Clinical Guidelines for the Care of Persisting Symptoms after Mild Traumatic Brain Injury

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Team Members

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- Scott McCullagh MD
- Diana Velikonja PhD
- Lindsay Berrigan PhD Candidate
Objectives

- Introduction of recently developed guidelines
  - Guidelines for Mild Traumatic Brain Injury and Persistent Symptoms
- To be able to identify persons who have sustained a mild TBI who are at greater risk of persisting symptoms
- Describe an approach to management of common symptoms post mTBI including sleep impairment, post-traumatic headache and mood

Case Example

- 38 year old male Tobogganing with children Jan 2009 (Saturday)
- Standing up going down hill and fell back and struck head
  - No Loss of consciousness- but felt dazed
  - Able to go home with children afterward
  - Onset of slow thinking, headache, balance problems
- Attempted work on Monday morning
  - High School Teacher
  - Not able to focus or concentrate
  - Worsening of Headache as Day progressed
Case Example

- Evaluated at Emergency Room
  - CT head normal
  - Informed he had a concussion
  - Advised off work for 1 week
  - Given analgesic for headache
- Initial symptoms
  - Sleep impairment
  - Headache
  - Balance impairment
  - Fatigue
  - Irritability

- Past Medical History
  - Migraine Headaches in young adulthood- resolved
  - Unable to return to work
  - Evaluated in Out patient clinic July 24, 2009

Case Example

- Symptoms at Presentation
  - Constant headaches
  - Migraine's 2-3 times per week
  - Exertion Headache
  - Tension Headache
  - Irritability
  - Shortness with family members

- Balance impairment
  - Problems with high level balance
  - Sleep initiation impairment
    - early morning awakening
  - Depression
  - Cognition
    - Fatigue
    - Headache with concentration
    - Decreased concentration
  - Montreal Cognitive Assessment Screen
    - 26/30
      - Recall
      - abstraction
American Congress of Rehabilitation Medicine (ACRM) Definition of mTBI

A patient with mild traumatic brain injury is a person who has had a traumatically induced physiological disruption of brain function, as manifested by one or more of the following:

- Loss of consciousness for up to 30 minutes
- Loss of memory for events immediately before or after the accident for as much as 24 hours
- Alteration of mental state at the time of the accident (e.g., feeling dazed, disoriented, or confused)
- Focal neurological deficit(s) that may or may not be transient

But where the severity of the injury does not exceed the following:

- Loss of consciousness > 30 minutes
- Posttraumatic amnesia > 24 hours
- Glasgow coma scale (GCS) score falling below 13 after 30 minutes

Epidemiology of mTBI

- 80-95% of TBIs classified as mild
- Typically estimated incidence of 100-200/100,000
- Estimates as high as 600/100,000 (even 1200)
- In Ontario, mTBI cases presenting to Family Physician first is estimated to be 67-118/100,000
- Overall incidence of mTBI in Ontario, 493-653/100,000
- Men age 15-24 most common
- 90% of mTBI patients will have resolution of symptoms by 7-10 days
Why Does mTBI Matter?

- 10 to 15% of mTBI patients will continue to experience significant symptoms beyond the normal recovery period of 3 months
  - Controversial number-dependent upon mechanism of injury; how incidence is captured
- Symptoms can include:
  - Post-traumatic headache
  - Sleep disturbances
  - Disorders of balance
  - Cognitive impairments
  - Fatigue
  - Mood disorders

Guideline Objective

- To create a set of guidelines that can be used by healthcare professionals to implement evidence-based, best practice care of individuals who incur a mild traumatic brain injury (mTBI) and experience persistent symptoms.
Why Does mTBI Matter?

- British Columbia WSIB Data

Figure 3-B Comparison of median total costs paid per MTBI claim.

Comparison of median total costs paid per MTBI claim

Year of injury

Why Does mTBI Matter?

- British Columbia WSIB Data

Figure 4. Distribution of days MTBI claimants on STD by Year.

Distribution of days on STD
ICD-10 Definition of Post-Concussion Syndrome

A. History of head trauma with loss of consciousness preceding symptoms onset by a maximum of 4 weeks

B. Symptoms in 3 or more of the following symptom categories:
   - Headache, dizziness, malaise, fatigue, noise tolerance
   - Irritability, depression, anxiety, emotional lability
   - Subjective concentration, memory, or intellectual difficulties without neuropsychological evidence of marked impairment
   - Insomnia
   - Reduced alcohol tolerance
   - Preoccupation with above symptoms and fear of brain damage with hypochondriacal concern and adoption of sick role

DSM-IV Definition of Post-Concussional Disorder

A. A history of head trauma that has caused significant cerebral concussion. Note: The manifestations of concussion include loss of consciousness, posttraumatic amnesia, and, less commonly, posttraumatic onset of seizures. The specific method of defining this criterion needs to be established by further research.

B. Evidence from neuropsychological testing or quantified cognitive assessment of difficulty in attention (concentrating, shifting focus of attention, performing simultaneous cognitive tasks) or memory (learning or recall of information).

C. Three (or more) of the following occur shortly after the trauma and last at least 3 months:
   1. Becoming fatigued easily
   2. Disordered sleep
   3. Headache
   4. Vertigo or dizziness
   5. Irritability or aggression on little or no provocation
   6. Anxiety, depression, or affective instability
   7. Changes in personality (e.g., social or sexual inappropriateness)
   8. Apathy or lack of spontaneity
DSM-IV Definition of Post-Concussional Disorder

D. The symptoms in criteria B and C have their onset following head trauma or else represent a substantial worsening of preexisting symptoms.

E. The disturbance causes significant impairment in social or occupational functioning and represents a significant decline from a previous level of functioning. In school-age children, the impairment may be manifested by a significant worsening in school or academic performance dating from the trauma.

F. The symptoms do not meet criteria for Dementia Due to Head Trauma and are not better accounted for by another mental disorder (e.g., Amnestic Disorder Due to Head Trauma, Personality Change Due to Head Trauma).

mTBI Controversy

- Definition and diagnostic criteria for mild TBI and concussion controversial
  - No agreement on Post Concussion syndrome definition
- Number with persisting symptoms and diagnoses post injury remains controversial
  - Sport versus MVC injury
- May not seek medical attention at time of injury
- Non specific symptoms/ overlap with many other diagnoses
- Symptoms may be subtle e.g. cognitive
- No specific diagnostic test
Experience

- Management of mild TBI not done in coordinated fashion
- Regional and specialty variation in practice
- Persons with persistent symptoms post mild TBI not necessarily managed in holistic manner e.g. sequential visits to specialists
- No specific health care specialty or group “owns” mild TBI
  - E.g. fibromyalgia- Rheumatology
  - Depression- Psychiatry
- Evidence for management lacking;
- Guidelines- up until recently, very few available to direct care

Persisting Symptoms and Complications post mild TBI

- **Somatic**
  - Headache, dizziness, auditory, visual, balance, fatigue, light sensitivity

- **Cognitive**
  - Memory, attention and concentration, information processing speed, abstraction, problem solving

- **Psychological, Behavioural**
  - Depression, Anxiety, PTSD, irritability, agitation, apathy
Biopsychosocial Model of mTBI and Post Concussion Syndrome (Rose 2005)

**Mild Traumatic Brain Injury**

**Pre-Injury Variables**
- Personality
- Life Stressors & Coping Skills
- History (e.g., Substance Abuse)
- Physical/mental Health - Abnormalities
- Family/financial Status, SES, Compromise
- History Head Injuries

**Post-Injury Variables**
- Other Factors (e.g., Misdemeanor Injury)
- Severity of Injury (e.g., Loss of consciousness)
- Nature of Injury Event (e.g., Head Injury)
- Reaction of Patient or Family

**Interpersonal Factors**
- Family Environment
- Developmental
- Cognitive
- Supportive & Positive Environment

**Psychosocial Factors**
- Social
- Economic, Socialization dissent
- Depression

**Outcome - Post Concussion Symptoms**
- Impact of symptom (e.g., Fatigue, Sleep, Work, or Self)

Need for Guidance

- Best practice treatment for these individuals is currently not well defined.
- Therefore, the following clinical questions needed to be addressed:
  - Can a management plan be developed to screen for and identify patients that are at high-risk of persistent symptoms?
  - And, once identified, can a management plan be developed to treat the symptoms commonly associated with the disorder?
Establishment of mTBI Expert Consensus Group

• Adequate representation:
  • Health care professions
    • Emergency Medicine
    • Neurology
    • Physical Medicine & Rehabilitation
    • Radiology
    • Psychiatry
    • Psychology
    • Physical Therapy
    • Occupational Therapy

• Interest Groups/Persons
  • Ontario Neurotrauma Foundation
  • Ontario Brain Injury Association
  • Consumer

Establishment of mTBI Expert Consensus Group cont.

• Adequate Representation:
  • Domain of Expertise
    • Physical Symptoms
    • Cognitive Symptoms
    • Behavioural Symptoms
    • Objective Evidence of mTBI
    • Quality of Life
    • Outcomes and Knowledge Translation
    • Sport-related Injuries
    • Motor Vehicle Accidents
    • Military Trauma

• Geographic location
  • Ontario
  • Across Canada
  • United States
  • Australia
mTBI Expert Consensus Group

- Mark Bayley, MD, FRCP; Toronto Rehabilitation Institute
- Markus Bessemann, MD, FRPCP, Dip. Sport Med., LCol.; HQ Health Services Delivery, Canadian Forces
- Angela Colantonio, PhD, OT; Toronto Rehabilitation Institute
- Paul Comper, PhD, CPsych; Toronto Rehabilitation Institute
- Nora Cullen, MD, MSc, FRCP; Toronto Rehabilitation Institute
- Anne Forrest, PhD; mTBI Survivor
- Jane Gillett, MD, FRCP; Hamilton Health Sciences
- John Gladstone, MD, FRCP; University of Toronto
- Wayne Gordon, MD, PhD, ABPP/Cn, FACRM; Mount Sinai School of Medicine
- Elizabeth Inness, BSc (PT), MSc; Toronto Rehabilitation Institute
- Grant Iverson, PhD, CPsych; University of British Columbia
- Corinne Kagan; Ontario Neurotrauma Foundation
- Vicki Kristman, PhD; University Health Network, Toronto Western Hospital
- John Kumpf; Ontario Brain Injury Association
- Andreal LaBorde, MD; Hospital of the University of Pennsylvania, Co-Chair of the Mild TBI Task Force for the American Congress of Rehabilitation Medicine
- Shayne Ladak, MD; McMaster University, Team Physician Canadian Soccer Association & Federation Internationale de Football Association (FIFA)
- Sue Lukersmith, OT; Lukersmith & Associates, Author of NSW MAA mTBI Guideline
- Shawn Marshall, MD, MSc, FRCP; University of Ottawa
- Scott McCullagh, MD, FRCP; University of Toronto
- Willie Miller, MD, FRCP; The Ottawa Hospital, University of Ottawa
- Alain Ptito, PhD, CPsych; Montreal Neurological Institute and Hospital, McGill University
- Laura Rees, PhD, CPsych; The Rehabilitation Centre, University of Ottawa
- Jim Thompson, MD, CCFP (EM), FCFP; Veterans Affairs Canada
- Rob van Reekum, MD, FRCP; University of Toronto and Laval University
- Diana Velikonja, PhD, CPsych; Hamilton Health Sciences

Search for Existing Guidelines

- Comprehensive search for guidelines relevant to TBI published in English or French within the last 10 years and included recommendations for mild injuries
  - Databases (e.g., The Cochrane Library, National Guidelines Clearing House)
  - MEDLINE
  - PsycINFO
  - General web search
  - Websites of relevant organizations (e.g., Canadian Medical Association, National Institute of Clinical Excellence)
Search for Existing Guidelines

- 23 guidelines identified
- After applying exclusion criteria, 7 were retained

### Evaluation of Existing Guidelines

- Guidelines were evaluated using the Appraisal of Guidelines for Research and Evaluation (AGREE)
- The AGREE instrument assesses quality across 6 domains:
  1. Scope and purpose
  2. Stakeholder involvement
  3. Rigour of development
  4. Clarity of presentation
  5. Applicability

#### Table 2. Existing TBI guidelines evaluated in the process of developing the current guideline

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Group</th>
<th>Guideline Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>North South Wales Motor Accident Authority</td>
<td>Guidelines for Mild Traumatic Brain Injury Following Closed Head Injury</td>
<td>2008</td>
</tr>
<tr>
<td>DVBIC</td>
<td>Defense and Veterans Brain Injury Centre</td>
<td>Updated Mild Traumatic Brain Injury (mTBI) Clinical Guidance</td>
<td>2008</td>
</tr>
<tr>
<td>NZGG</td>
<td>New Zealand Guidelines Group</td>
<td>Traumatic Brain Injury: Diagnosis, Acute Management and Rehabilitation</td>
<td>2006</td>
</tr>
<tr>
<td>CLE</td>
<td>State of Colorado Department of Labor and Employment</td>
<td>Traumatic Brain Injury Medical Treatment Guidelines</td>
<td>2005</td>
</tr>
<tr>
<td>WSIB</td>
<td>Workplace Safety and Insurance Board of Ontario</td>
<td>Mild Traumatic Brain Injury Program of Care</td>
<td>2006</td>
</tr>
<tr>
<td>NICE</td>
<td>National Institute for Clinical Excellence</td>
<td>Head Injury: Triage, Assessment, Investigation and Early Management of Head Injury in Infants, Children and Adults</td>
<td>2003</td>
</tr>
<tr>
<td>CIS</td>
<td>Concussion in Sport Group</td>
<td>Summary and Agreement Statement of the 2nd International Conference on Concussion in Sport, Prague 2004</td>
<td>2005</td>
</tr>
</tbody>
</table>
AGREE Ratings for Rigour of Development

Systematic Review of the Literature

- Extensive search for published research evaluating the effectiveness of treatments or interventions intended to either prevent or manage persistent symptoms following mTBI
  - MEDLINE and PsycINFO
  - From 2001-2008
  - Initiated from date where WHO review left off
Results of Systematic Review

- **Medline**
  - Number of results returned: 9435
  - Number retained after titles screened and obviously irrelevant articles (e.g., animal models, pediatrics) discarded: 394
  - Number retained after abstracts screened for relevance by 2 independent reviewers: 61
  - Number retained after relevance confirmed by screening full text and, thus, from which data was extracted: 36

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Results of Systematic Review

- **PsycInfo**
  - Number of results returned: 8342
  - Number retained after titles screened and obviously irrelevant articles (e.g., animal models, pediatrics) discarded: 105
  - Number retained after abstracts screened for relevance by 2 independent reviewers: 17
  - Number retained after relevance confirmed by screening full text and, thus, from which data was extracted: 0
Very few guidelines and little research addressing mTBI management were found. Thus, a search for guidelines and systematic reviews addressing most common persistent symptoms was also completed. Procedures similar to those already described.

Inclusion Criteria:
- Published within last 5 years
- Supported by Canadian or national organization
- Addressed symptom commonly found to persist after mTBI

Categories of symptoms for which guidelines outside of the TBI field were identified and recommendations were extracted from:
- Cognitive deficits: 1
- Fatigue: 1
- Mood Disorders: 4
- Sleep Disorders: 4
Expert Consensus Conference

- Held November, 2008 in Toronto
- Members of the mTBI Expert Consensus Group met to evaluate the existing research on mTBI management
- Attendees worked to adapt quality recommendations extracted from existing guidelines and to develop new recommendations based on current research and clinical expertise

Expert Consensus Conference

- The outcome of the conference was a rough draft of 152 recommendations
- Members voted using a modified delphi technique to narrow down the number of recommendations
- After the conference, members reviewed the recommendations again and endorsed which ones should be retained in the final guideline
mTBI Guideline

After applying the criteria:

- 77 recommendations remained
- 56 adapted from existing guidelines
- 21 generated from either new evidence or the opinion/experience of the expert consensus group
mTBI Guideline

1. Diagnosis/Assessment of mTBI
2. Management of mTBI
3. Sport-related mTBI
4. Diagnosis/Assessment of Persistent Symptoms
5. Management of Persistent Symptoms
6. Persistent Cognitive Difficulties
7. Persistent Balance Disorders
8. Post-traumatic Headache
9. Persistent Vision Disorders
10. Persistent Sleep Disturbances
11. Persistent Mental Health Disorders
12. Persistent Fatigue
13. Return to Work/School Considerations

Grading Scheme

Table 3. Levels of Evidence Grading Scheme Used in the Current Guideline

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>At least one randomized controlled trial, meta-analysis, or systematic review</td>
</tr>
<tr>
<td>B</td>
<td>At least one cohort comparison, case studies or other type of experimental study</td>
</tr>
<tr>
<td>C</td>
<td>Expert opinion, experience of a consensus panel</td>
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Mild TBI Guidelines

**GENERAL RECOMMENDATIONS FOR DIAGNOSIS/ASSESSMENT OF mTBI**

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>GRADE</th>
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</thead>
<tbody>
<tr>
<td>1.1 mTBI following closed head injury should be diagnosed early as early recognition will positively impact on health outcomes for patients.</td>
<td>A</td>
</tr>
<tr>
<td>1.2 Diagnosis of mTBI should be performed through a combined assessment of clinical factors and symptoms.</td>
<td>A</td>
</tr>
<tr>
<td>1.3 Standardized measurement of post traumatic amnesia should be routinely performed to assist with the monitoring, diagnosis, early management and prognosis of patients who have experienced a mTBI. The Orientation Log (O-Log; SEE APPENDIX 1.1) is a standardized tool that can be used to monitor post traumatic amnesia.</td>
<td>A/C</td>
</tr>
<tr>
<td>1.4 Medical assessment should include screening for red and yellow flags to identify patients for increased risk of persistent symptoms and urgent complications, such as subdural hematoma. Refer to the information sheet outlining red and yellow flags (SEE APPENDIX 1.2).</td>
<td>B</td>
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**RECOMMENDATIONS FOR EMERGENCY DEPARTMENT CLINICIANS**

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
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<tbody>
<tr>
<td>1.5 At four hours post injury, if the patient has a Glasgow Coma Scale score of 15, is clinically improving and has a normal CT scan or there is no indication for CT based on the Canadian CT Head rules but their Orientation Log (O-Log) score is &lt; 25, then clinical judgment is required to determine whether the patient should be discharged home before a normal score for this measure is obtained.</td>
<td>C</td>
</tr>
<tr>
<td>1.6 All patients with any degree of head injury who are deemed safe for appropriate discharge from an emergency department or the observation ward should receive verbal advice and a written head injury advice card (SEE APPENDIX 1.3). The details of the card should be discussed with the patient and their care providers. When necessary, communication in languages other than English or by other means should be used to communicate the information.</td>
<td>C</td>
</tr>
</tbody>
</table>
| 1.7 If the patient re-presents to the emergency department with symptoms related to the initial injury, the following should be conducted:  
  - Full re-assessment  
  - Orientation Log (O-Log) assessment  
  - CT scan, if indicated  
  - Emphasis and encouragement to the patients to attend their family physician for follow-up after discharge. | C |
Mild TBI and Persistent Symptoms Guidelines

- Provide background and information on mild TBI and its management
- Primary focus on more common situation of management of symptoms post mild TBI
- Provide resources to assess and manage symptoms

Case Example

- Management
  - Identification
  - Sleep
  - Mood
  - Headache
  - Balance/ Dizziness
  - Return to Work
Factors that may influence patient outcomes:

**Red flags** (pathology)
- Experienced PTA
- History of previous neurological or psychiatric problems, previous traumatic brain injury or physical limitations
- Higher number of symptoms reported early post injury
- Skull fracture
- Severe headache within 24 hours and pain severity > 4/10 on VAS
- Reduced balance, dizziness in acute stage
- Confounding effects of other health related issues e.g., pain medications, emotional distress
- Presence of nausea or memory problems post injury

**Yellow flags** (contextual factors – personal, psychosocial or environmental factors)
- Injury sustained in a MVA
- Insurance system claimant, but not at fault. Settling a claim will not necessarily result in resolution of symptoms
- Not returning to work or significant delays in returning to work following the injury (if work longer – delays recovery)
- Being a student
- Presence of concurrent life stressors
- Percentage of body in reported pain where compensation claim applicable (> 20% body in pain = delays recovery)
- Tendency to blame others compared to patient who was at fault (e.g., motor vehicle accident)
- Higher level of symptom reporting associated with mood symptoms and greater patient awareness of deficits

New South Wales - Guidelines for Mild Traumatic Brain Injury following Closed Head Injury - 2008
**RECOMMENDATIONS FOR FAMILY PHYSICIANS**

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<tr>
<td>1.8 On presentation, the Family Physician should conduct a comprehensive review of every patient who has sustained a mTBI. The Family Physician’s assessment should include taking a history, examination, cognitive screen, post concussive symptom assessment and review of mental health.</td>
<td>A</td>
</tr>
<tr>
<td>1.9 An appraisal of the severity and impact of post concussive symptoms should be made. A standardized tool such as the Rivermead Post-Concussion Symptoms Questionnaire (SEE APPENDIX 1.4) can aid in this.</td>
<td>C</td>
</tr>
<tr>
<td>1.10 The clinician should consider that one array of symptoms an individual who has sustained a mTBI is likely to experience is reduced cognitive functioning post injury which may resolve in a few days or continue for months before resolving, and can include problems with recall of material, speed of information processing, concentration and attention.</td>
<td>A</td>
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**Resources**
1. Rivermead Post-Concussion Symptoms Questionnaire

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**GENERAL RECOMMENDATIONS FOR THE MANAGEMENT OF mTBI**

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
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<tr>
<td>2.1 Because a variety of factors, including biopsychosocial, contextual, and temporal preinjury, injury and postinjury variables can impact on the outcomes of patients who have sustained a mTBI, clinicians should consider these factors when planning and implementing the management of patients.</td>
<td>A</td>
</tr>
<tr>
<td>2.2 Minor problems should be managed symptomatically and the person should be offered reassurance and information on symptom management strategies.</td>
<td>A</td>
</tr>
<tr>
<td>2.3 All people who have sustained a possible or definite mTBI should receive information about common symptoms and reassurance that recovery over a short period of time (days to a few weeks) is highly likely.</td>
<td>B</td>
</tr>
<tr>
<td>2.4 A person who sustains a mTBI should not drive for at least 24 hours and may require medical assessment. An extension of the recommended 24 hour time period is advised if there are symptoms or complications that result in loss of good judgment, decreased intellectual capacity (including slow thinking), post traumatic seizures, visual impairment or loss of motor skills. If there are complications, a medical assessment is required before an individual returns to driving.</td>
<td>C</td>
</tr>
<tr>
<td>2.5 Symptomatic patients should be followed every two to four weeks from the time of initial contact until no longer symptomatic or until another re-assessment procedure has been put in place.</td>
<td>C</td>
</tr>
<tr>
<td>2.6 A patient experiencing reduced cognitive functioning in the first few days following injury, with education and support, should be expected, in the majority of cases, to have these symptoms resolve and preinjury cognitive functioning return within days, up to three months. However, for patients who have 1) comorbidities or identified red and yellow flags and do not improve by one month, or 2) persisting symptoms at 3 months, it is recommended that these patients be referred for more comprehensive evaluation to a specialized brain injury environment.</td>
<td>A</td>
</tr>
<tr>
<td>2.7 Patients with preinjury psychiatric difficulties should be provided with multidisciplinary treatment.</td>
<td>A?</td>
</tr>
</tbody>
</table>
Mood

- Patient noted to have depression
- Also noted to have irritability
- Started on Citalopram 20 mg daily

Sleep

- Difficulty with initiating sleep
- Started on Trazadone 25 mg at bedtime as needed

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**ASSESSMENT OF PERSISTENT MENTAL HEALTH DISORDERS**

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<td>11.1</td>
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It is important to consider the overlap in symptoms between mTBI and associated mental health disorders. For symptomatic patients seen at first follow-up and subsequent follow-up, the following should be screened for specifically: depression; PTSD; irritability/personality change; anxiety; pain. Refer to the Algorithm for Assessment of Depression in Traumatic Brain Injury from the NZGG Guideline (SEE APPENDIX 11.1) and the NSW MAA Anxiety guideline (SEE APPENDIX 11.2). Consider use of the Patient Health Questionnaire (PHQ-9; SEE APPENDIX 11.3), PTSD screen from the NSW MAA Anxiety guideline, an irritability scale or the irritability items from the Rivermead Post-Concussion Symptoms Questionnaire (SEE APPENDIX 11.4), and the Pain Disability Index (SEE APPENDIX 11.5).

**Resources**

3. Screening tool for common mental health disorders: Patient Health Questionnaire (PHQ-9).
5. Irritability screening tool: To be identified.
### MANAGEMENT OF PERSISTENT MENTAL HEALTH DISORDERS

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Grade</th>
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<tbody>
<tr>
<td>11.2 The patient should be referred to a multidisciplinary team (ideally with expertise in treating people with TBI, if available): - the risk of suicidality is judged significant - the initial treatment is not effective within two months - the presentation is complex - pharmacotherapy is indicated and the familiar medication strategies are contraindicated - there are red and yellow flags present that are known to potentially affect course of recovery.</td>
<td>C</td>
</tr>
<tr>
<td>11.3 Given frequent complex presentation of persistent symptoms following mTBI, other symptoms should not be neglected or left unmanaged because a patient has been referred for specialized care. Management should still be attempted while the patient is well tested and treated with somatic symptoms such as headaches, dizziness, or sleep should still be treated as these may not be addressed by the specialist.</td>
<td>C</td>
</tr>
<tr>
<td>11.4 In any trial of psychotropic medication, the start low and go slow approach should be adopted. However, maximum dose antidepressants may be needed before efficacy is seen as medication is abandoned in some cases.</td>
<td>C</td>
</tr>
<tr>
<td>11.5 A specific selective serotonin reuptake inhibitor should be the first choice for treatment of post-traumatic brain injury depression unless the sedative/anxiolytic/migraine effects are considered desirable.</td>
<td>C</td>
</tr>
<tr>
<td>11.6 Serum drug levels should be monitored as necessary.</td>
<td>C</td>
</tr>
<tr>
<td>11.7 The patient should receive follow-up at appropriate intervals (e.g., 1-2 weeks) while the drug dose is increased to an effective dose to ensure that the drug is tolerated and producing the required improvement in mood.</td>
<td>C</td>
</tr>
<tr>
<td>11.8 Cognitive-behavioral therapy has been shown to be effective in the treatment of depression, and would be considered appropriate to the treatment of depression following mTBI.</td>
<td>B</td>
</tr>
<tr>
<td>11.9 Therapy should be offered to those with post-traumatic syndromes or with severe PTSD in the first month after the traumatic event.</td>
<td>B</td>
</tr>
<tr>
<td>11.10 An PTSD sufferers should be offered a course of trauma-focused psychological treatment, and assessed for appropriateness of additional adjunct medication treatment. These treatments should normally be provided on an individual outpatient basis.</td>
<td>A</td>
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### MANAGEMENT OF PERSISTENT SLEEP DISTURBANCES

<table>
<thead>
<tr>
<th>Recommendation</th>
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<tbody>
<tr>
<td>10.4 Advise patients that the goal of treatment is to improve the continuity and restorative quality of sleep, not to make them “8 hour sleepers”. More often than not the total sleep time will be less than 8 hours per night.</td>
<td>C</td>
</tr>
<tr>
<td>10.5 Provide the following sleep hygiene advice: - avoid vigorous exercise within 2 hours of bedtime - avoid sleeping-in after a poor night of sleep - avoid watching/checking the clock - avoid excessive liquids or heavy evening meals - avoid caffeine, nicotine, and alcohol before bed - maintain a quiet, dark, safe, and comfortable sleep environment - schedule a wind-down period before bed.</td>
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<td>10.6 Relaxation training is effective and recommended therapy in the treatment of chronic insomnia.</td>
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<td>10.7 Psychostimulants are generally recommended at the lowest effective dose as short-term treatment lasting less than 7 days. Although long-term use of hypnotic agents is discouraged due to the potential for tolerance and dependence, there are specific situations and circumstances under which long-term use of hypnotics may be appropriate.</td>
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- **Short term (>7 consecutive nights):** - Initially used to break the cycle of chronic insomnia and allow the patient to adapt to cognitive and behavioral interventions - Used to manage an exacerbation of previously controlled primary insomnia. **Long term intermittent** (self-administered therapy toincrinate while and prevent relapse): - Used on a limited PRN basis (<3 times/week) for occasional hours of insomnia - Used on a scheduled basis (i.e., <3 times/week) to ensure consistent adequate sleep in a patient with chronic primary insomnia where the goal of therapy is to prevent relapse. **Refer to the Therapeutic Options Table taken from the Alberta FPA guideline (See Appendix 10.1) for information on useful medications.**
Headache
- Tension Headache
- Post Exertion Headache
- Naproxen 500 mg bid

Balance
- No Benign Positional Vertigo
- Dix HallPike Maneuvre Negative
- Dizziness and balance impairment
  - Unable to skate
  - Difficulty walking on uneven terrain/hiking
- Referred for Vestibular Rehabilitation
  - Physiotherapy
  - Balance Exercises

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**MANAGEMENT OF POST-TRAUMATIC HEADACHE**

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<thead>
<tr>
<th>RECOMMENDATION</th>
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<td>8.3 Management of post-traumatic headache should be tailored to the class of non-traumatic headache it most closely resembles (e.g., chronic tension, migraine, etc.). Refer to the treatment algorithms specific to the appropriate class of headache taken from the ICSI guideline (see Appendix V.B-V.E) for treatment guidance. <strong>NOTE: CREATE TREATMENT RECOMMENDATIONS FOR OCCITAL NEURALGIA AS THE ICSI DOES NOT COVER THIS.</strong></td>
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<td>8.4 Manual mobilization therapy is evident to be moderately effective in treating post-traumatic headache. Mobilization consists of passive movements of the joint within its normal physiological range.</td>
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**ASSESSMENT OF PERSISTENT BALANCE DISORDERS**

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<tr>
<th>RECOMMENDATION</th>
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<tr>
<td><strong>7.1</strong> Clinicians should screen for balance deficits using the one leg standing eyes open and eyes closed quasi-static balance tests (SEE APPENDIX 7.2) for assessment of postural stability because clinical testing of balance offers additional information about the presence of ongoing symptoms and assists in the subsequent management of patients who have sustained a mTBI. For persons with functional balance impairments and screening positive on a balance measure, consideration for further balance assessment and treatment by physio may be warranted pending clinical course.</td>
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<td><strong>7.2</strong> If symptoms of benign positional vertigo are present the Dix-Hallpike Maneuver (SEE APPENDIX 7.1) should be used.</td>
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</tbody>
</table>
Cognition

- Referred for Neuropsychology Assessment
  - Teacher
  - Difficulty with concentration and reading since injury
  - Cognitive fatigue complaint
### Case Example- 1 Year Post Injury

- Mood and sleep clearly improved
- Balance improved
- Headaches intermittent
  - Still has headaches with exertion, but improved
- Cognition- Neuropsychology testing
  - Demonstrated relative deficits in information processing speed
  - Decreased divided attention
- Able to return to work on graduated basis
  - Now teaching full time
  - Some persisting symptoms

### ASSESSMENT OF PERSISTENT COGNITIVE DIFFICULTIES

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<tr>
<th>RECOMMENDATION</th>
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<td>6.1 When there are persisting cognitive complaints, the Family Physician should make efforts to formally screen for cognitive deficits. Objective measures of these domains most commonly affected post-mTBI (i.e., attention and concentration, information processing speed, memory) should be used. Although there currently is not screening measure specific to cognitive difficulties following mTBI, other non-proprietary measures evaluating the domains mentioned are available, such as the Montreal Cognitive Assessment (MoCA; SEE APPENDIX 6.1).</td>
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<td>6.2 Due consideration should be given to potential co-morbid diagnoses that could be present and have the potential to influence cognition such as anxiety, depression, PTSD, pain, fatigue, sleep disturbance, or acute stress disorder.</td>
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<td>6.3 If evidence of cognitive dysfunction is obtained upon screening that is likely attributable to the mTBI itself or if cognitive symptoms are reported to persist at 3 months, then consideration for more formal assessment should be given and referral made. If available, refer to a neuropsychologist (ideally with experience with TBI). When a local neuropsychologist is not available or known, referral to a TBI centre can be made (SEE APPENDIX 8.2 for a list of TBI centres in Ontario). For systems with long wait times, practitioners should consider referral earlier than 3 months.</td>
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Summary

- Persisting symptoms may occur post Mild TBI
- Multiple factors influence course of recovery
- Coordinated Symptom based approach is often required
- Guidelines for Mild Traumatic Brain Injury and Persistent Symptoms
  - Currently undergoing review
  - Aim to provide emphasis to approach and resources