Mild Traumatic Brain Injury: Clinical Practice Guidelines for Acute and Chronic CONUS Management in the DoD

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DCoE
Definition

• **Mild TBI/Concussion (DoD definition)**
  – LOC: 0-30 minutes
  – AOC: up to 24 hours
  – PTA: 0-24 hours
  – Structural Imaging (if done): normal

• **All head injuries do not result in TBI**

• **Level of injury severity does not equal level of functional impairment**
Management Overview

• Clinical guidance based upon time of presentation
  – Acute = \leq 7 \text{ days}
  – Sub-acute/Chronic = > 7 \text{ days}

• Acute management: Symptom Management in Mild TBI Health Affairs Policy Memo (May 2008)

• Sub-acute/Chronic management: VA/DoD Clinical Practice Guideline for the Management of Concussion/mild Traumatic Brain Injury (March 2009)
Management Overview

- Identification of injury
- Evaluation for potential red flags
- Symptom management
- Rest
- Prevention of further injury
- Education
Asymptomatic

- Closely monitor for symptoms and provide supportive education up to 30 days post injury
- Provide reassurance about recovery
- Advise about precautionary measures to prevent future head injury
- Provide written contact information for healthcare provider and instructions to contact for follow-up for changes in condition or development of symptoms
- Document concussion in medical record
Post Concussive Symptoms

<table>
<thead>
<tr>
<th><strong>Physical</strong></th>
<th><strong>Emotional</strong></th>
<th><strong>Cognitive</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Anxiety</td>
<td>Slowed processing</td>
</tr>
<tr>
<td>Dizziness</td>
<td>Depression</td>
<td>Decreased attention</td>
</tr>
<tr>
<td>Sleep Disturbances</td>
<td>Irritability</td>
<td>Poor Concentration</td>
</tr>
<tr>
<td>Balance problems</td>
<td>Mood lability</td>
<td>Memory Problems</td>
</tr>
<tr>
<td>Nausea/Vomiting</td>
<td></td>
<td>Verbal dysfluency</td>
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<tr>
<td>Fatigue</td>
<td></td>
<td>Word-finding</td>
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<tr>
<td>Visual disturbances</td>
<td></td>
<td>Abstract reasoning</td>
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<tr>
<td>Sensitivity to light/noise</td>
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<tr>
<td>Ringing in the ears</td>
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mTBI Symptom Interaction

- Sleep
- Headache
- Cognitive
- Irritability/Mood
## Summary of Algorithm B: Management of Symptoms

### Step One: History and Physical Exam

| Complete history | • Confirm diagnosis of mild TBI  
• Characterize initial injury and identify detailed information of the injury event  
• Patient’s symptoms and health concerns  
• Are symptoms related to the event characterized as a mild TBI  
• Pre-morbid conditions, potential co-occurring conditions, other psychosocial risk factors  
• Evaluate signs and symptoms indicating potential for neurosurgical emergencies that require immediate referrals  
• Assess danger to self or others |
|------------------|--------------------------------------------------------------------------------------------------|
| Physical Exam    | • Focused neurological examination  
• Focused vision examination  
• Focused musculoskeletal examination of head and neck |
| Lab Tests        | • Not necessary for mild TBI (may consider lab tests for evaluating other non-TBI causes of symptoms) |
| Imaging          | • Not recommended in patients who sustained mild TBI beyond emergency phase (72 hours post-injury) unless condition deteriorates or red flags noted  
• CT scan - modality of choice for acute mild TBI. Absence of abnormal findings does not preclude presence of mild TBI |
### Step Two: Clarify Symptoms

- Duration
- Frequency
- Onset and triggers
- Location
- Previous episodes
- Intensity or severity
- Previous treatment and response
- Patient perception
- Impact on functioning

Assess exacerbating factors:
- **Prescribed** and OTC medications
- Caffeine, tobacco and other stimulants (energy drinks)
- Sleep patterns & sleep hygiene
- Co-existing illnesses

### Step Three: Evaluate and Treat Co-Occurring Disorders

- Mood disorders
- Anxiety
- Stress
- Substance use disorders

### Step Four: Determine Treatment Plan

- Document summary of patient’s problems
- Develop treatment plan that includes severity and urgency for treatment interventions
- Emphasize good prognosis and empower patient for self-management

### Step Five: Educate Patient and Family (written & verbal)

- Review potential symptoms of mild TBI
- Review expected outcomes and recovery
- Educate about prevention of further injuries
- Empower patient for self management
- Techniques to manage stress

### Step Six: Provide Early (Non-Pharmacologic) Interventions

- Sleep hygiene education
- Relaxation techniques
- Limiting use of caffeine, tobacco, alcohol
- **Graded return to exercise with close monitoring**
- Monitored progressive return to normal duty, work or activity
Step Seven: Consider Case Management

- Consider case management if all symptoms not sufficiently resolved within days. Assign case manager to:
  - Follow-up and coordinate (remind) future appointments
  - Reinforce early interventions and education
  - Address psychosocial issues (financial, family, housing or school/work)
  - Connect to available resources

Step Eight: Initiate Symptom-Based Treatment

- See specific symptom tabs for symptom management

Step Nine: Follow Up and Reassess

- Follow up and reassess in 4-6 weeks, sooner if clinically indicated
- Encourage and reinforce positive expectation of recovery
- Monitor for co-morbid conditions
- Address:
  - Return to work, duty or activity
  - Community participation
  - Family/social issues

Step Ten: If Symptoms Not Sufficiently Resolved

- Continue to Algorithm C Management of Persistent Concussion/mild TBI Symptoms
  - Re-assess symptom severity and functional status and complete psychosocial evaluation
  - Possible referrals to mental health, occupational therapy, vocational therapy
  - Continue case management
# Management of Headaches

<table>
<thead>
<tr>
<th>Post Traumatic Headaches (Includes Tension and Migraine)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
</tr>
<tr>
<td>• Characterize headaches</td>
</tr>
<tr>
<td>• Pre-existing headache disorder</td>
</tr>
<tr>
<td>• Assess sleep/wake cycles (lack of sleep is an exacerbating factor and mTBI is also associated with impaired sleep)</td>
</tr>
<tr>
<td><strong>Patient Examination</strong></td>
</tr>
<tr>
<td>• Head and neck</td>
</tr>
<tr>
<td>• Complete cranial nerve, fundoscopic and pupil exam</td>
</tr>
<tr>
<td>• Muscle strength and tone</td>
</tr>
<tr>
<td>• Gait</td>
</tr>
<tr>
<td>• Upper and lower extremity coordination</td>
</tr>
<tr>
<td><strong>Medication Review</strong></td>
</tr>
<tr>
<td>• Chronic daily use of non-steroidal anti-inflammatory drugs (NSAIDs) or acetaminophen (alone or combined with caffeine) may lead to rebound headaches</td>
</tr>
<tr>
<td>• Excessive use or rapid withdrawal of caffeine or tobacco can trigger headaches</td>
</tr>
<tr>
<td>**Referral * **</td>
</tr>
<tr>
<td>• Emergency Department</td>
</tr>
<tr>
<td>• Fever</td>
</tr>
<tr>
<td>• Stiff neck</td>
</tr>
<tr>
<td>• Neurology</td>
</tr>
<tr>
<td>- Worsening headache</td>
</tr>
<tr>
<td>- Seizures</td>
</tr>
<tr>
<td>- Blackout</td>
</tr>
<tr>
<td>- Any abnormality found during neurological or musculoskeletal exam</td>
</tr>
<tr>
<td><strong>Patient Education</strong></td>
</tr>
<tr>
<td>• Perform series of neck stretches</td>
</tr>
<tr>
<td>• Review sleep posture and make adjustments to ensure neck and spine are in a neutral position</td>
</tr>
<tr>
<td>• Awareness and avoidance of migraine triggers</td>
</tr>
<tr>
<td>• Maintaining regular exercise, sleep and meal schedules</td>
</tr>
<tr>
<td>• Recognize warning signs (aura)</td>
</tr>
<tr>
<td>• Headache diary</td>
</tr>
</tbody>
</table>
## Pharmacologic Treatment
- NSAIDs
- Acetaminophen
- Prophylactic therapy
  - Analgesic washout period
  - Limit to 3 treatments/week or less
  - Prophylactic therapy

## Non-Pharmacologic Treatment
- Relaxation training and biofeedback in combination with medication
- Physical therapy
- Increased physical activity
- Alternate ice and heat on neck and head 2-3 times per day for about 20 minutes
- Therapeutic massages to help with headaches from neck tension
  - Relaxation
  - Biofeedback
  - Visualization
  - Extracranial pressure
  - Cold compress
  - Regular exercise
  - Alternate ice and heat on neck and head 2-3 times per day for about 20 minutes
  - Therapeutic massages to help with headaches from neck tension
## Management of Dizziness

<table>
<thead>
<tr>
<th></th>
<th>Dizziness</th>
</tr>
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</table>
| **Physical Assessment** | • Neurological examination  
• Vision  
• Auditory  
• Sensory  
• Motor  
• Coordination  
• Vestibular  
• Evaluation of functional and balance activities  
• Turning |
| **Medication Review** | (for medications that exacerbate or worsen symptom)  
• Stimulants  
• Benzodiazepines  
• Tricyclics  
• Monoamine oxidase inhibitors  
• Tetracyclics  
• Neuroleptics  
• Anticonvulsants  
• Selective serotonin agonists  
• Beta blockers  
• Cholinesterase inhibitors |
| **Referrals** | • Neurology  
– Lateral abnormality  
– Nystagmus  
– Abnormal Romberg  
• Emergency Department  
– CSF leak |
| **Pharmacologic Treatment** | • Not shown to be effective in chronic dizziness after mild TBI  
• Consider only if symptoms are severe enough to significantly limit functional activities  
• May be helpful during acute period  
• Meclizine  
• Scopolamine  
• Dimenhydrinate  
• Lorazepam  
• Clonazepam  
• Diazepam |
| **Non-Pharmacologic Treatment** | Vestibular and balance rehabilitation |
| **Patient Education** | • Perform neck stretches  
• Modify activity and change positions slowly  
• Change sleep position  
• Perform vestibular rehabilitation exercises  
• Talk with your healthcare provider if exercises do not help your dizziness |
## Management of Fatigue and Sleep Disturbances

| History | • Pre/post-injury level of physical activity, cognitive function and mental health (identify and treat underlying medical and psychological disorders) | • Sleep routine  
• Alcohol and substance abuse  
• Sleep activity  
• Nightmares  
• Frightened arousal |
| --- | --- | --- |
| **Physical Assessment** | • Multidimensional Assessment of Fatigue (MAF)  
• Fatigue Impact Scale (FIS)  
• Fatigue Assessment Instrument (FAI)  
• Laboratory tests (CBC, Metabolic panel, Vitamin B12 & folate, Thyroid function test, Erythrocyte Sedimentation Rate (ESR)) | • Epworth Sleepiness Scale  
• Consider Pittsburgh Sleep Quality Index (PSQI)  
• Neck size, airway, height, weight |
| **Medication Review** (for medications that exacerbate or worsen symptoms) | If medication appears contributory, perform Applied Behavioral Analysis (ABA) trial to determine the association |  |
| **Referrals** * |  | • Sleep study referral  
Apnea  
ESS>12  
BMI>30 |
| **Pharmacologic Treatment** ** | • Address modifiable factors prior to initiating pharmacotherapy  
• Persistent symptoms (>4 weeks) without improvement with management of sleep, pain, depression, lifestyle, may consider neurostimulant:  
• Medication trial for at least 3 months | • Prazosin  
• Zolpidem  
• Trazodone (sleep maintenance)  
• Amitriptyline (headache benefit) * |
| **Non-Pharmacologic Treatment**  | • Well balanced meals  
• Sleep hygiene  
• Regular exercise  
• Cognitive behavioral therapy | • Well balanced meals  
• Sleep hygiene  
• Regular exercise  
• Cognitive behavioral therapy  
• Sleep hygiene  
• Reduce stimulation before bedtime |
| **Patient Education**  |  | • No caffeine, heavy exercise, alcohol, nicotine or heavy meals 3 hours prior to bedtime  
• Avoid bright light exposure near bedtime  
• Keep regular bedtime and wakeup hours  
• Foster quiet, pleasant sleep environment  
• Stop work or TV viewing at least one hour before bedtime  
• Use bed only for sleep and sex  
• Do not take naps |
# Management of Vision, Hearing & Olfactory Symptoms

<table>
<thead>
<tr>
<th>History</th>
<th>Vision</th>
<th>Hearing</th>
<th>Olfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-injury visual deficits</td>
<td>• Pre-injury hearing deficits (common)</td>
<td>• Pre-injury causes of anosmia</td>
<td></td>
</tr>
<tr>
<td>Pre-injury hearing deficits</td>
<td>• Ophthalmologic examination</td>
<td>• Otologic examination</td>
<td></td>
</tr>
<tr>
<td>• Extraocular movements</td>
<td>• Deafness, decreased auditory acuity</td>
<td>• Decreased auditory acuity</td>
<td></td>
</tr>
<tr>
<td>• Pupils</td>
<td>• Sensitivity to noise</td>
<td>• Sensitivity to noise</td>
<td></td>
</tr>
<tr>
<td>• Visual fields by confrontation</td>
<td>• Perform nasal and oropharyngeal examination</td>
<td>• Perform depression screen</td>
<td></td>
</tr>
<tr>
<td>Physical Assessment</td>
<td>• Optometry and Ophthalmology</td>
<td>• Audiology (if no other cause is found)</td>
<td>• ENT (if needed)</td>
</tr>
<tr>
<td>• Initial use of sunglasses</td>
<td>• ENT * (Hemotympanum, FB, TM perforation)</td>
<td>• Reassurance</td>
<td></td>
</tr>
<tr>
<td>• Followed by formal weaning program (decrease by 15 minutes every 2 hours)</td>
<td>• Pain management</td>
<td>• Reassurance and monitoring</td>
<td></td>
</tr>
<tr>
<td>• Sunglasses</td>
<td>• Controlling environmental noise</td>
<td>• Increase spicing of foods (+/- dietary referral)</td>
<td></td>
</tr>
<tr>
<td>• Intermittent patching for double vision</td>
<td>• White noise generators</td>
<td>• Monitor weights</td>
<td></td>
</tr>
<tr>
<td>• Reassurance, pain management, controlling environmental light</td>
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</tr>
</tbody>
</table>

**Non-Pharmacologic Treatment**

- Initial use of sunglasses followed by formal weaning program (decrease by 15 minutes every 2 hours)
- Sunglasses
- Intermittent patching for double vision
- Reassurance, pain management, controlling environmental light
- Reassurance and monitoring
- Increase spicing of foods (+/- dietary referral)
- Monitor weights
## Management of Irritability

<table>
<thead>
<tr>
<th>History</th>
<th>Evaluate specific history and symptoms, physical fighting, alcohol intake, relationship problems, suicidal, homicidal</th>
</tr>
</thead>
</table>
| Physical Assessment | • Administer PCL-M screening questionnaire  
• Consider PHQ-9 or other depression inventory |
| Referrals | Psychiatry, psychology and social work  
• Outward violence  
• Excessive alcohol intake  
• Suicidal ideation  
• Homicidal ideation |
| Pharmacologic Treatment | • Sertraline  
• Citalopram Allow 3-4 week therapeutic trial of each drug  
• Refer to psychiatry, psychology, social work for treatment failure of 2 medications |
| Patient Education | • Understand that it is normal to have feelings of anxiety, depression, agitation and feeling overwhelmed  
• Replace negative thoughts and actions with positive ones  
• Do not call yourself bad names or put yourself down  
• Talk to someone you love and trust about these concerns  
• Seek emergency care if you have thoughts or feelings of hurting yourself or others  
• Seek psychological support if these feelings are causing you problems at work or home |
### Management of Appetite Changes & Nausea

<table>
<thead>
<tr>
<th></th>
<th>Appetite Changes</th>
<th>Nausea</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
<td>Pre-injury causes of appetite issues</td>
<td>Define triggers and patterns of nausea</td>
</tr>
<tr>
<td><strong>Physical Assessment</strong></td>
<td>• Perform nasal and oropharyngeal examination</td>
<td>• Perform oropharyngeal examination</td>
</tr>
<tr>
<td></td>
<td>• Review neurovegetative signs (assess for depressed affect or clinical depression)</td>
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</tr>
<tr>
<td><strong>Medication Review</strong></td>
<td>Assess medication list for agents that can cause olfactory or gustatory abnormalities (centrally acting medications, in particular anti-epileptics, some antibiotics)</td>
<td>Assess medication list for agents that may cause or worsen GI symptoms</td>
</tr>
</tbody>
</table>
| **Non-Pharmacologic Treatment** | • Reassurance and monitoring  
• Increase spicing of foods (+/- dietary referral)  
• Monitor weights | • Reassurance and monitoring  
• Encourage rapid management of dizziness and return to activity |
### When to Refer to Specialists

- Symptoms cannot be linked to a event (suspicion of another diagnosis)
- An atypical symptom pattern or course is present
- Findings indicate an acute neurologic condition that requires urgent intervention
- Presence of other major co-morbid conditions requiring special evaluation
## Return to Duty

### When to Return to Activity
- Period of rest for individuals with post-injury symptoms
- Encourage gradual return to normal activity as clinically appropriate
- Suggest exertional testing if a person’s normal activity involves significant physical activity
- If exertional testing results in a return of symptoms, recommend additional rest until symptoms resolve

### When to Apply Duty Restrictions
- A duty specific task cannot be safely or competently completed based on symptoms
- The work/duty environment cannot be adapted to the patient’s symptom-based limitation
- The deficits cannot be accommodated
- Symptoms reoccur
mTBI and Co-occurring Conditions

The polytrauma clinical triad: Distribution of patients with chronic pain, posttraumatic stress disorder (PTSD), and persistent postconcussive symptoms (PPCS) in a sample of 340 Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) veterans evaluated at Department of Veterans Affairs Boston Polytrauma Network Site (PNS).

Recently Published Clinical Recommendations

- Co-occurring conditions toolkit
- Cognitive rehabilitation in mild TBI
- Driving assessments after TBI
Questions?