On-Field Assessment & Management of the Neurologically Injured Athlete

Advances In Clinical Neuroscience Practice
Oregon Neurosciences Institute-Sacred Heart Medical Center
May 14, 2012

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University of Oregon
Sports-Related Spine Trauma

Sports-Related Concussion
Partnerships in delivery of acute care

Available Athletic Medicine Team

Athlete Athletic Trainer

Paramedic/EMT

Team Physician

Emergency Room
Partnerships in delivery of *return to play* decisions

- Athlete
- Athletic Trainer
- Team Physician
Before the injury happens.....
National Athletic Trainers’ Association Position Statement: Emergency Planning in Athletics

J. C. Andersen*; Ronald W. Courson†; Douglas M. Kleiner‡; Todd A. McLoda§
Prepare
Emergency Action Plan

CONSIDER

Venue
Personnel
Sport/Equipment Needs

Communicate

EAP Procedures to Local Emergency Medical Personnel

PRE-SEASON

PRE-GAME

Adapted; Flicker.com, seanfderry-studenna’s photostream
Review and practice procedures relative to EAP

IDEAL SCENARIO

= PRE-SEASON SIMULATION

University of South Florida On-Field Simulation (http://hscweb3.hsc.usf.edu/health/now/?p=20647)
Educate Coaches & Players
Implement the Emergency Action Plan
Sports-Related Spine Trauma
History

1998 Inter-Association Task Force for Appropriate Care of the Spine Injured Athlete
Current Standards of Care for Athletic Trainers


Swartz et al. JAT, 2009

National Athletic Trainers’ Association Position Statement: Preventing Sudden Death in Sports

Casa et al. JAT, 2012
Sideline Evaluation

On-the-Field Evaluation

Differential Diagnosis
- Brachial Plexus
- Cervical Spine Trauma

Closed Head Injury

Differential Diagnosis
- (Cervical) Spine Trauma
- Brachial Plexus Injury
Clinical Indicators of Catastrophic Cervical Spine Injury

- Unconsciousness/altered consciousness
- Bilateral neurological findings
- Significant cervical spine pain (w/ with or w/o palpation)
- Obvious spinal column deformity

Swartz et al. JAT, 2009; Sanchez et al. Spin Cond., 2005
Assessment of Cervical Spine

Subjective

Pain + Numbness

Anxiety
Assessment of Cervical Spine

**Objective**

Palpation (doorbell sign)
*Glasgow Coma Scale < 8
Myotomes- Isometric > Isodynamic
Dermatomes
*Deep Tendon Reflexes*

*Holly et al. J Neurosurg., 2002*
Suspect Cervical Spine Injury?

Stabilization

- Manual cervical immobilization
- Neutral Alignment
- Manual Re-alignment
- Ø Traction

Swartz et al. JAT, 2009
Suspect Cervical Spine Injury?

Airway

Easily Accessible?

Yes- provision of immobilization device

No- Prepare for access while maintaining stabilization

Swartz et al. JAT, 2009
Access to airway - Equipment Considerations

3-6 Volt Reversible Cordless Drill

Clip/Loop cutter (FMxtractor)

Quick-release loop tool (Manufacturer specific)

Facemask removal appropriate regardless of level of consciousness
Helmet Removal?

Improving the culture for ATCs and EMTs on-the-field

Football and Lacrosse Helmets are **not** removed for transport unless the shoulder pads **must** be removed.

Personnel must be familiar with how to manage shoulder pad removal while maintaining spine stabilization.
Helmet removal without shoulder pad removal influences cervical spine position

Sherbondy et al. AJSM, 2006
To log roll or not log roll?
Transfer techniques on-the-field

**Log Roll**

- 4-5 rescuers
- \( \uparrow \) Universal Familiarity
- Leads to greater axial rotation, lateral flexion in unstable spine, even with cervical collar*
- Only option with prone patient

**6+ Person Lift & Slide**

- 6-7 rescuers
- \( \downarrow \) Universal Familiarity
- Reduces cervical and thoracolumbar spine motion compared to log roll*
- Standard of Care for Football if Athletic Medicine Team Available
- Requires more practice

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Provision of cervical spine stabilization

Bilateral position of rescuers at shoulders, hips, legs

Rescuer prepared to slide spine board

Command directed rescuer lift 6+ inches off ground

Spine board positioned underneath athlete

Command directed rescuer lowering of athlete to spine board

Appropriate head stabilization and strapping, prepare for transportation

6 + person lift & slide

Swartz et al. JAT, 2009
High School
Small College/University
Division I- Olympic Sports

Collegiate/Pro Football
Current Standards of Care for Athletic Trainers

National Athletic Trainers’ Association Position Statement: Management of Sport-Related Concussion

CONSENSUS

Consensus Statement on Concussion in Sport – the 3rd International Conference on Concussion in Sport held in Zurich, November 2008
Not ‘just’ a football injury
Trending upward

7% average annual increase in concussions for NCAA athletes from 1998-2004

5-18% of injuries in collegiate athletes are concussions (sport dependent)

13% of high school injuries are concussions (RIO database)

Improved identification of the concussed athlete and awareness of the implications of the injury

Everyone treated the same!

“All athletes, regardless of level of participation should be managed using the same treatment and return-to-play paradigm.”

McCrory et al., SAJSM, 2009
Obvious vs. Subtle Signs and Symptoms
Pocket SCAT2

Concussion should be suspected in the presence of any one or more of the following: symptoms (such as headache), or physical signs (such as unsteadiness), or impaired brain function (e.g. confusion) or abnormal behaviour.

1. Symptoms
Presence of any of the following signs & symptoms may suggest a concussion.

- Loss of consciousness
- Seizure or convulsion
- Amnesia
- Headache
- “Pressure in head”
- Neck Pain
- Nausea or vomiting
- Dizziness
- Blurred vision
- Balance problems
- Sensitivity to light
- Sensitivity to noise
- Feeling slowed down
- Feeling like “in a fog”
- “Don’t feel right”
- Difficulty concentrating
- Difficulty remembering
- Fatigue or low energy
- Confusion
- Drowsiness
- More emotional
- Irritability
- Sadness
- Nervous or anxious

2. Memory function
Failure to answer all questions correctly may suggest a concussion.

“At what venue are we at today?”
“Which half is it now?”
“Who scored last in this game?”
“What team did you play last week/game?”
“Did your team win the last game?”

3. Balance testing
Instructions for tandem stance

“Now stand heel-to-toe with your non-dominant foot in back. Your weight should be evenly distributed across both feet. You should try to maintain stability for 20 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes.”

Observe the athlete for 20 seconds. If they make more than 5 errors (such as lift their hands off their hips; open their eyes; lift their forefoot or heel; step, stumble, or fall; or remain out of the start position for more than 5 seconds) then this may suggest a concussion.

Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, urgently assessed medically, should not be left alone and should not drive a motor vehicle.
Sport Concussion Assessment Tool 2

Symptom Score
\[= \text{Yes-No} \times \frac{1}{22}\]

Symptom Severity
\[= \text{Symptom score} \times 6\]

Symptoms worse with physical activity?

Symptoms worse with mental activity?

Headache
“Pressure in head”
Nausea or vomiting
Dizziness
Blurred vision
Balance problems
Sensitivity to light
Sensitivity to noise
Feeling slowed down
Feeling like “in a fog”
“Don’t feel right”
Difficulty concentrating
Difficulty remembering
Fatigue or low energy
Confusion
Drowsiness
Trouble falling asleep (if applicable)
More emotional
Irritability
Sadness
Nervous or anxious
Sport Concussion Assessment Tool 2

**Physical Signs Score**

Loss of consciousness

Y/N

*How long?*

Associated balance problems

Y/N
Glasgow coma scale

Best Eye Response (1-4)

Best Verbal Response (1-5)

Best Motor Response (1-6)

Total ___ / 15
Sport Concussion Assessment Tool 2

Sideline Maddocks Score (Total / 5)

“I am going to ask you a few questions, please listen carefully and give your best effort.”

At what venue are we at today?

Which half is it now?

Who scored last in the match?

What team did you play last week?

Did your team win the last game?
### Cognitive Assessment

<table>
<thead>
<tr>
<th>Orientation (Total/5)</th>
<th>Immediate Memory (Recall) (Total/15)</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>What month is it?</td>
<td>Elbow</td>
<td>Digits Backwards</td>
</tr>
<tr>
<td>What is the date today?</td>
<td>Apple</td>
<td>4-9-3</td>
</tr>
<tr>
<td>What is the day of the week?</td>
<td>Carpet</td>
<td>3-8-1-4</td>
</tr>
<tr>
<td>What year is it?</td>
<td>Saddle</td>
<td>6-2-9-7-1</td>
</tr>
<tr>
<td>What time is it right now (w/i 1 hr)?</td>
<td>Bubble</td>
<td>7-1-8-4-6-2</td>
</tr>
<tr>
<td></td>
<td>Evaluated 3x</td>
<td>Months in Reverse</td>
</tr>
</tbody>
</table>

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Dec-Nov-Oct-Sept……
Modified-Customized Considerations

Balance

+ Rhomberg (Tandem Stance)
Balance Error Scoring System (BESS)

Pronator Drift

Physical Exertion

Agility
Vestibular Challenges (up-downs)
Suspected Concussion?

**Removal** from play.

**Medical assessment.**

**Monitored** for changes in status (deterioration?)

**Instructions** for home care and schedule follow-up.
Sport Concussion Assessment Tool 2

Repeated Administration of Same Tool

<table>
<thead>
<tr>
<th>ATC/MD on-the-field</th>
<th>24 hr f/up ATC/MD</th>
<th>48 hr f/up ATC/MD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom Score</td>
<td>Symptom Score</td>
<td>Symptom Score</td>
</tr>
<tr>
<td>Cognitive Assessment</td>
<td>Cognitive Assessment</td>
<td>Cognitive Assessment</td>
</tr>
</tbody>
</table>

Never ask: “Do you have a headache today?”
Ask rather: “How is your headache today?”
<table>
<thead>
<tr>
<th>Symptom Score</th>
<th>Day 1</th>
<th>Day 2</th>
<th>…Day n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Pressure in head”</td>
<td></td>
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<td></td>
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<td>Feeling slowed down</td>
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<td>Nervous or anxious</td>
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</tr>
</tbody>
</table>

Coordinated Record Keeping and Assessment is Vital!

**Day 1 (ATC)**

<table>
<thead>
<tr>
<th>Word Recall</th>
<th>Immediate</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt;</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt;</th>
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<tbody>
<tr>
<td>Elbow</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Apple</td>
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</tr>
<tr>
<td>Carpet</td>
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<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bubble</td>
<td></td>
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</tbody>
</table>

**Day 2 (MD)**

<table>
<thead>
<tr>
<th>Word Recall</th>
<th>Immediate</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt;</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td>Car</td>
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<td></td>
</tr>
<tr>
<td>Ball</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby</td>
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</tr>
<tr>
<td>Truck</td>
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<td></td>
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<tr>
<td>Pencil</td>
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Challenges during game-time-decisions

Pressure to make quick decisions.

Coach’s bias- previous personal experience.

Athlete’s bias*- fear of loss of playing time, letting down teammates, thinking it isn’t serious enough.

Parent’s bias- previous personal experience.

Dogma associated with ‘getting bell rung’.

*McCrea et al. CJSM, 2004
Sum(IN)mary
Questions?

Thank you!

Contact:
graceg@uoregon.edu
Remaining slides as prep/back-up in case extra questions are asked-not for original presentation
Traditional Style vs. Revolution Helmet

Swartz et al. JAT, 2009
Cordless Screwdriver (Reversible)

Quick Release Facemask Attachment (Riddell Inc.)

FMxtractor (Sports Medicine Concepts Inc.)

Swartz et al. JAT, 2010