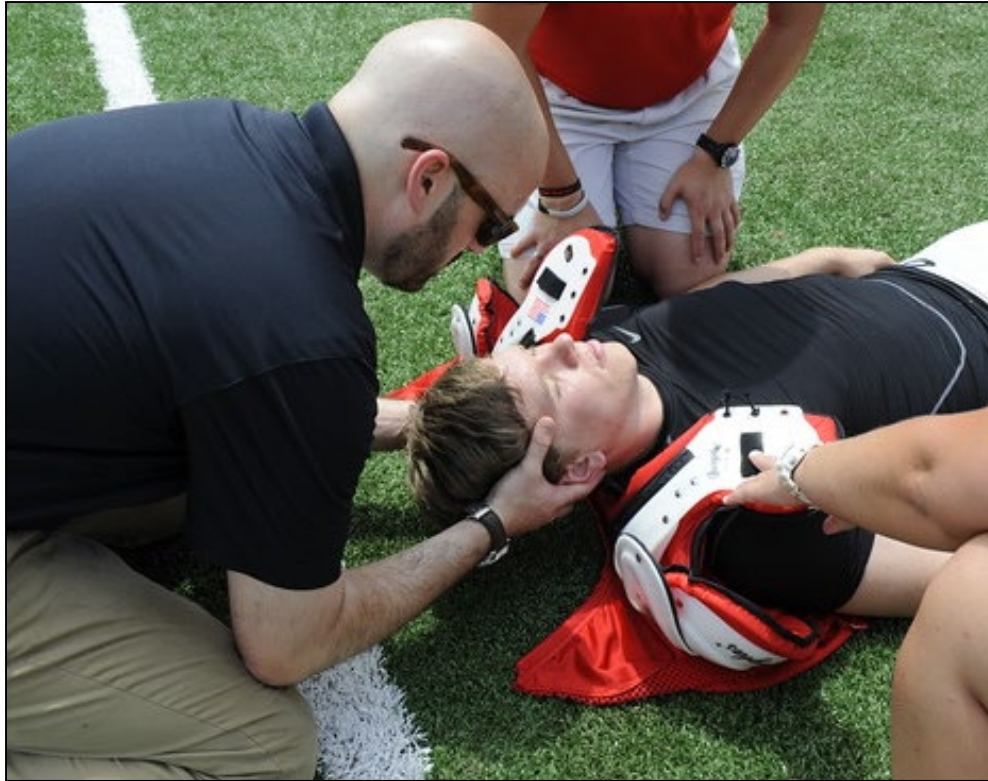


Current Care Concepts in Management of the Spine Injured Athlete



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Disclosure



I, Ron Courson, have NO relevant financial relationships to be discussed, directly or indirectly, referred to or illustrated with or without recognition within this presentation.



Objective

- Provide update on
 - new national EMS spine injury standards
 - changing concepts in past few years
 - different care options available in pre-hospital management of c-spine injury



National Athletic Trainers' Association Position Statement: Acute Management of the Cervical Spine-Injured Athlete

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Objective: To provide certified athletic trainers, team physicians, emergency responders, and other health care providers with recommendations on how to best manage a catastrophic cervical spine injury in the athlete.

Background: The relative incidence of catastrophic cervical spine injury in sports is low compared with other injuries. However, cervical spine injuries necessitate careful and precise management, often involving the combined efforts of a variety of health care providers. The outcome of a catastrophic cervical spine injury depends on the efficiency of this management process and the likelihood of transfer to a controlled environment for diagnosis and treatment.

Recommendations: Recommendations are based on current evidence pertaining to prevention strategies to reduce the incidence of cervical spine injuries in sport; emergency planning and preparation to increase management efficiency; immediate recognition of a catastrophic cervical spine injury; accurate and timely reporting of a catastrophic cervical spine injury; and maintaining the airway, stabilizing and transferring the athlete with a suspected cervical spine injury; managing the athlete participating in an equestrian sport, such as football, hockey, or lacrosse; and considerations in the emergency department.

Key Words: catastrophic injuries, emergency medicine, neurologic outcomes

The incidence of spinal cord injury in the United States is estimated to include 11,000 new cases each year.¹ Serious spinal injuries have devastating sequelae, including neurologic impairment and premature mortality. Sport participation constitutes the fourth most common cause (approximately 7.4%)² of these injuries overall but is the second most common cause for those younger than 30 years of age.³ Since 2000, the majority of all cervical spine fractures have occurred in individuals between the ages of 16 and 30 years.⁴

American football in the United States is associated with the greatest number of catastrophic spinal injuries for all US sports.⁵ Although catastrophic cervical spine injuries have decreased compared with the incidence in the early 1970s, an average of 7.8 catastrophic cervical spine injuries with incomplete recovery and 6 quadriplegic events⁶ occurred annually in football alone from 1992–2000. Of particular concern is a recent trend of double-digit catastrophic spine injuries in 2 of the 4 years between 2003 and 2006; from 1991 to 2002, only data from 1999 showed catastrophic spine injuries measuring in the double digits.⁷

Epidemiologic data have established the risk of catastrophic cervical spine injury in other sports as well. For example, an average of 15 catastrophic spine injuries occur annually in ice hockey in Canada and the United States.⁸

Sports such as skiing,^{9–11} rugby,^{12,13} gymnastics,^{14,15} swimming and diving,^{16,17} track and field (ie, pole vaulting),¹⁸ cheerleading,¹⁹ and basketball²⁰ all involve activities that place participants at risk for spine injuries. In fact, the incidence of nonfatal direct catastrophic injuries in the sports of lacrosse, gymnastics, and men's ice hockey is higher than that in American football (Table 1).²¹

Regardless of the sport, proper management and accurate diagnosis of acute spinal injuries are paramount because of the recognized risk of neurologic deterioration during and after the initial management of the injury.²² Consequently, sports medicine providers must be familiar with the appropriate acute management guidelines for the cervical spine-injured athlete.

PURPOSE

The purpose of this position statement is to provide athletic trainers, team physicians, emergency responders, and other health care professionals with recommendations and clinical considerations for managing a major, potentially catastrophic²³ cervical spine injury of catastrophic cervical spine injury is defined as "a structural distortion of the cervical spinal column associated with actual or potential damage to the spinal cord."²⁴

position statement



Spine Injury in Sport Group (SISG)

- 25 healthcare providers from medicine, AT, EMS and research
 - co-chairs: Ron Courson, ATC, PT, NRAEMT; Jim Ellis, MD; Stan Herring, MD
- Extensive literature review through Harborview Injury Prevention & Research Center (University of Washington)
- Modified Delphi study; met in Atlanta, GA March 2-3, 2019
- Educational initiatives:
 - evidence-based paper on appropriate care of the spine-injured athlete
 - *publication in Annals of Emergency Medicine, Clinics in Sports Medicine, Journal of Athletic Training, and Journal of Emergency Medical Services*
 - best practices and current care concepts paper
 - *publication in Journal of Athletic Training*
 - educational video
 - *Produced by Harborview Injury Prevention & Research Center: available on-line*
 - on-line educational materials



Science of Pre-Hospital Care is Evolving

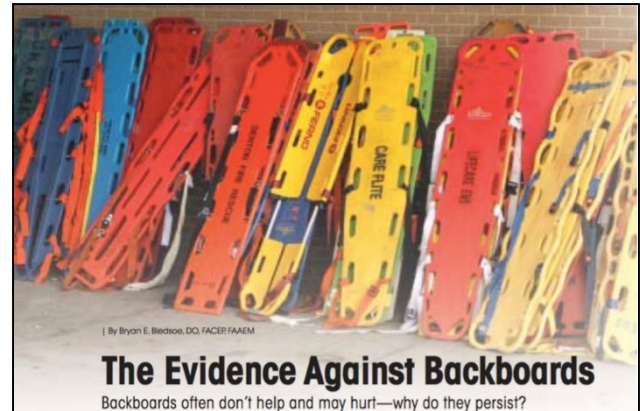


Goal is to provide immediate on-site medical care and transport to definitive care facility without causing further harm



New National EMS Spine Injury Standards

- The American College of Emergency Physicians believes that current out-of-hospital management practices of patients with potential spinal injury lack evidentiary scientific support.
 - differentiates between “spinal immobilization” and “spinal motion restriction”
 - spinal motion restriction procedures may require modification for certain conditions (eg, rescue, vehicle racing, contact or extreme sports) as determined by the EMS medical director.



| By Bryan E. Bledsoe, DO, FACEP, FAEM

The Evidence Against Backboards

Backboards often don't help and may hurt—why do they persist?



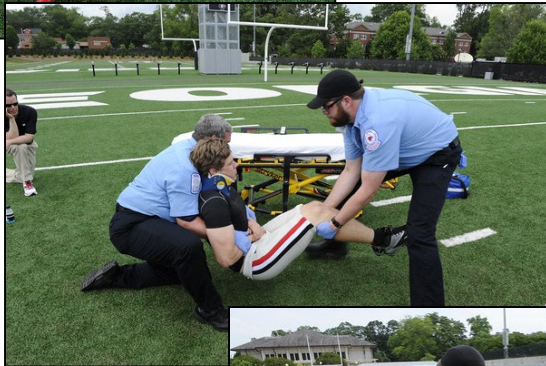
New National EMS Spine Injury Standards

- **Spinal Immobilization Indicated**
 - Blunt trauma and altered LOC
 - Spinal pain or tenderness
 - Neurological complaint
 - (e.g. numbness or motor weakness)
 - Anatomic deformity of the spine
 - High-energy MOI
- **Spinal Immobilization Not Necessary**
 - Normal LOC
 - No spine tenderness or anatomic abnormality
 - No neurologic findings or complaints
 - patients with penetrating trauma to the head, neck, or torso and no evidence of spinal injury should not be immobilized on a backboard



New National EMS Spine Injury Standards

Wide Variation in Treatment



- Variables:
 - state and local protocols
 - emergency equipment available
 - number of personnel on site
 - physician on site ?
 - EMS on site ?
 - training and experience of personnel
 - positioning of athlete
 - space restrictions ?
 - scene safety/control



Background

- **Variety of healthcare professionals may be involved in on-field management of suspected head and/or spine injury**



- **Important to develop standard guidelines to be used by all providers of pre-hospital care to ensure safe management**



Black & White or Gray ?



- Every emergency situation and every patient is different
- No such thing as “always” and “never”
- **Individual circumstances must dictate appropriate actions**



Emergency Action Plan (EAP)

- Athletic programs should have an EAP developed in conjunction with local EMS and approved by team physician(s)
- healthcare providers for athletic competition (MDs, EMTs, ATs) should develop a protocol for dealing with such injuries when they occur and rehearse on regular basis
- best practice to develop a c-spine protocol

Emergency Plan: Butts-Mehre Hall and Football Practice Fields

Emergency Personnel:

Butts-Mehre Hall: certified athletic trainers, student athletic trainers, and physician (limited basis) on site in athletic training facility, located on 1st floor

Football practice fields: certified athletic trainers and student athletic trainers on site for practice and work-outs

Emergency Communication:

Butts-Mehre Hall: fixed telephone lines in Butts-Mehre athletic training facility adjacent to practice fields (542-9060 and 542-8984)

Football practice fields: certified athletic trainer carries cellular telephone (Ron Courson 706-255-7690; Mike Dillon 706-540-2955; Lenny Navitski 706-202-2231); fixed telephone line under practice shed (542-8962); additional fixed telephone lines accessible from Butts-Mehre athletic training facility adjacent to practice fields (542-9060 and 542-8984)

Emergency Equipment:

Butts-Mehre Hall: emergency equipment (AED, trauma kit, splint kit, Banyan kit, spine board, ProPak vital signs monitor) located within athletic training facility on 1st floor

Football practice fields: emergency equipment (AED, trauma kit, splint kit, Banyan kit, spine board) maintained on motorized medical cart parked adjacent to practice shed during practice; additional supplies maintained under practice shed; additional emergency equipment accessible from Butts-Mehre athletic training facility adjacent to track

Roles of First Responders

1. Immediate care of the injured or ill student-athlete
2. Activation of emergency medical system (EMS)
 - a. 9-911 call (provide name, address, telephone number; number of individuals injured; condition of injured; first aid treatment; specific directions; other information as requested)
 - b. notify campus police at 542-2200
3. Emergency equipment retrieval
4. Direction of EMS to scene
 - a. open appropriate gates
 - b. designate individual to "flag down" EMS and direct to scene
 - c. scene control: limit scene to first aid providers and move bystanders away from area

Venue Directions:

Butts-Mehre Hall

Two entrances provide

1. Main entrance: P

Football practice

Smith Street. Two g

1. Rutherford Str
2. Smith Street: c



Medical “Time Out”

Sports medicine care teams should conduct a “Time Out” before each athletic event

- Same concept as surgery time-out or athletic time out
- miscommunication may lead to potentially catastrophic errors
- ensure EAP, emergency protocols, and care options are reviewed with personnel and appropriate equipment available for event



Emergency Preparation

Teamwork and Communication



- When dealing with a potential life-threatening situation such as a c-spine injury, the injury scene is not the time nor the place for healthcare professionals to decide on appropriate treatment



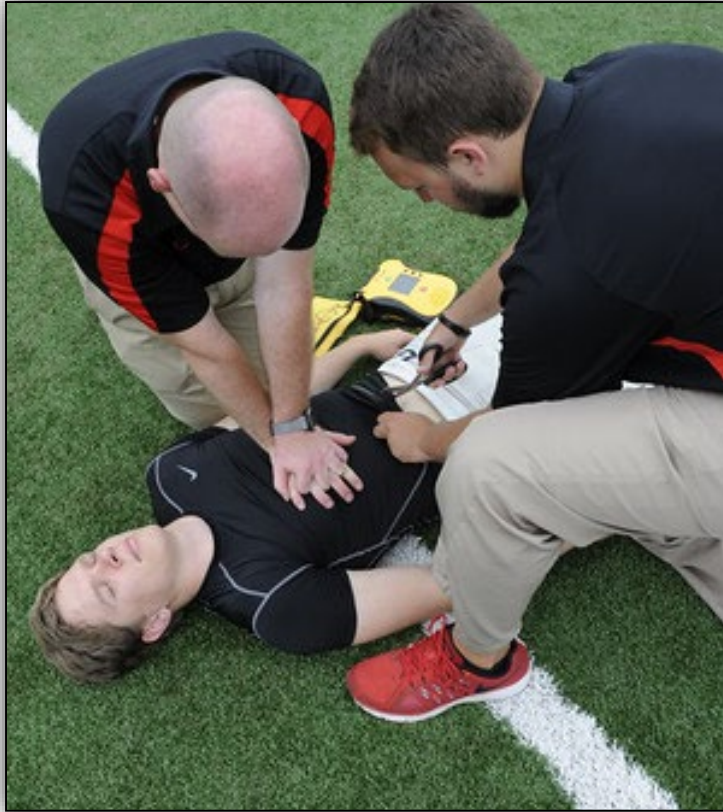
Emergency Assessment



- scene size-up
- primary survey/
resuscitation
- secondary survey
 - detailed secondary
assessment
 - vital signs
 - SAMPLE history



When Should Protective Equipment be Removed? Hospital ED or On-Site?



- **Should have access to airway prior to transport regardless of airway status**
 - **helmet facemask removal**
- OR**
- **when deemed necessary and appropriate by onsite medical personnel, protective equipment (helmet and shoulder pads) MAY be removed prior to transport to a primary emergency facility by medical personnel familiar with equipment removal**



Protective Equipment Removal

Protective athletic equipment removal facilitates ED physician evaluation and diagnostic testing



Protective Equipment Removal

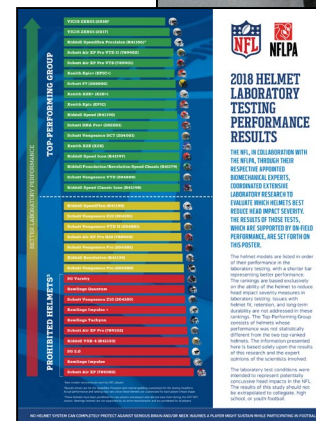


Safe equipment removal requires a minimum of 2-3 trained and experienced rescuers



Equipment and Equipment Removal

- EMS system personnel and ED personnel providing care for equipment specific sports should be familiar with sports equipment, as well as a variety of safe sport-specific equipment removal techniques
 - recent NFL study on FB helmet ratings



Helmet Removal

requires minimum of 2 rescuers



- **Anterior-posterior stabilization technique**
 - bottom hand carefully cradles the cervical spine and occiput while the top hand grips the chin and jaw, controlling rotation
 - top forearm may rest upon the athlete's chest providing additional control
 - this technique allows for a secure hold to stabilize the cervical spine
 - previous medial-lateral stabilization techniques where the rescuer grips the side of the athletes' head are limited by the cheek pads inside the helmet
 - weight of the head may cause the cervical spine to go into extension when the helmet is removed
 - anterior-posterior stabilization technique provides additional security to limit cervical extension



Helmet Removal

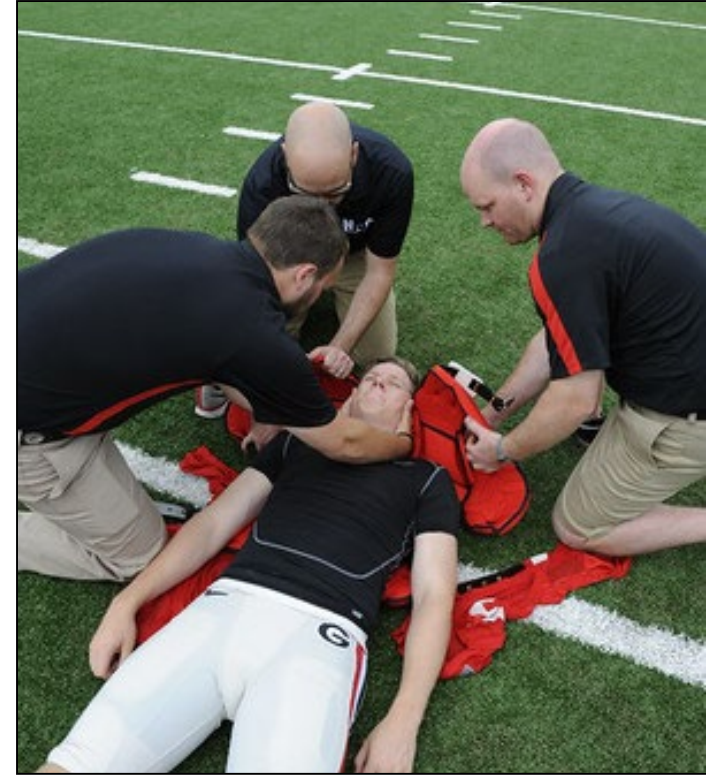


- **Requires minimum of 2 rescuers**
- Rescuer 1 maintains c-spine stabilization
- Rescuer 2 cuts front of jersey using “T technique”
 - neck to waist and sleeve to sleeve
- Rescuer 2 opens front of pads to gain access to cervical spine and chest
 - cut front of pads
 - utilize quick release if available
- Rescuer 2 takes control of c-spine from front: *“I have c-spine: you can release”*
- Rescuer 1 removes helmet
- Rescuer 1 resumes c-spine control



Shoulder Pad Removal

- **Requires minimum of 2-3 rescuers**
- **Multi-person lift**
- **Bi-valve pads**
- **Elevated torso technique**
- **Flat torso technique**
 - *may incorporate jersey and pad cutting into log roll or multi-person lift procedures*



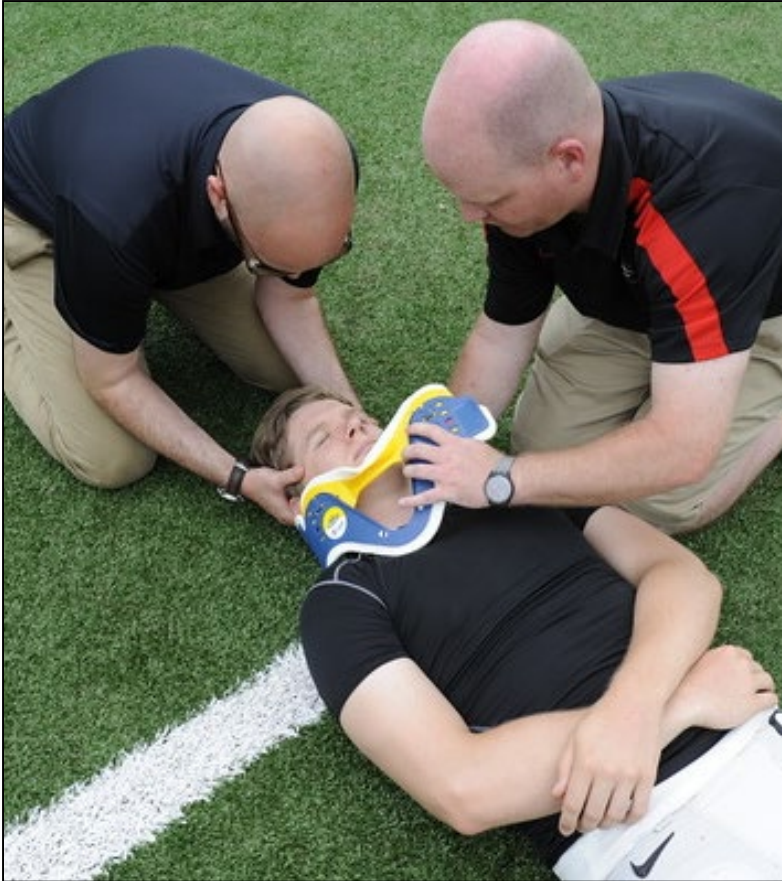
Shoulder Pad Removal



- Other considerations:
 - cervical collar
 - rib pads
 - back pad
 - difficulty or inability to cut pads due to materials involved



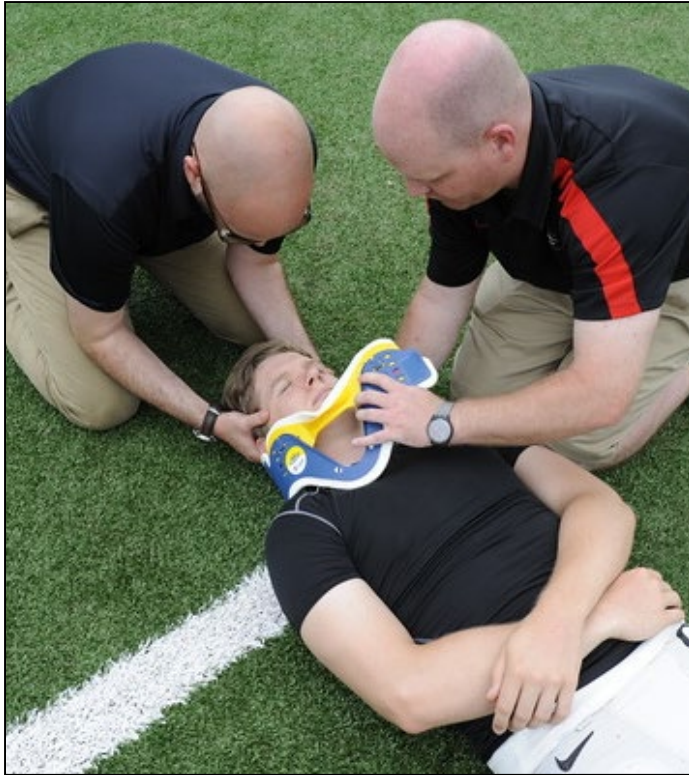
Cervical Stabilization



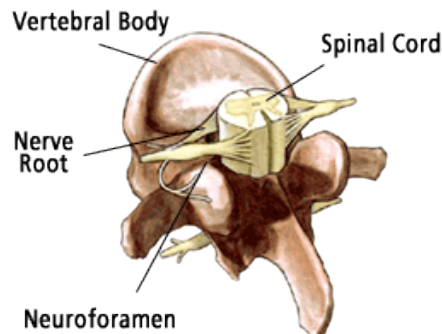
- **If equipment is removed or the athlete is not wearing protective equipment, a properly fitted rigid cervical stabilization device should be applied to spine-injured athletes prior to transport**
- **Manual in-line stabilization should be maintained until stabilization on a full body SMR has been achieved**



Neutral Alignment



- Current recommendations for the acute treatment of the cervical-spine injured athlete are to **immobilize the head and neck in neutral alignment** prior to transfer to an emergency facility and to minimize the motion that occurs throughout this process



Spinal Motion Restriction

Spine injured athletes should be transferred to and transported on a spinal motion restriction device



Spinal Immobilization Techniques



Log Roll vs. Multi-Person Lift

▪ research with cadaver
destabilized c-spine

- Del Rossi, Heffernan and Horodyski; Spine J 2004; 29(7); E134-8
- Del Rossi, Horodyski and Heffernan; J Ath Tr; 38(3); 204-208

▪ both techniques created movement; more with log roll



Supine Log Roll



- **In-line c-spine stabilization**
- **Thumbs toward face**
- **If c-spine not in neutral, gently correct unless resistance met**



Prone Log Roll

Pull Technique



Push Technique



Multi Person Lift



Requires eight (8) rescuers:

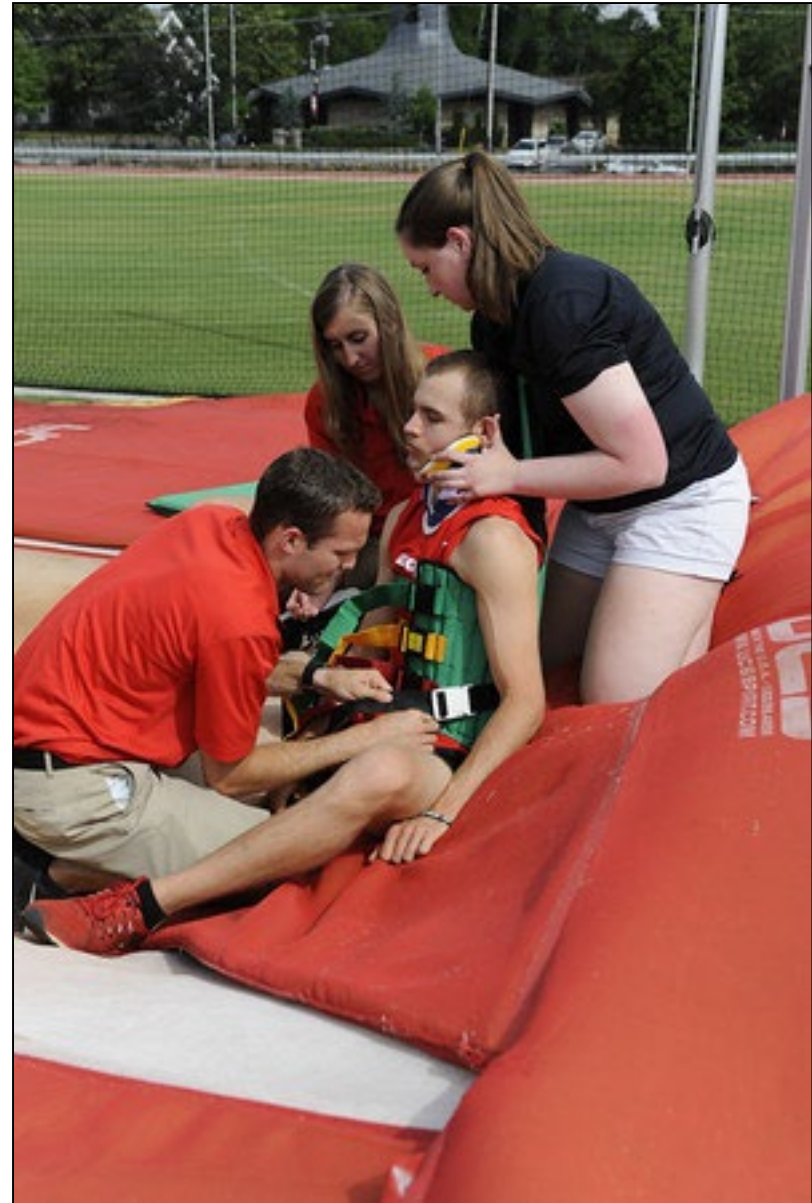
- Rescuer 1 maintains c-spine stabilization
 - Rescuer 2 positions spine board
 - Rescuers 3-8 position kneeling 3 to each side
 - “on my command, lift the athlete 12”: 1, 2, 3”
 - “on my command, lower the athlete: 1, 2, 3”
- **9th rescuer may be utilized for shoulder pad removal**



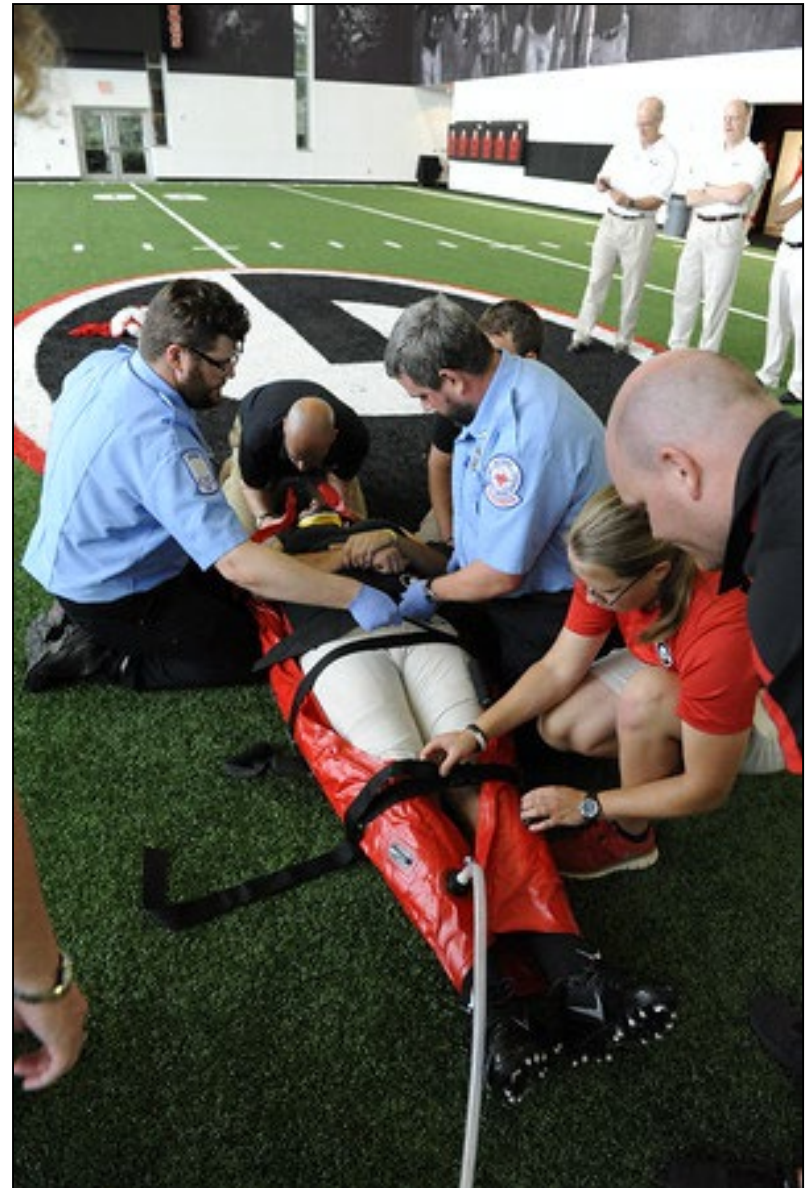
Scoop Stretcher



Kendrick Extrication Device (KED)



Vacuum Mattress



Straps & Strapping Technique



Traditional 3 strap technique

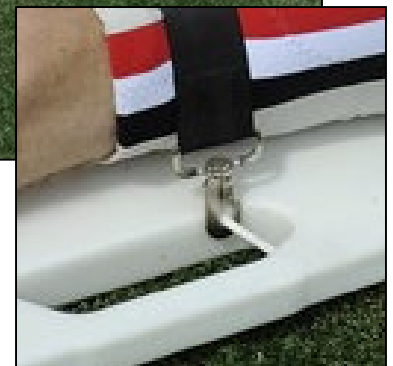
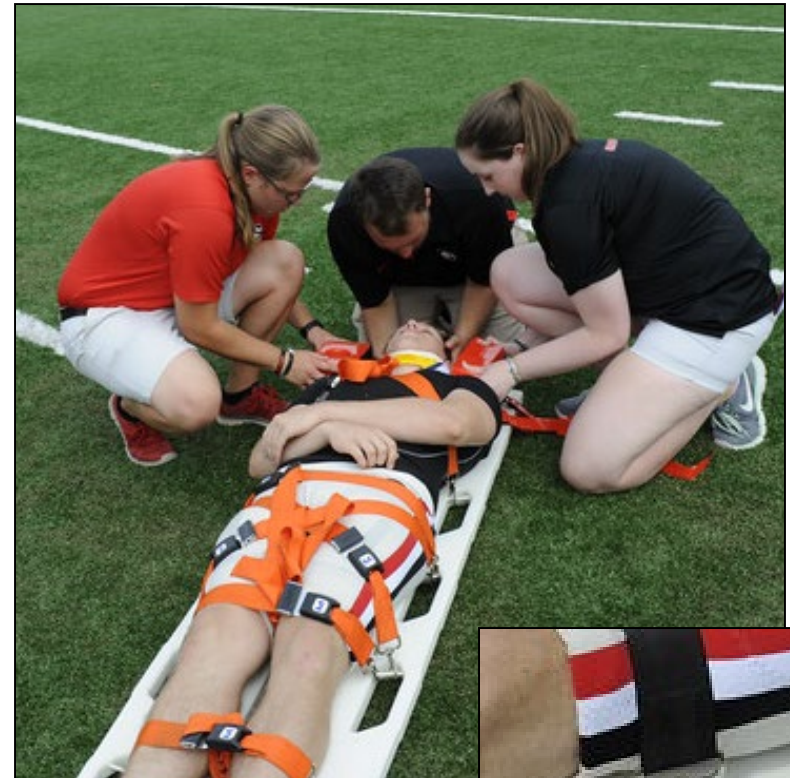
- chest
- pelvis
- thigh



Straps & Strapping Technique

Velcro Spider Straps

Pin and Speed Clip System



Transport to Medical Facility



If feasible, spine-injured athletes should be transported to a medical facility that can deliver immediate and preferably definitive care for SCIs as determined in the EAP



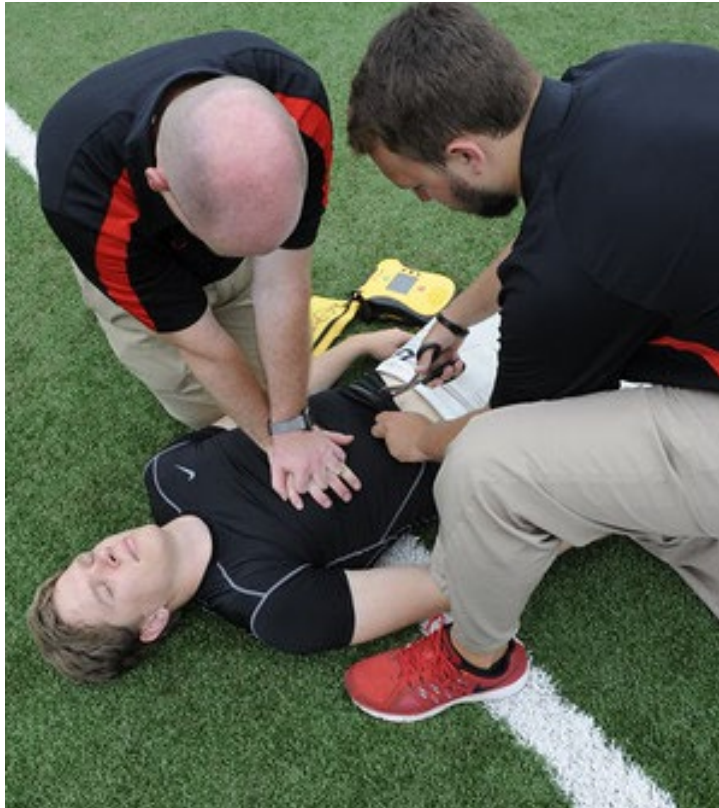
Special Situations

Combative Athlete

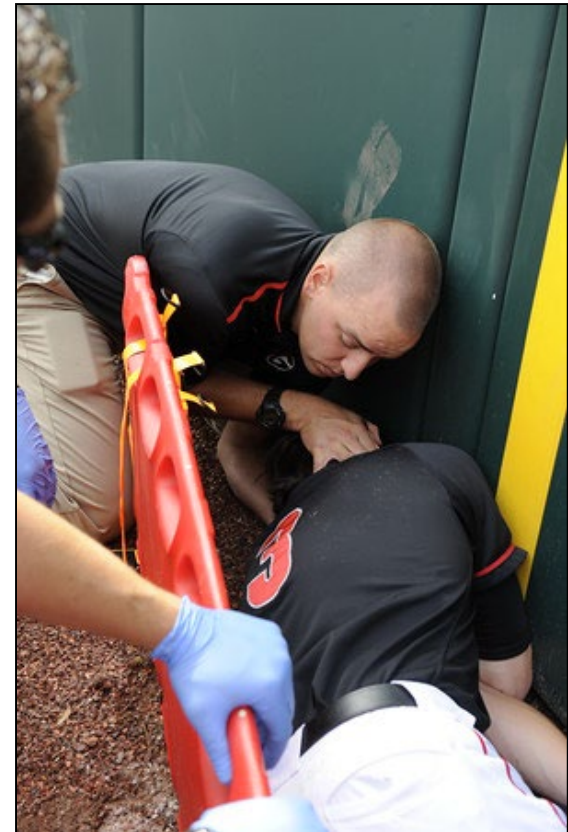


Special Situations

CPR



Confined Space



Take Home Points

- Preparation: develop EAP and c-spine protocol
- **Carefully weigh all factors and make clinical decision on what fits best into individual situation**
- Practice and review: “scenario based training”
- **Team concept**



SISG Resources

- “Consensus Recommendations on the Prehospital Care of the Injured Athlete with a Suspected Catastrophic Cervical Spine Injury” manuscript
- **“Best Practices and Current Care Concepts in Prehospital Care of the Spine-Injured Athlete in American Tackle Football” manuscript**
- “Best Practices and Current Care Concepts in Prehospital Care of the Spine-Injured Athlete in American Tackle Football” video

