Management of Headache Following Concussion/
Mild Traumatic Brain Injury: Guidance for Primary Care Management
in Deployed and Non-Deployed Settings

Ronald Riechers, II, M.D.
Medical Director, Polytrauma Program and Chief, Department of Neurology,
Louis Stokes Cleveland Veterans Affairs (VA) Medical Center
Assistant Professor, Department of Neurology, Case Western Reserve University School of Medicine

Donald W. Marion, M.D.
Senior Clinical Consultant, Clinical Affairs Division,
Contract support to Defense and Veterans Brain Injury Center (DVBIC),
Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury

“Medically Ready Force...Ready Medical Force”
Ronald Riechers, II, M.D.

- Medical Director, Polytrauma Program and Chief, Department of Neurology, Louis Stokes Cleveland Veterans Administration Medical Center, Cleveland, Ohio
- Assistant Professor, Department of Neurology, Case Western Reserve University School of Medicine, Cleveland, Ohio
- Member, Department of Defense (DoD)/Department of Veterans Affairs (VA) PTH Working Group
- Member/Subject Matter Expert, VA/DoD Mild TBI Clinical Practice Guideline Work Group
- Education:
  - M.D., Northeastern Ohio Universities College of Medicine
Donald W. Marion, M.D.

- Senior clinical consultant in the DVBIC Clinical Affairs Division
- Academic neurosurgeon who has focused on the clinical pathophysiology and treatment of TBI for more than 25 years
- Previously served as professor and chair of the Department of Neurosurgery, The Boston University School of Medicine; professor and vice-chair, Department of Neurosurgery, The University of Pittsburgh School of Medicine; and director of the Brain Trauma Research Center at the University of Pittsburgh
- Education:
  - M.D., University of California
Learning Objectives

• Articulate risk factors associated with PTH
• Describe and distinguish among the common types of PTH
• Apply the clinical recommendation (CR) to assess, diagnose and treat each type of PTH
Clinical Recommendation

Management of Headache Following Concussion/Mild TBI: Guidance for Primary Care Management in Deployed and Non-Deployed Settings

Ronald Riechers, II, M.D.

(Section of Defense (DoD)/Defense and Veterans Brain Injury Center (DVBIC), 2016)
Disclosure – Dr. Ronald Reichers

• The views expressed in this presentation are those of the presenter and do not reflect the official policy of the Department of Veterans Affairs or the U.S. Government.
  o I have no relevant financial relationships to disclose.
  o I do not intend to discuss devices, products or procedures which are off-label, unlabeled, experimental, and/or investigational (not Food and Drug Administration approved).
DoD TBI Statistics

DoD Numbers for Traumatic Brain Injury Worldwide – Totals

<table>
<thead>
<tr>
<th>Severity</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penetrating</td>
<td>5,000</td>
</tr>
<tr>
<td>Severe</td>
<td>3,653</td>
</tr>
<tr>
<td>Moderate</td>
<td>31,202</td>
</tr>
<tr>
<td>Mild</td>
<td>286,255</td>
</tr>
<tr>
<td>Not Classifiable</td>
<td>21,852</td>
</tr>
<tr>
<td><strong>Total - All Severities</strong></td>
<td><strong>347,962</strong></td>
</tr>
</tbody>
</table>

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

Prepared by the Defense and Veterans Brain Injury Center (DVbic) 2000-2016 Q1, as of May 16, 2016

“Medically Ready Force…Ready Medical Force”
Purpose and Scope of Clinical Recommendation

- Headache is the most common symptom reported following a concussion.
- 74 percent of an Operation Enduring Freedom/Operation cohort reported PTH that occurred within 30 days of sustaining a concussion.
- These recommendations were developed to provide comprehensive guidance for acute, sub-acute and persistent PTH.

(DoD/DVBIC, 2016)
Purpose and Scope of Clinical Recommendation (continued)

• The CR development followed a process that included evidence reviews, an analysis of the applicability of current clinical practice guidelines, and input from a multidisciplinary expert panel.
• Service-specific requirements regarding concussion or the management of PTH may exist.
• Provider judgment and operational requirements supersede any of these recommendations for an individual patient.
PTH

• PTH may occur from injury not only to the head but also to the neck or face.

• The diagnosis of PTH is largely dependent on the close temporal relationship between the injury and headache onset.

• PTH is classified as acute (<3 months) or persistent (>3 months) based upon duration of headache.

(DoD/DVBIC, 2016)
Risk Factors for PTH

• The most common risk factors for the development of PTH include:
  o Premorbid history of headache
  o Female gender
  o Presence of comorbid psychiatric disorders

(DoD/DVBIC, 2016)
Risk Factors for PTH (continued)

• Research suggests other risk factors include:
  o Patient’s expectation of developing a headache after head injury
  o Sleep disturbances
  o Mood disturbances
  o Psychosocial stressors
  o Overuse of abortive headache medications

(DoD/DVBIC, 2016)
Differentiation of headache type is important for optimal treatment. With a thorough history and review of systems, the characteristics of the specific type will emerge.

Four of the most common types of PTH following concussion are:

- Migraine
- Tension type
- Cervicogenic
- Headache related to neuropathic pain

(DoD/DVBIC, 2016)
General PTH

• For all types of PTH:
  o In addition to managing headache symptoms, providers should follow both the Concussion Management Algorithm (CMA) and Progressive Return to Activity for Primary Care Manager CR if in the acute phase (available at dvbic.dcoe.mil).
    ▪ Physical and cognitive rest are important for healing and symptom resolution.
  o Avoid benzodiazepines, tramadol, opiates.

(DoD/DVBIC, 2016)
Medically Ready Force...Ready Medical Force

PTH Evaluation & Treatment Algorithm

Patient presents with headache after a concussion

Perform focused headache history and assessment

Concussion or headache red flags present?

Yes
Emergent or specialty referral as indicated

No

Review diagnostic criteria and determine headache type

Migraine
Tension-Type
Cervicogenic
Neuropathic
Beginning the Algorithm

• Primary care providers should evaluate whether concussion/mild TBI is a possible cause for any headache. Remember:
  
  o PTH typically starts within 30 days of head injury.
  o If prior history of headaches, the TBI could exacerbate headache frequency/severity.
  o Patients with PTH may not present to the medical provider for treatment until long after the headache starts.

(DoD/DVBIC, 2016)
Perform Focused PTH History & Exam

Patient presents with headache after a concussion

Perform focused headache history and assessment

Concussion or headache red flags present?

Yes ➔ Emergent or specialty referral as indicated

No ➔ Review diagnostic criteria and determine headache type

- Migraine
- Tension-Type
- Cervicogenic
- Neuropathic
### Focused Headache History

<table>
<thead>
<tr>
<th>Assessment area</th>
<th>Examples of questions and information to collect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td>• Persistent pain in head or neck after a concussion (Use of 0-10 scale is recommended, 1= barely present, 5= pain beginning to interfere with activity, and 10= worst imaginable pain)</td>
</tr>
</tbody>
</table>
| **Location**            | • Right or left sided  
• Bilateral vs. unilateral  
• Face  
• Stays in one place or moves around (radiates)  
• Back or on top  
• Forehead  
• Neck |
| **Description of pain** | • Throbbing/pulsating  
• Pressing/squeezing  
• Stabbing, sharp, or dull/nagging  
• Pain with chewing or opening mouth  
• Head, face or neck tenderness  
• Decreased jaw movement |
| **Frequency and duration** | • Episodic or continuous  
• Seconds, minutes, hours, days or constant |
| **Associated physical symptoms** | • Vision changes (blindness, blurry vision, double vision, eyelid droop, tearing, eye redness or puffiness)  
• Light, noise and odor sensitivity, nose blockage/discharge  
• Nausea, loss of appetite, hunger, bowel changes  
• Premonitory symptoms (fatigue, difficulty concentrating)  
• Neck stiffness or pain  
• Yawning  
• Pallor  
• Auras (visual, sensory or dysphasic speech disturbances)  
• Numbness or tingling around lips, arms or legs |
### Table 1.0
**Focused Headache History (continued)**

<table>
<thead>
<tr>
<th>Assessment area</th>
<th>Examples of questions and information to collect</th>
</tr>
</thead>
</table>
| **Headache history**  | • Previous headache diagnosis  
                        • Worsening headache  
                        • Previous head trauma or TBI  
                        • History of temporal mandibular joint (TMJ) pain  
                        • Family history |
| **Triggers**          | • Sleep (too much or too little)  
                        • Physical activity  
                        • Straining or coughing  
                        • Missed meal  
                        • Food  
                        • Pregnancy  
                        • Caffeine  
                        • Muscle tension  
                        • Emotional stress (during or after)  
                        • Bending over  
                        • Sexual activity  
                        • Change in weather  
                        • Alcohol  
                        • Menstrual cycle  
                        • Contraceptives |
| **Social history**    | • Headache interferes with family, work or school  
                        • Substance use or abuse (caffeine, alcohol, tobacco), supplement use (vitamins, etc.) |
| **Medication history**| • Previous medications used for headache prevention and rescue  
                        - Dosage, frequency and duration  
                        - Failed medications  
                        • Current medications, how often taking rescue or preventative medications |
| **Comorbid conditions**| • Insomnia, depression, anxiety, obstructive sleep apnea |
| **Questionnaires**    | • Patient Health Questionnaire (PHQ), Neurobehavioral Symptom Inventory (NSU), Patient Global Impression of Change (PGIC), Headache Impact Test-6 (HIT) |
### Table 2.0
Focused Headache Examination

<table>
<thead>
<tr>
<th>Assessment area</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head, neck and face</td>
<td>• Cranial nerve examination&lt;br&gt;• Neck range of motion&lt;br&gt;• Palpation of head and neck for trigger points or tenderness&lt;br&gt;• Evaluate for papilledema</td>
</tr>
<tr>
<td>Ears, nose and throat</td>
<td>• Examine the ears, nares&lt;br&gt;• Palpitate the face and percuss sinuses&lt;br&gt;• Temporal mandibular joint (TMJ) examination</td>
</tr>
<tr>
<td>Other neurological examination</td>
<td>• Reflexes&lt;br&gt;• Sensory testing&lt;br&gt;• Romberg testing&lt;br&gt;• Pronator drift&lt;br&gt;• Strength testing</td>
</tr>
<tr>
<td>Mental status</td>
<td>• Speech fluency&lt;br&gt;• Word recall</td>
</tr>
</tbody>
</table>
Table 3.0
Concussion Red Flags

<table>
<thead>
<tr>
<th>Red flags that indicate emergency referral</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Progressively declining level of consciousness</td>
</tr>
<tr>
<td>2. Loss of consciousness (LOC) &gt; 5 minutes</td>
</tr>
<tr>
<td>3. Declining neurological status</td>
</tr>
<tr>
<td>4. GCS score &lt; 15</td>
</tr>
<tr>
<td>5. Seizures</td>
</tr>
<tr>
<td>7. Cannot recognize people or disoriented to place</td>
</tr>
</tbody>
</table>


Table 4.0 Headache Red Flags and Indications for Referral

<table>
<thead>
<tr>
<th>Red flags specific for headaches</th>
<th>Indications for emergency referral</th>
<th>Indications for specialty referral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concussion red flags</td>
<td>Presence of systemic symptoms</td>
<td></td>
</tr>
<tr>
<td>Thunderclap headache (sudden onset)</td>
<td>Associated neurological symptoms</td>
<td></td>
</tr>
<tr>
<td>Sudden neurological deficit</td>
<td>Onset after age 50*</td>
<td></td>
</tr>
<tr>
<td>Persistent bleeding from nose, ears or scalp</td>
<td>Change in pattern of headache</td>
<td></td>
</tr>
<tr>
<td>Cranial fracture</td>
<td>Valsalva precipitation</td>
<td></td>
</tr>
<tr>
<td>Infection resulting from a penetrating injury</td>
<td>Postural aggravation</td>
<td></td>
</tr>
<tr>
<td>Cerebrospinal fluid leakage (nose or ears)</td>
<td>TMJ disorder</td>
<td></td>
</tr>
<tr>
<td>Intracranial hemorrhage on CT</td>
<td>ENT disorder</td>
<td></td>
</tr>
<tr>
<td>Papilledema</td>
<td>Anticoagulant therapy*</td>
<td></td>
</tr>
</tbody>
</table>

* Patients on anticoagulant therapy or over the age of 50 have an increased risk of chronic subdural hematoma. This demographic may need imaging with or without specialty referral based on the head trauma history and provider judgment. Refer to the DVBIC CR Neuroimaging Following Mild Traumatic Brain Injury: Guidance in the Non-Deployed Setting that is available at dvbic.dcoe.mil.
<table>
<thead>
<tr>
<th></th>
<th>Migraine</th>
<th>Tension type</th>
<th>Cervicogenic</th>
<th>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 hours</td>
<td>30 minutes to 7 days</td>
<td>Some or all of the 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 head movement</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>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

*PCM should consider the possibility of medication overuse headache (MOH) when criteria in Table 5.0 are present. Optimal treatment consists of discontinuation of the offending medications, acute treatment of withdrawal symptoms and pain, and use of analgesic medication as preventative treatment only when necessary.
Migraine Headache

• Migraines are the most common type of PTH.
• International Classification of Headache Disorders-3 (beta version) provides two major subtypes for migraines.
  o With aura
  o Without aura
• Treatment is the same for both subtypes.

(DoD/DVBIC, 2016)
# Table 6.0 Migraine Headache Description

<table>
<thead>
<tr>
<th>ICD-9-CM: 346.10 (without aura)</th>
<th>ICD-10-CM: G43.009</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICD-9-CM: 346.00 (with aura)</td>
<td>ICD-10-CM: G43.109</td>
</tr>
</tbody>
</table>

## Description:

A. Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)

B. Headache has at least two of the following characteristics:
   1. Unilateral location
   2. Pulsating quality
   3. Moderate or severe pain intensity
   4. Aggravation by, or causing avoidance of, routine activity (e.g., walking or climbing stairs)

C. During headache at least one of the following:
   1. Nausea and/or vomiting
   2. Photophobia or phonophobia

D. May or may not be accompanied by an aura (present in 15-33 percent of patients). Most common auras are visual, other sensory, motor or speech and language

---

## Table 6.0 Migraine Headache Pharmacologic Treatment

### Acute/Abortive Agents

**Mild/moderate:** Acetaminophen; NSAIDs§ (ibuprofen, naproxen, >48 hours following concussion)

**Severe:** Triptans (e.g., sumatriptan, rizatriptan, zolmitriptan); dihydroergotamine (DHE) nasal spray§§ (pre-treat with antiemetic) Ketorolsac nasal spray§§ or IM

### Preventive Treatment

**First Line:** Tricyclic antidepressants (TCA) (e.g., amitriptyline, nortriptyline); antiepileptics (e.g., topiramate, valproate§§); beta blockers (e.g., metoprolol)

**Second Line:** Serotonin norepinephrine reuptake inhibitors (SNRI) (e.g., venlafexine); onabotulinumA§§ (Botox); (referral recommended)

---

§ Recent U.S. Food and Drug Administration Agency (FDA) warning cautions that NSAIDs can increase the risk of heart attack, heart failure, or stroke in patients with or without pre-existing heart disease, or risk factors for heart disease, even during the first few weeks of treatment, though the risk appears highest with longer use at higher doses. Detailed information on this topic is located at [http://www.fda.gov/Drugs/DrugSafety/ucm451800.htm](http://www.fda.gov/Drugs/DrugSafety/ucm451800.htm)

§§ These medications are not currently available in the deployed formulary; onabotulinumA is FDA approved for treatment of migraine headaches.
Tension-Type Headache
Assessment and Diagnosis

• Increased scalp palpation tenderness is the most significant abnormal finding in patients with tension-type headache.

• Tenderness can be elicited by small rotating movements and a firm pressure over the head and neck muscles.

• Tenderness is typically present between headaches.

(DoD/DVBIC, 2016)
### Table 7.0 Tension-Type Headache Description

<table>
<thead>
<tr>
<th>Description:*</th>
<th>ICD-9-CM: 339.1</th>
<th>ICD-10-CM: G44.209</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Episodic of headache, typically bilateral, pressing or tightening in quality, of mild to moderate intensity, lasting minutes to days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Pain does not worsen with routine physical activity and is not associated with nausea, but photophobia or phonophobia may be present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Occurring for 1-15 days per month.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.0 Tension-Type Headache
Non-Pharmacologic Treatment

<table>
<thead>
<tr>
<th>Education on lifestyle changes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(headache management fact sheet available at dvbic.dcoe.mil)</td>
<td></td>
</tr>
<tr>
<td>▪ Sleep hygiene</td>
<td>▪ Stress management</td>
</tr>
<tr>
<td>▪ Exercise</td>
<td>▪ Acupuncture</td>
</tr>
<tr>
<td>▪ Hydration</td>
<td>▪ Relaxation training</td>
</tr>
<tr>
<td>▪ Progressive return to activity</td>
<td>▪ Cognitive behavioral therapy (CBT)</td>
</tr>
<tr>
<td>▪ Caffeine intake</td>
<td>▪ Biofeedback</td>
</tr>
<tr>
<td>▪ Physical therapy</td>
<td>▪ Massage</td>
</tr>
</tbody>
</table>

### Table 7.0 Tension-Type Headache Pharmacologic Treatment

#### Acute/Abortive Agents

**First line:** Acetaminophen; NSAIDs

**Second Line:** Acetaminophen/caffeine compounds

#### Preventive Treatment

Selective serotonin reuptake inhibitors (SSRI) (e.g., paroxetine, citalopram);
Serotonin norepinephrine reuptake inhibitors (SNRI) (e.g., venlafaxine);
tricyclic antidepressants (TCA) (e.g., amitriptyline, nortriptyline);
tetracyclic antidepressants (e.g., mirtazapine)

---

§ U.S. Food and Drug Administration Agency (FDA) warning cautions that NSAIDs can increase the risk of heart attack, heart failure, or stroke in patients with or without pre-existing heart disease, or risk factors for heart disease, even during the first few weeks of treatment, though the risk appears highest with longer use at higher doses. Detailed information on this topic is located at [http://www.fda.gov/Drugs/DrugSafety/ucm451800.htm](http://www.fda.gov/Drugs/DrugSafety/ucm451800.htm)
<table>
<thead>
<tr>
<th>ICD-9-CM: 732.2</th>
<th>ICD-10-CM: G44.841</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong>*</td>
<td></td>
</tr>
<tr>
<td>A. Headache caused by a disorder of the cervical spine or soft tissue of the neck. Usually, but not always, associated neck pain</td>
<td></td>
</tr>
<tr>
<td>B. Headache has developed on temporal relation the head trauma</td>
<td></td>
</tr>
<tr>
<td>C. Cervical range of motion is reduced</td>
<td></td>
</tr>
<tr>
<td>D. Headache is made significantly worse by neck movement</td>
<td></td>
</tr>
</tbody>
</table>

Cervicogenic Headache
Physical Exam

• Physical exam findings may include:
  o Reduced cervical range of motion
  o Headache pain – unilateral
  o Provocation of headache by digital pressure on neck muscles
  o Posterior to anterior radiation of pain with head movement (Headache Classification Committee of the International Headache Society, 2013)

(DoD/DVBIC, 2016)
### Table 8.0 Cervicogenic Headache Treatment

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute/Abortive Agents</strong></td>
<td></td>
</tr>
<tr>
<td><strong>First Line:</strong></td>
<td>NSAIDs§</td>
</tr>
<tr>
<td><strong>Second Line:</strong></td>
<td>Muscle relaxants if cervical spasms; trigger point injection (referral recommended)</td>
</tr>
<tr>
<td><strong>Preventive Treatment</strong></td>
<td></td>
</tr>
<tr>
<td>Antiepileptics</td>
<td>(e.g., gabapentin, topiramate); tricyclic antidepressants (TCA) (e.g., amitriptyline, nortriptyline); serotonin norepinephrine reuptake inhibitors (SNRI) (e.g., venlafexine)</td>
</tr>
</tbody>
</table>

§ U.S. Food and Drug Administration Agency (FDA) warning cautions that NSAIDs can increase the risk of heart attack, heart failure, or stroke in patients with or without pre-existing heart disease, or risk factors for heart disease, even during the first few weeks of treatment, though the risk appears highest with longer use at higher doses. Detailed information on this topic is located at [http://www.fda.gov/Drugs/DrugSafety/ucm451800.htm](http://www.fda.gov/Drugs/DrugSafety/ucm451800.htm)
Headache Related to Neuropathic Pain Diagnosis and Assessment

- Complex chronic pain usually accompanied by soft tissue injury to the scalp or face
- Pain out of proportion to injury
- Burning, tingling type of pain
- Decreased sensation in the affected area

(DoD/DVBIC, 2016)
Headache Related to Neuropathic Pain

Physical Exam

- Findings on physical exam include:
  - Signs of nerve injury detected during neurologic exam
  - Pain may be elicited by palpation of face or scalp, especially over previous laceration or bruise.
  - May be associated with movement

(DoD/VA, 2016)
Table 9.0 Headache Related to Neuropathic Pain – Description

<table>
<thead>
<tr>
<th>ICD-9-CM: 792.2</th>
<th>ICD-10-CM: 792</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td>A. Pain associated with soft-tissue injury of the scalp or face</td>
<td></td>
</tr>
<tr>
<td>B. May have superimposed lancinating component and may also be burning, deep, and aching</td>
<td></td>
</tr>
<tr>
<td>C. There may be local tingling and numbness, hyperesthesia, hyperalgesia, allodynia (pain due to non-noxious stimulus) or hyperpathia (particularly unpleasant, exaggerated pain response)</td>
<td></td>
</tr>
<tr>
<td>D. Symptoms are long-lasting, typically persisting after resolution of the primary cause</td>
<td></td>
</tr>
</tbody>
</table>

Table 9.0 Headache Related to Neuropathic Pain – Treatment

<table>
<thead>
<tr>
<th>Non-pharmacologic treatment</th>
<th>Pharmacologic treatment§§§</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Relaxation therapy</td>
<td>• Cognitive behavioral therapy (CBT)</td>
</tr>
<tr>
<td>• Physical therapy</td>
<td>• Massage therapy</td>
</tr>
<tr>
<td>• Acupuncture</td>
<td></td>
</tr>
</tbody>
</table>

### Pharmacologic treatment§§§

#### Acute/Abortive Agents

**First Line**: Acetaminophen or NSAIDs  
**Second Line**: Antiepileptics (e.g., gabapentin, topiramate); tricyclic antidepressants (TCA) (e.g., amitriptyline, nortriptyline)

#### Preventive Treatment

Antiepileptics (e.g., gabapentin); TCA) (e.g., amitriptyline, nortriptyline)

---

U.S. Food and Drug Administration Agency (FDA) warning cautions that NSAIDs can increase the risk of heart attack, heart failure, or stroke in patients with or without pre-existing heart disease, or risk factors for heart disease, even during the first few weeks of treatment, though the risk appears highest with longer use at higher doses.
Medication-Overuse Headache (MOH)

• MOH is characterized as a headache that:
  o Is present for 15 or more days/month
  o Occurs when medications for the treatment of headaches are used at a higher than recommended dose or for longer than recommended time (i.e., more than three months)

• Treatment for MOH is discontinuing the offending medication.
  o Use of other medications to manage withdrawal symptoms is controversial.

(DoD/DVBIC, 2016)
Case Studies

Deployed Service Members with PTH

Donald W. Marion, M.D.
Disclosure – Dr. Donald Marion

• The views expressed in this presentation are those of the presenter and do not reflect the official policy of the Department of Defense or the U.S. Government.
  o I have no relevant financial relationships to disclose.
  o I do not intend to discuss devices, products or procedures which are off-label, unlabeled, experimental, and/or investigational (not FDA approved).
Case Study #1

CPL Smith
CPL Smith: History

- Suffered an mTBI approximately two weeks ago due to a blow to the head.
- He had LOC, nausea, headache and amnesia.
- A head Computed Tomography (CT) was obtained acutely and was normal.
- He has otherwise done well.
CPL Smith: Symptoms

• Headache in the mornings requiring him to lay in bed until they resolve.
  o These do not occur during the rest of the day.
  o He is not taking any medications for headache currently.
  o He is a caffeine drinker and has not changed his caffeine intake and does not take caffeine at night.
• Dizziness every three days or so lasting approximately five seconds per episode
• Subtle decrease in mental agility and just not feeling as mentally sharp as he normally feels
• No photophobia, a normal neurological exam, and otherwise is back to his normal self including his normal fitness regimen of running and weight lifting
CPL Smith: Treatment

- Tylenol 1000mg by mouth every 6 hours
- Re-evaluate him in 48 hours.
CPL Smith: Next Steps?

• If the headaches persist, what should the next step be?
• Would you recommend starting nortriptyline or amitriptyline? If so, at what dose?
• Are there any other lifestyle changes that should be recommended?
**Table 5.0**  
**Characteristics of Headache Types**  
(repeat of slide #39)

<table>
<thead>
<tr>
<th></th>
<th>Migraine</th>
<th>Tension type</th>
<th>Cervicogenic</th>
<th>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 hours</td>
<td>30 minutes to 7 days</td>
<td>Some or all of the 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 head movement</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>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

*PCM should consider the possibility of medication overuse headache (MOH) when criteria in Table 5.0 are present. Optimal treatment consists of discontinuation of the offending medications, acute treatment of withdrawal symptoms and pain, and use of analgesic medication as preventative treatment only when necessary.
• According to the Progressive Return to Activity Clinical Recommendations, what stage is the patient currently in?
  ○ The soldier is currently at Stage 5, and he is having symptoms but they are not brought on by exertion and only occur in the mornings.
• He is a chronic caffeine user. Should he stop all caffeine?
  o Could that contribute to headaches (caffeine-withdrawal headache)? I currently have him avoiding caffeine in the second half of the day so that it does not interfere with his sleep.
CPL Smith: Follow Up 24 Hours Later
(continued 2)

• Patient is returning to clinic tomorrow. If the Tylenol has not worked sufficiently, I am planning on starting amitriptyline 20 mg by mouth at night. We only have 10 mg tablets.
  ○ Should I also continue Tylenol or a nonsteroidal anti-inflammatory drug (NSAID)?
Case Study #2

LT Jones
LT Jones: History

• He suffered an mTBI approximately two weeks ago due to a blow to the head.
• He had LOC, nausea, headache and amnesia.
• A head CT was obtained acutely, and was normal.
• He has otherwise done well.
LT Jones: Symptoms

• He experiences headaches in the mornings requiring him to lay in bed until they resolve.
  o These do not occur during the rest of the day.
  o He is not taking any medications for headache currently.
  o He is a caffeine drinker and has not changed his caffeine intake and does not take caffeine at night.
LT Jones: Symptoms
(continued)

- Dizziness every three days or so lasting approximately five seconds per episode
- A subtle decrease in mental agility and just not feeling as mentally sharp as he normally feels
- No photophobia, a normal neurological exam, and otherwise is back to his normal self including his normal fitness regimen of running and weight lifting
LT Jones: Treatment

• Prescribed Tylenol 1000 mg by mouth every 6 hours and will re-evaluate him in 48 hours.
LT Jones: Next Steps?

• If the headaches persist what should be the next step be?
• Would you recommend starting nortriptyline or amitriptyline?
  o If so, at what dose?
• Any other lifestyle changes recommended?
Summary

• Headache is the most common symptom after a concussion.

• The four most common types of PTH are migraine, tension-type, cervicogenic and headache related to neuropathic pain.

• PTH should be managed corresponding to the headache type it most closely resembles.
  
  o Examples of effective non-pharmacologic treatment include sleep hygiene, physical therapy and relaxation.

  o Examples of effective symptomatic pharmacologic treatment include non-narcotic pain medicine and triptans.
Patient Apps

- Mindfulness Coach
- Concussion Coach
- Breathe2Relax

• Made by the National Center for Telehealth & Technology, a component center of DCoE
• Available for free for Apple and Android devices
References


References (continued 2)

Defense and Veterans Brain Injury Center. (2015). World wide numbers for TBI. Retrieved from


References (continued 6)


References (continued 7)


References (continued 8)


References (continued 9)


*Current Treatment Options in Neurology, 14*(1), 36-49.


*Headache: The Journal of Head and Face Pain, 50*(8), 1262-1272.


http://www.healthquality.va.gov/guidelines/Rehab/mtbi/concussion_mtbi_sum_1_0.pdf
References (continued 10)


**Primary reference:**