On Field Management of the Critically Injured Athlete

Preparation and Planning

Success is where preparation and opportunity meet

Bobby Unser
Hello and Thank you

Department of Athletic Training
Continuing Education Weekend

Collaborators and Supporters

• Darryl Conway, MA, AT, ATC (UM)
• David Berry, PhD ATC (SVSU)

Introduction

• Certified Athletic Trainer (1997)
• EMT-B (97), I(06) Paramedic (10)
• Alpine Ski Patroller (1999)
• Certified Flight Paramedic (2013)
• Certified Tactical Paramedic (2017)

Positions

• Maryland State Police Aviation Command
• Liberty Mountain Ski Patrol
• Rotational ATC, US Ski and Snowboard
Why are we here?

KNEES ACCOUNT FOR 50% OF ALL FOOTBALL INJURIES.
This is why we are here

Are you prepared for the ultimate emergency?

Ryan Shazier,
Pittsburgh Steelers
We don’t just act on the field....
Conflict of Interest

• The views expressed in these slides and today’s discussion are mine

• My views may not be the same as the views of my colleagues or employers.

ALWAYS use local protocols and treatments or interventions approved by your medical director or employer.
Disclosures

• I do not have financial or other associations with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters.

• No Conflict of Interest or Financial relationships

• There was no commercial support for this activity.

• The views expressed in these slides and the today’s discussion are mine.

Participants must use discretion when using the information contained in this presentation.
Overview of Presentation

At the conclusion of this program:

- Explain how a pre-hospital inter-professional healthcare team works collaboratively to improve patient outcomes.
- Discuss risk management, catastrophic injury planning, & crisis management principles.
- Discuss principles for the effective development of various policies & procedures.
- Describe effective strategies for the management of a catastrophic injury.
- Application of skills for Wound Care Management, Airway Management and Cardiac Arrest.
“You are not studying or practicing to pass the exam ...

You are preparing for the day when you are the only thing between the athlete and the grave!”
This is why we are here....
Why this topic?

• ATs 1st on the scene

• Ability to improve patient outcomes

• Changes in equipment

• Changes in EMS policies

• Developing Interprofessional relationships are key during critical events
“As the profession of athletic training continuously evolves and ATs practice in various settings, these healthcare providers must have the ability to maintain a high level of preparation and proficiency in all aspects of immediate and emergency care. This ability is critical to minimizing risk to the injured participant.” – BOC, 2015
This is why we are here....
NATA Position Statements

Erik E. Swartz, PhD, ATC*; Barry P. Boden, MD†; Ronald W. Courson, ATC, PT, ATC*

National Athletic Trainers’ Association Position Statement: Preventing Sudden Death in Sports
Douglas J. Casa, PhD, ATC, FNATA, FACSM* (co-chair); Kevin M. Anderson, ATC; Ronald W. Courson, ATC, PT, NREMT-I, CSCS*; Jonathan P. Reck, MS, ATC; Courson, ATC; Carolyn C. L. Nasser, PhD, ATC; Brendan P. McDermott, ATC; Carolyn C. L. Nasser, PhD, ATC; Rebecca L. Spierings, MS, ATC, ATC*; Erik E. Swartz, PhD, ATC*; Katie M. Walsh, EdD, ATC*

National Athletic Trainers’ Association Position Statement: Exertional Heat Illnesses
Helen M. Binkley*; Joseph Beckett†; Douglas J. Casa‡; Douglas M. Kleiner§; Paul E. Plummer∥
“If it is predictable ... It is manageable!
What might we see?

- Traumatic Injury
- Sudden Cardiac Arrest
- Environmental Exposure
- Spectator or Officials event
- School Shooting
- Bus Accident
- Terrorist Attack
Risk Management

- **RM Concerns**
  - Policies / Procedures
  - Supervision
  - Documentation
  - Training
  - Corrective Actions

- **Topics to Discuss**
  - PPE
  - Emergency Plans
  - Medications
  - Medical Coverage
  - Concussion Policies
  - Special Populations
  - Medical DQ
  - Team Physicians
  - Environmental Issues
Pre-Event Planning

The Athletic Trainers event doesn’t start of game day
• Creating or reviewing EAPs
  • For every facility and every event

• Develop and train with inter-professional partners
  • Meet with event medical team and local facilities

• Purchase, practice and prepare equipment
Inter-Professional Practice

• Why is this Important?

Facilitate & optimize collaborative patient-centered care that is current, competent, compassionate, efficient, effective, and safe!

Reduce service duplication and minimize unnecessary interventions while enhancing clinical effectiveness!

Increased engagement!
Inter-Professional Practice

Educate-
• What is the education level & capabilities of EMS personnel?
• Educate fire / EMS personnel about the education & training of ATCs
• EMS capabilities vs ATC skills / capabilities
• EMS protocols
• Joint training opportunities

Equipment-
• What equipment does EMS have? Sports Medicine have?
• What equipment is available at an event?
• What equipment is necessary for what emergencies?
• What equipment will be used (e.g. Splints, spineboard, etc.)?
FOAM PIT RESCUES, TRICKY FOR FIRST RESPONDERS
Event Planning

Questions -

• Just because you hold a certification, are you the best to perform the procedure?

• What are the qualifications of those executing the plan?

• Who is going to be involved in carrying out the EAP at all different times?

“Pit Crew Concepts”
Cervical Spine Injury
CPR
Other

What personnel are involved in your management of emergency situations?

Before EMS arrives?
Unstable patient?
After EMS arrives?
Visiting Team
Event Planning

Questions-

• Are your coaches, strength coaches, & other staff prepared to participate?
• Is a coach, strength coach, etc. who has trained with ATCs better suited than a MD who never trains?

• Who travels with injured athlete?
• Will activity be adequately supervised when you leave?
• What Facilities will be utilized?
  • Level 1 Trauma Center
  • Level 2 Trauma Center
  • Speciality Center
• Aeromedical vs ground

WHO HAS THE CAR KEYS ??????????
Medical Time Outs

“Time Out” system for athletic health care

Convene the health care professionals who comprise the emergency response team

Pre-event checklist

• EAP
• Roles & responsibilities
• Communication
• Equipment & resources
• Transportation plan
• Other / Miscellaneous
Roles during an Event

• Immediate care
• Equipment retrieval
• EMS activation
• Direction of EMS to scene
  • Meeting EMS if Not on Scene
• Communication
  • Family, Spectators, Media
• Other
  • Gates, Family, Spectators,

“Athletic teams excel because they practice! It is not conceivable that personnel responsible for emergency management cannot practice and expect to excel at the time of an emergency”

Ron Courson, ATC, PT, NREMT-I, CSCS, University of Georgia
Recommendations

• AED
• Airway Management
• Bleeding Management
• Splints
• Spine Board (and head Immobilization)
• Heat Illness equipment
• Medications
  • Epi, Albuterol, Narcan

• EAP will “provide directions” but is not the exact final road map
• EAP must be flexible“
  • adjust on the fly”
• A written EAP, will become your minimum standard of care
• Phases of Reactions
  • Denial
  • Deliberation
  • Decisive moment
“In times of stress, you will always fall to the level of your training, not rise to the level of your expectations”

John Sims, AA County Sheriff
Why are we here?
What is going to kill them first........

Treat that first........
Management Techniques

• Bleeding and Wound Care
• High Performance CPR
  • Pit Crew Concepts of CPR

• Airway Management
  • Basic Adjuncts
  • Supraglottic Airways
  • Chest Trauma and Decompression

• Spinal Injury Management

• Advanced Splinting

• Heat Illness
Initial Care

Initial Assessment:
- MARCH
  - Massive Hemorrhage
  - Airway Management
  - Respiratory Support
  - Circulation
  - Hypothermia/Head Injury

Where do I focus my Attention:
- ABCD
- Depending on Triage Criteria
- Depending on Resources

- Is Airway management more important? ABCD
- Is Gross Bleeding most important?
Bleeding and Wound Care

Everything has advantages and disadvantages

Each option can be implemented in a variety of situations

There is no “Gold Standard”

Stopping blood loss in a severe hemorrhage is really the Gold Standard
Controlling Bleeding

Direct Pressure or Pressure Bandage

Tourniquet

Wound Packing

Clotting Agents
# Shock Management

<table>
<thead>
<tr>
<th>Compensated shock</th>
<th>Decompensated shock</th>
<th>Irreversible shock</th>
</tr>
</thead>
</table>
| • Pulse rate increases  
  • Respirations increase  
  • Weak pulse  
  • Cool, clammy skin  
  • Anxious, restless, combative  
  • Thirsty, weak | • Very weak or absent pulses  
  • Severe drop in blood pressure  
  • Altered mental status or unconsciousness  
  • Slow breathing to apnea | • Cell death  
  • Organ system failure  
  • Washout  
  • Hemorrhaging all over  
  • Patient dies |

<table>
<thead>
<tr>
<th>Stage I and II hemorrhages</th>
<th>Stage III and IV hemorrhages</th>
<th>Stage IV hemorrhage</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-1250ml blood loss</td>
<td>1250-1750+ ml blood loss</td>
<td>1750+ ml blood loss</td>
</tr>
<tr>
<td>5-25% blood volume lost</td>
<td>25-35%+ blood volume lost</td>
<td>35%+ blood volume lost</td>
</tr>
</tbody>
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THIS IS WHERE YOU NEED TO WORK YOUR MAGIC. Stop the bleeding. Oxygenation. Give fluids. Keep the patient warm. Get them to definitive care.

WORK VERY FAST. You MAY be able to get the patient back, but you need to work very fast. Praying helps.

STICK A FORK IN HIM. HE’S DONE.
Direct Pressure/Pressure Dressing

Most venous hemorrhages or simple arterial hemorrhages from the distal third of an extremity are generally well controlled with an absorbent bandage placed direct over the wound.

The Closer an artery is to the left ventricle, the greater the force exerted on the vessel’s wall. The more proximal an arterial is to the heart, the greater amount of force needed to tamponade the vessel and stop hemorrhage.

120 lbs of pressure to occlude a proximal to a femoral artery hemorrhage.

Proximal Arterial Hemorrhage is life threatening.
Tourniquets

Commercial tourniquets

- 2-3 inches above the wound
- Watch for other sites of bleeding
  - above the wound
- Multiple bleeding sites
  » proximal application

- Should be tight enough to stop bleeding
- The tourniquet should never be placed
  - Joint (knee or elbow)
  - Over an impaled object
- Extremity should be exposed
- Document application time
  - Write on patient!
Wound Packing

- Open clothing around wound

- If possible, remove excess pooled blood from the wound while preserving any clots already formed in the wound

- Locate source of most active bleeding

- Pack the wound
  - Don’t release Pressure
  - Swapping fingers or Side by each
  - Pack all voids
    - Add, Add,
    - Add and then
    - Add some more
Wound Packing

- Apply Focused Direct Pressure
  - Thumb or 2 Fingers, DIRECTLY on the vessel
Airway Management

Basic Adjuncts

- BVMs
- NPA’s
- OPA’s

Supraglottic Airways

- King Tube and I-Gel or LMA

Differentiate the types of airway adjuncts (oropharyngeal airways [OPA], nasopharyngeal airways [NPA] and supraglottic airways [King LT-D or Combitube]) and their use in maintaining a patent airway in adult respiratory and/or cardiac arrest. (AC-9)
Hyperventilation

• DO NOT HYPERVENTILATE, ESPECIALLY WITH A HEAD INJURY

• Hyperventilation will cause vasoconstriction and allows more blood into the cranial vault worsening the injury.

• ONLY if they show signs of Herniation
“If rescue breathing becomes necessary, the person with the most training and experience should establish an airway and begin rescue breathing using the safest technique.”
“The jaw-thrust maneuver is recommended over the head-tilt technique, which produces unnecessary motion at the head and in the cervical spine.”

“Advanced airway management techniques (e.g., laryngoscope, endotracheal tube) are recommended when appropriately trained and certified rescuers are present.”

“If rescue breathing becomes necessary, the individual with the most training and experience should establish an airway and commence rescue breathing using the safest technique(s).”

“During airway management, rescuers should cause as little motion as possible.”
Why Progress beyond NPA/OPA

This is on a continuum

• Can you mask ventilate?
  – Does an NPA Help? Do they accept OPA?

• Athlete presentation
  – Are they getting better or worse

• Do I need to move the patient?

• Where is the equipment?

• How comfortable are you with the skill?
Keys to Successful CPR

• Emphasis on maximizing compressions
• Ensuring chest compressions of adequate rate
• Ensuring chest compressions of adequate depth
• Allowing full chest recoil between compressions
• Minimizing interruptions in chest compressions
• Avoiding excessive ventilation
Keys to Successful CPR

- Chest Compression Depth
- Chest Recoil
- Minimizing Interruptions in Chest Compressions
- Controlled Ventilations
- Early Defibrillation

Teamwork helps achieve goals of High Quality “High Performance” CPR

Goals include:
- Quality compressions (2-2.4 inches)
- Quality rate (100-120)
- Avoiding excessive ventilation
- Maximizing chest compression fraction (60-80%)
- Minimizing all pauses, especially the longest
High Performance CPR typically consists of expertly performed BLS with strict attention to:

• Minimally interrupted chest compressions
• Controlled ventilations
• Defibrillation
Pit Crew Concepts

• Systems based approach
• Each person has a specific pre-assigned duty
• Each person is strategically placed to maximize effectiveness
• Each duty is coordinated for efficiency
• As personnel integrate into the system add interventions
• Frequent practice
Team Approach to Resuscitation

How do we achieve quality CPR?

TEAMWORK!!!
Effective Teams

Assign team roles in an EAP, or before the beginning of an event;
• Reduces unnecessary discussion during initial assessment
• Creates clear communication and standards

Train together
• We train like we fight, and we fight like we train (make training and practice a team-based evolution)

Communicate
• Effective teamwork requires communication. Appropriate feedback and closed loop communication is key. Must be clear, concise and professional.
• Effective communication inhibits misunderstanding and increases collaboration
Indications for Splinting

Immobilizes injured extremities and the spine to:

1. Decrease pain from impaired neurological function or muscle spasm and bleeding, and allow promote healing
2. Decrease swelling associated with injury by reducing blood and fluid loss into the soft tissues
3. Facilitate healing following surgical repair of muscles and tendons.
4. Prevent further injury
WHEN IT COMES TO IMMOBLIZATION OF MUSCULOSKELETAL INJURIES???

Position Statements
This is why we are here!
Traction Splints

• Designed during World War I- traction splint are used with isolated closed and open fractures of the femoral shaft (Bledsoe & Barnes, 2004; Lee & Porter, 2005) and are designed to apply a constant pull along the length of the limb to stabilize the fracture, reduce blood loss, reduce quadriceps muscle spasms, and help maintain the athlete’s distal vascular supply (Wood et al, 2003).
Traction Splints

• The placement of a traction splint requires two well-trained individuals, one to apply initial manual traction and another to set up and apply the mechanical traction

• Several types of traction splints are available, always following the manufacturer’s guidelines
Pelvic Fractures

- Serious pelvic and acetabular fractures are rare and account for ≈3% to 8% of all fractures.

- Often the result of high energy blunt trauma, most patients sustaining pelvic injuries are at high risk of associated injuries which strongly influences outcome and survival rates...

Pelvic Fractures

• Hypovolaemia is often a significant contributing factor to these deaths

• If hemorrhage from pelvic injuries could be controlled or reduced in the prehospital environment, then survival rates may increase


Pelvic Binders

1. A **pelvic binder** is a treatment intervention rather than a packaging intervention and should be applied early.
   - Applying a pelvic binder early provides stability and allows clot formation. This may prevent ongoing hemorrhage and the often-lethal trauma-induced coagulopathy.

1. No one pelvic binder device can currently be recommended over another
   - Ideal binders should (1) stabilize the pelvis to reduce hemorrhage and pain, (2) be easy to apply, (3) not cause further harm, (4) allow radiological and surgical intervention without need for removal
     - Insufficient evidence to support one device over another
     - Adequate training must be provided to avoid misplacement of devices.
       - Evidence exists that misplacement of pelvic binders can reduce the degree of fracture reduction (Bonner, et al, 2011)
Pelvic Binders

3. Associated femoral fractures should also be reduced

4. Patients should not be log rolled or transported on a spinal board

5. The use of pelvic binders is associated with the risk of low pressure skin necrosis

6. The pelvic binder should be placed next to skin

7. The pelvic binder should be applied prior to extrication
Pelvic Binders
Pelvic Binders
Focus on prevention, recognition, and management of cervical spine injured (CSI) athletes.¹,²,³

Advocate emergency planning and preparation to increase management efficiency.¹,²,³

Review management of equipment-related issues in sports such as football, hockey, and lacrosse.²,³

Spinal Injury Management

Skills requiring training and regular practice may include… (eg, gaining access to the airway or chest), and immobilization methods (eg, long spine board, cervical collar application).

But what should I do if I need to perform other interventions?

What Options do I have in Unique Environments?
Spinal Injury Management

Transfer Techniques
For the supine CSI athlete, a lift-and-slide technique (eg., 6–plus-person lift, straddle lift and slide) produces less head and cervical spine motion compared to the log-roll technique, and should be used in appropriate situations.²

Heat Illness

Plan ahead
- NATA Position Statement
- State Athletic Board
- School protocols

Changes
- Adapt Practice Times and Duration
- Water readily available
- Shade
- COLD IMMERSION

National Athletic Trainers’ Association Position Statement: Exertional Heat Illnesses

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Heat Illness

- Evaluation
  - Assess Responsiveness and Vitals
  - Sideline or Rapid removal
  - Rectal Temperatures
  - Ice-Water Immersion
  - Continual Temperature Monitor
- IDEAL TEMPERATURE <102°F

Meet with EMS to Share and Practice your management plan
Unique Environments
Catastrophic Injury Response

- GET RID OF THE STIGMA
  - Normal Reactions to Abnormal events.
- Reach out to a Colleague
  - Say Hello, Be an Ear & Listen
  - Fears, anxieties, concerns, feelings of guilt, frustration, anger and ambivalence.
  - Allow all feelings to be expressed (look for the parts that people want to repress).
  - Emotional expression is often the first step in learning to deal with the event.

The ATs Care program is designed to offer crisis management training opportunities for athletic trainers dealing with the aftermath of a critical incident.
Distress Signals

- Cognitive:
  - concentration, cognitive function slowed.

- Emotional:
  - Moody, scared, irritable, feeling isolated.

- Physical:
  - Hyperactivity, muscle tension headaches, insomnia.

- Behavioral:
  - Risk taking, withdrawn, increased drug/alcohol use.
ATs CARE

• **ATs Helping ATs**
  • How can ATs Care help you in a crisis?

• **Pre-Incident Education: What is Critical Incident Stress Management (CISM)?**
  Provide athletic trainers and collegiate athletic training students with educational materials about critical incidents, post-traumatic stress and the effects of each in the workplace and in one’s personal life.

• **Training**
  Offer training to ATs and athletic training students at national, district and potentially state meetings and create a network of athletic trainers trained in psychological first-aid.

• **Post-event Assessment**
  Provide psychological and emotional support to athletic trainers through phone calls, on-scene assessment support, demobilization intervention, post-incident defusing or one-on-one interaction, group debriefings and follow-up.

CONTACT ATs CARE: GOOGLE AT’s CARE: You will see the link
The management techniques are mechanical skills that **MUST** be mastered by properly trained prehospital care providers. These are perishable skills and must be maintained through regular training. If rescue techniques becomes necessary, the person with the most training and experience should initiate care using the safest techniques.
Thoughts

Cole Fieldhouse

MD
Thoughts
Challenging your thinking

• International Travel Considerations

• Unique Environment considerations

• Atypical Event considerations
O.O.D.A Loop

Observe
Get on site quicker by seeing what the operator sees

Orient
Identify the issue and assemble the resources rapidly

Act
Conduct tasks as a timely, incisive & efficient team

Decide
Create options, communicate effectively
The OODA Loop

- **Observe**
  - Information Gathering
    - Good Info
    - Bad Info
    - Missing Info
    - Incomplete Info
    - Info Out Of Context (Implied)
    - Unfolding Circumstances
    - Uncertainty
    - Inundation

- **Orient**
  - Make Sense Of The Information
    - Previously Used Models Or Paradigms
    - Previous Experience
    - Should Be Vs. What Is (Brutal Reality)
    - Social Norms and Heritage
    - Analysis

- **Decide**
  - Decide What To Do
    - Decide Based On Options From The Orient Step
    - Observe And Orient Will Never Be Perfect – Choose The Best Option

- **Act**
  - Act Upon Your Decision
    - Nothing Matters Without Action
    - Testing

Action Will Have An Outcome And Becomes An Observation (Loop)
Don’t practice till you get it right

Practice till you CAN’T get it wrong
Review

• Discuss various situations we may present emergency management
• Change IF WHEN thinking to WHEN THEN thinking
• Explain how a pre-hospital inter-professional healthcare team works collaboratively to improve patient outcomes
• Discuss risk management, catastrophic injury planning, & crisis management principles.
QUESTIONS
Resources and References

- Appropriate Prehospital Management of the Spine-Injured Athlete 8/15
- Exertional Heat Illnesses (September 2015)
- Management of Sport Concussion (March 2014)
- Catastrophic Incident Guideline Plan, May 2003 NATA News, Timothy Neal, MS, ATC
- National Incident Management System
- https://www.fema.gov/national-incident-management-system
Resources and References

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• Update on critical care for acute spinal cord injury in the setting of polytrauma. Yue, JK. Et.al. Neurosurg Focus 2017;43(5):1-9