

2 Initial Management of Concussion/mTBI

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Whether a patient first presents to the Emergency Department (ED) or to the primary care provider's (PCP's) office, ruling out traumatic brain or spine injury that requires emergency intervention is the initial priority. Acutely following injury, it is essential that a management plan be initiated for each patient including: information regarding monitoring for potential acute complications requiring re-assessment, education regarding expected symptoms and course of recovery, and recommendations for healthcare follow-up post-injury.¹ Treatment should be individualized and based on individual patient symptoms and physical examination findings.² Pre-injury or current psychiatric difficulties, such as depression or anxiety, may place a patient at increased risk for persistent symptoms.² Referral to specialist services and/or interdisciplinary treatment may be required early on for these patients (see [Appendix 2.1](#)). Information pertinent to care pathway and referrals may also be found at the following links: [Post Concussion Care Pathway](#), [Referral Indicators](#), for [Concussion Symptom Management](#) and [Scope of Practice for Healthcare Professionals](#) (*Scope of Practice is information for Ontario only*). Referral to specialists should also be considered if symptoms exhibit an atypical pattern or cannot be linked to a concussion event, and/ or when there are other major comorbid conditions present (e.g., depression, PTSD).

The majority of patients will be discharged home; it should be noted that a person who remains symptomatic post mTBI should not drive for at least 24 hours.³⁻⁶ Even asymptomatic patients after 48 hours exhibited poorer vehicle control, especially when navigating curves suggesting that driving impairments may persist beyond when individuals with a concussion have returned to driving.⁷ Also, patients who did present symptoms compatible with a concussion/mTBI following a head trauma but who are completely asymptomatic by the time they are medically-assessed should be presumed to have sustained a concussion/mTBI and receive counselling as described below.

GENERAL RECOMMENDATIONS FOR MANAGEMENT OF CONCUSSION/mTBI		GRADE
2.1	Initial treatment of a patient with concussion/mTBI should be based upon a thorough evaluation of signs and symptoms, pre-injury history (e.g., prior concussion(s), premorbid conditions) and concurrent potential contributing factors (e.g., comorbid medical conditions, ADHD, medications, mental health difficulties, impact of associated concurrent injuries).	C
2.2	Persons who report somatic, cognitive and/or psychological difficulties after concussion/mTBI should be assessed and provided with symptom-based treatment even if it has been a prolonged time after injury. ^a	C
2.3	A patient with a first-time concussion/mTBI should be advised through early education, support and/ or assurance that a full recovery of symptoms, including cognitive functioning, is typically seen within as early as a few days up to 1 to 3 months post-injury. ^b	A
2.4	For patients who have 1) comorbidities or identified health or risk factors (see Table 1.1) and are not on a trajectory of improvement within the first month, or 2) persistent symptoms greater than 4 weeks post-injury, it is recommended that these patients be referred for more comprehensive interdisciplinary evaluation to specialized concussion services/clinics (see Appendix 2.1) ^b	C
2.5	The primary care provider should routinely screen for the risk of depression and/or anxiety in the first few weeks after concussion/mTBI (see Appendices 8.1 & 8.2), which may be influenced by psychosocial factors and psychological responses to the injury. Patients who screen positive should be managed and referred to specialist services, if needed, since these conditions commonly complicate recovery. ^b	B

Although the majority of current treatments for concussion are in their infancy of development,⁸ there is preliminary evidence to support the effectiveness of active rehabilitation such as psychoeducational, psychological and cognitive interventions.⁹⁻¹² The primary forms of treatment have traditionally included a recommendation for physical and cognitive rest until symptoms subside along with other interventions, such as education, coping techniques, support and reassurance, neurocognitive

a. Adapted from the *VA/DoD Management of Concussion/Mild Traumatic Brain Injury Clinical Practice Guideline* (VA/DoD, 2009).

b. Adapted from the *Motor Accidents Authority NSW, Guidelines for Mild Traumatic Brain Injury following a Closed Head Injury* (MAA, NSW, 2008).

rehabilitation and antidepressants.^{9,13} However, the most recent world Sport-Related Concussion consensus statement indicated that there is currently insufficient evidence that prescribing complete rest achieves recovery by minimizing brain energy demands following concussion. It is recommended that after a brief period of rest during the acute phase (24–48 hours) post-injury, patients can be encouraged to become gradually and progressively more active while staying below their cognitive and physical symptom-exacerbation thresholds¹³ (see [Appendix 2.2](#)). This emphasizes an approach of “Activity as tolerated” (i.e., in a manner that does not result in a significant or prolonged exacerbation of symptoms). The potential benefit of integrating cognitive behavioral therapy to address thoughts and activities, with cognitive rehabilitation to address difficulties with cognitive abilities, such as attention and memory, has also been noted.^{11,14} Currently, there is limited evidence to support the use of pharmacotherapy.¹³ Medications that may mask worsening symptoms or confuse changes in mental status should be avoided in the early phases of recovery.¹⁵

Several review articles have stated the importance of educational interventions addressing concussion knowledge, symptom interpretation, recovery expectations and thought patterns, and activity levels, in preventing and managing persistent symptoms after concussion.^{10-12,16-18} Educational interventions for mTBI should validate the current symptomatology, while providing education on the anticipated course of recovery and the importance of gradually achieving realistic functional goals.¹⁹ There is also evidence to suggest that reassurance, in addition to education about symptoms, is more effective for lowering risk of persistent symptoms than education alone.¹³ Several studies have demonstrated that providing brief single session education-oriented treatment is superior to standard procedures,^{10-12,19-21} and even as effective as more intensive interventions.^{20,21} Education and training for identified patient’s family and caregivers are also important in aiding the patient’s recovery.²² In addition to providing verbal information and reassurance to patients, it is also advised that written patient information sheets are delivered (see Appendices [1.3](#) and [1.4](#)).²³ See [Algorithm 2.1](#), which outlines the key steps for initial management of mTBI.

Overall, management of concussion/mTBI should initially be managed in a standardized and consistent fashion recognizing that the majority of patients will proceed to complete recovery. Interdisciplinary teams are important, particularly for those patients with more complex or prolonged recovery.⁸ By applying the strategies outlined above consistently, both the acute and chronic complications of concussion can be mitigated.

RECOMMENDATIONS FOR MANAGEMENT OF mTBI: PROVIDING EDUCATION AFTER mTBI		
		GRADE
2.6	On presentation to healthcare professionals, patients and their support persons should be provided with education that includes verbal and printed information (see Appendices 1.3 and 1.4). This information should be provided at the initial assessment and ongoing as required. ^a Education should be tailored based on the patient’s history and symptoms and include information on: <ol style="list-style-type: none"> Symptoms and expected outcomes Normalizing symptoms (education that current symptoms are expected and common after injury event) Reassurance about expected full recovery in the majority of patients within a few days, weeks or months Gradual return to activities as tolerated i.e., in a manner that does not result in a significant or prolonged exacerbation of symptoms and life roles Techniques to manage stress^a 	A (a-d) C (e)
2.7	Scheduled telephone and/or in-person follow-up should be arranged. The focus of these sessions should be to provide education regarding symptom management as well as strategies to encourage a gradual and active resumption of everyday activities as tolerated. These sessions should be provided over the initial 12 weeks post-injury as required.	A
NEW 2.8	Cognitive behavioural therapy could be considered as a supplementary early intervention for patients with psychological risk factors (e.g., pre-injury mental health disorder, negative expectations for recovery, high post-injury anxiety), or as a treatment option for patients with multiple persisting symptoms.	A

RESOURCES

APPENDICES

1	Brain Injury Advice Card (Long Version)	Appendix 1.3
2	Brain Injury Advice Card (Short Version)	Appendix 1.4
3	Specialized Concussion Clinics/ Centers in Ontario	Appendix 2.1

a. Adapted from the *VA/DoD Management of Concussion/Mild Traumatic Brain Injury Clinical Practice Guideline* (VA/DoD, 2009).

4	Parkwood Pacing Graphs	Appendix 2.2
5	Post Concussion Care Pathway	Appendix 2.3
6	Referral Indicators	Appendix 2.4
7	Concussion Symptom Management	Appendix 2.5
ALGORITHMS		
1	Algorithm: Initial Management of Symptoms Following mTBI	Algorithm 2.1
TABLES		
1	Risk Factors Influencing Recovery Post mTBI	Table 1.1

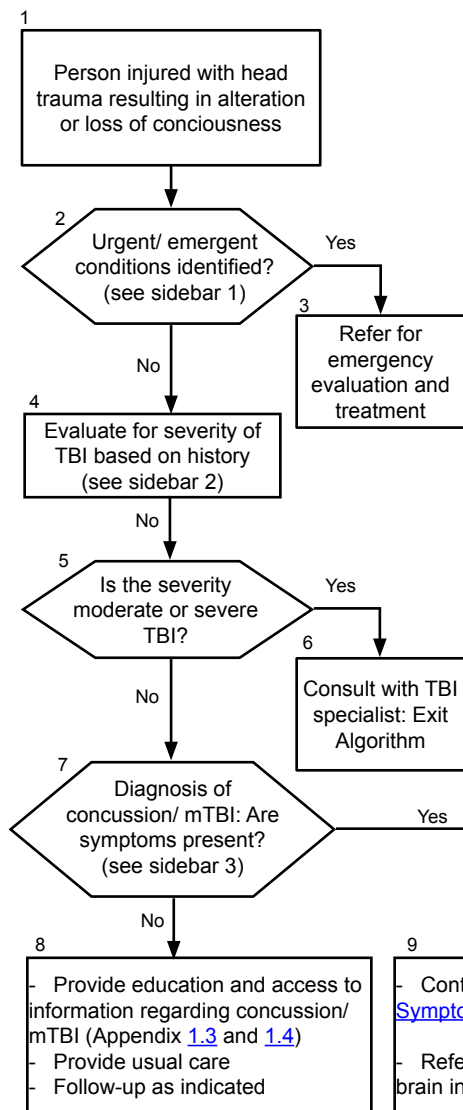
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Algorithm 2.1

Initial Management of Symptoms Following mTBI*

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



Sidebar 1: Indicators for Immediate Referral	
1. Progressively declining level of consciousness	7. Double vision
2. Progressively declining neurological exam (Appendix 3.4)	8. Worsening headache
3. Pupillary asymmetry	9. Cannot recognize people or disoriented to place
4. Seizures	10. Slurred speech
5. Repeated vomiting	11. Unusual behavior
6. Neurological deficit: motor or sensory	

Sidebar 2: Indicators for Immediate Referral (If a patient meets criteria for more than one category of severity, the higher severity level is assigned)			
Criteria	Mild	Moderate	Severe
Structural Imaging	Normal	Normal or abnormal	Normal or abnormal
Loss of Consciousness (LOC)	0-30 min	>30 min and <24 hours	>24 hours
Alteration of Consciousness/ mental state (AOC)*	up to 24 hours	>24 hours; severity based on other criteria	
Posttraumatic Amnesia	0-1 day	>1 and <7 days	>7 days
Glasgow Coma Scale (GCS) (best available score in 24 hours) **	13-15	9-12	<9

Sidebar 3: Possible Post-mTBI Related Symptoms***		
Physical Symptoms: Headache, dizziness, balance disorders, nausea, fatigue, sleep disturbance, blurred vision, sensitivity to light, hearing difficulties/loss, tinnitus, sensitivity to noise, seizure, transient neurological abnormalities, numbness, tingling, neck pain	Cognitive Symptoms: Problems with attention, concentration, memory, speed of processing, judgement, executive control	Behavior/ Emotional Symptoms: Depression, anxiety, agitation, irritability, impulsivity, aggression

*Alteration of mental status must be immediately related to the trauma to the head. Typical symptoms would be: looking and feeling dazed and uncertain of what is happening, confusion, difficulty thinking clearly or responding appropriately to mental status questions, and being unable to describe events immediately before or after the trauma event.

**In April 2015, the DoD released a memorandum recommending against the use of GCS scores to diagnose TBI. See the memorandum for more information

***Symptoms that may develop within 30 days post-injury.

For a narrative description and guideline recommendations related to this algorithm, please refer to **Section 2**.

* Adapted from the VA/DoD Management of Concussion/Mild Traumatic Brain Injury Clinical Practice Guideline (VA/DoD, 2016).