Concussion Care In a Deployed Setting

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Purpose and Outline

• **Purpose:** to provide a discussion of theater concussion care 2012-13

• **Outline:**
  • DoD TBI incidence
  • Theater roles and responsibilities
  • Concussion care centers
  • Rationale for care provided
# Department of Defense TBI Incidence

## Annual Department of Defense TBI Diagnoses (All Severities) 2000 - 2013 (Q2)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>10,958</td>
</tr>
<tr>
<td>2001</td>
<td>11,619</td>
</tr>
<tr>
<td>2002</td>
<td>12,407</td>
</tr>
<tr>
<td>2003</td>
<td>12,815</td>
</tr>
<tr>
<td>2004</td>
<td>14,469</td>
</tr>
<tr>
<td>2005</td>
<td>15,531</td>
</tr>
<tr>
<td>2006</td>
<td>17,037</td>
</tr>
<tr>
<td>2007</td>
<td>23,217</td>
</tr>
<tr>
<td>2008</td>
<td>28,462</td>
</tr>
<tr>
<td>2009</td>
<td>28,877</td>
</tr>
<tr>
<td>2010</td>
<td>29,188</td>
</tr>
<tr>
<td>2011</td>
<td>32,625</td>
</tr>
<tr>
<td>2012</td>
<td>30,406</td>
</tr>
<tr>
<td>2013 (Q2)</td>
<td>13,123</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>280,734</strong></td>
</tr>
</tbody>
</table>

Source: Armed Forces Health Surveillance Center (AFHSC), Data ending June 2013, current as of 1 August 2013.

- **84.3% of all TBIs are non-deployment related.**
- **82.4% of all TBIs are mild / concussion.**
The Role of the Neurologist in Theater

- Clinician
- Consultant
- Educator

- Advisor
- Diplomat
- Facilitator
Multi-disciplinary approach

- Neurologist
- Primary Care
- Occupational Therapists (OT)
- Neuropsychologists

- Radiologist
- Hospital and/or Medical Brigade Commander
Background: Theater Concussion Care

• Since 2012: ~97% return to duty (RTD) rate
  - Mandatory event-driven concussion screening and evaluation
  - Standardized screening and assessment tools
  - Emphasis: Treat concussed SM close to unit; maintain in theater
  - Enforce strict supervised physical & mental rest

• Events and approach are defined by DoDI 6490.11 (Replaced DTM 09-033)

The Department of Defense Instruction (DoDI) 6490.11, signed September 18, 2012, mandates Service members involved in potentially concussive events in the deployed setting be screened, identified, and treated promptly for concussion in accordance to the Clinical Management Algorithms in the Deployed Setting (2012). The DoDI also identifies specific reporting requirements so that Service members who have been exposed to potentially concussive events are identified and tracked.
Mandatory Event Screening & Reporting

Any Service member in a vehicle associated with a blast event, collision, or rollover

Presence within 50 meters of a blast (inside or outside)

A direct blow to the head or witnessed loss of consciousness

Exposure to more than one blast event (the Service member’s commander shall direct a medical evaluation)

Mandatory 24-hour downtime* & medical evaluation

* Commanders may delay or postpone 24-hour downtime based on mission requirements

• Reference: Department of Defense Instructions (DoDI) 6490.11
### DoD Definition of TBI

**A concussion occurs when two conditions are met:**

- An injury event

**AND at least one of the following**

- An alteration of consciousness (AOC) lasting < 24 hours

- A loss of consciousness (LOC) lasting < 30 minutes

- Post-traumatic amnesia (PTA) caused by the injury event lasting < 24 hours
# TBI Classification

<table>
<thead>
<tr>
<th>Severity</th>
<th>Mild (Concussion)</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Imaging</td>
<td>Normal</td>
<td>Normal or abnormal</td>
<td>Normal or abnormal</td>
</tr>
<tr>
<td>Loss of consciousness (LOC)</td>
<td>0 to 30 minutes</td>
<td>30 minutes and &lt; 24 hours</td>
<td>&gt; 24 hours</td>
</tr>
<tr>
<td>Alteration of consciousness (AOC)</td>
<td>a moment up to 24 hours</td>
<td></td>
<td>&gt; 24 hours</td>
</tr>
<tr>
<td>Post traumatic amnesia (PTA)</td>
<td>0 to 1 day</td>
<td>&gt; 1 day &lt; 7 days</td>
<td>&gt; 7 days</td>
</tr>
</tbody>
</table>

This classification refers to severity at the time of injury, not symptoms experienced.
Diagnosing Concussion

**Key Points:**

- LOC is NOT required for the diagnosis of concussion
- Symptoms alone (such as headache) do NOT equate to a concussion diagnosis

Two conditions must be met before a concussion can be diagnosed:

1. An injury event
   AND

2. At least one of the following:
   - An alteration of consciousness (AOC), even momentary
   - A loss of consciousness (LOC) lasting < 30 minutes
   - Post-traumatic amnesia (PTA) caused by the injury event lasting < 24 hours

Reference: [Department of Defense Instructions (DoDI) 6490.11](#)
Distribution of Post-concussion Symptom Recovery

Percentage Symptom Recovery in Concussed Athletes (N = 635*)

Rapid (< 1 Day): 21%
Gradual (1-7 Days): 64%
Prolonged (1-4 Weeks): 12%
Persistent (>1 Month): 3%

*McCrea, 2009
What Activities HELP Brain Recovery Following a Concussion?

Cognitive/Thinking
- Maximize downtime or rest during the day
- Adequate sleep routines
  - Keep sleeping quarters quiet and dark
  - Get six to eight hours of sleep

Physical
- Keep the heart rate low
  - Stay out of the heat
  - Limit physical activity
  - Get adequate sleep
  - Drink plenty of water
What Activities HURT Brain Recovery Following a Concussion?

Cognitive/Thinking
- Mental exertion
  - Writing reports
  - Activities requiring intense concentration
- Inadequate sleep
  - Caffeine or “energy enhancers”
    • Interfere with proper sleep
    • Prevent relaxation

Physical
- Physical exertion
  - Working
  - Heavy lifting
  - Exercising
- Physical activities that increase risk for a second concussion
  - Combatives
  - Sports
Leadership Assessment

Commanders are required to report everyone involved in a mandatory event using the I.E.D. and H.E.A.D.S. checklist

<table>
<thead>
<tr>
<th>Injury</th>
<th>Evaluation (H.E.A.D.S)</th>
<th>Distance</th>
</tr>
</thead>
</table>
| • Physical damage to SM body or body part? | H – Headache and/or vomiting  
E – Ears ringing  
A – Amnesia, alteration or loss consciousness  
D – Double vision and/or dizziness  
S – Something feels wrong or is not right | • Was SM within 50M of blast?  
• Record the distance from blast for ALL SM |
2012 mTBI Screening & Assessment Tools

Military Acute Concussion Evaluation (MACE)

Concussion Management Algorithms
The Concussion Care Center Model

Aid Station (BAS)
- Medic/Corpsman
- Unit Physician
- MACE Screening

Concussion Care Center (CCC)
- Occupational therapist (OT)
- OT Tech
- Level II Physician
- Cognitive testing

Level I
- up to 48 hrs

Concussion Specialty Care Center (CSCC)
- OT, OT Tech
- Neurologist
- Neuropsychologist
- Sports Medicine
- Imaging (CT/MRI)

Level III
- 1-7 days

Level IV (LRMC/CONUS)

Theater Treatment

BLAST
Theater Concussion Care Centers

Goal: Treat concussed Service Members close to unit & maintain in theater

Role III Concussion Care Specialty Centers

Role II Concussion Care Centers

*Sept. 2013
Medical and Line Unit Responsibilities

DoDI 6490.11 Tracking Requirement

Medical Personnel
- Concussion Screening (MACE)
- 24 Hour Follow-Up

Line Unit Personnel
- BECIR

VALIDATE
- Documentation of head trauma, symptoms, immediate treatment
- MACE Card
- Reports back to the next higher responsible Medical Corps Officer in level I or level II

Clinical Practice Guideline (CPG)
Derived from DTM 09-033

MACE card; supports the CPG
### Medical Corps Officer

| • Reviewing and/or documenting the concussion/TBI in the electronic medical record. |
| • Determination of concussion or not |
| • Detail treatment for concussion |
| • Referral to the concussion care center (CCC) |
| • Disposition from the CCC |
Medical Corps Officer (MCO): Responsibilities to the Command

- Only a MCO’s medical record documentation will be accepted for Purple Heart submissions

- Reviewing and/or documenting the concussion/TBI in the electronic medical record.
  - Determination of concussion or not
  - Detail treatment for concussion
  - Agree with referral and/or refer to the concussion care center (CCC)

- Per USAFOR-A
  - Unit MCO reviews SMs medical record
  - Authors memorandum to the unit commander
  - Agrees or disagrees with Purple Heart recommendation
Concussion Care Center (CCC)

- Not all patients will require treatment at CCC
  ...yet still qualify as having a concussion
- Need to have a diagnosis of concussion to be admitted
- Inpatient and outpatient capabilities
  - Level II OT and OT technologists
  - Level III OT and OT technologists with...
    - Access to subspecialty care
    - Neurologist
    - Neuropsychologist
    - Automated Neurological Assessment Metric (ANAM) available at all CCCs
Theater mTBI workload at Concussion Care Centers March 2011-2012
Summary

- Overview
- History
- Definition

- Evaluation
- Responsibilities
- Questions
References

- DODI 6490.11
- USFOR-A Policy #40
- DCoE: http://www.dcoe.mil/
- DVBIC: www.dvbic.org or info@dvbic.org
- TBI coding fact sheet
- TBI videos and presentations – https://atn.army.mil
- Department of Defense Instructions (DoDI) 6490.11
Extra slides
Four Types of Acute Post-Traumatic Intracranial Hemorrhage, NEJM 2001; 344:580, February 22, 2001
3.3 admissions/1000 US Forces

3.0 admissions/1000 US Forces

1,646 admissions in 2012
Average length of stay = 5 days
97% RTD in 2012

2011  2012  2013
Monthly Admissions to CCCs

3.3 admissions/1000 US Forces

3.0 admissions/1000 US Forces
MRIs in Theater

- 1,072 MRI studies performed between NOV 2011-NOV 2012: BAF 440, KAF 300, LNK/Bastion 327.
- 32% of studies are done for mTBI, including mTBI research.
- Estimated 3% of brain MRI studies for mTBI/concussion showed abnormalities caused by trauma.
- MRI facilitates earlier diagnosis in theater and more precise determination of prognosis, treatment, and patient disposition for neurologic and orthopedic conditions.
- Rarely required for “life or limb threatening” emergencies.
- MRI removed in Spring 2013.
Magnetic Resonance Imaging

MRI Utilization: Nov 2011 - Feb 2013

- Extremity: 24%
- C/T-Spine: 16%
- L/S-Spine: 14%
- Brain (non-TBI): 20%
- Brain (mTBI): 12%
- Other: 1%

n = 1,407
mTBI AIM Form

**Concussion Screening:** Complete this section to determine if there was both an injury event AND an alteration of consciousness.

### 1. Description of Event

- **A. Record the event as described by the service member or witness.**
  - Can you tell me what you remember?
  - What happened?
  - Use open-ended questions to get as much detail as possible.
  - Key questions:
    - Can you tell me what you remember?
    - What happened?

- **B. Record the type of event (Check all that apply)**
  - Explosion/Blast
  - Fragment
  - Motor Vehicle Crash
  - Blunt object
  - Sport injury
  - Gunshot Wound
  - Fall
  - Other

- **C. Was there a head injury event?**
  - Key questions:
    - Did your head hit any objects?
    - Did any objects strike your head?
    - Did you feel a blast wave? (A blast wave that is felt striking the body/ head is considered a blow to the head)

### 2. Alterations of Consciousness or Memory (AOC/LOC/PTA)

- **A. Was there Alteration of Consciousness (AOC)?**
  - AOC is temporary confusion or "having your bell rung."
  - [ ] minutes
  - Key question:
    - Were you dazed, confused, or did you see stars immediately after the injury?

- **B. Was there Loss of Consciousness (LOC)?**
  - LOC is temporarily passed out or blocking out.
  - [ ] minutes
  - Key question:
    - Did you pass out or black out?

- **C. Was there any Post Traumatic Amnesia (PTA)?**
  - FTA is a problem remembering part or all of the injury events.
  - [ ] minutes
  - What is the last thing you remember before the event?
  - What is the first thing you remember after the event?
  - Key questions:
    - What is the last thing you remember before the event?
    - How long were you unconscious?
## Concussion Care Center
### Assessments and Interventions

#### Assessments
- Confirm history and diagnosis
- Post-concussion symptoms
- Acute stress reaction screening
- Balance Error Scoring System (BESS)
- Functional evaluation
- (ANAM)
- Exertion test

#### Interventions
- Supervised rest
- Sleep hygiene
- Relaxation techniques
- Concussion education
- Behavioral health consultation
- Balance training
- Headache treatment by MD
- Cognitive therapy
- [Graded return to activity](#)
**BECIR/MACE QA Tools**

- **Deployment/Redeployment**
  - Line Units
  - RC MEDADs
  - JTAPIC MACE/BECIR TEAM
- **Send List of Actual Units**
  - TF MED-A BECIR/MACE QA
- **Develops Weekly Report (MSAT)**
  - Actual Soldier Unit/RC Identified
- **Screens Soldier List for Compliance (TMDS)**
- **BECIR/MACE QA Unit Report Card**
- **BECIR/MACE QA RC Report Card**

**Centers**
- CENTCOM
- IJC
- III Corps
- USFOR-A

**Supporting Organizations**
- DCoE
- Joint Staff
- OTSG