1999

A content analysis of football helmet removal protocols

Anthony J. Recinell
San Jose State University

Follow this and additional works at: https://scholarworks.sjsu.edu/etd_theses

Recommended Citation

Recinell, Anthony J., "A content analysis of football helmet removal protocols" (1999). *Master's Theses*. 1908.

DOI: <https://doi.org/10.31979/etd.57t9-7tzk>

https://scholarworks.sjsu.edu/etd_theses/1908

This Thesis is brought to you for free and open access by the Master's Theses and Graduate Research at SJSU ScholarWorks. It has been accepted for inclusion in Master's Theses by an authorized administrator of SJSU ScholarWorks. For more information, please contact scholarworks@sjsu.edu.

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

Bell & Howell Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600

A CONTENT ANALYSIS OF FOOTBALL HELMET REMOVAL PROTOCOLS

A Thesis

Presented to

The Faculty of the Department of Human Performance

San Jose State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts

By

Anthony J. Recinella

August 1999

UMI Number: 1396342

UMI Microform 1396342
Copyright 1999, by UMI Company. All rights reserved.

**This microform edition is protected against unauthorized
copying under Title 17, United States Code.**

UMI
300 North Zeeb Road
Ann Arbor, MI 48103

© 1999

Anthony J. Recinella

ALL RIGHTS RESERVED

APPROVED FOR THE DEPARTMENT OF HUMAN PERFORMANCE

Emily H. Wughalter, Ed. D.

Kyle Bodyfelt, ATC, M.A.

Mike Lahaie, ATC, M.A.

Barbara J. Conry, Ph. D.

APPROVED FOR THE UNIVERSITY

ABSTRACT

A CONTENT ANALYSIS OF FOOTBALL HELMET REMOVAL PROTOCOLS

By Anthony J. Recinella

The following thesis addressed the controversy between athletic trainers and emergency medical technicians on the topic of football helmet removal from an athlete that might have a cervical spine or head injury. The argument found in the literature over the past two decades focuses on whether or not to remove the football helmet at the scene of a cervical spine or head trauma. In this study, helmet removal protocols used by athletic trainers and emergency medical technicians in the state of California were analyzed using a content analysis. There were 10 emergency medical technician (EMT) agencies, 10 college athletic training (AT), and 10 high school AT departments from California randomly selected from the Emergency Medical Service Authority, the National Directory of Collegiate Athletics, and the National Directory of High School Coaches. Each group was asked to send a written protocol for helmet removal to be included for analysis. It was found that 60% of the EMT protocols contained specific information on football helmets. Only 10% of the colleges and 20% of the high schools AT departments possessed written protocols for helmet removal. The content of the protocols varied between EMTs and ATs, but in contradiction of the literature, similarities between EMT and AT protocols were found.

Dedication

In Memory of Dr. Walter A. Daniel

July 3, 1916- May 22, 1997

This thesis is dedicated to a great physician that had a tremendous impact on my life. Dr. Walter Daniel was a model of excellence and an inspiration through out my college career. It was because of him I became interested in the medical field. He will always be remebered for his greatness as a physician, a friend, a father, and a grandfather. Thanks Tatone for all the opportunities that you provided for me, and all the lives you have touched.

Acknowledgments

I would like to thank all those who helped, and supported me through out the past two years of Graduate School. First I would like to thank my parents for all they have done for me. Thanks for the financial and moral support. Thanks to my grand mother for helping me get through college. I really want to thank my committee members for all their time and input. Thanks Dr. Wughalter, Dr. Conry, Kyle, and Mike for being there for me. Special thanks to Mike for his continued support not to give up. Thanks to Dr. Shifflett for getting me started. Katie Watts for all your help. My room mates Chris, Shane and Lexus, and close friends Ann and the 15, thanks for all the fun nights at Scruffys. Thanks to Anita, Marrisa, Michael, and Brendon for all the cold beverages. Thanks to the staff at Stanford University for all you have done for me and my fellow GA's at both Stanford and SJSU. Special thanks to Nelly, Dirty, Sully, and Tricky. Thank you KP, Frog, Office Max, Dava, Dale, Jim, P-Train, Buck, and Jan. Thanks to Disco Don, the Cheeseballs, and Kyle Petty for all your entertainment. Thank you all for everything you have contributed, whether it was for a direct or indirect purpose. Thanks to all that helped and I have forgotten to mention.

Table of Contents

	Page
Table of Tables	ix
Chapter	
1. INTRODUCTION	1
Problem Statement	3
Hypothesis	3
Limitations	3
Delimitations	3
Assumptions	4
Definitions	4
Justification	5
2. REVIEW OF LITERATURE	7
History of Head and Spine Injuries in Football	7
Education of EMTs and ATs	9
Helmet Removal Research	11
Controversy of Helmet Removal	13
Position Statements	18
Summary	21
3. METHODS	24
Participants	24
Coders and Researcher	25

Instrument	25
Pretest and Reliability	28
Procedure	29
Design and Analysis	30
4. RESULTS	32
Introduction to Descriptive Statistics	32
Descriptive Statistics	33
Airway Management	33
Cervical Spine and Head Stabilization	35
Other Considerations for Helmet Removal	37
5. DISCUSSION, RECOMMENDATIONS FOR FUTURE STUDIES, AND SUMMARY AND CONCLUSIONS	39
Discussion	39
Recommendations for Future Research	44
Summary and Conclusions	45
References	47
Appendix A	51
Appendix B	52
Appendix C	53
Appendix D	54

Table of Tables

	Page
Table 1 <u>Airway Management Results</u>	34
Table 2 <u>Cervical Spine and Head Stabilization: Helmet Removal and</u> <u>Non-removal</u>	36
Table 3 <u>Cervical Spine and Head Stabilization: Shoulder Pads and</u> <u>Stabilization Devices</u>	38

Chapter 1

INTRODUCTION

The sport of football had a rough beginning. For the first 26 years of existence players did not wear any type of head protection (Danzig, 1956). Due to the physical nature of the game several protests were held against the sport (Danzig, 1956). Football related fatalities were caused by trauma to the head and neck. Studies by Torg and the American Football Coaches Association began examining injuries and what could be done to prevent them. From the beginning of football in 1869 to the present, rule changes and new standards for equipment have contributed to a lower number of fatalities and serious injuries in football than previously reported (Maroon, Steele, & Berlin, 1980). Today the number of fatalities are few, but there is an average of 10 football players a year that receive permanent spinal cord damage (Wiesenfarth & Briner, 1996).

When a head or neck injury occurs, an athletic trainer (AT) and emergency medical technician (EMT) are usually the first to assist athletes. In the past ATs and EMTs have disagreed on procedures for the care of football players with head or cervical spine injuries (Feld, 1993; Segan, Cassidy, & Bentowski, 1993; Patel & Rund, 1994; Wiesenfarth & Briner, 1996; Donaldson, 1997; Waninger, 1998). ATs' guidelines dictate leaving the helmet in place and removing the facemask for airway access (Feld & Blanc, 1987). EMTs often remove the helmet to maintain the airway (Feld & Blanc, 1987). ATs argue that the EMT protocol is unacceptable because it was intended for use with motorcycle, auto racing, and football helmets (Feld & Blanc, 1987). These differences in protocols may lead to arguments or confusion at the scene of an injury (Denegar &

Saliba, 1989). Feld and Blanc (1987) supported the AT argument against the EMT protocol by listing reasons the football helmet does not need to be removed. Reasons to leave the helmet on included: (a) football helmets are custom fit and provide good stabilization of the head while in place; (b) there is easy visualization of any injury inside the helmet along with a low rate of blunt trauma to the head; (c) the facemask can be removed to establish an airway; and (c) the shoulder pads along with the helmet keep the cervical spine in a neutral alignment (Feld & Blanc, 1987). Segan et al. (1993) reviewed why EMTs remove the helmet and then listed responses rebutting the reasons from the AT viewpoint. In defense to the ATs' arguments, Feld (1993) wrote from an EMT perspective and explained why certain situations warranted helmet removal. Despite the arguments between ATs and EMTs, universal guidelines for football helmet removal were agreed upon (Denegar & Saliba, 1989; Patel & Rund, 1994; Segan et al., 1993). In May of 1998, the members of the Inter-Association Spine Task Force met to create common guidelines that would suit ATs and EMTs. These guidelines for football helmet removal were intended to be a solution to the arguments between AT and EMT philosophies.

A major goal of the Inter-Association Spine Task Force is to introduce their guidelines to each state Emergency Medical Service (EMS) organization in an attempt to have EMTs and ATs follow the same protocols for football helmet removal (Hunt, 1998). The National Athletic Trainer's Association is currently adopting the Inter-Association Spine Task Force's helmet removal guidelines. The Inter-Association Spine Task Force may face obstacles in making changes in the state EMS agencies. Many states, such as

California, have given the authority to the county level EMS to create protocols to fit the local EMS system. Each county then needs to be contacted through out each of those particular states. This situation will make it difficult for the Inter-Association Spine Task Force to accomplish its goals.

Problem Statement

The purpose of this study was to analyze the content of protocols submitted from California EMS agencies, college AT departments, and high school AT departments for helmet removal and compare them to each other and the Inter-Association Spine Task Force's guidelines for helmet removal.

Hypothesis

The following null hypothesis was tested for this study:

1. The protocols for the removal of football helmets from cervical spine or head injured players will not vary between ATs and EMTs in California.

Delimitations

Delimitations to this study were:

1. Only EMS protocols for helmet removal in California were used in the study. There are 32 independent EMS agencies in California which govern the EMS system in the state.
2. A total of only 20 AT departments were randomly selected, 10 being from college and 10 being from high school AT departments.
3. AT football helmet removal guidelines for high schools and colleges in California were randomly selected for the study.

Assumptions

This study assumed:

1. AT and EMT helmet removal protocols were current and up to date with new standards of care.
2. Each EMS agency possessed a helmet removal protocol. It is a national standard for EMS agencies to possess procedures and protocols.
3. EMT protocols for helmet removal contained specific information on football helmet removal. Protocols for helmet removal should have been all encompassing for all types of helmets.

Definitions

Emergency Medical Service (EMS). The Emergency Medical Service is a national network of services coordinated to provide aid and medical assistance to injured and ill people (Sanders, 1995). For the purpose of this study EMS will be referred to as the emergency care system in the state of California.

Emergency Medical Technician (EMT). An EMT is a member of the EMS system who is trained to provide prehospital medical care (Crosby & Lewallen, 1995). For the purpose of this study EMTs will be referred to as individuals who are certified according to the requirements issued by the state of California, the county presiding in, and the United States Division of Transportation.

Athletic Trainer (AT). An Athletic Trainer is a highly educated and skilled professional specializing in athletic health care (National Athletic Trainer's Association,

1998). For the purpose of this study ATs will be referred to as those who are certified by the NATA and work in the state of California.

Athletic Trainer/ Emergency Medical Technician (AT/ EMT). For the purpose of this study an AT/ EMT is an individual with dual certification in both athletic training and emergency medicine as an EMT.

Protocol. A protocol is a set of guidelines defining the scope of prehospital emergency care procedures by emergency care providers (Sanders, 1995). For the purpose of this study, the protocol for helmet removal was studied.

Guideline. An instructional guide or reference to indicate a course of action in a specified situation (Thomas, 1997).

Airway. An airway refers to the upper airway tract above the larynx (Crosby & Lewallen, 1995). For the purpose of this study the airway was referred to accessing a person's mouth and nose, which is the opening of the upper airway tract, for means of possible artificial ventilation.

Justification

The purpose of this study was to collect 32 EMS agencies and 20 AT protocols for football helmet removal in California and analyze the content. The EMS and AT protocols were then compared to the Inter-Association Spine Task Force guidelines. The study was significant because prior studies by Segan et al. (1993) along with others revealed differences in protocols used by ATs and EMTs. An effort by Segan et al. to settle the difference between ATs and EMTs provided specific information to establish a joint sportsmedicine and emergency medical service plan. Most recently, the Inter-spine

Association Task Force created guidelines to eliminate the controversy and has taken action for implementation (Hunt, 1998).

This study was needed to determine the similarities and differences between protocols used by EMTs and ATs in California, and to compare these protocols to the Inter-Association Spine Task Force guidelines. This study was also needed to conclude if the Inter-Association Spine Task Force guidelines for football helmet removal are recognized by ATs and EMTs as a model for California helmet removal protocols. EMTs and ATs must work together at the scene of an injury, and similar protocols must be followed to avoid conflict. The nature of a spinal cord injury is serious and needs to be handled carefully so as not to compromise an athlete's health and safety. The situation is so delicate that intervertebral movement as little as 1 mm could cause permanent neurological damage (Waninger, 1998).

Chapter 2

REVIEW OF LITERATURE

Have EMT protocols in California been revised or changed to incorporate facemask removal of football helmets? ATs and EMTs may not follow the same guidelines for football helmet removal. The following review of literature will be designed as follows: a history of spine and head injuries in football, a discussion of the education EMTs and ATs must receive to become certified or licensed, a comparison of different views of helmet removal, a presentation of the controversy between EMTs and ATs, and a discussion of the position statements on helmet removal.

History of Head and Spine Injuries in Football

Football began with the first game in 1869. It was not until 25 years later in 1896 when helmets were first worn (Mueller & Blyth, 1987). Protest against the roughness of the sport led to President Roosevelt stating football needed remodeling (Danzig, 1956). Columbia University was one of many universities that abolished football due to its violence (Mueller & Blyth, 1987). Rule changes to eliminate brutality and reconstruction of the helmet have changed the game. The design of the helmet has progressed from a leather shell without a facemask, to hard plastic shell a full facemask. In 1978, the National Operating Committee on Standards for Athletic Equipment (NOCSAE) developed a national safety standard for football helmets (Virgin, 1980). By standardizing the helmets used, NOCSAE hoped to reduce the number of head and neck injuries.

Assisting in the battle against head and neck injury in football was Joseph Torg. Torg developed the National Football Head and Neck registry in 1971 (Torg, Vegso, Sennett, & Das, 1984). The registry began an ongoing study examining the number of cervical spine and head injuries in football. Torg's study focused on the mechanisms for each head and spine injury in football. Mueller and Schindler (1985) reported that many rule changes and equipment improvements in the middle to late 1970s came about because of the information collected from the studies by Torg, and the American Football Coaches Association.

The compiled data from 1945 to 1984 indicated there were 643 fatalities in football, 433 of them were from head injuries and 111 were from cervical spine injuries (Hodgson & Thomas, 1985). The majority of the injuries were found to occur during tackling or from being tackled. Beginning in the late 1950's players were taught to keep their heads up when tackling and focus on hitting with their shoulder pads (Snook, 1969). In the 1970's the contact during a tackle shifted from the shoulder pads to the face and head, probably because of the introduction of full caged helmets (Hodgson & Thomas, 1985). There was once again an increase in cervical spine deaths due to this new head first tackling. In the 1968 season there was a total of 36 deaths from head and spine injuries (Snook, 1969). Finally in 1976 head-on tackling or "spearing" was declared illegal by the football ruling committee (Torg, Truex, & Quedenfeld, 1979). This rule modification helped to significantly decrease the number of deaths occurring from tackling. Since 1977, football has averaged 10 permanent cervical spine injuries per year (Wiesenfarth & Briner, 1996). Today the National Athletic Training Association,

National Collegiate Athletic Association and the American Football Coaches Association continue to conduct studies to aid in the prevention of cervical spine and head injuries.

Education of EMTs and ATs

There are three levels of EMTs in the state of California. The first level is the EMT-I level. This level can be achieved through 110 hours of training at an Emergency Medical Service Authority approved program. At least 100 hours of classroom and laboratory instruction must be completed. Each student must work a minimum of 10 hours in a supervised clinical experience. Cardiopulmonary resuscitation and first aid certification must be achieved. Specific course content must be covered as mandated by the state of California. Each component of the program must include periodic competency-based exams to test both knowledge and skills. Everyone must pass a written and practical exam to be able to take the certification exam for the state.

The second level is the EMT-II level. To achieve the EMT-II level, students must already be a certified EMT-I and take a 306-hour course. Each student must achieve a minimum of 210 hours of skill laboratory and 96 hours of clinical training. Students are taught certain Advanced Life Support procedures. The emphasis of this course is placed on why each technique is used. Each student spends 96 hours working in an emergency setting as designated by the program. Contact with a minimum of 20 patients needing advanced life support must be made in the clinical setting. The EMT-II must complete an examination including both written and skill sections to obtain certification.

EMT-Paramedics are required to have a high school diploma to be selected for the program. Students are only permitted to enter the program as an EMT-I or II. The

courses are solely offered by state Emergency Medical Services Authority accredited programs. The following guidelines were taken from the Emergency Medical Service Authority world-wide-web site of California codes for regulation, specifically for EMT-Paramedics (Armitage, Jensen, & Little, 1998). Every program in California requires a minimum of 1032 hours of training consisting of 320 hours of skill laboratory experience, at least 160 hours of hospital clinical experience, and a field internship of 480 hours (Armitage et al., 1998). Students are required to have a minimum of 40 Advanced Life Support patient contacts during the field internship (Armitage et al., 1998). The focus of the program is on Advanced Life Support techniques such as drug administration, advanced airway techniques and intravenous therapy. Completion of the program and licensure in California is determined by a comprehensive examination consisting of both a written and skills practical section (Armitage et al., 1998).

ATs can reach the level of certification through two different routes. The first is through an internship under the direct supervision of a certified athletic trainer. The National Athletic Trainer's Association requires each student to complete internship classes to qualify to take the certification exam. These classes include evaluation, treatment and rehabilitation of athletic injuries. The following guidelines were taken from the National Athletic Trainer's Association world-wide-web site dedicated to education for ATs (National Athletic Trainer's Association, 1998). To become an AT it is mandatory to receive 1500 hours of supervised work at an athletic training facility (National Athletic Trainer's Association, 1998). Each student must possess experience with a high-risk sport, such as football, making up 375 of the 1500 hours needed

(National Athletic Trainer's Association, 1998). Internship students may also obtain 500 hours in any other allied health setting (National Athletic Trainer's Association, 1998).

The second route to certification is through a Commission on Accreditation of Allied Health Education Programs (CAAHEP) accredited program with classes set forth by a standard curriculum. The programs require a total of 800 hours of supervised work in an athletic training facility (National Athletic Trainer's Association, 1998). Experience in high-risk sports must make up 200 hours of the total amount. Unlike the internship route, the hours may not be received in an allied health care setting. The remainder of 400 hours must be received from the host institution (National Athletic Trainer's Association, 1998). The CAAHEP has developed specific competencies each student must prove to be proficient at to be able to take the national certification exam. All AT programs must be a minimum of two years in length and an Baccalaureate degree must be achieved by both routes to take the certification exam (National Athletic Trainer's Association, 1998). The certification exam consists of three sections: a written, written simulation, and a skills practical section.

Helmet Removal Research

Aprahamian, Thompson, and Darin (1984) wrote, "Leave the helmet on!" The authors claim EMTs and emergency department personnel jump too fast to remove the helmet with out radiographs of the cervical spine (Aprahamian et al., 1984). This statement was concluded by a study done with cadavers wearing two different types of helmets. One was a full-face helmet and the other a partial faced helmet. The cadavers were placed supine with a helmet on. The helmets were then removed while the

examiner evaluated movement of the neck by palpating the cervical spine spaces with the fingers. The study found movement did occur at the joint spaces of the neck predisposing an existing unstable fracture to possible further damage. The authors suggested the helmeted patients should be stabilized in the field without attempting to remove the helmet (Aprahamian et al., 1984). It is safer to be in a controlled atmosphere where the cervical spine can be x-rayed with the helmet in place. If the x-rays are normal, the helmet then can be removed safely (Aprahamian et al., 1984).

Meyer and Daniel (1985) performed a helmet removal study in which eight participants were radiographed with their cervical spines in three different positions. These authors radiographed five of the participants with a jacket or folded sheet under their shoulders and then radiographed the subjects after removing the jacket. Meyer and Daniel indicated there was 10 degrees of flexion at the cervical spine between the fourth and sixth cervical vertebrae without anything under the shoulders. By elevating the shoulders, cervical flexion was minimized creating a neutral and stable position for the neck (Meyer & Daniel, 1985). Meyer and Daniel stated, since the helmet provides traction and stabilization to the cervical spine, it would be better to leave it in place.

Donaldson (1997) conducted a study on cadavers demonstrating helmet removal on the field could be hazardous to a football player. The study contained six cadavers, three of which were given instabilities at the first and second cervical vertebra, and the other three were given instabilities at the sixth and seventh vertebra. The cadavers were placed in shoulder pads and helmets, and stabilized to a spine board. Fluoroscopic images were recorded to measure any movement the process of helmet removal had on

the spine instabilities. The images of the first group indicated an increase in flexion, distraction and narrowing of the cord space, while the second group presented an additional 18 degrees of motion in addition to the normal ranges. As a result of the study, Donaldson (1997) strongly suggested leaving the helmet on until the patient is in a controlled environment.

Swenson, Lauerman, Blanc, Donaldson, and Fu (1997) performed a study using live people instead of cadavers. The study observed 10 male subjects age's 27-32 years old. The participants were secured to a standard backboard and then radiographed. Next, each participant was radiographed with shoulder pads and a football helmet on, and then with shoulder pads without a helmet. The radiographs were then evaluated for differences in range of motion in each position. The outcome of the evaluation was a severe hyperextension of the cervical spine when the helmet was removed with the shoulder pads still in place. Swenson et al. (1997) claimed they used live people because the use of cadavers in such a study would be difficult due to changes in tissue characteristics and rigor mortis.

Controversy of Helmet Removal

In 1980 Budassi created a chart to educate health care professionals on helmet removal due to the increase in people wearing helmets because of laws requiring helmet use. Budassi (1980) diagrammed five different types of helmets, and presented seven steps of helmet removal. The steps outlined by Budassi (1980) were similar to those steps followed by the EMS. The Budassi diagram indicates the same helmet removal protocol for each type of helmet displayed. Kleiner (1996) however, stated the football

helmet fits snug unlike motorcycle and other helmets, and the facemask can be removed on a football helmet unlike many motorcycle helmets (Kleiner, 1996).

Kleiner (1996) supported the views of Aprahamian et al. (1984) by stating removal of a football helmet should only take place after the proper x-rays of the cervical spine have been taken. Kleiner (1996) suggested that ATs schedule a meeting with local EMS providers to determine how a cervical spine situation should be handled. Kleiner (1996) claimed helmet removal is now widely disregarded and facemask removal is well accepted, however if there are any uncertainties of the EMS protocols, ATs should remove the facemask before the EMTs arrive at the scene (Kleiner, 1996). Kleiner suggested removing all four clips holding the facemask on instead of leaving the top two clips intact and swinging the mask back. Recent research by Kleiner has indicated excessive movement occurs from swinging the facemask up, therefore it is safer to remove the whole facemask (Kleiner, 1996).

Football helmet facemasks are commonly removed with a device called the Trainer's Angel. Other types of tools used are various kinds of anvil pruners, and screwdrivers, all of which are used to remove the plastic clips securing the facemask to the helmet. Knox and Kleiner (1997) performed a study to find out the most efficient tools used. Their research claimed the anvil pruner produced the least amount of movement of the head and was the easiest to use as well (Knox & Kleiner, 1997). All of the tools used in the study took approximately the same amount of time to remove the clips. In their study EMTs, ATs, and student ATs using each of the tools were compared. The research resulted in the students causing less motion in the removal of the clips than

any other group (Knox & Kleiner, 1997). The researchers concluded facemask removal should be learned and practiced by ATs and EMTs to achieve the least amount of movement of the head and neck (Knox & Kleiner, 1997).

Denegar and Saliba (1989) wanted to call attention to the different helmet removal protocols between ATs and EMTs. The authors also wanted to present a protocol model and emphasize the need for communication between ATs and EMTs (Denegar & Saliba, 1989). Denegar and Saliba mentioned two instances when the football helmet is to be removed. One instance is when the airway cannot be reached for adequate ventilation, and the second being the helmet is too loose to give cervical support. The major argument Denegar and Saliba made in support of leaving the helmet on is a cervical collar does not fit with the shoulder pads in place, so the helmet should not be removed to apply a collar (Denegar & Saliba, 1989). Naturally the helmet and shoulder pads eventually need to be removed, therefore the AT is responsible for assisting the hospital staff if needed (Denegar & Saliba, 1989). EMTs are not always familiar with football equipment, and ATs should be able to assist the EMTs if asked to do so (Denegar & Saliba, 1989). ATs and EMTs are encouraged to learn the football helmet removal process because they are usually the first on the scene (Denegar & Saliba, 1989).

Feld (1993) took an EMT-Ps approach to the topic of helmet removal. He listed instances when football equipment should be removed, and how equipment complicates advanced life support. Feld (1993) defined a critical injury as respiratory distress, loss of consciousness or sudden cardiac arrest. A football helmet should only be removed if a

critical injury exists in an athlete (Feld, 1993). If the critical injury is caused by a closed head injury, a high cervical spine injury or a pneumothorax, it could lead to ventricular fibrillation of the heart which needs to be defibrillated immediately (Feld, 1993).

According to Feld the shoulder pads are in the way of cardiac monitoring and defibrillation devices, and removing the shoulder pads requires removing the helmet as well. In concluding, Feld reported removal of the helmet and shoulder pads only applies to athletes in respiratory or cardiac arrest.

Segan et al. (1993) revealed four reasons EMTs remove helmets, and then rebutted each of the reasons. The EMS protocol for removing the helmet is universal for all helmets, and most specifically written for motorcycle helmets (Segan et al., 1993). The first reason for removing a helmet is if the helmet interferes with immobilization of the cervical spine (Segan et al., 1993). The second reason is if the helmet interferes with visualization of injury to the head or face (Segan et al., 1993). Seagan et al. (1993) explained the helmet might also cause hyperflexion of the cervical spine. The final reason Seagan et al. (1993) gave for helmet removal is if the helmet prevents the caregiver from giving the athlete a proper airway. The authors' first response to the reasons for removing a football helmet was, the football players have custom fit helmets and immobilization of the cervical spine with the helmet on should not pose a problem. The authors also stated football has a low rate of facial and open skull injuries and the athlete can be evaluated by looking through the facemask. The shoulder pads of a football player keep the cervical spine in a neutral position when the helmet is in place, while a motorcycle helmet without pads causes hyperflexion of the neck (Segan et al., 1993).

Finally, the facemask can be removed to access an airway without jeopardizing the neutral position of the cervical spine (Segan et al., 1993). Segan et al. encouraged all ATs to contact their state EMS agency to develop a joint emergency action plan for cervical spine injured football players.

The article by Patel and Rund (1994) revisited when and how to remove the football helmet. The first person at the scene of the injury should follow their appropriate protocol for helmet removal (Patel & Rund, 1994). EMTs will follow the basic life support protocol and the ATs will follow the National Collegiate Athletic Association protocol (Patel & Rund, 1994). The National Collegiate Athletic Association guidelines state the helmet should only be removed on the field under special circumstances such as respiratory distress or the inability to access the airway (Earle, 1998). Patel and Rund (1994) supported leaving the helmet on because of the new designs and tighter fit of today's football helmets. Removing the helmet would only cause the head to fall into extension due to the shoulder pads elevating the torso (Patel & Rund, 1994). Patel and Rund stressed a need for a standard protocol and education of all parties involved with the removal of football equipment.

Wiesenfarth and Briner (1996) listed three priorities to address a cervical spine injury. The first is to ensure survival. The second is to preserve spinal cord function, and the last is to increase the athlete's chances for full recovery. Wiesenfarth and Briner reported 50% of all neurological deformities are created after the initial injury; therefore, the initial evaluation and stabilization must be done carefully to ensure the priorities are met (Wiesenfarth & Briner, 1996).

Vieson and Wimer (1998) performed a study using a scenario with a survey to determine the extent of knowledge EMTs had for leaving the helmet on a cervical spine injured football player. The study consisted of 81 students in a paramedic program. EMT-Ps were found to have some knowledge of football helmet removal techniques (Vieson & Wimer, 1998). EMT-IIs agreed it was important to leave the helmet on while EMT-Is felt it was less important (Vieson & Wimer, 1998). Vieson and Wimer suggested the difference in the results stemmed from extra training EMT-Ps had at workshops, and the influence of ATs educating them on football equipment (Vieson & Wimer, 1998).

In May 1998 the Inter-Association Spine Task Force met to discuss the issue of helmet removal from cervical spine injured football players. The task force was made up of representatives from over 25 medical and allied health organizations (Hunt, 1998). Discussions took place for two days and the task force came up with a set of guidelines for football helmet removal. The task force suggested in their guidelines to leave the helmet on unless specified problems or situations exist. It was recommended by the task force to remove the helmet only: if the helmet does not fit properly, if ventilations cannot be performed even with the facemask removed, if the facemask cannot be removed for a reasonable amount of time, or if the helmet prevents immobilization in the proper position (Hunt, 1998).

Position Statements

The National Collegiate Athletic Association revised their guidelines for football helmet removal in 1998. The National Collegiate Athletic Association guidelines read:

Unless there are special circumstances such as respiratory distress along with the inability to access the airway, the helmet should never be removed (Earle, 1998). Specific circumstances warranting helmet removal are: if the helmet does not secure the head because it is loose, or if the helmet is designed in such a way that after removing the facemask the airway is still inaccessible (Earle, 1998). In the guidelines it was also indicated to remove the helmet if the facemask cannot be removed after a reasonable period of time, or if the helmet prevents immobilization for transportation in a neutral position (Earle, 1998).

The American Academy of Orthopedic Surgeons (AAOS) stated its views on helmet removal in the text, "Emergency Care and Transportation of the Sick and Injured". The AAOS suggested leaving the helmet in place unless: the facemask interferes with proper airway access, the helmet is too loose to immobilize the head and cervical spine, a life-threatening hemorrhage under the helmet cannot be controlled without removing the helmet, or if the helmet causes the head to be forced into hyperflexion (Crosby & Lewallen, 1995). In the textbook the AAOS recommended removing the facemask of a football helmet to access the airway, and then secure the helmet to the spine board to stabilize the head and neck (Crosby & Lewallen, 1995).

The American College of Sports Medicine suggested not removing the helmet but rather remove the facemask to access the airway (Kleiner & Cantu, 1996). The American College of Sports Medicine advised against removing the helmet because it will put the neck in hyperextension while the shoulder pads are still on; therefore, American College of Sports Medicine suggested taking both the helmet and shoulder pads off

simultaneously (Kleiner & Cantu, 1996). The American College of Sports Medicine stated proper management of head and neck injuries may prevent further damage from occurring (Kleiner & Cantu, 1996).

The National Athletic Trainer's Association guidelines for helmet removal are currently under revision and have not yet been published. The current guidelines suggest removing the facemask to access the airway by cutting the helmet clips (National Athletic Trainer's Association, 1998). If the helmet must be removed, the shoulder pads have to be removed as well to avoid hyperextension of the neck (National Athletic Trainer's Association, 1998). The National Athletic Trainer's Association (1998) stated removal of the helmet should be avoided unless there are special circumstances present. The National Athletic Trainer's Association does not however indicate what the special circumstances are.

Finally, the United States Department of Transportation stated sports helmets typically open anteriorly and the airway can be accessed as such (United States Department of Transportation, 1994). The United States Department of Transportation (1994) did not discuss any specifics about shoulder pads or hyperextension of the head when the helmet is removed without the shoulder pads. They did however suggest to leave the helmet on if it fits with little or no movement (United States Department of Transportation, 1994). The guidelines the United States Department of Transportation develops are given to each state, and it is up to each individual state to incorporate the guidelines in their own protocol.

Summary

The past 20 years have held a great deal of debate over the removal of the football helmet from a cervical spine injured football player in the pre-hospital setting. EMTs have maintained an “always remove” protocol (Feld, 1993; Patel & Rund, 1994; Sanders, 1995; Segan et al., 1993). ATs believe the helmet should never be removed unless absolutely necessary (Donaldson, 1997; Feld, 1993; Segan et al., 1993; Patel & Rund, 1994; Waninger, 1998; Wiesenfarth & Briner, 1996). If it becomes necessary to remove a helmet, the shoulder pads must be removed at the same time to prevent hyperextension of the head and neck (Feld, 1993; Kleiner & Cantu, 1996; National Collegiate Athletic Association, 1998; National Athletic Trainer’s Association, 1998; Swenson et al., 1997). The studies by Donaldson (1997) and Swenson et al. (1997) showed removing the helmet without the shoulder pads puts the cervical spine in an unstable position. Meyer and Daniel (1985) presented similar findings by elevating the shoulders of individuals with just a helmet on, bringing the cervical spine into a stable alignment. Feld, (1993) also made it clear to only remove the helmet when the athlete is critically injured.

Crosby and Lewallen (1995) specifically cover the removal of football helmet facemasks. Many professionals strongly suggested leaving the helmet in place and removing the facemask to maintain the airway (Crosby & Lewallen, 1995; Hunt, 1998; Kleiner, 1996; Kleiner & Cantu, 1996; Knox & Kleiner, 1997; National Athletic Trainer’s Association, 1998; Segan et al., 1993; United States Department of Transportation, 1994). As Kleiner (1996) suggested, removing the facemask is now a

widely acceptable practice to access a football player's airway. By leaving the helmet on and accessing the airway through the facemask, hyperextension of the cervical spine is avoided.

The EMT protocols for helmet removal in the past were geared toward motorcycle helmets or generic for all types of helmets (Denegar & Saliba, 1989; Segan et al., 1993). Budassi's (1980) chart did include a football helmet, however it did not take into consideration the special circumstances involved with the football helmet and other equipment. According to Busdassi's helmet removal chart, removing a football helmet does not require any different technique than removing a motorcycle helmet.

An important finding in the review of literature revealed a need for standard guidelines for the removal process of football equipment (Denger & Saliba, 1989; Hunt, 1998; Patel & Rund, 1994; Segan et al., 1993). The guidelines need to be universal for the emergency room staff, EMTs and ATs (Deneger & Saliba, 1989; Patel & Rund, 1994; Segan et al., 1993; Waninger, 1998). It is desirable that removal of the facemask and knowledge of tools to perform the task be universal. It was suggested that training sessions be held for equipment removal for EMTs and ATs who may be working together (Patel & Rund, 1994).

The Inter-Association Spine Task Force has brought together EMTs, ATs, and other medical and allied health professional to discuss the controversial issue of helmet removal. The guidelines they have set forth are the universal guidelines ATs and EMTs have been asking for in the literature (Denger & Saliba, 1989; Hunt, 1998; Patel & Rund, 1994; Segan et al., 1993). Now it is up to the National Athletic Trainer's Association and

each individual state Emergency Medical Service agency to incorporate the guidelines into practice. It is imperative to have a universal protocol to treat every cervical spine injured football player with the best possible care. If the Inter-Association Spine Task Force's guidelines are not adopted, ATs and EMTs may continue to have different ways of handling football players, which could cause a conflict at the scene of an injury.

Chapter 3

METHODS

This study was a content analysis of protocols used by EMTs and ATs in California for head and neck injuries occurring in football. The study compared 10 protocols used by EMTs, 10 high school AT protocols, and 10 college AT protocols for football helmet removal.

Participants

The sample in this study was made up of the 32 EMS agencies. Twelve agencies responded with the return of a written protocol. Of these 12 protocols, 10 were randomly selected. Ten high school, and 10 college AT departments in California were also selected for the study. There are 58 counties in California, but because of the small size of some of them, there are EMS agencies made up of more than one county for a total of 32 EMS agencies. The state of California has given each county EMS agency the option to create its own protocol. Hypothetically, each agency could have a different protocol. All 32 EMS agencies in California were sampled from a list provided by the Emergency Medical Service Authority in order to get the best representation of the entire state. After 12 EMS protocols were attained, 10 were randomly selected using a simple random sample.

A random selection of 10 high schools and 10 colleges in California were sampled for analysis of AT protocols by a simple random sampling. The sample of colleges came from the National Directory of Collegiate Athletics to ensure the colleges

have football teams; the high schools were selected from the National Directory of High School Coaches.

Coders and Researcher

Three coders were used to test the content reliability. The coders included an AT, EMT, and an AT-EMT. Inter-coder reliability was also measured by using the same three coders. The researcher was the only one to collect the protocols and analyze them using the rules for coding and the content categories determined by the coders.

Instrument

The EMS protocols for helmet removal were placed into specific content categories for a check-list that was used to collect data contained in the helmet removal protocols. All content categories in the check-list were chosen after carefully reviewing the literature on football helmet removal. The content categories in the check-list were sub-divided into phrases or sentences that imply a certain idea in order to “unitize” or define specific data for analysis (Krippendorff, 1980). The helmet removal protocols were broken down into three major areas: (a) airway management; (b) cervical spine and head stabilization; and (c) other considerations for helmet removal. Airway management was further divided into helmet removal and facemask removal content categories in the check-list. Helmet removal and facemask removal were broken down even further into sub-categories in the categorical check-list (see Appendix C). The cervical spine and head stabilization content categories on the check-list were subdivided by helmet removal, helmet non-removal, shoulder pads, and cervical stabilization devices. Each of these content categories on the check-list were further divided into sub-categories (see

Appendix C). The content category in the check-list for other considerations for helmet removal included content sub-categories dealing with blood inside the helmet, and cardiac arrest.

The content from the protocols chosen to be analyzed was selected by using a system of coding. Coding refers to the way content data were gathered in order to be analyzed. A list of rules for coding was used to delineate exactly how to choose and record data for the check-list (see Appendix D). This was done to ensure all data are collected in a systematic way that can be replicated. All coding of the protocols for the check-list was done by the researcher. Airway Management, Cervical Spine and Head Stabilization, and Other Considerations for Helmet Removal categories, were coded using the rules for coding presented in Appendix D.

Airway management

The researcher analyzed information in the protocols on airway management, meaning how the mouth and nose were accessed in case the patient is in, or advances to respiratory arrest where artificial respirations are needed. The researcher analyzed information referring to removing either the helmet or facemask to access the airway. If a protocol stated the helmet was to be removed to access the airway, the researcher indicated the specific instances when it should be done on the check-list. If not indicated to remove the helmet for airway access, the researcher wrote it in under the “other” category on the checklist. If the facemask was removed to access the airway, the researcher indicated on the check-list when the protocol states it should be removed and if the chin-strap is to be removed as well (see Appendix C).

Cervical Spine and Head Stabilization

Next the researcher analyzed information on cervical spine and head stabilization considerations with respect to helmet removal. The researcher indicated on the check-list when the helmet was to be removed, or if the protocol stated not to remove the helmet. If the protocol indicated removal when there were problems immobilizing the spine because of the helmet not fitting, the box was marked on the check-list. If there were reasons given for the helmet preventing proper immobilization, the second box was marked on the check-list. The researcher marked box one under “helmet non-removal” on the check-list, even if the protocol stated to leave the helmet on, but did not indicate securing the helmet to the board. The researcher only marked the first box on the check-list under “shoulder pads” if the protocol stated to remove the shoulder pads at the same time the helmet was removed. If removing the shoulder pads was not indicated, the box on the check-list for “no reference to removal” was marked. The third box on the check-list under “shoulder pads” was marked if the protocol stated opening the front portion of the shoulder pads while leaving both the shoulder pads and helmet on, to perform cardiopulmonary resuscitation, defibrillation or cardiac monitoring. If a protocol indicated the use of a cervical collar with the shoulder pads and helmet in place, the researcher marked the appropriate box on the check-list under “cervical spine stabilization devices”. If no use of a cervical collar was indicated, it was marked in the second box on the check-list. If any other form of a stabilization device, such as sand bags, towels, or blocks were indicated in the protocols, it was recorded in the “other” category under “cervical spine stabilization devices” on the check-list.

Other Consideration for Helmet Removal

The researcher then determined if there were any other reasons to remove the helmet other than because of airway, or cervical spine and head stabilization problems. “Blood in the helmet” was marked if the protocol mentioned removing the helmet if there was any blunt trauma to the face or head. Removal of the helmet for cardiac arrest was marked respectively, and any other considerations not mentioned above were marked and indicated next to the “other” box under “other consideration for helmet removal” on the check-list.

Pretest and Reliability

A pre-test was administered to measure category reliability of each category as suggested by Holsti (1969). The pre-test consisted of three coders who examined a helmet removal protocol and placed the appropriate data into categories perceived to be important for helmet removal. The categories chosen by the coders were then compared to those already chosen for the study. Appropriate changes were made for each category based on the results of the pre-test. For example, under the category of facemask removal, the coders felt it to be important to add a category for specific procedures for removing the facemask.

Inter-coder reliability was then measured by using the same three coders. The coders took a helmet removal protocol, analyzed the content by following the appropriate rules for coding and placing checks in the appropriate boxes on the category check-list (see Appendix A). The rules for coding were changed appropriately until there was a 78% agreement between coders while coding (see Appendix D). The goal for the study

was 80% as suggested by Wimmer and Dominick (1994), but 78% was still considered reliable after many changes were made in the rules for coding. Some of the changes that came about from the coder's discussion were: to be able to check more than one box on the check-list when appropriate, and the use of the "other" category to fill in alternative information. Scott's pi formula, $\pi = (\% \text{ observed agreement} - \% \text{ expected agreement}) / (1 - \% \text{ expected agreement})$, was used to determine the intercoder reliability for this study (Holsti, 1969).

Once the categories were established, the analysis of the sample protocols took place. This was done to observe the similarities and differences in the content between AT and EMT protocols for football helmet removal. The content in the AT and EMT protocols was also compared to the Inter-Association Spine Task Force guidelines for helmet removal.

Procedure

A list of EMS agencies in the state of California was obtained from the Emergency Medical Service Authority of California's world-wide-web site, and is also available by contacting the Emergency Medical Service Authority. To analyze a sample of protocols used by ATs in California, a list of colleges was obtained from the National Directory of Collegiate Athletics (Cleary, 1998). The directory contains information on the division of the school as well as sports that are offered. The directory also provided ATs names and phone numbers used for contacting them. It was imperative that schools selected for the study had football programs.

ATs from 10 high schools in California were also selected from the National Directory of High School Coaches (Beazley, 1998). The directory provided a list of high schools in the state. The high schools chosen had to have football programs to qualify for the study.

Exemption from human subjects review was obtained from the San Jose State University Human Subjects-Institutional Review Board. Following human subjects board exemption, the 32 EMS agencies, as well as the 10 colleges and 10 high schools in California, were contacted by phone. Each agency and school received an explanation of the study as a helmet removal protocol examination, and was told that participation was not required. The caller identified himself as a graduate student at San Jose State University under the direction of Dr. Emily Wughalter. The agencies and schools were asked if they possessed a written protocol or procedure specific for helmet removal for cervical spine or head injured patients. The questions asked in-order to obtain the appropriate information appears in Appendix A.

Each EMS agency and school was then faxed a consent form that was signed and returned with the helmet removal protocol (see Appendix B). The agencies and schools that did not possess written protocols were recorded. Once the 12 EMS agencies sent their protocols, 10 were randomly selected. Information from the 10 EMS agencies, 10 colleges, and 10 high school AT helmet removal protocols was then gathered using the categorical check-list (see Appendix C). The check-list used in the study was similar to that suggested by Krippendorff (1980) suggested to gather and record data.

Design and Analysis

The data collected with the check-lists were used in a descriptive analysis of the number of county EMS agencies, college ATs, and high school ATs possessing helmet removal protocols. A descriptive analysis of the data also represented the percentage of EMS agencies that possessed helmet removal protocols, and more specifically protocols for football helmet removal. The sub-categories under Airway Management, Cervical Spine and Head Stabilization, and Other Considerations for Helmet Removal in the check-list were analyzed using descriptive analysis. The sub-categories on the check-list were analyzed to determine the number of EMT and AT protocols that included those sub-categories. Each sub-category was given a percentage indicating how often each particular sub-category appeared in the EMT and AT protocols. The descriptive analysis was done by frequency distributions using the Statistical Package for Social Science Software (SPSS), Windows 95, version 9.0.

Chapter 4

RESULTS

The purpose of this study was to analyze the content of protocols submitted from California EMS agencies, college AT departments, and high school AT departments for helmet removal, compare them to each other and the Inter-Association Spine Task Force guidelines for helmet removal. The study was significant because prior studies by Segan et al. (1993) along with others reveal differences in protocols used by ATs and EMTs. This study was also needed to conclude if the Inter-Association Spine Task Force guidelines for football helmet removal are recognized by ATs and EMTs as a model for California helmet removal protocols.

Introduction to Descriptive Statistics

Frequency distributions were used to calculate the following descriptive statistics using SPSS Windows 95, version 9.0 software. Out of the total number of 32 EMS agencies, only 12, or 38% of the agencies possessed a written helmet removal protocol. Of the 12 EMS protocols, 10 were randomly selected for the study. It was found that 60% of the 10 EMS protocols chosen for the study contained information specific for football helmet removal. Of the 10 colleges selected for the study, only 10% of them possessed a written protocol for football helmet removal, and 20% of the 10 high schools selected had a written protocol for football helmet removal. Two of the colleges that did not possess written protocols, claimed to use a video by the Northern Virginia Spine institute to teach the athletic training staff procedures for removing a football helmet. The remaining seven colleges claimed they used the NATA guidelines, but did not

possess a written protocol. Of the 10 high schools, eight without written protocols indicated using the NATA guidelines for football helmet removal. There were two high schools that possessed written protocols for helmet removal, which were photocopies of the Inter-Association Spine Task Force guidelines. The results of the content analysis are arranged in the order of the content categories found in the check-list. The results for each category will be as follows: Airway Management, Cervical Spine and Head Stabilization, and Other Considerations for Helmet Removal.

Descriptive Statistics

Airway Management

Helmet Removal. Under the category of airway management and the sub-category for helmet removal, 22% of the EMS protocols indicated to always remove the helmet, 56% indicated to only remove the helmet if an airway cannot be established even with the facemask removed (see Table 1). In 11% of the EMS protocols there were indications to only remove the helmet if the helmet itself was preventing airway access (see Table 1). The one college AT protocol available indicated to only remove the helmet if the airway could not be accessed through removing the facemask, and to remove the helmet if the helmet itself prevented airway access. In the two high school AT protocols reviewed, 100% of the protocols indicated removing the helmet if the airway could not be accessed through removing the facemask, and indicated to remove the helmet if the helmet prevented airway access (see Table 1).

Facemask Removal. Under the category for airway management, the sub-category for facemask removal for EMS protocols contained information to always

Table 1

Airway Management Results

	EMS		College AT		High school AT	
Content Category	n	%	n	%	n	%
Helmet Removal						
Always remove	2	22%	-	-	-	-
Only remove/ FM	5	56%	1	100%	2	100%
Only remove/ H	1	11%	-	-	-	-
Other	1	11%	-	-	-	-
Total	9	90%	1	10%	2	20%
Facemask Removal						
Always remove	4	80%	-	-	-	-
Without chinstrap	-	-	-	-	-	-
Procedures to remove	-	-	-	-	-	-
Other	-	-	-	-	-	-
Both 1&2	1	20%	1	100%	2	100%
Total	5	50%	1	10%	2	20%

Note. The “n” column refers to the number of EMS and AT protocols that contained information for that particular sub-category; FM = facemask; H = helmet.

remove the facemask with a suspected cervical spine injury 80% of the time as seen in Table 1. In EMS protocols information to always remove the facemask to gain airway access, and to remove the facemask without removing the chin-strap, was written 20% of the time (see Table 1). There were five EMS protocols that did not contain any information on facemask removal. The one college AT protocol contained information to always remove the facemask and remove the facemask without removing the chin-strap. The two high school AT protocols also indicated to remove the facemask and to leave the chin-strap attached while removing the facemask.

Cervical Spine and Head Stabilization

Helmet Removal. In the sub-category of helmet removal, under the category of cervical spine and head stabilization, 20% of EMS protocols contained within their guidelines, information about how to remove the helmet if it prevented proper immobilization (see Table 2). There were 80% of the EMS protocols indicating to remove an improper fitting helmet, and remove the helmet if it prevented proper immobilization to the spine board (see Table 2). There were five EMS protocols that did not contain any information in the helmet removal sub-category. The one college and two high school AT protocols possessed information on both removing helmets that did not fit properly, and removing the helmets if proper immobilization to the spine board could not be done with the helmet on (see Table 2).

Helmet Non-removal. While there were only five EMS protocols that fit into the sub-category of non-helmet removal, 100% of them contained information on stabilizing

the head to the spine board with the helmet in place as seen in Table 2. None of the college or high school AT protocols mentioned stabilization of the head and cervical spine to the spine board with the helmet in place.

Table 2

Cervical Spine and Head Stabilization Results: Helmet Removal and Non-removal

Content Category	EMS		College AT		High school AT	
	n	%	n	%	n	%
Helmet Removal						
Only remove/ fit	-	-	-	-	-	-
Only remove/ immob.	1	20%	-	-	-	-
Both	4	80%	1	100%	2	100%
Total	5	50%	1	10%	2	20%
Helmet non-removal						
Stab. to board	5	100%	-	-	-	-
Other	-	-	-	-	-	-
Total	5	50%	0	0%	0	0%

Note. The “n” column refers to the number of EMS and AT protocols that contained information for that particular sub-category.

Shoulder Pads. In 67% of the EMS protocols, removal of the shoulder pads was to only be performed simultaneously with helmet removal (see Table 3). There were 33% of the EMS protocols that did not indicate removing the shoulder pads when the helmet was removed as seen in Table 3. Of the college and high school AT protocols, 100% of the protocols contained information about opening the front of the shoulder pads to access the chest (see Table 3). None of the AT protocols contained information about simultaneous removal of the helmet and shoulder pads.

Cervical Spine Stabilization Devices. In the cervical spine stabilization device sub-category, 20% of the EMS protocols contained information on the use of a cervical collar with the shoulder pads and helmet in place (see Table 3). There were 60% of the EMS protocols that did not indicate usage of a cervical collar. The remaining 20% of the EMS protocols contained other forms of cervical stabilization such as foam blocks (see Table 3). One college and two high school AT protocols failed to contain any information on the usage of cervical stabilization devices.

Other Considerations for Helmet Removal

In the content category of “other considerations for helmet removal” there were 78% of the EMS protocols that indicated to remove the helmet if blood was present inside it. Another 22% of the EMS protocols indicated to remove the helmet if a person was in cardiac arrest. Only one EMS protocol did not mention other considerations for removing the helmet. Both the college and high school AT protocols failed to indicate any specific considerations to remove the helmet other than for airway management or cervical spine and head stabilization.

Table 3

Cervical Spine and Head Stabilization Results: Shoulder Pads and Stabilization Devices

	EMS		College AT		High school AT	
<u>Content Category</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Shoulder pads						
Remove with helmet	4	67%	-	-	-	-
Not indicated	2	33%	-	-	-	-
Open front	-	-	1	100%	2	100%
Other	-	-	-	-	-	-
Total	6	60%	1	10%	2	20%
CS stab. devices						
C-collar with pads	1	20%	-	-	-	-
Not indicated	3	60%	-	-	-	-
Other	1	20%	-	-	-	-
Total	5	50%	0	0%	0	0%

Note. The “n” column refers to the number of EMS and AT protocols that contained information for that particular sub-category; CS= Cervical Spine; C-collar= cervical collar.

Chapter 5

DISCUSSION, RECOMMENDATIONS FOR FUTURE RESEARCH, AND SUMMARY AND CONCLUSIONS

The EMS and AT professions are rapidly changing. New laws, health care reform, and an increase in lawsuits in the United States, have caused change in each profession. Liability issues threaten both EMT and AT professions. The only protection EMTs and ATs have against liability suits is to document the procedures followed in a cervical spine injury situation, and to be sure those procedures are backed by written protocols. Possessing and following a universally accepted procedure that is common practice releases ATs and EMTs from any negligent torts. The Inter-Association Spine Task Force has attempted to make a change in EMS and AT helmet removal protocols to make the pre-hospital health care universal in practice when dealing with cervical spine injured football players (Hunt, 1998).

Discussion

The purpose of this study was to analyze the content of protocols submitted from California EMS agencies, college AT departments, and high school AT departments for helmet removal and compare them to each other and the Inter-Association Spine Task Force guidelines for helmet removal.

The results of this study revealed that EMS agencies across the state of California have different protocols for helmet removal. Of those AT departments surveyed only 10% of the colleges and 20% of the high schools had written AT protocols for helmet removal. Specific protocols for football helmet removal were contained in 60% of the

protocols received from EMS agencies in California. The assumption that all EMS agencies would have protocols for helmet removal proved to be a limitation of the study.

Traditionally EMTs have removed the helmet to access the airway and ATs have left the helmet on and removed only the facemask (Feld, 1993; Patel & Rund, 1994; Sanders, 1995; Segan et al., 1993). The results of this study showed that only 22% of the time EMS agencies provide information about removing the helmet specifically in order to access the airway. However, 56% replied that if the facemask could not be removed, the helmet would be removed. To ensure the facemask is removed and the helmet remains in place as suggested by Donaldson (1997), and Meyer and Daniel (1985), it is necessary to have EMTs trained in football helmet facemask removal, and carry the proper tools to remove the facemask (Knox & Kleiner, 1997). There was 80% agreement amongst EMS protocols to always remove the facemask. EMTs have shifted their guidelines away from removing the helmet for airway access to removing the facemask as stated by Kleiner (1996). The available AT protocols for colleges and high schools all supported the removal of the facemask and leaving the helmet in place.

There was agreement between EMTs and ATs for removing the helmet if it did not fit properly, or if the helmet prevented proper immobilization of the head to the spine board. This agreement goes against the reported literature that ATs never remove the helmet, possibly showing that AT guidelines for removing helmets are different than what has been reported (Feld, 1993; Patel & Rund, 1994; Sanders, 1995; Segan et al., 1993). Of the five EMS protocols that contained information on stabilizing the helmet to

the spine board, 100% supported stabilizing the helmet to the spine board while AT protocols did not indicate stabilizing to the spine board.

Another issue of importance was the topic of the shoulder pads. Over half of the EMS protocols, 67%, indicated removing the helmet and shoulder pads simultaneously. It was stated that if it becomes necessary to remove a helmet, the shoulder pads must be removed at the same time to prevent hyperextension of the head and neck (Feld, 1993; Kleiner & Cantu, 1996; National Collegiate Athletic Association, 1998; National Athletic Trainer's Association, 1998; Swenson et al., 1997). Removing the shoulder pads at the same time the helmet is removed supports the studies by Donaldson (1997), Meyer and Daniel (1985), and Swenson et al. (1997). There is hyperextension of the cervical spine when the helmet is removed and the shoulder pads are still in place (Donaldson, 1997; Meyer & Daniel, 1985; Swenson et al., 1997). Of the EMS agency protocols 67% supported shoulder pad removal. This indicated the acknowledgment of EMS agencies to the special situation of the neck in a football player wearing both a helmet and shoulder pads. Feld and Blanc (1987) discussed how EMT helmet removal protocols were geared toward motorcycle helmets. The findings in this study refer to the contrary with 60% of the 10 EMS agencies possessing protocols specific to football helmet removal. These results are possibly due to ATs and EMTs meeting to discuss football helmet removal as suggested by Segan et al. (1993) and Kleiner (1996). AT protocols indicated to open the front of the shoulder pads in order to access the chest, probably to avoid having to remove the helmet. Feld (1993) however indicated that the shoulder pads, even when open in the front, are in the way for cardiac monitoring and defibrillation.

Cervical stabilization devices such as cervical collars with the shoulder pads in place was thought to be a bad idea by Deneger and Saliba (1989) because the collar does not fit properly with the shoulder pads on. However, 20% of the EMS protocols supported using a cervical collar with the helmet and shoulder pads in place, while none of the ATs protocols even mentioned cervical stabilization devices. There is little study done in this area, and little is said about whether a collar is needed or indicated with football equipment in place.

It was found that 78% of EMT protocols indicated removing the helmet if blood was seen inside helmet due to head trauma. Many studies suggest removing the helmet in the event of uncontrollable bleeding inside the helmet due to head trauma (Crosby & Lewallen, 1995; Feld, 1993; Feld & Blanc, 1987). Other studies suggest that because the football helmet is custom fit, there is a low rate of open head trauma, and bleeding can be visualized with the helmet in place (Patel & Rund, 1994; Segan et al., 1993). AT protocols did not indicate removing the helmet when blood was visible. This may be due to the argument that there is a low rate of blunt trauma to the skull in football as discussed by Feld and Blanc (1987). EMT protocols indicated removing the helmet if cardiac arrest was present, while none of the AT protocols addressed this situation. In the literature it is indicated to remove the helmet and shoulder pads if cardiac arrest is present (Feld, 1993; Feld & Blanc, 1987; Patel & Rund, 1994; Earle, 1998). The AT protocols indicated to open the front of the shoulder pads for chest access instead of removing the shoulder pads and the helmet. This possibly allows ATs to perform CPR on players in cardiac arrest without removing the helmet, but removing the facemask. It has been

stated by Kleiner (1996) that facemask removal is a commonly accepted practice of airway access, and there is little reason to remove the helmet.

It seems that EMT and AT protocols still have their similar qualities, but for the most part have broken away from their traditional stereotypes being that EMTs always remove the helmet and ATs never remove the helmet (Feld, 1993; Patel & Rund, 1994; Sanders, 1995; Segan et al., 1993). This could be due to ATs and EMTs meeting to discuss procedures for helmet removal for local football programs (Segan et al., 1993). These meetings of ATs and EMTs may not have only helped EMTs and ATs revise their protocols, but also may have helped ATs understand why EMT protocols indicate removing the helmet. It appears as if there is a give and take relationship between EMTs and ATs, as the results of this study indicate EMTs do not always remove the helmet and ATs do not always leave the helmet on.

In comparing the EMS protocols to the Inter-Association Spine Task Force's guideline, only 34% of EMS protocols coincided with the categories chosen by the Inter-Association Spine Task Force. The one college and two high schools that had written protocols used copies of the Inter-Association Spine Task Force's guidelines. The Inter-Association Spine Task Force's guidelines did not indicate removing the helmet and shoulder pads at the same time, but did indicate opening the front of the shoulder pads. One reason removing the helmet with the shoulder pads is not mentioned, may be because they did not intend the helmet to be removed. In the Inter-Association Spine Task Force's guidelines it is stated that the facemask should always be removed to access the airway (Hunt, 1998). The Inter-Association Spine Task Force also did not indicate

the use of a cervical collar, and as stated earlier, it is unclear whether one should be used or not. The Inter-Association Spine Task Force's guidelines also failed to indicate any other considerations for removing the helmet, such as blood in the helmet or cardiac arrest. This could also be due to the reason that the protocol does not intend for the helmet to be removed unless certain circumstances are present, not including a head bleed or cardiac arrest. Another reason for not indicating helmet removal for cardiac arrest is because the shoulder pads are being opened in the front hence negating the need to remove the helmet.

Recommendations for Future Research

Additional research still needs to be done regarding helmet removal. The rest of the country needs to be surveyed as to what protocols are being followed, and who is responsible for the implementation of the protocols. Future studies need to focus on cervical spine stabilization devices such as cervical collars. Studies need to be conducted on specific procedures needed to remove the helmet and shoulder pads from an athlete's head if it is found to be necessary. New tools for removing the facemask and new facemask clips need to be further studied for ease, movement, and quickness.

Many changes may take place in EMT and AT protocols due to the Inter-Association Spine Task Force's guidelines within the next 5 to 10 years. A follow up study in the future will give great insight on progress made by both EMTs and ATs with helmet removal protocols. Studies also need to be done to see if EMTs and ATs are practicing their written protocols.

Summary and Conclusions

Many of the findings in this study both supported and rebutted the findings in the literature. It was found that EMTs do not always remove the helmet as reported in the literature, and ATs do remove the helmet in certain situations specifically if the helmet does not fit properly or prevents proper immobilization (Feld, 1993; Patel & Rund, 1994; Sanders, 1995; Segan et al., 1993). EMTs also felt it was important to remove both the shoulder pads and helmet at the same time if it was found necessary to remove the helmet. Removing the equipment together is in support of what the AT literature claims to be the most appropriate way to handle football equipment because it offers the least amount of movement (Donaldson, 1997; Meyer & Daniel, 1985; Swenson et al., 1997). However, the AT protocols indicate to open the front of the shoulder pads and give no indication of removing both the shoulder pads and helmet simultaneously. EMS protocols indicated the use of cervical collars with the shoulder pads and helmet in place, while ATs did not indicate usage of cervical collars. There needs to be more empirical studies in the area of cervical stabilization devices in conjunction with the helmet and shoulder pads. EMT and AT protocols differed in “other considerations for removing the helmet”. EMT protocols indicated removing the helmet for blood and cardiac arrest, while AT protocols did not indicate such.

The results do not suggest that the Inter-Association Spine Task Force guidelines are universally accepted by either EMTs or ATs. It was also found that the Inter-Association Spine Task Force guidelines differ from those EMT protocols that were surveyed. Out of the 20 AT departments that were surveyed, only 3 had written protocols

for football helmet removal. It is strongly recommended that ATs have a readily available written protocol for football helmet removal amongst their policy and procedures manuals to help protect against possible legal action. Future follow up studies will be needed to determine the impact of the Inter-Association Spine Task Force's guidelines on helmet removal protocols.

References

- Aprahamian, C., Thomas, B. M., & Darin, J. C. (1984). Recommended helmet removal techniques in a cervical spine injured patient. The Journal of Trauma, 24(9), 841-842.
- Armitage, E., Jensen, C., & Little, L. (1998). California Code of Regulations (Title 22. Social Security, Division 9. Prehospital Emergency Medical Services, Chapter 4 Emergency Medical Technician –P). Available: http://www.emsa.cahwnet.gov/p_regs.html
- Beazley, C. (Ed.). (1998). The National Directory of High School Coaches (1998-1999 ed.). Montgomery, AL: Athletic Publishing Company.
- Budassi, S. A. (1980). Helmet removal from injured patients. Journal of Emergency Nursing, 7(6), 290.
- Crosby, L. A., & Lewallen, D. G. (Eds.). (1995). Emergency care and transportation of the sick and injured (pp. 583-586). Rosemont, IL: American Academy of Orthopedic Surgeons.
- Cleary, K. (Ed.). (1998). The 1998-99 National Directory of Collegiate Athletics. Cleveland, OH: 1998 Collegiate Directors Inc.
- Danzig, A. (1956). The History of American Football. Englewood Cliffs, NJ: Prentice-Hall.
- Denegar, C. R., & Saliba, E. (1989). On field management of the potentially cervical spine injured football player. Athletic Training, 24(2), 108-114.
- Donaldson, W. F. (1997). Helmet removal in a football player with a suspected spine injury: easy does it. Clinical Journal of Sport Medicine, 12(1), 3.
- Earle, M. V. (Ed). (1998). Guidelines for helmet fitting and removal in athletics. NCAA 1998-1999 Sports Medicine Handbook, 11, 71-73.
- Emergency Medical Services Authority. (1998, April). California Code of Regulations (Title 22. Social Security, Division 9. Prehospital Emergency Medical Services, Chapter 2 Emergency Medical Technician I). Sacramento, CA.
- Feld, F. (1993). Management of the critically injured football player. Journal of Athletic Training, 28(3), 206-212.

Feld, F., & Blanc, R. O. (1987, October). Immobilizing the spine-injured football player. Journal of Emergency Medical Services, 12, 38-40.

Hodgson, V. R., & Thomas, L. M. (1985). Playing head-up football. National Federal News, 2, 24-27.

Holsti, O. R. (1969). Content Analysis for the Social Sciences and Humanities. Reading, MA: Addison-Wesley Publishing Co.

Hunt, V. (1998, August). Question of caution: Task force examines spine care, helmet removal. NATA News, pp.10-12.

Kleiner, D. M. (1996, January). Football helmet face mask removal. Athletic Therapy Today, 1, 11-13.

Kleiner, D. M., & Cantu, R. C. (1996, Summer). Football helmet removal (official statement). Indianapolis, IN: American College of Sports Medicine.

Knox, K. E., & Kleiner, D. M. (1997). The efficiency of tools used to retract a football helmet face mask. Journal of Athletic Training, 32(3), 211-215.

Krippendorff, K. (1980). Content Analysis, An Introduction to its Methodology. Beverly Hills, CA: Sage Publishing.

Maroon, J. C., Steele, P. B., & Berlin, R. (1980). Football head and neck injuries-an update. Clinical Neurosurgery, 27, 414-429.

Meyer, R. D., & Daniel, W. W. (1985). The biomechanics of helmets and helmet removal. The Journal of Trauma, 25(4), 329-332.

Mueller, F. O., & Blyth, C. S. (1987, January). Fatalities from head and cervical spine injuries occurring in tackle football: 40 years' experience. Clinics in Sports Medicine, 6(1), 185-196.

Mueller, F. O., & Schindler, R. D. (1985). Annual survey of football injury research, 1932-1984. Orlando, FL: American Football Coaches Association.

National Athletic Trainer's Association. (1998, July). NATA helmet removal guidelines. Dallas, TX: Author.

National Athletic Trainer's Association. (1998). What education does an athletic trainer need?. Available: <http://www.nata.org/publications/careers.html>

Patel, M. N., & Rund, D. A. (1994). Emergency removal of football helmets. The Physician and Sportsmedicine, 22(9), 57-59.

Sanders, M. J. (1995). Mosby's Paramedic Textbook (pp. 457-458). St. Louis, MO: Mosby-Year Book.

Segan, R. D., Cassidy, C., & Bentkowski, J. (1993). A discussion of the issue of football helmet removal in suspected cervical spine injuries. Journal of Athletic Training, 28(4), 294-305.

Snook, G. A. (1969). Head and neck injuries in contact sports. Medical Science Sports, 1, 117-123.

Swenson, T. M., Lauerman, W. C., Blanc, R. O., Donaldson, W. F., & Fu, F. H. (1997). Cervical spine alignment in the immobilized football player. The American Journal of Sports Medicine, 25(2), 226-230.

Thomas, C. L. (Ed.) (1997). Taber's cyclopedic medical dictionary. Philadelphia, PA: F. A. Davis Company.

Torg, J. S., Truex, R., & Quedenfeld, T. C. (1979). The national football head and neck injury registry. Journal of American Medical Association, 241, 1477-1479.

Torg, J. S., Vesgo, J. J., Sennett, B., & Das, M. (1984). The national football head and neck injury registry: 14 year report on cervical quadriplegia, 1971-1984. Journal of American Medical Association, 254(24), 3439-3443.

United States Department of Transportation. (1994). National Standard Curriculum. Washington, DC: Author.

Vieson, M., & Wimer, J. W. (1998). Attitudes about football helmet removal procedures from students in a paramedic education classroom. Supplement to Journal of Athletic Training, 33(2), s-61.

Virgin, H. (1980). Cineradiographic study of football helmets and the cervical spine. American Journal of Sports Medicine, 8, 310-317.

Waninger, K. N. (1998). On-field management of potential cervical spine injury in helmeted football players: leave the helmet on. Clinical Journal of Sport Medicine. Manuscript submitted for publication.

Wiesenfarth, J., & Briner, W. (1996). Neck injuries: urgent decisions and actions. The Physician and Sportsmedicine (online), 24(1). Available: http://www.physsportsmed.com/issues/jan_96/wies.htm

Wimmer, R. D., & Dominick, J. R. (1994). Mass media research: an introduction. Belmont, CA: Wadsworth Publishing Company.

APPENDIX A. Telephone Questions

1. My name is Anthony Recinella. I am a graduate student at San Jose State University in the department of Human Performance studying Athletic Training.
2. I am conducting research for my graduate thesis under Dr. Emily Wughalter.
3. The research is on helmet removal protocols used by EMTs and ATs in California.
4. Does your agency/ school have a specific written protocol or procedure for helmet removal in a cervical spine or head injury situation?
5. Does the protocol include football helmets?
6. Could you fax the protocol to me and sign a consent form?

APPENDIX B. Letter of Consent

Dear California EMS agency or Athletic Training facility,

I would like your help completing a study on EMT and AT helmet removal protocols in the state of California. All that is asked of you is that you fax in a copy of your current protocol or procedure dealing with helmet removal, specifically for football helmets.

All information you release will remain confidential. The agency / school you represent will not be mentioned by name in the study. You do not have to participate in this study if you choose so, and you may withdrawal from participation at any time. Please be aware you will not receive any reimbursement for participating.

Should you have any questions or concerns please feel free to contact me at (408) 248-8826. If you have any complaints or concerns about the authenticity of the research, please contact Nabil Ibrahim Ph. D., Acting Vice President for Graduate Studies and Research at San Jose State University, San Jose, California 95192 or call at (408) 924-2480.

If you wish to receive a copy of the study summary and results please fill in your address below.

Thanks,

Anthony J. Recinella
San Jose State University

I have read and understand the above information and by signing agree to participate in this study.

Participant signature

Researcher's signature indicates the participant above has been informed of their rights and will be included in the research.

APPENDIX C. Categorical Check-list

☐ Is there a specific protocol for football helmets? (check if yes)

(a) Airway Management

1. **Helmet Removal**

- ☐ i. Always remove to establish an airway
- ☐ ii. Only remove if facemask can not be removed
- ☐ iii. Only remove if helmet is preventing airway access after facemask removal
- ☐ iv. Other

2. **Facemask Removal**

- ☐ i. Always with suspected cervical spine injury
- ☐ ii. Done without removing the chin strap
- ☐ iii. Have specific procedures for removing
- ☐ iv. Other

(b) Cervical Spine and Head Stabilization

1. **Helmet Removal**

- ☐ i. Only remove if helmet does not fit
- ☐ ii. Only if helmet prevents proper immobilization
- ☐ iii. Other

2. **Helmet Non-removal**

- ☐ i. Stabilization to board with helmet in place
- ☐ ii. Other

3. **Shoulder Pads**

- ☐ i. Remove when helmet is removed
- ☐ ii. No reference to removal
- ☐ iii. Open front to access chest with helmet on
- ☐ iv. Other

4. **Cervical Spine Stabilization Devices**

- ☐ i. Cervical collar indicated with helmet and pads in place
- ☐ ii. Cervical collar not indicated
- ☐ iii. Other

(c) Other Consideration for Helmet Removal

- ☐ i. Blood in helmet
- ☐ ii. Cardiac Arrest

APPENDIX D. Rules for coding

1. It is possible to check more than one box under a given category.
2. Check for each content category in the order it appears on the check-list.
3. If the opposite action is indicated in the protocol and it is not a choice on the check-list, it is to be entered in the “other” space provided and noted as such.
4. If the protocol is specific to football helmets, mark the box, and if the protocol is non-specific, record any data that fits into the categories.
5. A protocol will be considered specific to football helmet removal if “football helmet” is written anywhere in the protocol.
6. If information is present in the protocol that pertains to helmet removal and is not on the check-list, enter it in the appropriate “other” space.
7. If information present in the protocol pertains to helmet removal, but doesn’t have to do with the airway or stabilization, enter it under the “other consideration for helmet removal” category.
8. Keep helmet removal categories for airway management separate from helmet removal categories for cervical spine and head stabilization.
9. A new category may be added if there is pertinent information in more than one protocol for football helmet removal that does not fit into given categories.
10. New rules may be added during the coding phase.

Airway Management

11. Locate information in the protocols on airway management, meaning how the mouth and nose will be accessed in case the patient is in, or advances to respiratory arrest where artificial respirations will be needed.
12. Locate any information referring to removing either the helmet or facemask to access the airway.
13. If the helmet is to be removed to access the airway, indicate the specific instances the protocol states it should be done, if the protocol indicates it.

14. If not indicated, note it under the “other” category.
15. If the facemask is to be removed to access the airway indicate when the protocol states it should be removed and if the chin-strap is to be removed as well.

Cervical Spine and Head Stabilization

16. Locate information on cervical spine and head stabilization considerations with helmet removal.
17. Indicate when the helmet is to be removed, or if the protocol states not to remove the helmet.
18. If the protocol indicates removal when there are problems immobilizing the spine because of the helmet not fitting, mark the box.
19. If there are other reasons given for the helmet preventing proper immobilization, mark the second box and indicate the reason.
20. Still mark box one under “helmet non-removal”, even if the protocol states leaving the helmet on, but does not indicate securing the helmet to the board.
21. Only mark the first box under “shoulder pads” if the protocol states removing the shoulder pads at the same time the helmet is removed.
22. If removing the shoulder pads is not indicated, mark it as such.
23. Mark the third box if the protocol states opening the front portion of the shoulder pads while leaving the pads and helmet on, to perform cardiopulmonary resuscitation, defibrillation or cardiac monitoring.
24. If a protocol indicates the use a cervical collar with the shoulder pads and helmet in place, mark the appropriate box.
If no use of a cervical collar is indicated, mark it as such.

Other Consideration for Helmet Removal

25. If any other form of stabilization device, such as sand bags, towels, or blocks is indicated, mark what it is under “other”.
26. Determine if there are any other reasons to remove the helmet other than because of airway, or cervical spine and head stabilization problems.

27. "Blood in the helmet" should be marked if the protocol mentions removing the helmet if there is any blunt trauma to the face or head.
28. Removal of the helmet for cardiac arrest should be marked respectively, and any other considerations not mentioned above should be marked and indicated next to the "other" box under "other considerations for helmet removal".