CMC TCCC

COMBAT MEDIC/ CORPSMAN

DHA Defense Health Agency JOINT TRAUMA SYSTEM

TACTICAL COMBAT CASUALTY CARE COURSE

MODULE 13: HEAD INJURIES

Committee on Tactical Combat Casualty Care (CoTCCC)

TCCC TIER 1
All Service Members

TCCC TIER 2
Combat Lifesaver

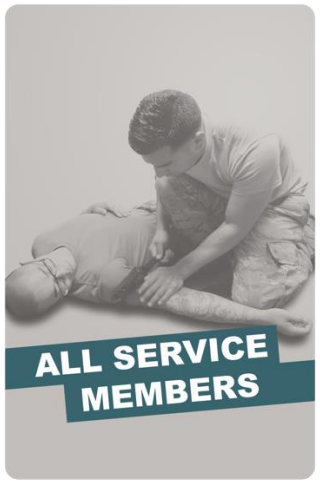
TCCC TIER 3
Combat Medic/Corpsman

TCCC TIER 4
Combat Paramedic/Provider

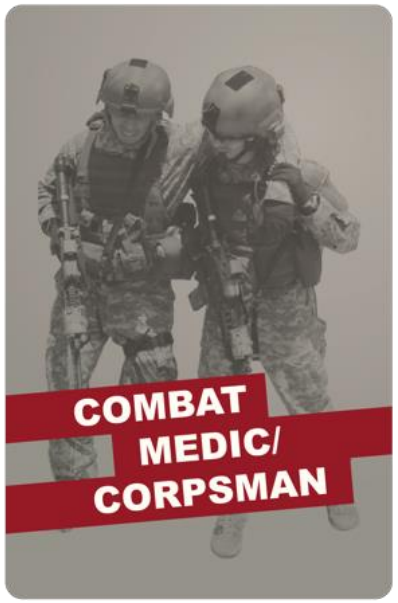
TACTICAL COMBAT CASUALTY CARE (TCCC) ROLE-BASED TRAINING SPECTRUM

ROLE 1 CARE

NONMEDICAL PERSONNEL



MEDICAL PERSONNEL



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STANDARDIZED JOINT CURRICULUM

1 x TERMINAL LEARNING OBJECTIVE

16 Identify a head injury iaw TCCC Guidelines.

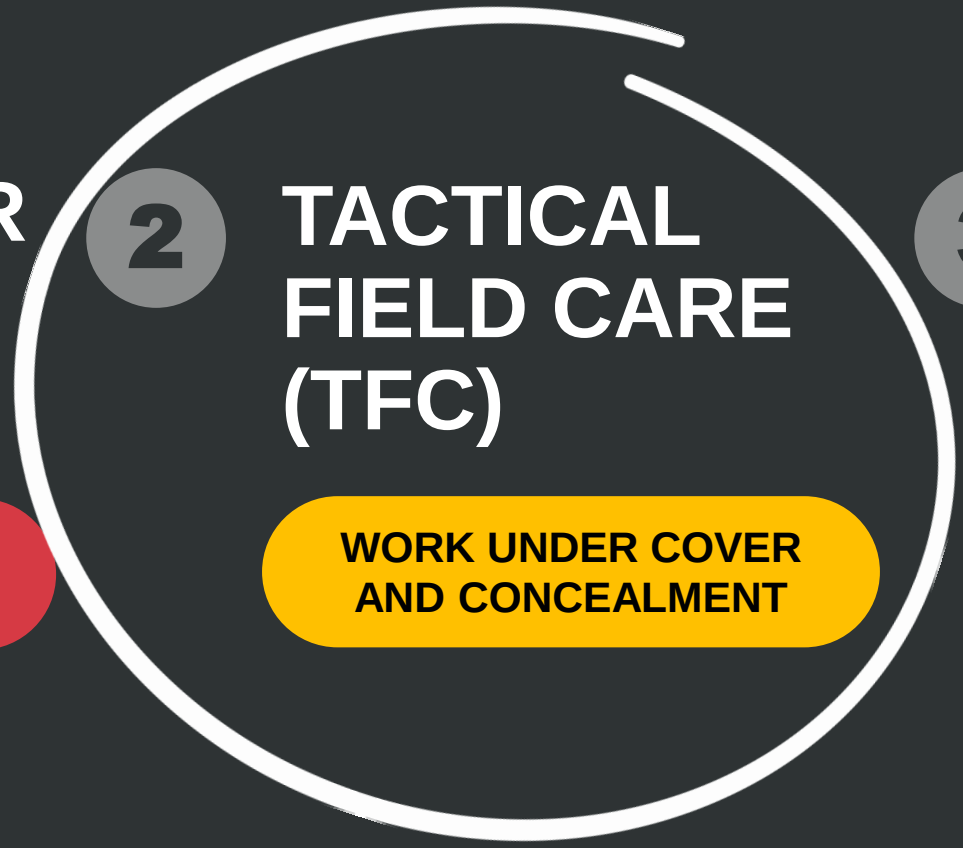
- **16.1** Identify external forces that can cause a head injury.
- **16.2** Identify signs and symptoms of a head injury
- **16.3** Identify the indications for performing a Military Acute Concussion Evaluation 2 (MACE 2) for a casualty with a suspected head injury.
- **16.4** Identify the progressive strategies and constraints for management of a suspected head injury in Tactical Field Care.
- **16.5** Identify the signs an symptoms of impending cerebral herniation in Tactical Field Care.

05 x ENABLING LEARNING OBJECTIVES

● = Cognitive ELOs

Three PHASES of TCCC

1. **CARE UNDER FIRE (CUF) / THREAT**
   - RETURN FIRE AND TAKE COVER
2. **TACTICAL FIELD CARE (TFC)**
   - WORK UNDER COVER AND CONCEALMENT
3. **TACTICAL EVACUATION CARE (TACEVAC)**
   - MORE DELIBERATE ASSESSMENT AND PRE-EVACUATION PROCEDURES



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MARCH PAWS

LIFE-THREATENING

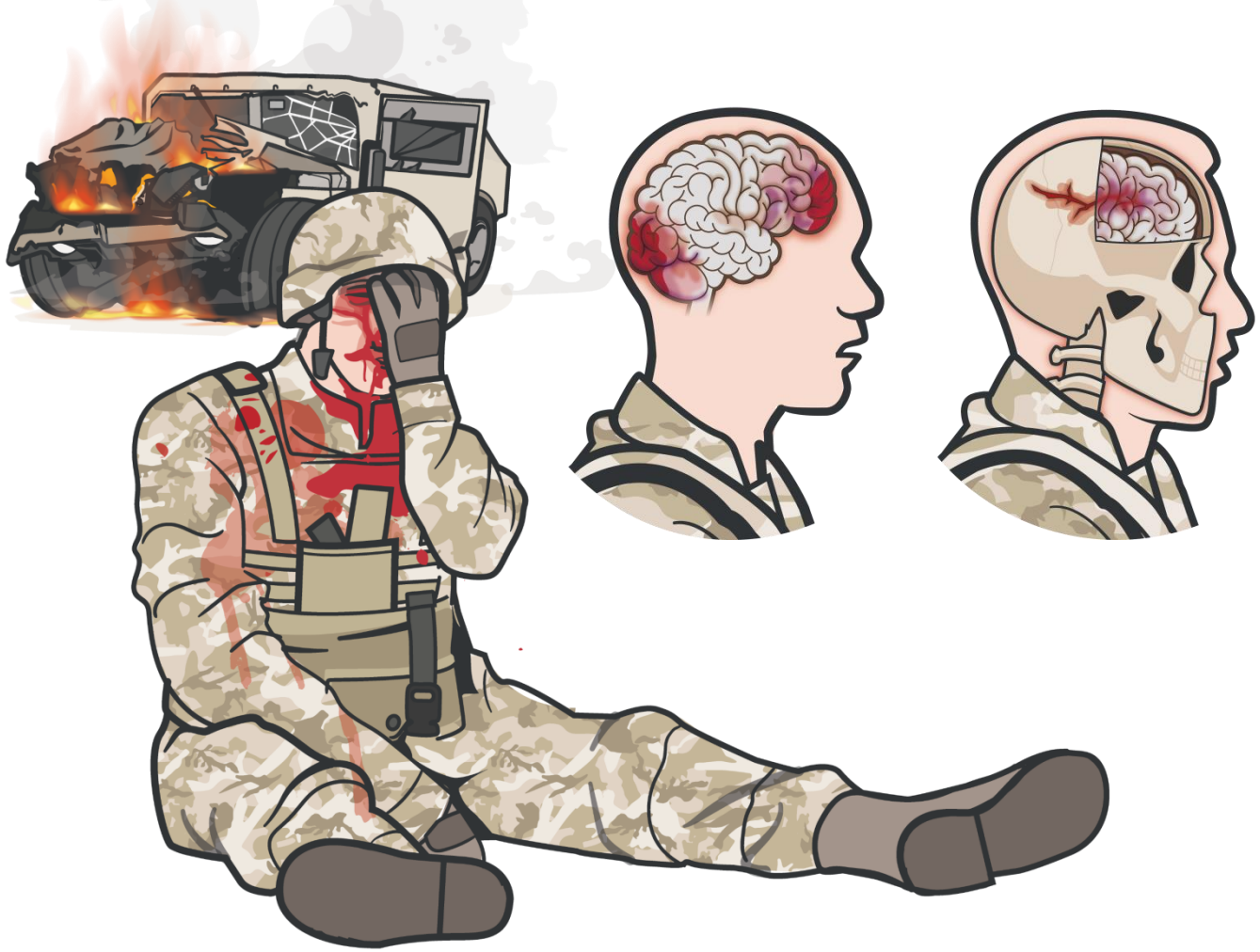
- **M** MASSIVE BLEEDING — #1 Priority
- **A** AIRWAY
- **R** RESPIRATION *(Breathing)*
- **C** CIRCULATION
- **H** HYPOTHERMIA / HEAD INJURIES

AFTER LIFE-THREATENING

- **P** PAIN
- **A** ANTIBIOTICS
- **W** WOUNDS
- **S** SPLINTING

TYPES OF HEAD INJURY

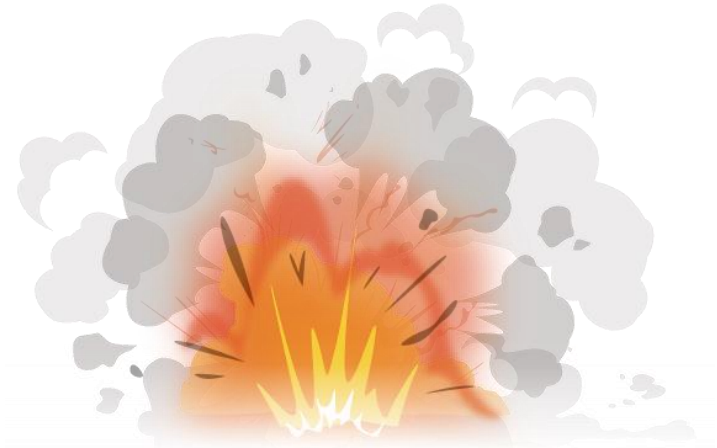
HEAD INJURY IS TRAUMA TO THE SCALP, SKULL, OR BRAIN



- **Blunt TBI/closed head injury** (blast event, fall, vehicle collision/rollover, etc.)
- **Penetrating TBI/open head injury** (gunshot or shrapnel wound, open skull fracture, etc.)

Open head injuries may be obvious while closed head injuries may not

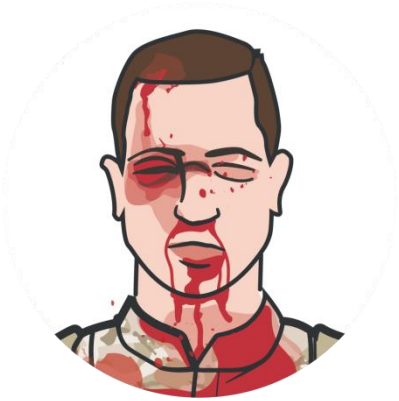
POTENTIAL MECHANISMS OF HEAD INJURY



Blasts

MVAs

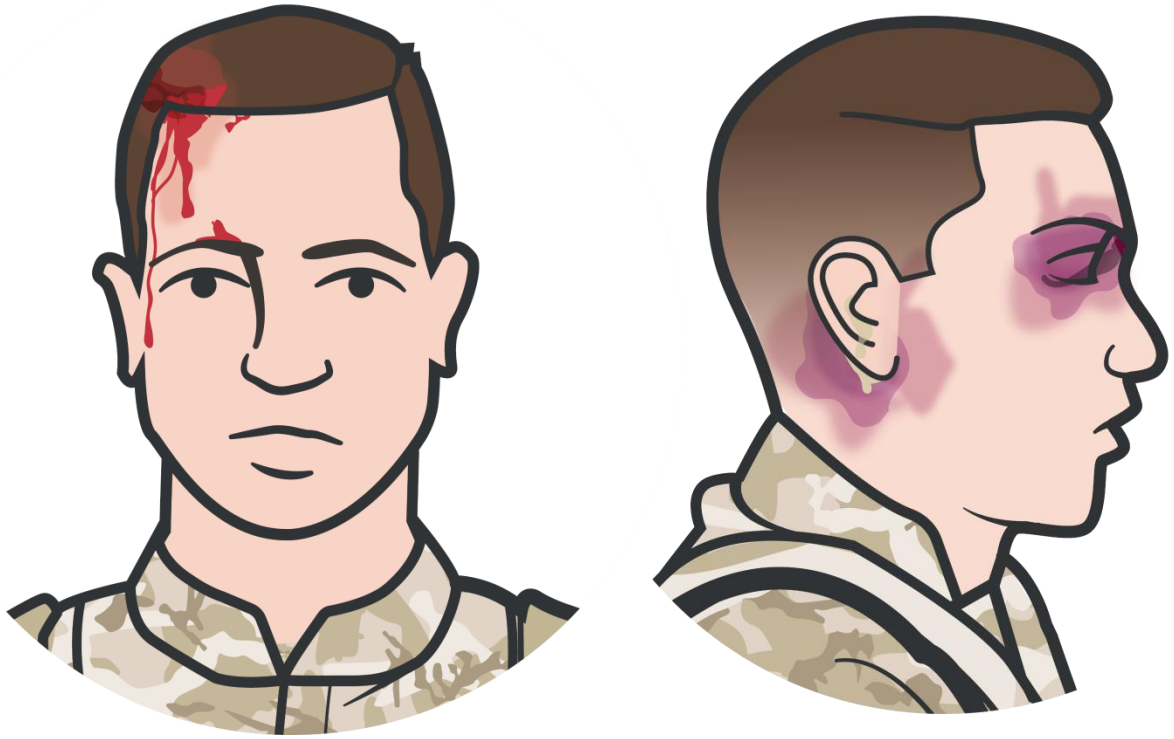
Direct Blow to the Head



Gunshot/ Shrapnel

- Involvement in a vehicle **blast event**, **collision**, or rollover
- Presence within **50 METERS of any blast** (**inside or outside**)
- A direct blow to the head or witnessed loss of consciousness
- Exposure to more than one blast event
- Gunshot or shrapnel wound to head, open skull fracture, etc.

SIGNS AND SYMPTOMS OF HEAD INJURY



- Obvious scalp, skull wound or deformity
- Altered level of consciousness
- Pupillary dilation
- Otorrhea or rhinorrhea (leakage of cerebrospinal fluid)

SIGNS AND SYMPTOMS OF HEAD INJURY

COMMUNICATE WITH THE CASUALTY TO ASSESS FOR ALTERED MENTAL STATUS

- **A** lert
- **V** erbal Stimuli
- **P** ainful Stimuli
- **U** nresponsive

SIGNS AND SYMPTOMS OF HEAD INJURY

Injury	Physical damage to the body or body part of a Service member?	YES NO
Evaluation	**H:** Headaches and/or vomiting?	YES NO
	E: Ear ringing?	YES NO
	A: Amnesia, altered consciousness, and/or loss of consciousness?	YES NO
	D: Double vision and/or dizziness?	YES NO
	S: Something feels wrong or is not right?	YES NO
Distance	Was the Service member within 50 meters of the blast? Record the distance from the blast.	YES NO *Not applicable*

DoDI 6490.11 (section 3, para 2.a)

SIGNS AND SYMPTOMS OF HEAD INJURY

Mild TBI
(or concussion)

- Casualty may remain conscious or lose consciousness only briefly (a few seconds or minutes up to 30 minutes)
- Headache, ringing in ears, blurred vision, nausea/vomiting
- Dizziness/lightheadedness, impaired balance/coordination
- Confusion/disorientation and/or memory loss (<24 hours)

Moderate TBI
(symptoms similar to mild TBI)

- Confusion or disorientation (>24 hours)
- Loss of consciousness (> 30 minutes but < 24 hours)
- Memory loss (>24 hours but < 7 days)

Severe TBI
(symptoms similar to mild TBI)

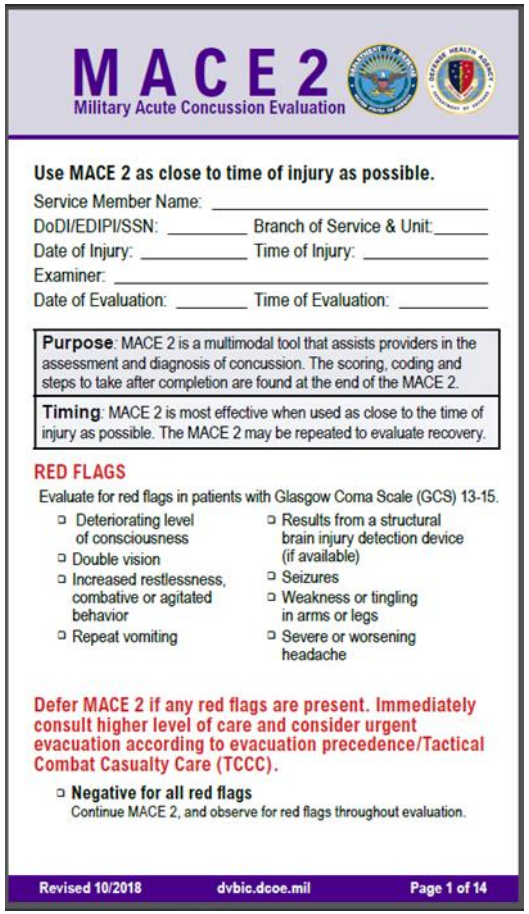
- Confusion or disorientation (>24 hours)
- Loss of consciousness (> 24 hours)
- Memory loss (>7 days)

MILITARY ACUTE CONCUSSION EVALUATION 2 INDICATIONS

Trauma casualties with suspected head injury/TBI should be referred to medical personnel as soon as possible for **Military Acute Concussion Evaluation 2 (MACE 2)**

If **ANY** of the following **RED FLAG** signs and symptoms are present, MACE 2 should be deferred and urgent evacuation considered:

- **Deteriorating** level of consciousness
- Double vision
- Increased restlessness; combative or agitated behavior
- Repeat vomiting
- Seizures
- Weakness or tingling in arms or legs
- **Severe** or **worsening** headache
- Results from a structural brain injury detection device (if available)



MACE 2
Military Acute Concussion Evaluation

Use MACE 2 as close to time of injury as possible.

Service Member Name: _____
DoDI/EDIPI/SSN: _____ Branch of Service & Unit: _____
Date of Injury: _____ Time of Injury: _____
Examiner: _____
Date of Evaluation: _____ Time of Evaluation: _____

Purpose: MACE 2 is a multimodal tool that assists providers in the assessment and diagnosis of concussion. The scoring, coding and steps to take after completion are found at the end of the MACE 2.

Timing: MACE 2 is most effective when used as close to the time of injury as possible. The MACE 2 may be repeated to evaluate recovery.

RED FLAGS

Evaluate for red flags in patients with Glasgow Coma Scale (GCS) 13-15.

- ☐ Deteriorating level of consciousness
- ☐ Double vision
- ☐ Increased restlessness, combative or agitated behavior
- ☐ Repeat vomiting
- ☐ Results from a structural brain injury detection device (if available)
- ☐ Seizures
- ☐ Weakness or tingling in arms or legs
- ☐ Severe or worsening headache

Defer MACE 2 if any red flags are present. Immediately consult higher level of care and consider urgent evacuation according to evacuation precedence/Tactical Combat Casualty Care (TCCC).

- ☐ **Negative for all red flags**
  Continue MACE 2, and observe for red flags throughout evaluation.

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MANAGEMENT OF HEAD INJURIES

DISARM CASUALTY with altered mental status and have unit point of contact (POC) take control of weapon

If casualty has communication equipment, have the unit POC take control of it, as well

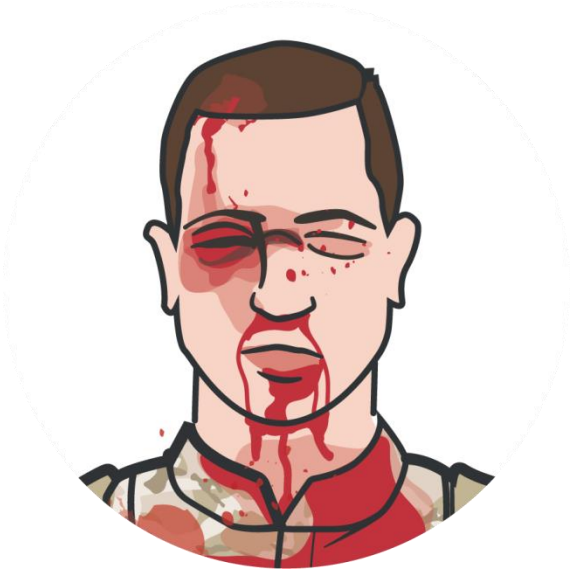
MANAGEMENT OF HEAD INJURIES

- Control hemorrhage from head and other injuries;
- Administer tranexamic acid for significant TBI
- Secure airway as indicated
- Provide supplemental oxygen if available (monitor with pulse oximetry and maintain oxygen saturation >90%)
- Resuscitate as indicated (monitor and maintain normal radial pulse or, if blood pressure monitoring is available, systolic blood pressure 100-110 mm Hg)
- Treat other immediately life-threatening injuries to prevent hypoxia and hypotension (secondary brain injury)
- Prevent/treat hypothermia
- Administer antibiotics for all open wounds per TCCC guidelines
- Manage pain per TCCC guidelines

Prevent **secondary brain injury** caused by hypoxia and hypotension

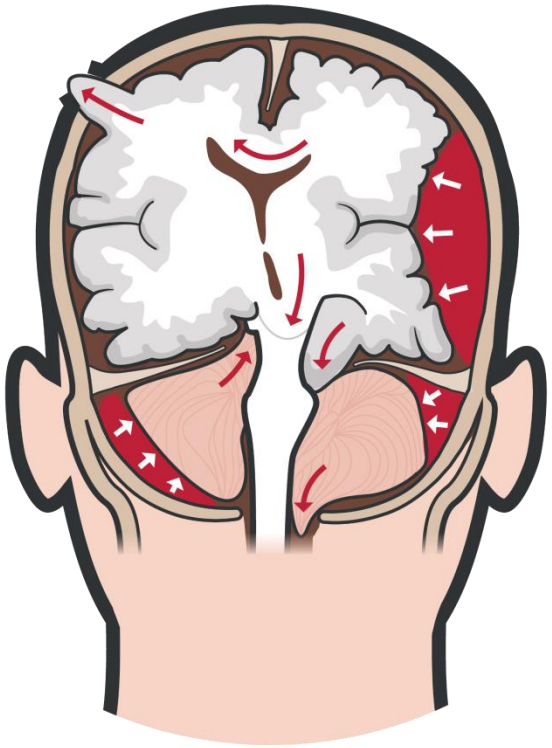
Ensure low oxygen saturations are not due to tension pneumothorax and intervene if needed

MONITORING FOR MODERATE TO SEVERE TBI



- Decreases in level of consciousness
- Pupillary dilation
- SBP >90 mmHg
- O2 sat >90
- Hypothermia
- End-tidal CO2 32-38 mmHg
- Penetrating head trauma
- C-spine

SIGNS AND SYMPTOMS OF CEREBRAL HERNIATION



HIGH BLOOD PRESSURE

LOW HEART RATE

IRREGULAR RESPIRATIONS

- Deteriorating level of consciousness
- Dilated (blown) and fixed pupil(s)
- Erratic breathing patterns
- Severe headaches, vomiting, seizures
- Abnormal body posturing
- Cardiovascular and respiratory irregularities

IMPORTANT CONSIDERATION:
Casualties with moderate/severe TBI

TREATMENT OF CEREBRAL HERNIATION

Unilateral pupillary dilation accompanied by a decreased level of consciousness may signify impending cerebral herniation, take the following action:

- Administer 250 ml of 3 or 5% hypertonic saline IV/IO bolus.

  or

- 30 ml 23% hypertonic saline slow IV/IO push (over one minute)
- Elevate casualty's head 30 degrees
- Hyperventilate at 20 breaths per minute
- End-tidal CO2 32-38 mmHg
- Highest oxygen concentration possible

IMPORTANT CONSIDERATION:
Do not hyperventilate the casualty unless signs of impending herniation are present

SUMMARY

- Head injury **defined**
- **Mechanisms** of head injury
- **Signs and symptoms** of head injury
- Indications for performing a **MACE 2 evaluation** for casualties suspected of head injury/TBI
- **Management** of suspected head injury in Tactical Field Care
- Signs and symptoms of **impending cerebral herniation** in Tactical Field Care

CHECK ON LEARNING

What external forces can cause a head injury?

What are the critical observations that should be reported to medical personnel for trauma casualties with a suspected head injury, in accordance with the Military Acute Concussion Evaluation 2 (MACE 2)?

What is the goal of management of casualties with suspected head injury/TBI in TFC?

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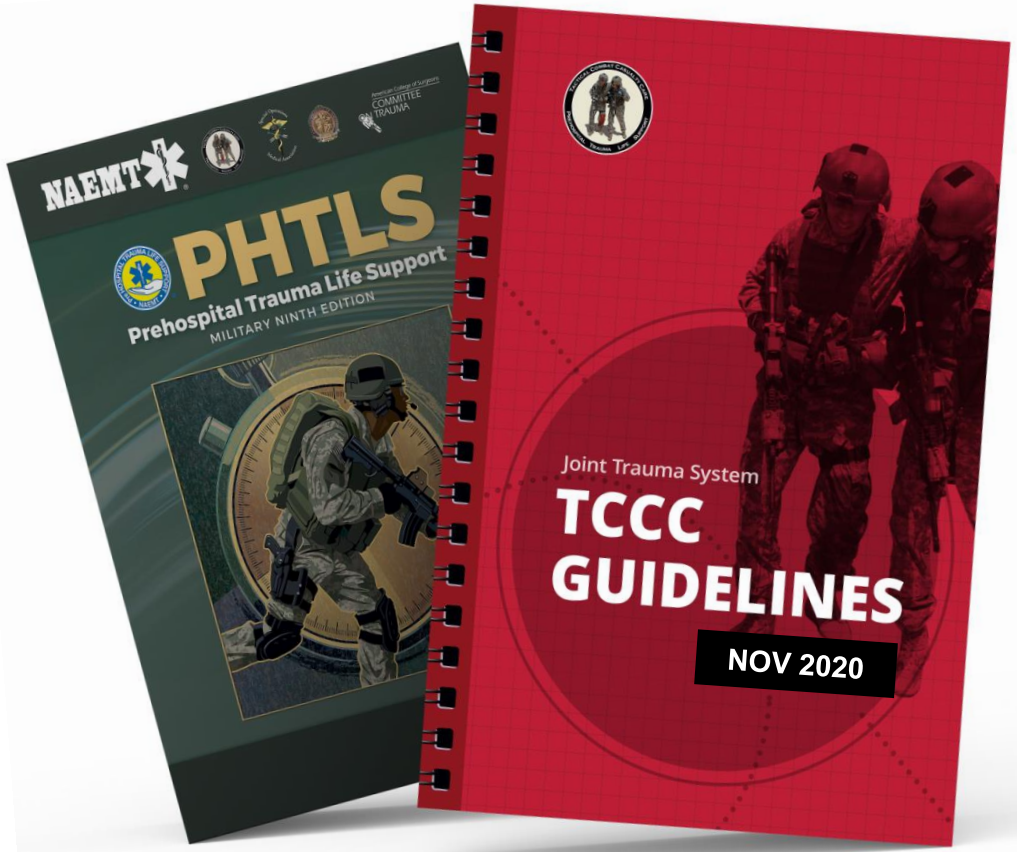
ANY QUESTIONS?

REFERENCES



TCCC: Guidelines

by JTS/CoTCCC

Updated regularly – latest edition dated
5 November 2020

These guidelines are the result of decisions made by the Committee on Tactical Combat Casualty Care as they explore evidence-based research regarding best practices

PHTLS: Military Edition, Chapter 25, 30, & 31

by NAEMT

Prehospital Trauma Life Support,
Military Ninth Edition