Mild Traumatic Brain Injury Pocket Guide (CONUS)
PURPOSE OF THIS GUIDE

This guide offers primary care providers an easy reference that includes clinical guidance in assessing and treating service members and veterans who have sustained a mild traumatic brain injury (mTBI). Mild TBI is also known as concussion. The terms concussion, mild TBI and mTBI will be used interchangeably throughout this guide.

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TBI BASICS
TBI BASICS

DoD Definition (2015)

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

- Any alteration in mental status (confusion, disorientation, slowed thinking) etc.
- Any loss of memory for events immediately before or after the injury
- Any period of observed or self-reported loss of, or decreased, level of consciousness

External forces may include any of the following events: the head being struck by an object, the head striking an object, the brain undergoing an acceleration/deceleration movement without direct external trauma to the head, or forces generated from events such as a blast or explosion including penetrating injuries.

The above criteria define a traumatic brain injury (TBI). Sequelae of TBI may resolve quickly, within minutes to hours after the neurological event, or they may persist longer. Some sequelae of TBI may be permanent. Most signs and symptoms will manifest immediately following the event. However, other signs and symptoms may be delayed from days to months (e.g., headaches, subdural hematoma, seizures, hydrocephalus, spasticity, etc.). Signs and symptoms may occur alone or in varying combinations and may result in a functional impairment. The signs and symptoms generally fall into one or more of the following three categories:

- **Physical**: Headache, nausea, vomiting, dizziness, sleep disturbance, weakness, paresis/plegia, sensory loss including hearing loss, visual loss, or loss/alteration of taste or smell, tinnitus, spasticity, aphasia, dysphagia, dysarthria, balance disorders, disorders of coordination, seizure disorder.

- **Cognitive**: Deficits in attention, concentration, memory, speed of processing, new learning, planning, reasoning, judgment, executive control, self-awareness, language, abstract thinking.

- **Behavioral/Emotional**: Depression, anxiety, agitation, irritability, impulsivity, aggression.
Note: The signs and symptoms listed above are typical of each category but are not an exhaustive list of all possible signs and symptoms.

**Causes**

In the military the leading causes of TBI are: blasts, fragments, bullets, motor vehicle crashes and falls.

Severity Classification: TBI's are classified based on the physical examination at time of injury. TBI's are classified into mild, moderate, severe and penetrating categories. Mild TBI (mTBI) is also known as concussion.
ACUTE CONCUSSION / mTBI MANAGEMENT
Military Acute Concussion Evaluation (MACE)
MACE is the military concussion screening tool for the acute assessment of service members involved in a potentially concussive event.


Concussion Management Algorithm (CMA)
Initial Provider Algorithm (2014)
The CMA is a tool for all levels of providers on the assessment, evaluation and treatment of concussion in the deployed setting. This tool was updated in 2014 by subject matter experts from the Army, Navy, Air Force and Marine Corps, as well as DCoE, DVBIC and National Intrepid Center of Excellence. Changes reflect the latest scientific research and enhance ease of use.

This clinical recommendation (CR) details the importance of aiding service members to progressively return to pre-injury activity and promotes the standardization of Military Health System (MHS) care following a concussion. The CR can be downloaded individually or ordered as a part of the Progressive Return to Activity suite for primary care managers.

Progressive Return to Activity (PRA) Following Acute Concussion/mTBI: Guidance for the Primary Care Manager in Deployed and Non-Deployed Settings (2014)


Stages of the Progressive Return to Activity Process

<table>
<thead>
<tr>
<th>Stages</th>
<th>Description</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rest</td>
<td>Symptom resolution</td>
</tr>
<tr>
<td>2.</td>
<td>Light Routine Activity</td>
<td>Introduce and promote limited effort</td>
</tr>
<tr>
<td>3.</td>
<td>Light Occupation-oriented Activity</td>
<td>Increase light activities that require a combined use of physical, cognitive and/or balance skills</td>
</tr>
<tr>
<td>4.</td>
<td>Moderate Activity</td>
<td>Increase the intensity and complexity of physical, cognitive and balance activities</td>
</tr>
<tr>
<td>5.</td>
<td>Intensive Activity</td>
<td>Introduce activity of duration and intensity that parallels the service member’s typical role, function and tempo</td>
</tr>
<tr>
<td>6.</td>
<td>Unrestricted Activity</td>
<td>Return to pre-injury activities</td>
</tr>
</tbody>
</table>
This clinical recommendation (CR) provides background on pre-deployment neurocognitive testing and the use of automated neuropsychological assessment metrics.

NCAT is a useful and effective tool for assessing service members following the diagnosis of concussion/mTBI. The DoD has selected the Automated Neuropsychological Assessment Matrix (ANAM) as the current NCAT test of choice for the pre-deployment NCAT program, and ANAM capabilities are available for use in the deployed setting. NCAT is best utilized as one component of a comprehensive assessment for the service member with clinically confirmed concussion/mTBI. It should not be used as a screening or diagnostic tool for the exposed service member prior to an actual diagnosis of concussion/mTBI. When used properly, NCAT can provide valuable clinical insight, particularly regarding neurocognitive deficits, and is a tool to be considered in the setting of concussion/mTBI with persistent symptoms when providers can administer it within the appropriate time frame and under acceptable conditions.


**Neuroimaging Following Mild TBI in the Non-Deployed Setting (2013)**

This clinical recommendation (CR) and reference card offer guidance on a standard approach to neuroimaging from the acute through chronic stages following mild TBI in the non-deployed setting.

**Neuroimaging Recommendations Following mTBI**

No imaging recommended if symptoms are improving.

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**Table 4.0**

<table>
<thead>
<tr>
<th>Modality</th>
<th>Clinical indications in mTBI</th>
<th>Acute (injury-7 days post injury)</th>
<th>Sub-Acute (8-89 Days post injury)</th>
<th>Chronic (90 days or greater post injury)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT</td>
<td>Utility varies based upon length of time between injury and presentation.</td>
<td>Modality of choice if clinical evaluation indicates.</td>
<td>Use only if MRI is contraindicated.</td>
<td>Use only if MRI is contraindicated.</td>
</tr>
<tr>
<td>MRI</td>
<td>Minimum requirements of a mTBI exam includes; 1.5 Tesla or above with 3D T1/T2, FLAIR, DWI, DTI, SWI/GRE SWI, GRE SWI may identify areas of prior DAI or prior microhemorrhage. GRE may be substituted if SWI not available or run on a complementary exam.</td>
<td>If symptoms are worsening after 72 hours.</td>
<td>Modality of choice.</td>
<td>MRI has low yield for individuals with chronic mTBI and persistent symptoms.</td>
</tr>
<tr>
<td>PET</td>
<td>if PET not available, consider HMPAO or ECD SPECT</td>
<td>No clinical indication.</td>
<td>If there are no structural abnormalities identified on MRI or CT and/or abnormalities do not explain persistent symptoms, PET may offer additional information in the understanding of sequelae following mTBI.</td>
<td>If there are no structural abnormalities identified on MRI or CT and/or abnormalities do not explain persistent symptoms, PET may offer additional information in the understanding of sequelae following mTBI.</td>
</tr>
<tr>
<td>SPECT</td>
<td>If PET not available, consider HMPAO or ECD SPECT</td>
<td>No clinical indication.</td>
<td>If there are no structural abnormalities identified on MRI or CT and/or abnormalities do not explain persistent symptoms, PET may offer additional information in the understanding of sequelae following mTBI.</td>
<td>If there are no structural abnormalities identified on MRI or CT and/or abnormalities do not explain persistent symptoms, PET may offer additional information in the understanding of sequelae following mTBI.</td>
</tr>
</tbody>
</table>

VA/DoD mTBI Clinical Practice Guideline (CPG)

The guideline describes the critical decision points in the management of concussion/mTBI and provides clear and comprehensive evidence-based recommendations incorporating current information and practices for practitioners throughout the DoD and VA health care systems. The guideline is intended to improve patient outcomes and local management of patients with concussion/mTBI.

Clinical Algorithms

A. Module A: Initial Presentation (>7 Days Post-injury)

B. Module B: Management of Symptoms Persisting >7 days

Full CPG available at: http://www.healthquality.va.gov/guidelines/Rehab/mtbi/
CONCUSSION / mTBI
SYMPTOM MANAGEMENT
CONCUSSION/mTBI SYMPTOM MANAGEMENT

Management of Headaches Following Concussion/mTBI (2016)
This clinical recommendation (CR) and reference card offer guidance on a standard approach to neuroimaging from the acute through chronic stages following mild TBI in the non-deployed setting.

Clinical Algorithm

Characteristics of Headache Types

<table>
<thead>
<tr>
<th></th>
<th>Migraine</th>
<th>Tension-type</th>
<th>Cervicogenic</th>
<th>Headache Related to Neuropathic Pain</th>
<th>Medication Overuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aura</td>
<td>Possible (15-33%)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Duration</td>
<td>4-72 hrs.</td>
<td>30 mins to 7 days</td>
<td>Some or all of day</td>
<td>Seconds, minutes, hours</td>
<td>Some or all of the day</td>
</tr>
<tr>
<td>Frequency</td>
<td>Episodic, variable</td>
<td>1-15 days/month, variable</td>
<td>Variable</td>
<td>Episodic, variable</td>
<td>Daily &gt; 15 days each month</td>
</tr>
<tr>
<td>Site</td>
<td>Unilateral</td>
<td>Bilateral</td>
<td>Usually unilateral</td>
<td>Unilateral</td>
<td>Unilateral or bilateral</td>
</tr>
<tr>
<td>Pain Characteristics</td>
<td>Pulsating</td>
<td>Pressure/tightening</td>
<td>Tightening and/or burning</td>
<td>Burning, radiating</td>
<td>Pressing, tightening, pulsating</td>
</tr>
<tr>
<td>Pain Severity</td>
<td>Moderate/severe</td>
<td>Mild/moderate</td>
<td>Mild/moderate</td>
<td>Moderate/severe</td>
<td>Mild/moderate/severe</td>
</tr>
<tr>
<td>Aggravated by movement</td>
<td>Yes</td>
<td>No</td>
<td>Yes with movement of head</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Nausea/Vomiting</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Photophobia/ Phonophobia</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Full CR: https://dvbic.dcoe.mil/material/management-headache/clinical-recommendation
Management of Sleep Disturbances Following Acute Concussion/mTBI (2014)

This clinical recommendation (CR) outlines how to identify and assess sleep disturbances; primary care manager initial treatment options; and recommended conditions for referral to sleep medicine.

Clinical Algorithm

The following algorithm is a guide for primary care managers (PCM) for screening and initial assessment of sleep disturbances in a service member or veteran after concussion. This algorithm is fully explained including sleep disorder diagnostic criteria, screening recommendations and primary care treatments in the companion CST.

Full CR: https://dvbic.dcoe.mil/material/management-sleep-disturbances/clinical-recommendation
Assessment and Management of Visual Dysfunction Associated with mTBI (2013)

This clinical suite provides providers an approach to evaluate visual dysfunction following mild TBI and offers guidance regarding referral for further eye or visual evaluation and care.

Clinical Algorithm

Assessment and Management of Dizziness Associated with Mild TBI (2012)

This clinical recommendation (CR) and reference card provide primary care providers with an approach to evaluate dizziness following mild TBI and offers guidance on referral for further vestibular evaluation and care.

Clinical Algorithm


Neuroendocrine Dysfunction Screening Post mTBI Recommendation

This clinical recommendation (CR) serves as a reference tool offering medical guidance following indications from post-injury neuroendocrine screening.

Neuroendocrine dysfunction (NED) should be considered following a confirmed diagnosis of TBI when a service member remains symptomatic beyond three months and/or becomes symptomatic up to 36 months after injury. NED screening studies should not be routinely ordered as a screening or diagnostic tool during the early post injury period. Screening for NED can provide valuable clinical insight leading to prompt treatment and improved overall prognosis for this subset of patients. As with all clinical decisions, field and operational circumstances may at times require deviation from these recommendations.

ICD-10 CODING

Traumatic brain injury (TBI)

The following ICD-10 codes are included in the case definition:

<table>
<thead>
<tr>
<th>Severity of TBI</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal structural imaging</td>
<td>Normal or abnormal structural imaging</td>
<td>Normal or abnormal structural imaging</td>
<td></td>
</tr>
<tr>
<td>LOC = 0 – 30 min</td>
<td>LOC &gt;30 min and &lt;24 hours</td>
<td>LOC &gt;24 hours</td>
<td></td>
</tr>
<tr>
<td>AOC = a moment up to 24 hours</td>
<td>AOC &gt;24 hours. Severity based on other criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTA = 0 – 1 day</td>
<td>PTA &gt;1 and &lt;7 days</td>
<td>PTA &gt;7 days</td>
<td></td>
</tr>
</tbody>
</table>

AOC – Alteration of consciousness/mental state
LOC – Loss of consciousness
PTA – Post-traumatic amnesia


PATIENT EDUCATION TOOLS FOR mTBI SYMPTOM MANAGEMENT
**PATIENT EDUCATION TOOLS FOR MTBI SYMPTOM MANAGEMENT**

A. **Acute Concussion Brochure**
   This brochure is designed to educate deployed service members about traumatic brain injuries immediately after concussion injury.
   https://dvbic.dcoe.mil/material/acute-concussion-mtbi-educational-brochure

B. **Return to Activity: Guidance for Service Members with Symptoms Following a Concussion**
   This brochure is intended to help service members and veterans who have experienced a concussion recover as quickly and safely as possible. It outlines each stage of the recovery process, explains what affected individuals should expect throughout the recovery process, provides guidance on how to track progress and includes a table to track progress.
   https://dvbic.dcoe.mil/material/progressive-return-activity-a2

C. **Mild TBI Symptom Management: Managing Headaches**
   Although each headache is different, identifying common causes, or triggers, is important for health care providers and patients to determine appropriate treatment. This fact sheet provides non-drug options to help those diagnosed with a mild TBI and associated post-traumatic headache (PTH) to manage symptoms.
   https://dvbic.dcoe.mil/material/tbi-symptom-management-headaches

D. **Mild TBI Symptom Management: Healthy Sleep**
   Getting restful sleep is one of the most important things you can do for your health, and it often takes thoughtful preparation during the day. This fact sheet offers service members and veterans who experience sleep disturbances healthy sleep tips that can likely improve their sleep.
   https://dvbic.dcoe.mil/material/healthy-sleep-fact-sheet

E. **Mild TBI Symptom Management: Head Injury and Dizziness**
   This fact sheet can be used by health care providers to educate patients with concussion/mild TBI on how to manage dizziness related to their injury. It was developed by subject matter experts from the Defense Department and Department of Veterans Affairs.

F. **Mild TBI Symptom Management: Help with Ongoing Symptoms**
   Although the majority of service members recover from concussion with little to no intervention, some experience symptoms beyond the first three months after their initial injury. This fact sheet addresses why symptoms continue to persist in some patients and how they can cope or seek additional help.
   https://dvbic.dcoe.mil/material/help-ongoing-symptoms-fact-sheet
G. **Mild TBI Symptom Management: Headache and Neck Pain**
This handout is designed to educate patients with traumatic brain injury on how to manage headaches and neck pain related to head injury. It is intended to be used by providers during an office visit to educate patients about TBI. 

H. **Mild TBI Symptom Management: Changes in Behavior, Personality or Mood**
This fact sheet can be used by health care providers to educate patients with concussion/mild TBI on how to manage changes in mood related to their injury. 
https://dvbic.dcoe.mil/material/tbi-symptom-management-changes-behavior-personality-or-mood

I. **Mild TBI Symptom Management: Ways to Improve Your Memory**
This fact sheet can be used by health care providers to educate patients with concussion/mild TBI on how to manage memory problems related to their injury. 

J. **Concussion/Mild Traumatic Brain Injury and Posttraumatic Stress Disorder**
This fact sheet defines concussion/mild TBI and posttraumatic stress disorder and explains how overlapping symptoms often occur. It also describes why it’s important to seek out treatment for both conditions and provides helpful advice on what to tell family and friends to help in the recovery process. 
CLINICAL TOOLS AND PATIENT SYMPTOM RATING SCALES
**CLINICAL TOOLS AND PATIENT SYMPTOM RATING SCALES**

A. **Dizziness Handicap Inventory (DHI)**  
The 25-item self-assessment evaluates the impact of dizziness on daily life imposed by vestibular system disease.  

B. **Epworth Sleepiness Scale (ESS)**  
The ESS is widely used in the field of sleep medicine as a subjective measure of a patient’s sleepiness. The test is a list of eight situations in which you rate your tendency to become sleepy on a scale of 0, no chance of dozing, to 3, high chance of dozing.  

C. **Glasgow Coma Scale (GCS)**  
The GCS is used to assess the consciousness and neurological functioning of a person who has just received a TBI. The total score is the sum of the scores in three categories: eye-opening response, verbal response, and motor response. (Source: DVBIC)  

D. **Neurobehavioral Symptom Inventory (NSI)**  
The NSI is used as a subjective measure for symptom reporting. The NSI is a 22-item symptom inventory of non-specific but common mTBI symptoms.  

E. **Patient Health Questionnaire (PHQ-9)**  
The PHQ-9 is a nine-item tool commonly used in the primary care setting to assess the presence and severity of depression symptoms.  

F. **Posttraumatic Stress Disorder Checklist-5 (PCL-5)**  
The PCL-5 is a 20-item self-report measure that assesses the 20 DSM-5 symptoms of PTSD. The PCL-5 has a variety of purposes, including: monitoring symptom change during and after treatment, screening individuals for PTSD, making a provisional PTSD diagnosis.  

G. **Headache Impact Test (HIT-6)**  
The six-item HIT-6 provides a global measure of adverse headache impact and is used to screen and monitor patients with headaches in both clinical practice and clinical research. The HIT-6 items measure the severity of headache pain and the adverse impact of headache on social functioning, role functioning, vitality, cognitive functioning, and psychological distress. (Source: NIH)  
H. Patient Global Impression of Change (PGIC)

The PGIC captures clinically meaningful change that makes a difference to the patient. Consisting of one question rated on a seven-point Likert scale, the PGIC offers a quick and simple method of quantifying clinical progress. The patient is asked to describe the change in activity limitations, symptoms, emotions, and overall quality of life related to the concussion.


I. Insomnia Severity Index (ISI)

The ISI is a brief, validated, seven-item self-report questionnaire useful for the initial assessment of insomnia symptom severity and ongoing monitoring of treatment response.


J. Traumatic Brain Injury Quality of Life (TBI-QOL)

The Traumatic Brain Injury Quality-of-Life (QOL) is a QOL measure specifically designed for the population with TBI. The TBI-QOL consists of 20 item banks in four domains (Physical Health, Emotional Health, Cognition, Social Participation).
TBI REHABILITATION RESOURCES
TBI REHABILITATION RESOURCES

A. Cognitive Rehabilitation Consensus Statement
   The Consensus Conference Statement on Cognitive Rehabilitation for Mild Traumatic Brain Injury (2009) provides guidance to address the needs of service members who experience persistent cognitive symptoms following concussion.

B. Driving Following TBI
   This clinical recommendation provides guidance to healthcare professionals on evaluating the safe return to driving following TBI, regardless of severity.

C. Mild Traumatic Brain Injury Rehabilitation Toolkit
   Published by the Army Office of The Surgeon General, this toolkit was designed to help military and civilian physical and occupational therapists and speech-language pathologists gain knowledge of valid and reliable screening tools, patient-oriented outcome instruments, and evidence-informed intervention techniques useful in evaluating and treating service members with concussion/mTBI.