administered instead of the using the AED because the machine cannot register any activity. The athletic trainer should be aware of this situation and when it occurs administer proper care and treatment to attempt to save the athlete's life. Once EMS has been activated, CPR has been initiated early; and early defibrillation has taken place, advanced life support must be pursued. Early advanced life support is the fourth link to

the “chain of survival” according to Terry et al. (2001), that includes defibrillation, early intubation techniques, external pacemakers, cardiac medications, and early transport to cardiac care units. This medical care is performed by the arriving EMS, but in order to provide this care quickly the horizontal and vertical delay must be shortened. The horizontal delay addressed earlier can be decreased with a quick activation of EMS. Once an athlete suffering from cardiac arrest has been identified, EMS should be activated without delay. This will provide the immediate activation needed to decrease the horizontal delay. Once the horizontal delay has been decreased the vertical delay must be addressed. In order to decrease the vertical delay a smooth transition of the care of the athlete between the EMTs and the on site athletic trainer is essential. This can be made easier by the established communication process between EMS and athletic training personnel and the chain of command. The transfer of care of the athlete between the EMT’s and the athletic trainer must be discussed and agreed upon. Some universities will not hand over the responsibility of care to the EMT’s until the athlete is completely stabilized on a spine board and in the ambulance. Depending on the level of treatment that needs to be performed EMT’s and athletic trainers must work together to put in the highest effort in saving the athlete that suffers from cardiac arrest. The last “chain of survival” is late advanced life support. This step essentially involves the treatment and care that the athlete will receive in the emergency department. Once this stage of treatment has been reached the athletic trainers have done everything in their power and the transfer of care must be handed to those trained specifically for this medical situation (Terry et al., 2001). The quick response of the athletic trainers and assisting medical personnel is essential for the survival of the athlete, demonstrating the importance of an

emergency plan that includes the mentioned emergency situations. “After recognizing the many problems that result in a poor chance of survival for athletes experiencing sudden cardiac arrest, the athletic care medical team should develop a comprehensive and well-integrated plan to address these emergencies. The first, second, third, and fourth components of the emergency plan should proceed with near-simultaneous activation of EMS with a practiced response time (less than 8 minutes to initiation of treatment) (Terry et al., 2001).”

Spinal Cord Injuries

One of the most important injuries that a student-athletic trainer will learn to manage is a spinal cord injury. The ability to manually stabilize the head and neck of a possible spinal cord injured athlete and log roll them onto a spine board is a task that once learned will never be forgotten. The constant practice of spine boarding and cervical stabilization is crucial to instill confidence in the ability of the student so that the task itself is second nature. In addition to practicing spinal stabilization, it must be stressed to student athletic trainers the importance of watching activity on the field. A constant watch on the field may enable the student or the certified athletic trainer to see first hand the mechanism of injury. The mechanism of injury when dealing with a spinal cord injury can be crucial to the treatment and care of the injured athlete. Not only will the mechanism of injury be important for the treatment and care, but it can clarify the significant of the injury as well. In 1998, the National Athletic Trainers’ Association developed the Inter-Association Task Force for Appropriate Care of the Spine-Injured

Athlete. This task force was developed for two reasons, one to provide guidelines for the treatment of an athlete suffering from a spinal cord injury before they are transferred to the hospital, and two to provide athletic trainers and other sports medicine staff additional information that may prove useful when understanding the need for a comprehensive approach when treating the spine. When a spinal injury is suspected, the on-the-field management and immediate care becomes critical in the proper care of the athlete. If an athlete is approached on the field and is found to be unconscious it should be assumed that the athlete has an unstable fracture and spinal stabilization performed. When an athlete is determined to be conscious, the athlete should be questioned as to whether they are experiencing pain, weakness, lack of sensation, and decreased strength in their extremities, as well as, assess hearing and visual capabilities. If, upon initial examinations, a spinal cord injury is assumed, the athlete will be immediately transported to the emergency room to have a more formal neurological examination performed. When transporting an athlete they must be stabilized on a spine board, forcing the athlete's trunk and head to be moved as one unit. The head and neck must be manually stabilized in order to move the athlete as one unit that will be discussed later in this section.

Managing an athlete with a possible spinal cord injury can be more difficult due to the amount of equipment worn (Swartz et al., 2002; Kleiner et al., 1998). The Inter-Association Task Force for Appropriate Care of the Spine-Injured Athlete emphasizes the importance of immediate facemask removal with a suspected spinal cord injury whether the athlete is conscious or unconscious (Kleiner et al., 1998). Previous standards of care of a spine injured athlete stated that the face mask was only removed when

cardiopulmonary resuscitation had to be initiated. However, current recommendations provide for removal of the facemask was only removed when cardiopulmonary resuscitation had to be initiated, but regardless of the respiratory status. The primary focus when stabilizing the head and neck is minimal movement, any additional movement can cause secondary damage to the injured athlete. This need for limited cervical movement makes practicing facemask removal extremely important.

When an athlete is suspected of suffering from a spinal cord injury, the decision to remove the helmet is also one that must be made. It has already been stated that the facemask should be removed in all situations where there is consideration of a spinal cord injury, regardless of the athlete's current respiratory status. Is it necessary to remove the injured athlete's helmet? Football helmets are fitted individually to each player and, with shoulder pads, are known to hold the head in neutral spinal alignment. The Inter-Association Task Force recommends that neither the helmet nor the shoulder pads be encouraged from being removed due to the neutral alignment they provide the athlete (Kleiner et al., 1998). As mentioned before, minimal movement is essential to treating and caring for a spinal injury. For this reason leaving the helmet and shoulder pads intact can provide the neutral alignment necessary to provide a degree of stabilization. The removal of the helmet could cause secondary damage to an already unstable athlete if any movement occurs. The Inter-Association Task Force states that removing the helmet on their own will cause the athlete's head to hyperextend due to the increased height from shoulder pads, thus compromising the neutral position that had been maintained. In situations where the athlete's helmet must be removed, the shoulder pads are to be removed simultaneously, however, this is a difficult maneuver and movement is bound to

occur, and the chance of maintaining neutral spinal alignment increasingly difficult (Kleiner et al., 1998; Swartz et al., 2002; Tierney et al., 2002). Due to these situations where the helmet has to be removed, the Inter-Association Task Force has set forth guidelines for removing the helmet as safe as possible. Their guidelines are suggested only if the helmet must be removed and are as follows:

- If after a reasonable period of time, the facemask cannot be removed to gain access to the airway.
- If the design of the helmet and chinstrap are such that even after removal of the facemask, the airway cannot be controlled or ventilation provided.
- If the helmet and chinstraps do not hold the head securely such that immobilization of the helmet does not immobilize the head.
- If the helmet prevents immobilization for transport in an appropriate position.

Immobilizing the athlete prepares the athlete for the necessary transportation. Once it has been determined to transport the athlete to an emergency facility, stabilization must be continued through the use of a spine board. Stabilizing the head and neck and prove to be difficult if the position of the head and neck are in a position other than neutral. The Inter-Association Task Force recommends that stabilization of the head and spine be strictly maintained, essentially meaning the head and spine be repositioned into a neutral position, but movement to reposition can cause further damage. "With trauma to the cervical area, any movement during immobilization increases the risk of neurologic damage (Tierney et al., 2002)." The Inter-Association Task Force also points out that in some cases it may be wise to immobilize the athlete's head and neck in the position that it

was found, sometimes making spine boarding the athlete difficult with the provided equipment (head blocks, cervical collars), other supplies (towels, blankets) can be used to accomplish the task. Each case should be assessed on an individual basis and according to the severity of the injury when pondering the decision of repositioning the head (Kleiner et al., 1998). Transferring the athlete to the spine board must be planned and organized in such a fashion that minimal movement of the spine is obtained. The position the athlete upon arrival on the scene will determine what method of transfer is utilized in spine boarding. When the spine-injured athlete is in a supine position, the Inter-Association Task Force recommends a six-plus-person lift due to the amount of protective equipment and the size of the athlete. The log roll technique is more efficient in moving an injured athlete in a prone position onto a spine board. Emphasis in executing the transfer of the athlete should be placed on the chain of command. As mentioned earlier in this review, the person at the head maintaining manual stabilization should be in charge and giving orders in an organized manner. Once the athlete is stabilized on the spine board, transporting the athlete to an emergency vehicle as quickly and efficiently as possible is essential. The proper number of people to lift the spine board should be present so that this transportation is smooth with minimal movement as possible.

Suicides Among Athletes

Another life threatening situation that is rarely addressed is the threat of suicide among student-athletes. The reason behind the lack of inclusion of treating significant mental disorders, such as suicide, in a university's emergency policies and procedures plan is unknown. Whether it be from "out of sight, out of mind" syndrome or that sports medicine staffs rarely think to include the factor of serious mental illness in their emergency policies and procedures is unclear, however, this is a very serious situation that must be addressed when dealing with emergency medical situations. The incidence of suicides and mental disorders in student-athletes makes this area of concern as important to discuss as all other issues in emergency policy and procedures for athletics. At most universities there is an established policy concerning an attempted or committed suicide among the student body. When a student-athlete is involved in attempting or committing suicide those policies and procedures may need to be utilized by the sports medicine/athletic training staff. With the increasing occurrence of depression, anxiety, feelings of pressure by coaches, teammates, peers and parents among student-athletes, a well thought out addition in the athletic department's emergency polices and procedures should be implemented. Athletes endure more commitments than the common college student, ranging from weights, conditioning, practices, competitions, traveling, tutoring, social athletic functions and team meetings in turn causing stress levels that can rise further than some may begin to realize. These increased demands can in turn cause stress levels to rise further than most people realize. The NATA developed a matrix of professional skills that an athletic trainer must be able to perform to become a certified

athletic trainer. One of those competencies is counseling of the student-athletes (Cramer Roh & Perna, 2000). This competency is significant when an athletic trainer becomes involved in the athlete's psychological problems, and evaluating an athlete's psychological distress is important to assess the depth of the problem. Through the close interaction between an athletic trainer and the student-athlete, an amount of trust is built and it is this trust the athlete uses when problems arise within their lives. Milliner of the Mayo Clinic states, "…athletic trainers – as primary care providers – are in an ideal position to detect serious post-injury depression and to begin assessing whether the injured athlete is at risk for suicide (NATA Release, 1995)."

Suicide alone among the population of the Unites States occurs every 11 minutes, totaling approximately 31,000 suicides per year (Fagan et al., 1999). Suicide is the 8th leading cause of death in the United States, but is the 3rd leading cause among young people between the ages of 20-24 (Fagan et al., 1999; Las Positas College, 2002). Las Positas College (2002) reports, "One in 12 US college students make a suicide plan." The Surgeon General stated suicide as being a "serious public health threat (Fagan et al., 1999)." Fagan et al. (1999) also report that while suicide may affect all age and ethnic groups, men in the United States between the ages of 10-15 are the fastest growing group to commit suicide with a 200% increase within the 1990's. Men were found to be four times more likely to complete suicide than women, though women seemed to have attempted suicide more often than men in the United States (Fagan et al., 1999). Fagan et al. (1999) reported that men were found with a more often with firearms, stating that 80% of suicides committed by males were from the direct use of a firearm. Women were

found to be more likely to attempt to commit suicide by a drug overdose (Fagan et al., (1999).

According to Fagan et al. (1999) signs and symptoms that should provide a significant indicator to an athletic trainer that they may have a student-athlete that could be at risk for attempting or committing suicide are as follows:

1. Significant changes in appetite or sleep patterns that persist over a two month period of time.
2. Loss of interest in usual interests or activities (school, friends, athletics).
3. Frequent and unexpected outbursts of anger.
4. Preoccupation with tapes, CDs, and movies that deal with death, loss, suicide and violence.
5. Sudden and dramatic change in appearance (style of dress, hair).
6. Excessive use of alcohol or drugs (over half of all adolescents who make a suicidal gesture are under the influence of alcohol).
7. Recent (within pas six months) significant loss in relationships or status (break-up with boyfriend, girlfriend, "kicked off" an athletic team).
8. Withdrawal from family and friends – preference to spend long periods of time alone.
9. Has had a peer or friend commit suicide within the past year (Fagan et al., 1999).

Other important warning signs to be aware of when evaluating a student-athlete for a threat of suicide are: previous suicide attempt, verbal threat or statement of desire to

die, changes in personality involving increased risk taking, getting affairs in order, tendency toward isolation, unusual purchases such as weapons, or giving away possessions. Athletic trainers are trained in a brief ability to counsel an athlete, but when signs indicate an athlete at risk of committing suicide; the athlete should immediately be referred to a psychologist or psychiatrist under the direct supervision of the team physician. The athlete who is suffering at this level will already have a developed plan as to how they would attempt suicide, when the attempt will occur, have already acquired a means to carry out their method, and possibly already initiated suicide, and left notes behind for others to see (Fagan et al., 1999; ISU.edu.com).

In situations where an athletic trainer becomes aware of an athlete attempting to commit suicide, the team physician, psychologist, counselor, or psychiatrist may not always be near by or at the disposal of the athlete. The athletic trainer must be aware of the signs that can identify a problem of emotional distress in an athlete; however they must also be knowledgeable in how to properly manage the situation. Even in circumstances where signs of suicide are present and the athlete may not have intentions of committing suicide, the situation should never be taken lightly. Hesitation in handling this type of situation could be fatal. Not knowing what to do in the event that the student-athlete approaches an athletic trainer, coach, far away parent, friend, professor, or teammate could be the pause that will cause the athlete to execute their plan. Fagan et al. (1999) state that not all individuals will be knowledgeable in handling such a situation, but even the most untrained professional can follow basic steps in attempting to help the athlete until further help can be sought. These steps are as follows:

1. If there are reasonable concerns, do not hesitate to ask the person if he or she is thinking of harming him or herself. "You seem very down and upset – are you thinking of harming yourself?" Bringing up the subject will not plant the idea if not already there, or necessarily anger or upset the person. In fact, the suicidal individual may feel that the question gives permission for them to admit to their suicidal feelings, which may be a relief.
2. If the individual admits to suicidal thoughts or feelings, always assume the threat is serious, even if it is questionable. It is better to be too cautious then to dismiss a legitimate suicidal threat.
3. If the person is not in immediate danger (they do not possess a weapon, or do not have in their possession medication available for an overdose), take the following steps:
    - Ask if they have thought up a plan
    - If the answer is no, continue to talk to them about how they feel, what the problem areas are. LISTEN!! Do not attempt to fix the problems, deny the importance of their problems or pass judgment. Inform them there is help available and whatever necessary to help them get through this situation would be done.
    - If the answer is yes, they have thought of a plan to commit suicide, ask them to explain what the plan is. At the same time, a plan to get in touch with any resource possible for the athlete's immediate attention should be thought of. This person should not be left alone, listening is

important and waiting until further help arrives. This further help may involve admitting the person into a mental health facility or hospital.

Fagan et al. (1999) states that the individual might become angry with those trying to help them and resist any attempts to provide help. They suggest that the EMS or local police be called to provide further assistance for the individual and even notifying immediate family members or significant others. At the intercollegiate level, athletic trainers and team physicians are subject to confidentiality for those athletes over the age of 18 years old. Fagan et al. (1999) state, "Confidentiality is not a consideration when a person's life is at stake." Suicide – a cry for help suggest that one should not keep what they find out from an at risk individual a secret, confidentiality should never be promised because doing so could result in tragedy (ISU.edu.com). This compromised level of confidentiality can be a controversial issue at the collegiate level, and there is currently no research directly pertaining to this situation. Extreme caution must be taken when dealing with a suicide attempt, the individual must be reassured that they will be okay and the help they will receive will be in their best interest. Fagan et al. (1999) stresses the importance of someone remaining with the at risk individual throughout the process to reduce fears about the treatment they will receive. Once the individual is placed in the hands of the trained professionals, the athletic trainer should allow these professionals to take over and handle the situation as best as they see fit.

Most articles addressing suicide in athletics refer to suicide attempts following an injury. This is an equally important issue for an athletic trainer to be aware of as are depression and emotional distressing athlete. The NATA Press Release (1995) stated

concern from the Mayo Clinic for seriously injured athletes between the ages of 15-24 who may be at an increase risk for depression and even suicide attempts. Whereas, a study was conducted using 4, 728 questionnaires sent out to undergraduate students found that men not involved in sports were 2.5 times more likely to experience suicidal thoughts (Dreyfuss, 2002). Women were found to have a 67% greater risk of suicidal thoughts or actions that were not a member of a varsity sanctioned or intramural team (Dreyfuss, 2002). Brown & Blanton conducted the study and reported, "Being on a team, in the company of coaches and other athletes, provides a network of social support. And exercise has long been prescribed as an antidote to depression, which can lead to thoughts of suicide (Dreyfuss, 2002)."

Many universities have their own emergency policies and procedures that are completely separate of those implemented and utilized by the athletic training staff, and these policies have been found to directly address suicide attempts. These plans for action are specifically designed to address suicidal attempts and range from calling campus security, notifying the dorm hall director to calling an on-call psychologist. These plans usually vary from the type of student at risk, on-campus, commuter, graduate student or family of a student. If athletic emergency policies and procedures have not implemented suicide into their emergency plan, the universities' policies and procedures should be readily accessible to utilize in the event this type the situation arises.

No matter what the cause of the athlete's depression and suicidal thoughts, suicide has long been described as a permanent solution to a temporary problem, but 31,000 individuals in the United States alone chose this permanent solution (Fagan et al., 1999). Athletic trainers must be aware of sudden changes in behaviors of athletes that are

directly under their supervision as much as possible, knowing what to do in a suicidal situation is even more important in order to provide the best possible care and treatment to the suffering athlete.

Legal Concerns

When modifying or reviewing the emergency procedures, legal concerns must be addressed in order to protect the legal interests of the university and individuals involved. Andersen et al. (2002) states, "It is well known that organizational medical personnel, including certified athletic trainers, have a legal duty as reasonable and prudent professionals to ensure high quality care for the participants." It is also stated, "Of further precedence is the accepted standard of care by which allied health professionals are measured (Andesen et al., 2002)." The standard of care is what allows for liability of actions of an athletic trainer or other medical personnel if an emergency should arise (Andersen et al., 2002). Negligence is another concern in the sports medicine profession. Negligence is considered to be a legal tort, or a private wrong or injury that has been suffered by a person as a result of another's conduct (Osborne, 2001). There are two kinds of torts, intentional and unintentional. An unintentional tort is when the person did not mean to cause harm upon the other individual, whereas an intentional tort occurs when the act was intended. Negligence is considered to be an unintentional tort. Osborne (2001) states, "Negligence law was founded on the principle that those who are harmed as the result of others' carelessness or failure to carry out responsibilities properly must be compensated." Those who are victim to negligence have the burden of

proving the four legal elements of negligence. These elements are duty, breach, cause and actual harm/damage. Duty is when the individual has to prove that there was a certain amount of responsibility owed due to the relationship that existed amongst the two parties involved (Osborne, 2001). The duty of an athletic trainer can be defined as such, "The athletic trainer is the one individual who deals with the athlete throughout the period of rehabilitation, from the time of the initial injury until the athlete's complete unrestricted return to practice or competition (Prentice, 2003)." Prentice (2003) continues to state, "The athletic trainer is most directly responsible for all phases of health care in an athletic environment, including preventing injuries from occurring, providing initial first aid and injury management, evaluating injuries and designing and supervising a timely and effective program of rehabilitation that can facilitate the safe and expeditious return of the athlete to activity." Because of the specificity of an athletic trainer's responsibilities, the duty of an athletic trainer is not difficult to understand. Breach is when the individual responsible for providing this care has failed to do so properly to the injured party. In the profession of athletic training, a breach of duty by an athletic trainer would be failing to carry out the responsibilities of an athletic trainer. Osborne (2001) states, "Because an athletic trainer is a sports medicine professional, he or she would be held to the level of care that a reasonable sports medicine professional would be held to in the same situation." The level of care, or standard of care, is established in the athletic training profession by the National Athletic Trainer's Certification Boards, standardized training programs, certification programs and state licensing requirements (Osborne, 2001). The third element, cause, is when the individual being accused must prove that it was this breach of duty that caused the harm to the

second party. If the accusing party can prove that the specific actions by the athletic trainer were the cause of the damaged being proclaimed then the actual cause can be proven (Osborne, 2001). Osborne (2001) also points out that if the actual cause cannot be proven then a proximate cause must be proven. This proximate cause that Osborne (2001) points out is when the action of the athletic trainer can lead to the harm or injury of the accusing party. And the fourth element that is needed to prove that negligence occurred is actual harm. Actual harm, literally, or the potential to harm must have taken place to the second party in order for negligence to be proven. Any actual harm that is proven in a case of negligence the second party will usually seek damages through a legal suit in return.

The scope of practice is the amount of duties a first responder is allowed to perform. A first responder is an individual trained in caring for injuries in an emergency situation that may be called upon to provide this care as a routine part of his/her job (American Red Cross, 2001). There are certain duties a first responder is allowed to perform versus duties they are expected to perform. The practice of medicine from state to state can be defined differently, but for the most part the scope is unlimited when involving physicians. In contrast, in athletic training the scope of practicing medicine is limited; meaning that an athletic trainer works directly under the supervision of a physician and does not have the authority to diagnosis an injury, perform surgery, or prescribe medication, whereas a doctor is allowed (Rankin et al., 2001). Rankin et al (2001) state, “The concept of standard of care is directly related to these limitations” and, the standard of care can be defined as, “the level of medical sophistication and competency that must be demonstrated by someone who has similar education and

training to other members of a particular group (Rankin et al., 2001)." The standard of care established for athletic trainers can be used in court against them to define the duty owed to the patient or athlete; when unauthorized practice of medicine is undergone by an athletic trainer, their standard of care can be elevated to that of physicians (Rankin et al., 2001).

There are several court cases that can be directly linked to the need of developing emergency plans. Osborne (2001) discusses *Pinson v State* and provides a better understanding of the necessity of implementing emergency policies and procedures and following these plans out in an emergency situation. During this case, a collegiate football player suffered a blow to the head during football practice one day; he came to the sidelines complaining that he got "kicked in the head" and therein turned and collapsed on the ground (Osborne, 2001). The athletic trainer covering practice that day conducted a physical exam, noting a Palsy on the left side of the athlete's face, a loss of control of body movements on the left side, unequal pupils, no response to painful stimuli, sound or movement on the left side, and an unconscious state for approximately 10 minutes (Osborne, 2001). The athlete was sent to the hospital accompanied by a student-athletic trainer shortly following the physical exam, however, the certified athletic trainer failed to forward the information gathered from the physical exam to the emergency medical personnel or the attending physician who would be caring fro the athlete. The information regarding the athlete's prior condition was never given to the physician. The athlete was later released from the hospital after undergoing tests that resulted with negative results, but with stern instructions that the athlete was not to participate in football practice for one week. After being released the athlete complained

to his athletic trainer of a headache on several different occasions. The physician was contacted one week of following the accident and informed by the athletic trainer that the athlete was currently asymptomatic. The athlete was then cleared to participate by the physician due to the information given by the athletic trainer. Over the next three weeks the athlete participated in practice and two games, all the while continuing to complain of headaches, dizziness, blurred vision, and nausea; no symptoms were reported to the physician. One month after the initial head injury, the athlete once again collapsed on the sideline and taken to the hospital. When the athlete arrived at the hospital he then underwent brain surgery for "subdural hematoma of several hundred cubic centimeters, an acute subdural hematoma of approximately 25-30 cubic centimeters and a midline shift of almost 1.5 centimeters (Osborne, 2001)." The athlete "remained in a coma for several weeks and suffered severe and permanent neurologic damage (Osborne, 2001)." When the trial arrived the athlete "… was hemiparetic and had no use of his left arm and little use of his left leg" he also "had a shunt to drain the excess fluid from his brain, suffered from severe cognitive problems, and experienced frequent seizures (Osborne, 2001)." Not informing physicians of signs and symptoms that were present at the time of the athletic trainer's arrival proved to be a life-altering situation for the athlete. If the physician had been informed the athlete's return-to-play status would have been delayed longer than one week. The athlete should have never been permitted to step foot on the field as long as signs and symptoms directly related to the initial injury were occurring. The guidelines discussed throughout this literature review clearly state their purpose and significance, to disregard these guidelines in unethical and illegal.

In 1990, *Kleinkencht v Gettysburg College* was brought to court when Drew Kleinkencht, a member of the intercollegiate lacrosse team, died of cardiac arrest on September 16, 1988. Drew was a 20-year-old sophomore student at Gettysburg College recruited to play intercollegiate lacrosse. Drew was attending a coach only supervised practice on September 16, 1988, began at approximately 3:15pm when he suddenly fell to the ground during a drill. When Drew was approached after collapsing, he was observed lying with his head in an awkward position and was heard as making a continuous "funny" "gurgling" noise (*Kleinknecht v Gettysburg College*). Drew's teammates also observed his skin beginning to change colors and turning blue. When coaches arrived and quickly assessed the situation, players were ordered to get an athletic trainer and call an ambulance. One coach began to run to Musselman Stadium to the nearest telephone located in the athletic training room approximately 200-250 yards from the field. The athlete sent to get an athletic trainer found a student-athletic trainer on his way and told her that a player was down and needed help. The student-athletic trainer then proceeded toward the field after encountering an obstacle course to get there quickly; the student had to squeeze through the main gate of the football stadium between the locked fence and a brick pillar and run on foot to the field until she was able to flag down a car for a ride. The athlete continued into the athletic training room and informed other student-athletic trainers of the incidence and who then proceeded to call the Head Athletic Trainer at Plank Gymnasium. Another teammate was en route to get help at Musselman Stadium, but noticed that the first athlete was going to beat him to the athletic training room so decided to change his course to the Student Union. When he arrived at the Student Union he informed the front desk of the situation, where she, after channeling

through to her supervisor, in turn called for an ambulance. The student-athletic trainer en route to the field was first to arrive on the scene to provide medical assistance to Drew and noticed labor breathing and change of skin color upon her arrival. Because Drew was breathing, the student-athletic trainer monitored vital signs. Once the coach arrived in the athletic training room at Musselman Stadium and was informed that help was on the way, he made his way back to the practice field arriving at the same time as the head athletic trainer. Upon his arrival in a golf cart, the head athletic trainer realized that Drew was not breathing and turned him on his back and began initiated CPR with the help of a student band member that arrived by chance and was an emergency medical technician. The two performed CPR until two ambulances arrived on the scene at approximately 4:15pm. Upon the arrival of EMS, defibrillation was administered along with drugs to help aid in strengthening his heart and was then transported to the hospital. Drew was pronounced dead at 4:58pm.

This case is significant when dealing with developing, implementing, and utilizing emergency polices and procedures in several ways. At the time practice began until 2 minutes after Drew collapsed on the field, there was no medical coverage for the officially sanctioned practice, and the first to arrive with any amount of training was a student-athletic trainer. At Gettysburg College two full-time athletic trainers are employed with twelve student trainers that participate in the sports program. Student-athletic trainers were only assigned to cover lacrosse during their spring in season practices and competitions, whereas in the fall practices were considered as, “skills and drills” and no coverage was provided. The NCAA states that all out of season practices and skills session should have an emergency plan in the event that an emergency should

arise (Potts & Dick, 2002-03). Neither coach was certified in CPR and admitted to never having discussed handling an emergency situation. If a practice is being held some form of coverage must be provided, whether it's fall or spring season. Lacrosse is a contact sport that makes it high risk, coverage is essential in risk sports. At Gettysburg College, lacrosse ranks fourth in sports-related injuries just behind football, basketball, and wrestling. It was also stated that while neither coach was certified in CPR there was also no form of communication on the field and the nearest telephone was 200-250 yards away. Say there was difficulty providing medical coverage for an off-season sport, some form of communication should have been provided for an emergency situation. Why cell phones are not provided for practices if no other coverage is available is inexcusable. Two-way radios can also be a means of communication between the athletic training room and the coaches on the field.

Without medical coverage or a means of communication, some formulated plan should have been established for the coaches to implement in the event an emergency should arise. Both coaches admitted to never having discussed how an emergency would be handled. Prentice (2003) stress the importance of prearranged emergency plan to ensure the best possible care and preparation to the student-athletes. This duty should fall within the hands of the athletic training staff, especially if coverage is not being provided. Guidelines would not have been established by various organizations, including the NATA, if an emergency plan was unnecessary (Andersen et al., 2002).

Once the student-athletic trainer was informed of a lacrosse player down on the field, she had to squeeze through a small space between the fence and a brick pillar. This fence was the main gate to the football stadium, where was the key? Does the gate remain

locked all day? Does the gate get unlocked during practices of risk sports or just football practices? Who possesses the key to the gate, is it easily accessible to all athletic training personnel in the event of an emergency situation? A plan should be implemented for this situation only; the key should be readily accessible for athletic training staff.

Upon arrival of the head athletic trainer, CPR was initiated. There was a student present at the time of arrival that had been monitoring Drew's vital signs, when did he lose his pulse and why didn't the student begin CPR? Was the student certified in First Aid and CPR? These details were not given, but any student working within the athletic training profession should be certified in first aid and CPR when their duties require them to cover practices of any nature whether high risk or low risk.

When a university utilizes an emergency plan in athletics, a formulated plan can be conducted to provide the best possible care for the injured athlete as possible. In the *Kleinknecht v Gettysburg College* case, if a plan was implemented at the time of Drew Kleinknecht's collapse, it definitely was not apparent. Each athletic venue must be addressed within the plan and obviously by a locked gate at the stadium, that is just one of the many complications that were undergone to get to Drew's side. All of these complications could have been prevented if the athletic training staff was better prepared with an emergency policies and procedures plan.

There are cases that will be brought before the courts that essentially may not reflect back on the fault of the university, but well devised emergency policies and procedures that could be presented in court can help in clarifying the course of treatment taken at the time of the emergency. *Hanson v. Kynast* is a case involving two opponent lacrosse players involved in a sanctioned game between Ohio State University and

Ashland University. On May 1, 1982 a player from Ohio State University intercepted a pass to an Ashland player and continued down the field to score a goal. As the Ashland player proceeded to score; Kynast, a defender from Ashland University, body-checked him from behind. Kynast continued to stand over the Ohio State player taunting him while he was on the ground; Hanson, a fellow Ohio State teammate, grabbed Kynast from the side or back and held him in a bear hug. Kynast immediately twisted and continued to throw Hanson off his back, in turn Hanson struck his head on the ground causing severe injuries. Both athletic trainers attended to Hanson on the field to find that he was numb and could not move. An assistant athletic trainer for Ashland University was sent to call 9-1-1. The ambulance's arrival was delayed at the main entrance in which they were to enter due to an illegally parked vehicle and was forced to find another entrance to the facility. Once Hanson was immobilized, he was transported to a local hospital where he remained for approximately one hour and then transferred to a General Hospital for surgery. The surgery was found to successfully relieve vascular compression in turn preventing any further brain damage, but Hanson also suffered a compression fracture of his sixth vertebra that resulted in leaving him as an incomplete quadriplegic.

Not a whole lot can be done about the conduct of players on the field of play, but the facilities should always be readily accessible for ambulances or other emergency personnel in the event that their assistance is needed during practice or competition. A vehicle blocking the main entrance to a field during competition can be detrimental to handling the care of an injured athlete where time is of the essence. The faster treatment and care is administered the better the chance. Though this does not apply to every situation, the majority of emergencies rely on the amount of time it takes to care for the

athlete. Hanson argued that Ashland University should be held liable for negligently failing to have an ambulance or emergency vehicle at the competition, and allowing a parked vehicle to block the entrance to the main gate. An ambulance does not have to necessarily be present during the time of competition, but a clear entrance to the field should always be maintained. The courts reversed their decision here and decided that there was no legal duty to have an ambulance present at the time of competition. In a well thought out emergency policy and procedures manual the entrance would never have been an issue. Someone should be designated to go and provide a means of guidance for the ambulance prior to their arrival. If the entrance was blocked during that time, arrangements could be made to move the vehicle or provide an alternate quick route for the ambulance, of that fact. If a spinal injury is suspected, why hadn't cervical stabilization already been initiated? Why hadn't the athlete been immobilized on to a spine board? All of the questions asked of each individual case should be answered or clarified within the athletic emergency policies and procedures.

Summary

In summary, based on the data available on emergency policies and procedures the known significance of a devised, implemented and utilized emergency plan is undeniable. What universities are doing to carry out the necessity of an emergency plan and what is specifically stated within these plans is unknown. Literature states that not only the particular contents included in the plan that is all but spelled out for athletic training professionals through various published guidelines are important, but the actual

development and implementation as well. Having an emergency polices and procedure is one thing, implementing them and actually utilizing them when an emergency situation arises is another. The study performed by the NCAA to arise awareness on medical coverage showed a small amount of schools actually implementing an emergency plan brought forth issues of universities providing the best care possible in the event that an injury occurs, but this study did not compare what universities were implementing specifically compared to fellow universities and the guidelines published by various organizations.

CHAPTER III

Methods

Chapter III represents the methodology used when completing this study. These methods include the description of the subjects, the study design and materials, procedures used in the data collection, and statistical study analysis of the data.

Subjects

The subjects of this study consisted of head athletic trainers at the National Collegiate Athletic Association member institutions. The subjects were divided according to the NCAA division I-A and I-AA based upon the size and scope of their athletic program. The NCAA also bases the divisional breakdown by regulating financial assistance to the athlete and the number of sports sponsored. Division I-A is the largest in scope (NCAA, 2000). As of 2003, the number of active member schools was 241 Division I-A and Division I-AA. The NCAA was contacted and a request was made for a list of address labels of all current head athletic trainers at each affiliated college or university. Due to the amount of time it would take to receive the labels, a list was utilized instead via the Internet. Using this list, addresses were found in The Blue Book of College Athletics. Each school's address label was typed up and sent in care of "Head Athletic Trainer."

Study Design

The questionnaire used in this study is presented in Appendix B. The questionnaire was to be completed by the head athletic trainer of each NCAA institution and returned by a set date, allowing a reasonable amount of time before its return. The questionnaire was developed to obtain responses from each university that would lead to answers proposed by the research question.

The questionnaire format of this study was developed to be short in length, easy to complete, and returnable without cost to each head athletic trainer. A basic review of several universities' emergency policies and procedures was conducted to establish the information needed to complete the questionnaire in turn utilizing experts in the athletic training profession. A stamped envelope was including in the mailing to help limit costs and increase return rate. The questionnaire was brought before thesis committee members, a committee of my peers including graduate assistants, current head and assistant athletic trainers and departmental personnel all of whom are experts in the field of athletic training. The questionnaire was also reviewed by a statistician for the purpose of data collection, processing and to avoid any statistical problems. Changes were made according to all parties involved.

Deciding on the questions to be asked for the questionnaire was based on three subjects. Most of the questions were formatted such that the individual was to circle YES or NO, the remaining questions were such that the individual had to check next to the answer that applied. The first section was solely on emergency policies and procedures and general information pertaining to the plan itself. The second section was based on

emergency response of the athletic training staff, student-athletic trainers, and the EMS. The third and last section was based on equipment practice/training frequencies conducted by athletic training staff and student-athletic trainers and the particular equipment readily accessible by each university.

Procedures

The questionnaire was sent to 241 NCAA member institutions in an organized manner. A cover letter was included with the questionnaire stating a brief summary of the factors involved with the research (Appendix B). The cover letter explained the reasons behind the study and how the results would benefit athletic trainers and their preparations for emergency situations. A statement included in the cover letter insured all data collected would remain confidential and be used for research purposes only. The subjects were also informed they should include a business card with their completed questionnaire if they were interested in the results of the study. My committee chair was listed as a contact with a phone number in case there were any questions or concerns regarding the study. In addition, a pre-paid return envelope was included to insure better return rate.

Statistical Analysis

The statistical analysis was performed by using the SPSS (version 11.5). Frequencies, regression tables, analysis of variance, principal components with interpretable loadings and correlations were calculated for each question. The level of significance study was set at $P < .05$ (95%).

CHAPTER IV

Results

The purpose of this study was to compare the differences among 139 universities' emergency policies and procedures on the Division I-A and I-AA levels. This chapter will present the data collected from the respondents of this study. The SPSS software system was utilized to calculate frequencies, percentages, principal components results, and multiple regression results (SPSS, 2003).

Respondents

The head athletic trainers of each Division I-A and I-AA university were asked to complete and return a questionnaire. According to the NCAA online calculations, the total number of Division I-A and I-AA universities equaled 241; where 117 Division I-A and 124 Division I-AA. Because the study was conducted on all Division I-A and I-AA universities, the total number of questionnaires mailed equaled 241. One hundred and thirty-nine questionnaires were returned, giving the researcher an overall return rate of 57.7%. The return rate of the questionnaires above 50% indicates the concerns within the athletic training profession of the development, quality, implementation and utilization of emergency policies and procedures.

Table 3 reveals the variables chosen for the principal components analysis and the abbreviations given for coding purposes. Variables with loadings above .500 were retained for interpretation. The retained variables were grouped together based upon their relevancy to emergency policies and procedures.

Composite variables were formed base upon this method and named: Emergency Preparation, Emergency Communication, Practice/Preparation, Facility Accessibility, and Coaches' Preparation. Table 4 shows the principal components results regarding the chosen variables and the scores found to hold these particular groups significant. Regression results were calculated for each composite variable.

For the regression analyses, control variables and independent variables, were chosen according to the research hypothesis statement. Because we were trying to inquire about emergency policies and procedures and if there was a difference amongst the universities due to their size the following groups were chosen for the independent variables: total enrollment of the university, the number of athletes participating in intercollegiate athletics, and the number of NCAA sanctioned sports at the particular university.

Emergency Preparation

Emergency preparation of the universities at the Division I-A and I-AA level is represented in Table 5. The Emergency Preparation group was established through the help of the principal components results and the scores. Based on the range of scores within this table we know that universities vary with regards to emergency preparation. What was found to be significant within this group was that the more athletes the university had participating in intercollegiate athletics, the better the university were prepared for an emergency situation based upon the answers within their questionnaire. The level of significance was set at $p < .05$ and the 'number of athletes' within Emergency Preparation scored .193 showing a significance relating to the number of

athletes and the university's preparedness. No other statistical significance was found when controlling for the total of enrollment or the number of sports.

Emergency Communication

Table 6 represents regression results for Emergency Communication. This group was developed the same way, but the variables grouped together were different. The variables were comprised through the particular questions asked within the questionnaire itself. The two variables that stood out with scores $p < .05$ was as follows: directions to each individual athletic site posted by telephone or readily accessible when EMS is to be activated and specific hand signals used when on-field emergency took place to inform other medical personnel when to activate EMS or act upon retrieval of equipment. No scores were found within these results relating to a level of significance when controlling for total enrollment, number of athletes, or number of sports. This could be due to small sample size tested within this study. If there was a larger sample size tested the variables could have come up significant.

Practice/Preparation

Table 7 shows information representing the regression results from composite variables formed by the relation of the chosen variables. The questions used to develop the variables chosen for this group were whether the medical team rehearsed the actual policies and procedures with all involved staff and how often, whether the staff/students

practiced actually spine board techniques and how often, and whether the emergency equipment was checked for proper working conditions and how often. Again, no relationship within this group was found to be statistically significant using total enrollment, number of athletes, and number of sports as independent variables.

Facility Accessibility

Table 8 shows information representing the regression results from a group formed by the relation of the chosen variables. This group was named Facility Accessibility due to the variables that are included in its development. The variables used to comprise this group whether the university's facilities are readily accessible for ambulance and/or helicopter use should a situation arise where further medical assistance is needed by the staff medical personnel. No relationship was found within this group and amongst the chosen variables to be statistically significance when controlling for the total enrollment, number of athletes or number of sports.

Coaches' Preparation

Table 9 represents the regression results from the group Coaches' Preparation developed through the close relationship among the variables picked from particular questions within the questionnaire. Coaches' Preparation was developed through comprising whether the coaches at the universities were certified in the usage of an AED, if they were certified in CPR and whether yearly in-services were conducted to keep them

up-to-date with these certifications. Again, no significance was found when controlling for the total enrollment, number of athletes, or number of sports.

Emergency Policies and Procedures

Table 10 represents descriptive frequencies and percentages within questions of the questionnaire that address the actual presence of an emergency policy and procedures manual in the particular university. These frequencies were gathered based on whether the university had a written, documented emergency polices and procedures available, if these emergency policies and procedures were currently implemented, if no were there plans to establish emergency policies and procedures and finally were these emergency policies and procedures reviewed and revised annually. Ninety-seven percent of the universities stated that they did have a documented emergency policies and procedures manual, but only 94.2% stated these policies were actually implemented. The difference between these two percentages is largely due to the question being over looked by the respondent. There were 4 universities (2.9%) that responded that they did not have a written emergency policies and procedures. Though is should be noted that written beside the question the establishment of emergency policies and procedures were currently in progress with the return of the questionnaire. When the concern of whether the emergency policies and procedures were reviewed and revised annually by the athletic training/sports medicine staff, administration and emergency medical services 88.5% (123 of the 137) of the universities responded ‘yes’, where as 10.1% said ‘no.’

Medical Team:

Team Physicians, Certified Athletic Trainers, Emergency Medical Technicians

Table 11 shows descriptive frequencies and percentages of the medical team of each university consisting of the head team physician, full-time certified athletic trainers and the emergency medical technicians. Of the 139 schools 129 responded, 92.8%, that the head team physician is a member of their medical team. Emergency medical technicians were 75.5% likely to be considered part of the universities' medical team and ATCs were 97.1% chance of being part of the medical team. Again, questions could have been over-looked as the respondents filled out the questionnaire. The head team physician and certified athletic trainers were chosen from the rest of the choices listed on the questionnaire due to their particular close relation with the athletes and usually first to arrive on the scene. Emergency medical technicians were chosen as a third variable because following the athletic trainer and team physician; EMTs arrive as the first additional medical assistance once 9-1-1 has been activated.

Constructing and Reviewing by Medical Team

Table 12 represents the results of the descriptive frequencies and percentages calculated to show the involvement of the team physician, athletic trainers and local emergency medical technicians in the construction and annual review of the emergency policies and procedures. Again these three variables were chosen due to their close relationship to the athletes and being the first to arrive on the scene in an event of an

emergency. Athletic trainers showed 98.6 % likelihood of being involved in the direct construction and reviewing of the emergency policies and procedures. The head team physician was found to be part of the construction and reviewing at 78.4% of the universities, whereas the local emergency medical technicians were only 23% likelihood of being present when this process was being conducted.

Concussion Grading Scales and Specific Scales Utilized

Table 13 represents the results of the descriptive frequencies and percentages found regarding concussions. This table is divided into two sections, 1) whether its specified within the emergency policies and procedures what grading scale will be used to assess concussion and 2) if yes, which grading scale does the university utilize for assessment purposes (Colorado, Cantu, AAN, other). In 34.5% of the universities grading scales were found to be specified within the emergency policies and procedures, 63.3 % indicated that their university did not specify a particular grading scale. When asked the particular grading scale utilized 7.2 % used Colorado Guidelines, 10.1% used Cantu's, 12.2 % used AAN and 13.7% indicated other guidelines were utilized. The numbers do not match up, but again this can be due to the error on the respondents' part in answering the questionnaire possibly overlooking the second portion of the question.

On-Field Hand Signals and Specific Roles Delegated

Table 14 represents the descriptive frequencies and percentages calculated regarding the universities' preparation of on-field situations. This table indicates how many universities actually have on-field hand signals they use when an emergency situation arises. These hand signals indicate to other medical personnel what action is to be taken next, whether it be activating EMS or bringing out the necessary equipment to give immediate treatment and care to the injured athlete. Of those schools that responded to this question 65.5% of them stated that on-field hand signals were utilized in the event an emergency situation arises. Seventy-nine nine percent stated that specific roles were delegated to medical personnel for an emergency situation. These roles range from bringing out the spine board to activating EMS.

Emergency-Readiness

Table 15 represents the descriptive frequencies and percentages indicated for the emergency-readiness of the universities' medical personnel. Certain tasks can be performed to prepare the medical personnel of an emergency situation such as: 1) knowing the estimated arrival time of the EMS to each athletic facility, 2) exact directions to each facility reviewed and revised with EMS (particular gates, certain roads, certain end of the field), 3) directions and emergency script posted by a fixed phone or carried by specific person readily accessible when EMS needs to be activated, 4) ambulance-ready facilities (no blocked entrances, unlocked gates), 5) helicopter-ready

facilities (when applicable), and 6) specific hospital utilized for specific injuries/traumas (trauma one unit versus trauma four). Those universities that knew the estimated arrival time of the EMS calculated to 82.7 %, 155 out of 139. Of 139 schools, 103 (74.1 %) indicated that directions were reviewed with EMS, whereas 25.9 % indicated no review or revision takes place. When calculations were completed for posted directions and emergency scripts, 48.9 % of the schools indicated this as a completed task, but 49.6 % had not. Ambulance-ready universities' facilities came out to 97.1 % and helicopter-ready facilities came out to 74.1 %. Fifty-nine percent of the universities stated that a specific hospital was indicated in the emergency policies and procedures that would be utilized according to the situation at hand.

Cervical Stabilization and Spine Boarding

In Table 16 represents the descriptive frequencies and percentages calculated from variables used to develop from questions directly related to cervical stabilization and spine boarding. The questions used to develop these results are as follows: 1) understanding that the first to arrive will perform head and neck immobilization, and EMS will not take over upon arrival, 2) if this understanding is not established, is an ATC specified as the one to stabilize, 3) is it specified when athlete be spine boarded according to specific injury, and 4) is spine boarding practiced on a regular basis by the medical personnel. When answered 'yes' or 'no' to specifying that there is an understanding between the medical personnel and the EMS that the first to arrive will maintain cervical stabilization and EMS is not to take over the stabilization upon their arrival, 60.4% of the

universities stated this was a specificity within their emergency policies and procedures, whereas 36.7 % said no. The following question stated that if the answer to the previous question was 'no' and the first to arrive will not be the one to stabilize the head and neck 32.4% of the universities stated that it was specified that an ATC will be the one at the head and neck. When asked if their emergency policies and procedures specified when they would stabilize an athlete according the type of injury they are suffering (hip fracture, spinal injury, etc.) only 30.9 % of the universities stated it was specified within the policies and procedures, 66.2% stated 'no'. Finally, only 10.1% of the universities practiced spine boarding on a daily/weekly basis and 87% answered 'no' which leads us to assume that spine boarding is not practiced on a regular basis.

Essential Equipment Availability

Table 17 represents descriptive frequencies and percentages calculated from questions pertaining to equipment available at each university. Spine boards, head blocks, chinstraps, cervical spine collars, splint kit, extractors, and automated external defibrillators were included as 'essential equipment.' Each university were asked to check the chosen equipment if it was readily available results were as follows: 94.2% of the universities had spine boards, 82.7% head blocks, 69.1 % chinstraps, 95.7% c-collars, 95% extractors and 73.4% AEDs. Only 69.1% of the universities had chinstraps this could be a result of the universities' ability to replace the straps with the use of athletic tape.

Non-Essential Equipment Availability

Table 18 represents descriptive frequencies and percentages on non-essential equipment availability at the universities. Non-essential equipment was the remaining equipment within the original question and titled as such because to provide immediate care for the athlete until EMS arrives this equipment is not essential. Oxygen, IV Kit, and tracheotomy kit are all classified as non-essential equipment. In universities, 64.7 % had access to an IV kit, 17.2% to a tracheotomy kit and 41.7% access to oxygen.

Rehearsing Emergency Policies and Procedures and Checking Equipment

Table 20 represents the descriptive frequencies and percentages for rehearsing emergency policies and procedures as well as the frequency in which the university checks their equipment for working condition. Rehearsing policies and procedures was found to be 72.7% likely to be conducted 1-2 a season as oppose to .7% daily, 3.6% weekly and 23% other times. When the calculation was completed on universities checking the equipment to ensure proper working condition 5% did on a daily basis, 15.8%on a weekly basis, 27.3% on a monthly basis and 47.5% checked equipment at another time.

Helmet/Facemask Removal Equipment

Table 21 shows the results from a calculation of descriptive frequencies and percentages. This table represents the institutions answer to what type of helmet/facemask removal devices they utilize at their university. Several choices were given to the institution within the questionnaire that is as follows: FM Extractors, Anvil pruners, electric screw drivers, PVC shears, and Trainers Angels. Forty-one percent of the universities stated that they utilized FM Extractors as their primary device for helmet/facemask removal. Anvil pruners served as 25.9% of the universities' removal device and the electric screw driver as 46% of the universities' device. PVC shears were 13.7% likelihood usage by universities for their removal devices and 60.4% stated they utilize trainers' angels. A lot of the universities answered more than one device which they utilize as removal equipment, but the descriptive frequencies only calculated each removal device individually.

Coaches' Preparation

Table 22 represents the descriptive frequencies and percentages' results gathered from questions pertaining to the athletic coaches' preparation for an emergency and whether they can contribute to an emergency situation. The questions utilized for this particular table were concerned with whether the coaches were certified in CPR, AED usage, and whether yearly in-services were conducted to update the coaches on their certifications. Universities replied that only 31.7% of their athletic coaches were certified in the usage of the AED and 59.7% of the coaches were certified in CPR. Sixty-four

percent of the universities stated that yearly in-services were conducted for the coaches. Coaches were only found to be 59.7% likely to be certified in CPR, this number can definitely be increased because the medical coverage of a practice or competition may only be one person. When administering CPR, the medical personnel may experience fatigue and the help of a coach could make the difference in a life-threatening situation.

CHAPTER V

Discussion and Conclusions

The purpose of this study was to determine if the size of the university made a difference whether the university utilized emergency policies and procedures. By determining the size of the university through specific questions concerning the enrollment size, number of athletes that participated in intercollegiate athletics, and the number of sanctioned sports we hoped to find the larger the university the more likely they would be prepared for an emergency through the use of an emergency polices and procedures plan. This chapter will discuss the results of this study and relate the data to the current literature.

Discussion

Emergency Preparedness

The results in the regression table of Emergency Preparedness showed us that when the universities' number of athletes increased, the more likely the university would be prepared for an emergency (Table 5). The statistical significance found here is important because it shows us universities are more prepared when they are responsible for more athletes. Though the number of athletes should not dictate how prepared a university is when dealing with an emergency situation, it is significant that universities that are responsible for more athletes do seem better prepared.

Emergency Communication, Practice/Preparation, Facility Accessibility & Coaches' Preparation

The remaining regression results failed to make any relationship that was determined as statistically significance (Tables 6, 7, 8, 9, 10). Though there was no significance found within the results of the regression tables, the essentialness of these topics must still be stressed. Being able to communicate sufficiently while on-field and with the EMS could is crucial and could make the difference in a life-threatening situation (Rankin et al., 2001). Practice/preparation is also a significant factor when treating and caring to an injured athlete. The more practice medical personnel and students conduct in mock emergency situations the better prepared they will be in a real situation. We failed to show statistical significance here when looking at enrollment size, number of athletes or number of sports; this does not decrease the importance of being prepared. The facility accessibility cannot be overlooked because all actions can be taken by the on-site medical personnel in attempt to care for the injured athlete, but once EMS has been activated their inability to arrive on scene efficiently and safely is essential when a life-threatening situation is at hand. Whether or not the coaches are prepared for an emergency situation could be irrelevant to some, but smaller universities where covering all practices with an certified athletic trainer is difficult this could play a key factor in dealing with a life-threatening situation. The aid of a coach certified in the use of an AED or in CPR can make the difference in saving a life. If the sample size was larger there could be a possibility that a significant relationship exists, but with the sample size used within this study relationship among these results does not exist.

Emergency Polices & Procedures

The results of this composite variable showed us the likelihood of universities having a written, documented emergency policies and procedures plan. Prentice (2003) tell us that an emergency plan that is prearranged and organized is essential to providing effective and immediate care to an injured athlete. Whereas the NATA have gone as far as developing emergency procedures guidelines position statement to aid in the preparation of an emergency policies and procedures (Andersen et al., 2002). Considering that only 2.9% of the universities replied the absence of a formulated emergency policies and procedures manual (Table 10).

Constructing and Reviewing by Medical Team

Constructing the emergency policies and procedures manual for an athletic training program should be done with the establishment of the program; reviewing should be done annually to modify any changes necessary to keep all information up-to-date. (Andersen et al., 2002; Prentice, 2003). Athletic trainers should be directly involved in the construction and reviewing of the emergency policies and procedures and it was found that 98.6% actually were involved (Table 12). This large percentage is not surprising because the head athletic trainer should be the one that develops the emergency polices and procedures for their institution so the athletic training staff is able to implement and utilize appropriately.

Emergency-Readiness

The emergency readiness of a university serves equally important to being prepared to handle a life-threatening situation. The estimated arrival time (ETA) of the EMS to each athletic facility was one classification that helps determine the emergency-readiness of the university. Only 82.7% of the universities knew the ETA of the EMS; though this percentage is nearly a 100% the ETA is significant when the life of an athlete is at risk (Table 15). Time is of the essence and every second counts when tending to a life-threatening situation; of the universities, 17.3% of the indicated that the ETA was unknown to each athletic venue. Whether the university is aware of different trauma centers within their area is crucial because knowing which hospital can handle certain situations can be pertinent information to know at the beginning of each practice. A spinal injury would go to a major trauma center in the area, but trauma centers range from one to four in their capabilities of handling major situations. This information is vital because what hospital an injured athlete will be transported should be determined once an initial assessment is conducted before EMS is activated. Fifty-nine percent of the universities indicated a particular hospital would utilized for different types of injuries/trauma and this was clarified and stated within their emergency polices and procedures. Fifty-nine percent indicates the universities' emergency-readiness to handle emergency situations.

Essential/Non-Essential Equipment Availability

The type of emergency equipment a university has access to will determine the degree of treatment and care that can be given to an injured athlete whether a minor situation or a life-threatening one. Most universities were found to be decently supplied of essential equipment such as spine board, splints, head blocks, etc, but when non-essential equipment was found to less frequent. Some universities would indicate their access to a spine board and chinstraps, but would lack the head blocks. Other universities indicated their access to most all essential equipment and non-essential equipment but would lack a splint kit (Tables 17 & 18). The absence of the non-essential equipment can be overlooked; upon EMS' arrival these non-essential equipment is readily available. Athletic trainers are not trained in the use of or administration of the described non-essential equipment, so the presence of a team physician or an EMT would be the only way an athlete would receive this treatment. The accessibility of AEDs in universities settings was indicated in 73.4% of institutions (Table 17). Though AEDs in athletic training rooms and on the field are becoming more a trend, unfortunately the cost of AEDs are not decreasing to the amount that is affordable for all university budgets.

Checking Equipment

Checking the proper working conditions of the equipment is an essential task that must be performed on regular basis. This task should be a daily routine for the medical personnel before taking the equipment out to the field or court to ensure the working

conditions of each piece of equipment in case an emergency should arise and the use of the equipment is needed. Only 5% of the universities indicated that their equipment was checked on a daily basis (Table 20). Other universities indicated that their checks fell on a weekly, monthly or at another time. If an emergency situation took place on the field, delaying treatment to the athlete could prove the difference between life and death some circumstances. Where time is of the essence risks should not be taken when they can be prevented.

Summary and Conclusions

The study examined the probability of larger universities' availability of emergency policies and procedures over smaller universities specifically focusing on the enrollment size, number of athletes and number of sports.

No factors were found to be statistically significant in determining larger universities were more likely to utilize emergency policies and procedures than smaller universities. The main factor that was found to be statistically significant was the more athletes the universities participating in intercollegiate sports; the more prepared for an emergency situation the university seemed to be.

Further research is needed to distinguish between Division I-A and I-AA universities. Respondents were not asked to distinguish which level of Division I they represented when answering the questionnaire. To include all other levels of NCAA divisions would also aid in determining where all universities stood within the scope of this study and the NATA's guidelines for emergency policies and procedures (Andersen

et al., 2002). With a larger sample size more statistically significant information could possibly be found within this research.

In order to maintain high-quality health care to our student-athletes further research must be continued because the significance cannot be stressed enough. The primary reason for this study was to provide data regarding emergency policies and procedures in Division I-A and I-AA universities and what these institutions were doing to abide and meet the standards put forth by the NATA's emergency planning guidelines (Andersen et al., 2002).

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APPENDIX A

TABLES

TABLES LIST

Table 1

GLASCOW COMA SCALE

Response	Point/s	Action
Eye Opening		
Spontaneously	4	Reticular activity system is intact; Patient may not be aware.
To verbal command	3	Opens eyes when told to do so.
To pain	2	Opens eyes in response to pain.
None	1	Does not open eyes to any stimuli.
Verbal		
Oriented, converses	5	Relatively intact CNS; aware of self and environment.
Disoriented, converses	4	Well articulated, organized, but disoriented.
Inappropriate words	3	Random, exclamatory words
Incomprehensible	2	Moaning, no recognizable words
No response	1	No response or intubated
Motor		
Obeys verbal commands	6	Readily moves limbs when told to
Localizes to painful stimuli	5	Moves limb in an effort to avoid pain.
Flexion withdrawal	4	Pulls away from pain in flexion
Abnormal flexion	3	Decorticate rigidity
Extension	2	Decerebrate rigidity
No response	1	Hypotonic, flaccid; suggests loss of medullary function or concomitant cord injury.

Table 2

Cranial Nerves

Optic (II)	**Sensory**: visual acuity and visual fields
Oculomotor (III)	**Motor**: raise eyelids, most extraocular movements **Parasympathetic**: papillary constriction, change lens shape
Trochlear (IV)	**Motor:** downward, inward eye movement
Tigeminal (V)	**Motor:** jaw opening and clenching, chewing and **Sensory:** sensation to cornea, iris, lacrimal glands,
Abducens (VI)	**Motor:** later eye movement
Facial (VII)	**Motor**: movement of facial expression muscles except jaw, **Sensory:** taste --- anterior two thirds of tongue, sensation to **Parasympathetic:** secretion of saliva and tears
Acoustic (VIII)	**Sensory**: hearing and equilibrium
Glossopharyngeal (IX)	**Motor:** voluntary muscles for swallowing and phonation **Sensory:** sensation of nasopharynx, gag reflex, taste --- **Parasympathetic:** secretion of salivary glands, carotid reflex
Vagus (X)	**Motor:** voluntary muscles of phonation (gluttural speech **Sensory:** sensation behind ear and part of external ear canal **Parasympathetic**: secretion of digestive enzymes;
Spinal accessory (XI)	**Motor**: turn head; shrug shoulders, some actions for
Hypoglossal (XIII)	**Motor:** tongue movement for speech sound articulation (l, t, n) and swallowing

TABLE 3

VARIABLES

Emergency Policies & Procedures (EPP)	Documented emergency policies and procedures at university; Codes: 1-yes; 0-no.
Rehearse Frequency (REHEARSE)	Frequency of university's rehearsal of emergency policies and procedures. Codes: 5-daily; 4-weekly; 3-monthly; 2-one to two times per season; 1- other
EMS Estimated Arrival (ETA)	Known estimated arrival time of EMS at each facility. Codes: 1-yes; 0-no
Coaches Cert. – AED (COACHAED)	Coaches certified to use Automated External Defibrillator. Codes: 1-yes; 0-no
Coaches Cert. – CPR (COACHCPR)	Coaches certified in cardiopulmonary resuscitation. Codes: 1-yes; 2-no
Coaches-In service (INSERV)	Yearly in-services conducted for coaches for CPR. Codes: 1-yes; 2-no
Facility Directions (DIRREVUE)	Directions to each facility reviewed with EMS. Codes: 1-yes; 2-no
Emergency Script (DIRSCRIP)	Emergency script posted by telephone of each facility for emergencies. Codes: 1-yes; 0-no
Ambulance Access (AMBUACES)	Ambulances easy access to each facility. Codes: 1-yes; 0-no
Helicopter Access (HELIACES)	Helicopters easy access to each facility. Codes: 1-yes; 0-no
Spine Board Practice (PRACBORD)	Spine board practice daily/weekly among students/staff. Codes: 1-yes; 0-no
Equipment Checks (CHCKFREQ)	Equipment checks conducted to ensure proper condition. Codes: 5-daily; 4-weekly; 3-monthly; 2- other
Staff trained w/equip (TRNEQUIP)	Staff/students trained in usage of equipment available. Codes: 1-yes; 0-no
Specific Hand Signals (HANDSIGS)	Specific hand signals used for on-field communication. Codes: 1-yes; 0-no
Specific Roles (SPECROLE)	Specific roles designated to students/staff for emergency care (retrieval of equipment, activating EMS, etc.) Codes: 1-yes; 0-no

TABLE 4

PRINCIPAL COMPONENTS RESULTS (INTERPRETABLE LOADINGS):

COMPOSITE DEPENDENT VARIABLES

	Coaches Prep.	Practice Prep.	Emergency Prep.	Facility Access	Emergency Communication
Emerg. P & P					
Rehearse Freq.		.617			
EMS Arrival			.626		
Coach-AED	.682				
Coach-CPR	.844				
Coach In-Serv.	.695				
Facility Direct.					
Emerg. Script					.723
Ambul Access				.737	
Helicpt. Access				.813	
Spine Bd Pract.		.706			
Equipment Chks.		.527			
Staff trned. w/equip.					
Spec. Hnd Signals					.544
Specific Roles			.618		

TABLE 5

REGRESSION RESULTS
DEPENDENT VARIABLE: EMERGENCY PREPARATION

UNSTANDARDIZED AND (STANDARDIZED) REGRESSION COEFFICIENTS

TOTAL ENROLLMENT	.055 (.155)
NUMBER OF ATHLETES	.193* (.295)
NUMBER OF SPORTS	.093 (.092)

$R^2 = 9.8\ \%*$

N = 112

*p < .05

TABLE 6

REGRESSION RESULTS
DEPENDENT VARIABLE: EMERGENCY COMMUNICATION

UNSTANDARDIZED AND (STANDARDIZED) REGRESSION COEFFICIENTS

TOTAL ENROLLMENT	.017 (.048)
NUMBER OF ATHLETES	.029 (-.044)
NUMBER OF SPORTS	.069 (-.001)

R^2 = .3%

N = 112

*p >.05

TABLE 7

REGRESSION RESULTS
DEPENDENT VARIABLE: PRACTICE/PREPARATION

UNSTANDARDIZED AND (STANDARDIZED) REGRESSION COEFFICIENTS

TOTAL ENROLLEMENT	.005 (-.014)
NUMBER OF ATHLETES	-.122 (-.186)
NUMBER OF SPORTS	-.193 (-.192)

$R^2 = 1.9\ \%$

N = 112

*p < .05

TABLE 8

REGRESSION RESULTS
DEPENDENT VARIABLE: FACILITY ACCESSIBILITY

UNSTANDARDIZED AND (STANDARDIZED) REGRESSION COEFFICIENTS

TOTAL ENROLLMENT	.010 (.028)
NUMBER OF ATHLETES	.092 (-.139)
NUMBER OF SPORTS .076	 (-.075)

$R^2 = 0.9\ \%$

N = 112

*p < .05

TABLE 9

REGRESSION RESULTS
DEPENDENT VARIABLE: COACHES' PREPARATION

UNSTANDARDIZED AND (STANDARDIZED) REGRESSION COEFFICIENTS

TOTAL ENROLLMENT	.029 (-.080)
NUMBER OF ATHLETES	.099 (.151)
NUMBER OF SPORTS	.016 (.016)

$R^2 = 2.0\ \%$

N = 112

*p < .05

Table 10

Frequencies & Percentages of Emergency Policies and Procedures in Division I-A and I-AA Universities

	Frequency (1.00)	Percentages (1.00)	Frequency (.00)	Percentages (.00)
Current Emergency Policies & Procedures	135	97.1	3	2.1
Current Implementation Of Emergency Policies	131	94.2	2	1.4
Plans to Establish (if no, to previous questions)	4	2.9	0	0
Emergency Policies & Procedures Reviewed & Revised	123	88.5	14	10.1

* codes: 1.00 for yes; .00 for no.

Table 11

Frequencies & Percentages of Medical Team in Division I-A and I-AA Universities

	Frequency (1.00)	Percentage (1.00)	Frequency (.00)	Percentage (.00)
Head Team Physician	129	92.8	9	6.5
Local Emergency Medical Technician (EMT)	105	75.5	33	23.7
Certified Athletic Trainers (ATCs)	135	97.1	3	2.2

* codes: 1.00 for yes; .00 for no

Table 12

Frequencies & Percentages Medical Team Responsible for Constructing and Reviewing Division I-A and I-AA Emergency Policies and Procedures

	Frequency (1.00)	Percentage (1.00)	Frequency (.00)	Percentage (.00)
Head Team Physician	109	78.4	30	21.6
Local Emergency Medical Technicians (EMT)	32	23.0	107	77.0
Certified Athletic Trainer (ATC)	137	98.6	2	1.4

* codes: 1.00 for yes; .00 for no

Table 13

Frequencies & Percentages of Concussion Grading Scales and Specified Scales in Division I-A and I-AA Universities

	Frequency (1.00)	Percentage (1.00)	Frequency (.00)	Percentage (.00)
Concussion Grading Scale In Emergency Policies & Procedures	48	34.5	88	63.3

Frequencies & Percentages of Specific Scales in Division I-A and I-AA Universities' Emergency Policies and Procedures

	Frequency (1.00)	Percentage (1.00)	Frequency (.00)	Percentage (.00)
Colorado Guidelines	10	7.2	127	91.4
Cantu Guidelines	14	10.1	123	88.5
American Academy of Neurology Guidelines (AAN)	17	12.2	120	86.3
Other	19	13.7	118	84.9

* codes: 1.00 for yes; .00 for no

Table 14

Frequencies & Percentages Emergency On-Field Hand Signals & Specific Roles Delegated for Emergencies in Division I-A and I-AA Universities' Emergency Policies and Procedures

	Frequencies (1.00)	Percentage (1.00)	Frequency (.00)	Percentage (.00)
Specific Hand Signals Indicating Type of On-Field Emergency	91	65.5	44	31.7
Specific Roles Delegated To Medical Personnel for Emergency Situation (equip. retrieval, EMS Activation)	111	79.9	27	19.4

* codes: 1.00 for yes; .00 for no

Table 15

Frequencies & Percentages in the Emergency-Readiness of Division I-A and Division I-AA Universities' Emergency Policies and Procedures

	Frequency (1.00)	Percentage (1.00)	Frequency (.00)	Percentage (.00)
Known Estimated Arrival Time of EMS at each Facility	115	82.7	24	17.3
Directions to each Facility Reviewed/Revised w/ EMS	103	74.1	36	25.9
Directions & Emergency Script Posted/Available w/Telephone	68	48.9	69	49.6
Ambulance-Ready Facilities	135	97.1	4	2.9
Helicopter-Ready Facilities	103	74.1	25	18.0
Specific Hospital Utilized for Specific Injuries/Traumas	82	59.0	57	41.0

* codes: 1.00 for yes; .00 for no

Table 16

Frequencies & Percentages in Cervical Stabilization of Injured Athlete and Spine Boarding In Division I-A and I-AA Universities' Emergency Policies and Procedures

	Frequency (1.00)	Percentage (1.00)	Frequency (.00)	Percentage (.00)
Understanding w/EMS ATC WILL NOT release the head upon EMS arrival	84	60.4	51	36.7
If no, ATC specified in C-spine Stabilization	45	32.4	17	12.2
Stabilize on Board According To Specific Injury	43	30.9	92	66.2
Practice Spine Board on Daily/Weekly Basis	14	10.1	121	87

* codes: 1.00 for 'yes'; .00 for 'no'

Table 17

Frequencies & Percentages in Essential Equipment Availability in Division I-A and I-AA Universities to Administer Emergency Care

	Frequency (1.00)*	Percentage (1.00)	Frequency (.00)*	Percentage (.00)
Spine Board	131	94.2	7	5.0
Head Blocks	115	82.7	23	16.5
Chinstraps	96	69.1	42	30.2
C-Spine Collars	133	95.7	5	3.6
Splint Kit	133	95.7	5	3.6
Extractors (Facemask removal)	132	95.0	6	4.3
Automated External Defibrillator (AED)	102	73.4	35	25.2

* codes: 1.00 for ‘yes’; .00 for ‘no’

Table 18

Frequencies & Percentages in Non-Essential Equipment Availability Division I-A and I-AA Universities to Administer Emergency Care

	Frequency (1.00)*	Percentage (1.00)	Frequency (.00)*	Percentage (.00)
Intravenous Kit (IV Kit)	90	64.7	48	34.5
Tracheotomy Kit (TRACH Kit)	24	17.2	113	81.3
Oxygen (O^2)	58	41.7	79	56.8

* codes: 1.00 for ‘yes’; .00 for ‘no’

Table 19

Frequencies & Percentages in Training and Removing Equipment w/ On-Field Emergency Situation in Division I-A and I-AA Universities

	Frequency (1.00)*	Percentage (1.00)	Frequency (.00)*	Percentage (.00)
Medical Personnel Properly Trained In Usage of Equipment	135	97.1	3	2.2
Specify in Facemask Removal	74	53.2	61	43.9
Specify in Shoulder Pad Removal w/ Facemask Removal	25	18.0	110	79.1

* codes: 1.00 for ‘yes’; .00 for ‘no’

Table 20

Frequencies & Percentages in Rehearsing Emergency Policies and Procedures & Checking Equipment on a Regular Basis for to Ensure Proper Condition in Division I-A and I-AA Universities

	Frequency (5.00)* (5.00)+	Percentage (5.00)* (5.00)+	Frequency (4.00)* (4.00)+	Percentage (4.00)* (4.00)+	Frequency (3.00)* (3.00)+	Percentage (3.00)* (3.00)+
Rehearsal of Emergency Policies & Procedures	1	.7	0	0	5	3.6
Checking Equipment For Proper Working Condition	7	5.0	22	15.8	38	27.3

	Frequency (2.00)* (2.00)+	Percentage (2.00)* (2.00)+	Frequency (1.00)*	Percentage (1.00)*
Rehearsal of Emergency Policies & Procedures	101	72.7	32	23.0
Checking Equipment For Proper Working Condition			66	47.5

Rehearsal of Emergency Polices & Procedures
*codes: 5.00 for daily; 4.00 for weekly; 3.00 for monthly; 2.00 for 1-2 times per season; 1.00 for other
Checking Equipment for Working Conditions
+codes: 5.00 for daily; 4.00 for weekly; 3.00 for monthly; 2.00 for other

Table 21

Frequencies & Percentages in Helmet/Facemask Removal Equipment in Division I-A and I-AA Universities

	Frequency (6.00)	Percentage (6.00)	Frequency (5.00)	Percentage (5.00)	Frequency (4.00)	Percentage (4.00)
FM Extractors	57	41.0				
Anvil Pruners			36	25.9		
Screw Driver (Electric)					64	46

	Frequency (3.00)	Percentage (3.00)	Frequency (2.00)	Percentage (2.00)
PVC Shears	19	13.7		
Trainers' Angels			85	61

Table 22

Frequencies & Percentages in Coaches' Preparation for Emergency Situation in Division I-A and I-AA Universities

	Frequency (1.00)	Percentage (1.00)	Frequency (.00)	Percentage (.00)
Coaches Certified In AED Usage	44	31.7	94	67.6
Coaches Certified In CPR	83	59.7	54	38.8
Yearly In-Services Conducted for Coaches	89	64.0	50	36.0

* codes: 1.00 for 'yes'; .00 for 'no'

APPENDIX B

COVER LETTER AND QUESTIONNAIRE

January 21, 2003

Dear Head Athletic Trainer:

My name is Brandy Petty and I am currently a graduate student at Marshall University. As part of my graduate work here at Marshall University I am conducting a survey of Division I A and I AA athletic programs to evaluate their emergency policies and procedures. The NATA has set specific guidelines stating what should be included in intercollegiate athletics emergency policies and procedures, with this study I hope to find out if universities are utilizing these guidelines. I also hope to determine if smaller universities are unable to meet these guidelines due to a considerably lower budget. I am asking that you complete the enclosed questionnaire developed for this study to aid me in my research.

All results and responses will be held confidential, and no university will be identified in the final product of the theses. Please direct any questions or concerns that you may have towards my Committee Chair Dr. Dan Martin at 304-696-2412. If you wish a synopsis of the results of this study please include your business card with your reply. Please postmark the returned questionnaire by February 26, 2003. Thank you for you time and consideration.

Sincerely,

Brandy A. Petty, ATC

Enclosure

Emergency Policies and Procedures Questionnaire
Brandy A. Petty, ATC

1. Is there a written, medical manual or handbook documenting emergency policies and procedures available to your athletic training staff? YES NO

If yes, are these emergency policies and procedures currently implemented at your institution? YES NO

If no, do you have immediate plans to establish emergency policies and procedures for your institution? YES NO

2. Are your emergency policies and procedures reviewed and revised annually by your athletic training/sports medicine staff, athletic/university administration and emergency medical services? YES NO

3. Please check all that you consider to be part of your emergency medical team

__ Head Team Physician
__ Athletic Training Full-time Staff
__ Local EMTs
__ Team Orthopedic Doctor (s)
__ Hospital ER Personnel
__ Hospital Medical Director
__ Sports Medicine/Athletic Training Curriculum Coordinator
__ Athletic Director/Asst. Athletic Director
__ University Administration (President, Vice President, etc)
__ Team Neurosurgeon
__ Campus Police/Local Police
__ Director of Student Affairs
__ Director of Emergency Services

4. Of these people included in your medical team which are involved in your institution's process of constructing and reviewing your emergency policies and procedures manual?

__ Head Team Physician
__ Team Orthopedic Doctor (s)
__ Director of Student Affairs
__ Athletic Training Full-time Staff
__ Athletic Director/Asst. Athletic Director
__ Managers
__ Director of Emergency Services
__ Team Neurosurgeon
__ University Administration (President, Vice President, etc.)
__ Sports Medicine/Athletic Training Curriculum Coordinator
__ Hospital Medical Director
__ Student-athletic trainers
__ Hospital ER Personnel
__ Local EMTs
__Campus Police/Local Police
__ Coaches

5. How often does your institution rehearse your emergency policies and procedures (spine boarding, AED usage, CPR, face mask removal, etc)? Please check one of the following. __ daily __ weekly __ monthly __ 1-2 a season __other

6. Is the estimated arrival time of the local emergency medical services to each athletic facility known to medical personnel covering each practice/competition? YES NO

7. Are your institution's athletic coaches required to be certified or knowledgeable in AED usage? YES NO

8. Are your coaches required to be certified in CPR? YES NO

9. Are yearly in-services conducted for coaches and other athletic staff to ensure and reinforce their CPR certification capabilities? YES NO

10. Are quick, easy to follow directions available and reviewed with the EMS for each athletic facility? YES NO

11. Are there directions and an emergency script posted by a fixed telephone at each athletic facility? YES NO

12. Are your athletic facilities readily accessible to all ambulances? YES NO

13. Are your athletic facilities accessible to a helicopter if necessary? YES NO

14. Dependent on the severity of the athlete's injury; does your emergency policies and procedures specify what hospital to use such as a trauma center? YES NO

15. Is it specified in your institution's emergency policies and procedures what grading scale will be used to assess concussions?

YES NO

If yes, what grading scale does your institution utilize? Please check one of the following:
___ Colorado Guidelines __ Cantu Guidelines __American Academy of Neurology Guidelines __ Other

16. In your emergency policies and procedures, is it specifically stated and understood with the local emergency medical services staff that in a suspected spinal injury the first to arrive on scene of the emergency will initiate and maintain cervical spine stabilization; and WILL NOT release cervical spine stabilization until the athlete is completely stabilized on the board? YES NO

If no, is a certified athletic trainer the one specified to initiate and maintain cervical spinal stabilization? YES NO

17. Is it specified in your emergency policies and procedures plan when an athlete will be stabilized on a spine board in an emergency situation according to specific injury? YES NO

18. Is spine boarding a daily/weekly activity practiced by student athletic trainers and certified athletic trainer during the in-season participation of your institution's sports? YES NO

19. Please check all equipment that your institution possesses for use in an emergency situation that is in good operating condition:

__ Spine Board __ Head Blocks __ Splint Kit __IV Kit __ Cervical Collars (various sizes)
__ Chin / Head Straps __O2 Air Adjunct Kit __ Tracheotomy Kit
__ Automatic External Defibrillators (AED)
__ FM Extractors, PVC shears, Trainers' Angels, Anvil Pruners, Screw Driver

20. Is it a requirement to conduct daily/weekly/monthly checks on all emergency equipment to ensure proper working condition? Please check below: __ daily __ weekly __ monthly __ other

21. Are medical personnel that are covering university athletic practices and competitions (ATCs, SATs, physicians, etc.) properly trained in usage of emergency equipment when necessary to carry out emergency policies and procedures? YES NO

22. Does your emergency policies and procedures specify in facemask removal? YES NO

23. If the decision to remove the facemask is made, do your emergency policies and procedures specify that the helmet and shoulder pads will also be removed in the applicable sports? YES NO

24. If the decision is made to remove the facemask and helmet, what extractors are used at your institution? Please check below:
__ FM Extractors __ Anvil Pruners __ Battery operated screw driver __ PVC Shears __ Trainers' Angels

25. Does your institution have specific hand signals that are utilized to indicate what is needed (ie splints, spineboard, 9-1-1, etc) on the field during an emergency on-field situation? YES NO

26. Are roles delegated to certain individuals for equipment retrieval and EMS activation as part of your emergency plan during practice/competition? YES NO

27. Currently approximately how many are enrolled in your university? Please check below:
__10-15,000 __15-20,000 __20-25,000 __25-30,000 __30-35,000 __35-40,000 __ 40-45,000
__45-50,000 __50-55,000 __55-60,000 __60-65,000 __65-70,000

28. How many NCAA intercollegiate sports participate at your university?
__ 5-10 __10-15 __ 15-20__ 20-25__other

29. How many student athletes do you have at your university participating in NCAA intercollegiate sports?
__ less than 100 __ 100-200 __200-300 __300-400 __400-500 __500-600__600-700 __ greater than 700

Brandy A. Petty
942 12th Ave Apt #2
Huntington, WV 25701

Home: (304) 523-2492
brandypetty@msn.com

Objective

A full time position in the field of athletic training.

Education

8/2001-Present ***Marshall University, Huntington, West Virginia***
Master of Science in Health and Physical Education
Major: General Studies

8/97-12/2000 ***Georgia Southern University, Statesboro, Georgia***
Bachelor of Science in Kinesiology
Major: Sports Medicine/Athletic Training

8/95-6/1997 ***Gordon College, Barnesville, Georgia***
Associate of Arts in General Studies
Major: Pre-Physical Therapy/General Studies

Sports Medicine/Athletic Training Experience:

8/2001-Present ***Graduate Assistant Athletic Trainer***
Marshall University
Assist Head Athletic Trainer and Assistant Athletic Trainer with daily operation and maintenance of athletic training room.
Assist with the supervision of athletic training students, coordinating physician visits and follow-up visits.
Assist Head Athletic Trainer with the planning, implementation, organization, and development of rehabilitation with women's golf and post-operative baseball players.
Assist with coverage of various athletic events as needed.

01/2003-Present ***Graduate Assistant Athletic Trainer-Football & Men's Soccer***
Assist Assistant Athletic Trainers with coverage of all FB spring practices and scrimmages.

Assist with the supervision of athletic training students, operation and maintenance of the FB athletic training room.
Assist with planning, implementation, and organization of rehabilitation of football.
Directly responsible for the planning, implementation, organization, and progression of rehabilitation of men's soccer
Responsible for complete coverage of all spring practices, games and team travel for men's soccer

10/2002-Present ***Graduate Assistant Athletic Trainer-Women's Swimming & Diving***

8/2001-12/2002 ***Graduate Assistant Athletic Trainer-Women's Soccer***
Directly responsible for the prevention and recognition of athletic injuries & conditions, management of injuries that occur, and treatment of athletic injuries
Directly responsible for complete coverage of all practices, games and team travel.
Responsible for planning, organizing and implementing rehabilitation programs.
Responsible for monitoring the progression of injuries and rehabilitation programs
Responsible for the documentation of all injuries, illnesses, treatment and rehabilitation
Responsible for direct communication with physicians and coaches

3/99-12/2000 ***Student Athletic Trainer:***
Georgia Southern University
Assist with the prevention, evaluation, and wound management of athletic injuries.
Assist with treatment and rehabilitation of athletes.
Assist Head Athletic Trainer with all athletic insurance claim settlements and billing.
Assisted with Varsity Football, Varsity Women's Basketball, Varsity Women's Soccer, Men's & Women's Soccer Camps, Men's & Women's Basketball Camps, & Football Camps

Related Experience:

8/98-12/2000 ***Campus, Recreation, & Intramurals, Statesboro, Georgia***
Georgia Southern University
Facility Supervisor
Assisted with daily opening/closing operation of the facility, direct supervision of employees, emergency management procedures, facility activities and safety of guests

Research Experience:

Parker, B. (May 2000). The Relationship of Thoracolumbar Functional Stabilization Level III Serve Velocity and Serve Accuracy in Collegiate Tennis Players

Assisted with data collection

Petty, B. (May 2003). Utilization of Emergency Policies & Procedures by Division I-A & I-AA Intercollegiate Athletic Programs

Activities & Honors:

1998	*Georgia Southern University Student-Athlete 3.0 Club*
1998-1999	*Georgia Southern University Varsity Tennis Team Captain*
1998	*Division I Southern Conference Tennis Champions*
1998-1999	*Georgia Southern University Student-Athlete Advisory Board Member*
1998-1999	*Eagle Sports Medicine Association Member*
2000	*Georgia Southern University Campus, Recreation & Intramurals' Leader of the Pack Award*
2000	*Georgia Southern University Campus, Recreation, & Intramurals' Facility Employee of the Year*
2003	*Awarded the Scooter Shreve Athletic Training Scholarship*

Certifications and Credentials:

10/99-11/01	*National Athletic Trainers Association, Student-Athletic Trainer Member*
9/99-Present	*American Red Cross*
	Adult, Child, & Infant First Aid & CPR
11/01-Present	*National Athletic Trainer Association*
	Board of Certification Certified, #110102114