

Introduction to Traumatic brain injury (TBI)

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Disclosure

The instructors have no financial relationships or conflicts of interest to disclose.

Learning Objectives

- Identify statistical trends of TBI in the general US and military populations
- Demonstrate an increased knowledge of the pathophysiology of TBI;
- Identify common signs of mild TBI;
- Identify causes of TBI in service members and civilian population and;
- Explain the key components of evaluation and management of mild TBI.

VA Definition of TBI

A traumatically induced structural injury and/or physiological disruption of brain function as a result of an external force and is indicated by new onset or worsening of at least one of the following clinical signs immediately following the event:

- Any period of loss of or a decreased level of consciousness
- Any loss of memory for events immediately before or after the injury (posttraumatic amnesia)
- Any alteration in mental state at the time of the injury (e.g., confusion, disorientation, slowed thinking, alteration of
- consciousness/mental state)
- Neurological deficits (e.g., weakness, loss of balance, change in vision, praxis, paresis/plegia, sensory loss, aphasia) that may or may not be transient
- Intracranial lesion

<http://www.healthquality.va.gov/guidelines/Rehab/mtbi/mTBICPGFuICPG50821816.pdf>

What is a Concussion

- It is at the mild end of the spectrum of traumatic brain injury
- May be confused or have a lapse in memory
 - Reflecting brain dysfunction
- You don't have to lose consciousness in order to sustain a concussion

What happens to the brain

- Impact shakes the brain inside the skull
- A wave through brain tissue causes discharge of damaging chemicals
- Nerve cells can shear
- Microscopic damage can affect the anatomy and function of brain cells

How can I tell if I had a concussion?

- You don't have to lose consciousness
- The person may think they were unconscious because they can't account for some span of time (memory gap)

Common Symptoms of Mild TBI

- Headaches
- Nausea
- Confusion
- Slow thinking
- Sleep changes
- Mood changes
- Dizziness
- State of confusion
 - Length of time can vary, depending on the severity of the injury
 - Could last a few seconds, minutes, or even hours

Continued

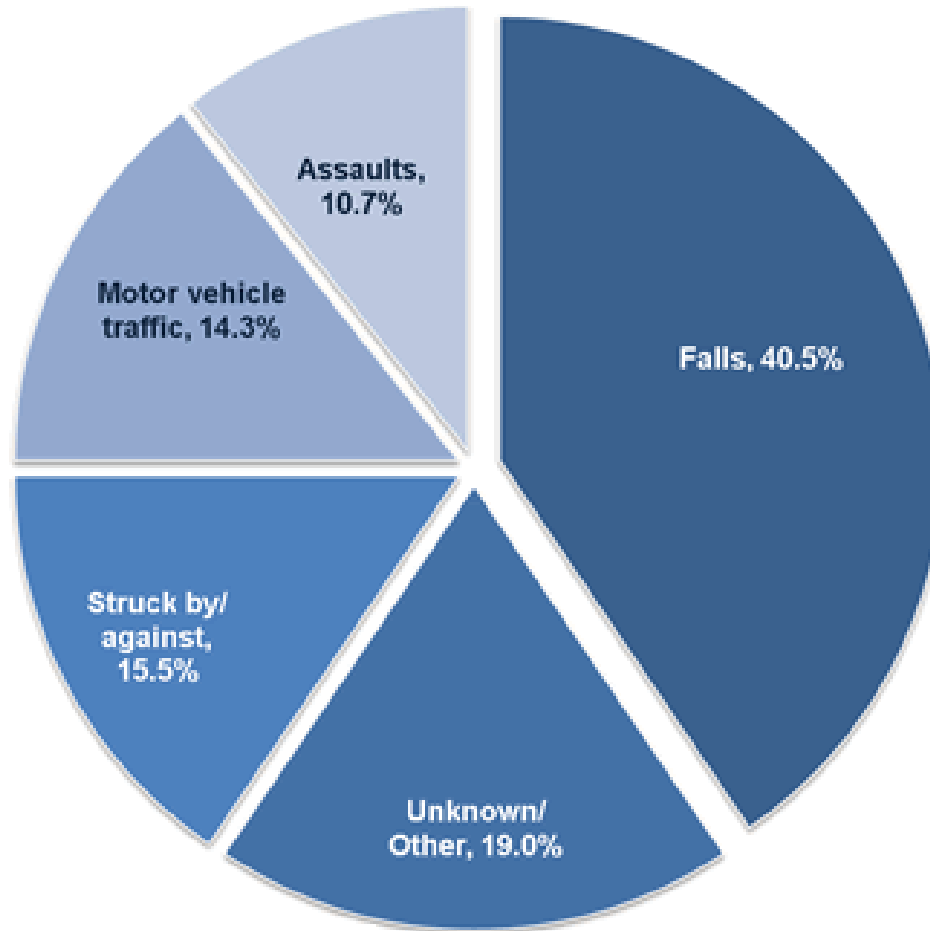
- Nausea
 - Due to the swelling of the brain and the release of neurochemicals
- Headaches
 - Most common sign of a concussion
- Mood changes
 - May result in depression due to the dysfunction of the brain
 - Depression may go away, but some need help in counseling or medications

Common Cause of mild TBI

- Motor vehicle collisions
- Falls
 - Toddlers learning to walk
 - Elderly who are beginning to experience coordination problems
- Contact sports
 - More common amongst 15 – 25 year old males

Leading Causes of TBI in General US Population

Leading Causes of TBI



Top cause for military Non deployed

Top cause for elderly and children

*DOD is not included in the CDC numbers

TBI in General US Population

An estimated 1.7 million people sustain a TBI annually in the U.S. Of them:

52,000 die

275,000 are hospitalized

1.365 million
(80%) are treated and released from the ED

About 75% of TBIs are mild

DoD TBI Incidence by Severity



DoD Numbers for Traumatic Brain Injury Worldwide – Totals

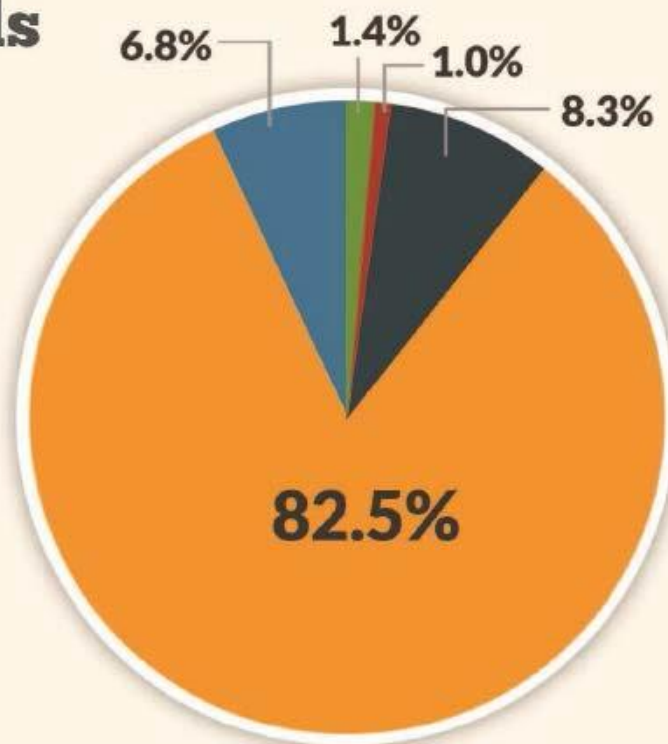
2000-2014

Penetrating	4,619
Severe	3,171
Moderate	26,548
Mild	264,344
Not Classifiable	21,662

Total - All Severities 320,344

Source: Defense Medical Surveillance System (DMSS), Theater Medical Data Store (TMDS) provided by the Armed Forces Health Surveillance Center (AFHSC)

Prepared by the Defense and Veterans Brain Injury Center (DVBIC)

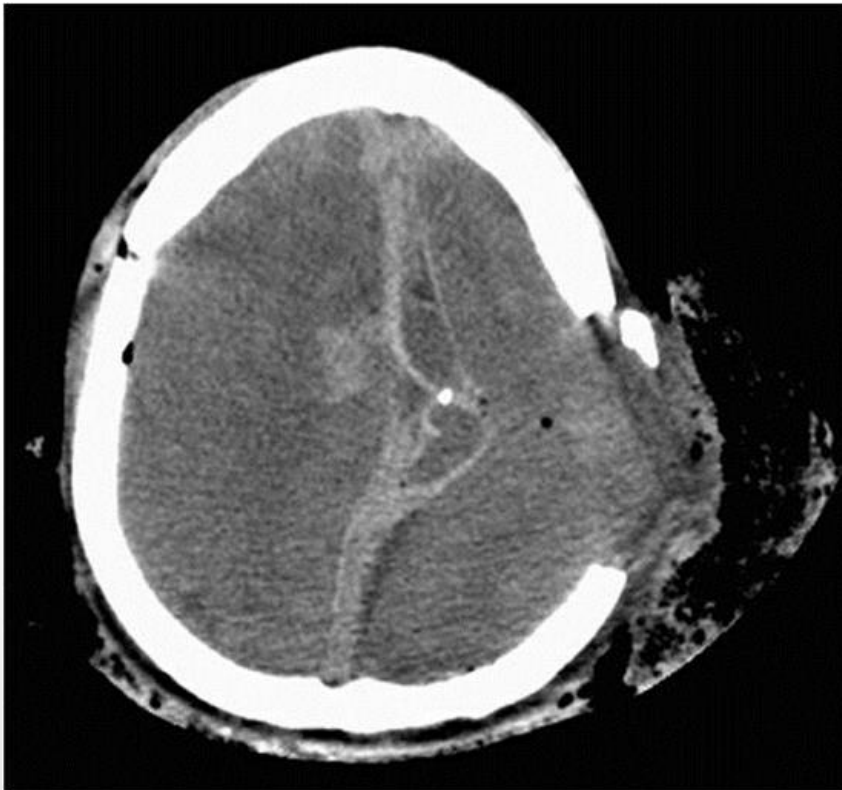


2000-2014, as of Feb 23, 2015

Severity

Penetrating (0.05%)

An Injury in which the dura, the outer layer of the meninges, is compromised.

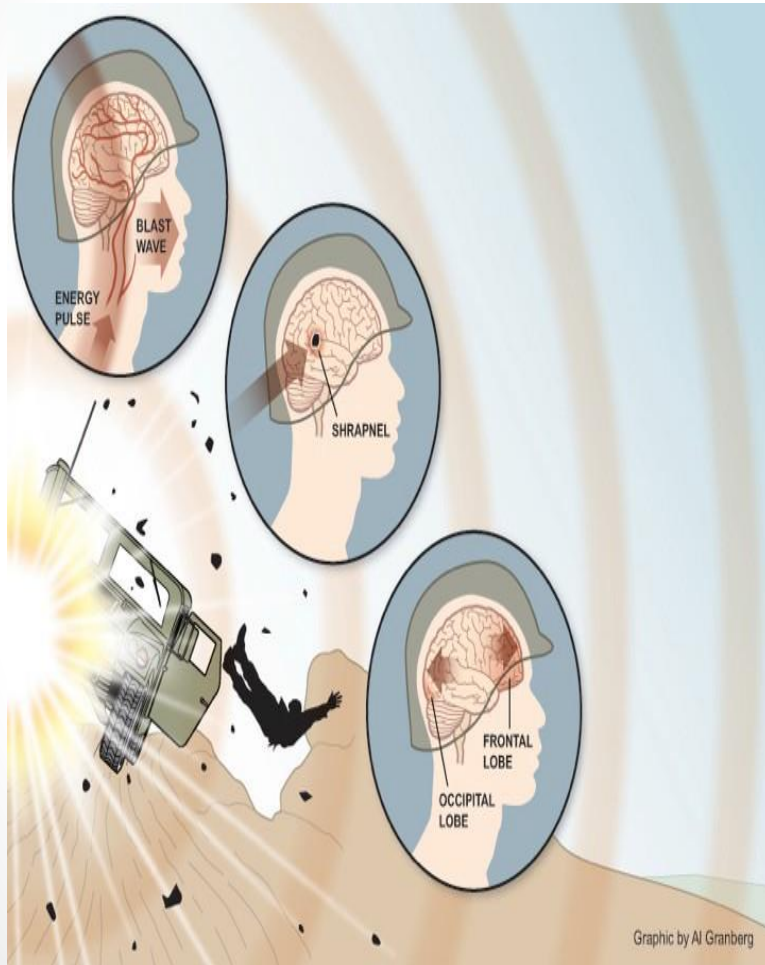


Closed (99.5%)

An injury where the dura remains intact. Further classified As mild, moderate, and severe.



Mechanisms of Blast Injury

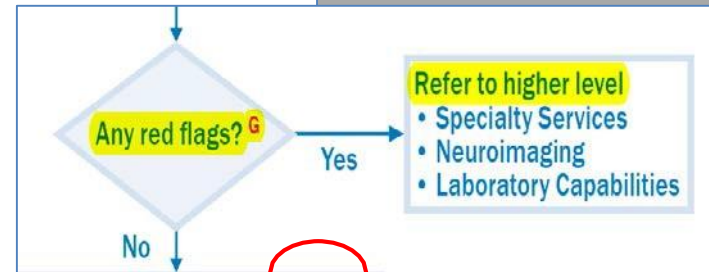


- Primary blast injuries are caused by the blast's over pressure wave traveling
 - through the body
- Secondary blast injuries are
 - caused by shrapnel and other flying debris hitting the body
- Tertiary blast injuries occur
 - from acceleration into a solid object (eg: ground or interior of vehicle)
- Quaternary blast injuries
 - include crush injuries, burns and injuries caused by
 - inhalation of smoke or noxious gases

INITIAL MANAGEMENT OF MILD TBI

ASSESS FOR RED FLAGS

If red flags are present: refer to appropriate specialist/level of care



G Provider Algorithm Red Flags:

1. Progressively declining level of consciousness
2. Progressively declining neurological exam
3. Pupillary asymmetry
4. Seizures
5. Repeated vomiting
6. Clinically verified GCS < 15
7. Neurological deficit: motor or sensory
8. LOC > 5 minutes
9. Double vision
10. Worsening headache
11. Cannot recognize people or disoriented to place
12. Slurred speech
13. Unusual behavior

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ACUTE MTBI SYMPTOMS

- Confusion/ memory problems
- Nausea/Emesis
- Irritability
- Balance problems
- Vertigo/dizziness
- Headache
- Photophobia
- Phonophobia
- Sleep problems
- Difficulty concentrating
- Visual disturbances
- Tinnitus



Photo By Private 1st Class Michael Schuch

Questions????