



**COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF INDUSTRIAL ACCIDENTS**

**MILD TRAUMATIC BRAIN INJURY (mTBI) TREATMENT GUIDELINE
JULY 2026**

INTRODUCTION

This clinical guideline has been created to consistently improve health care services for injured workers by outlining appropriate evaluation and treatment of concussion/mild traumatic brain injuries (mTBI). Although mTBI, including concussion, represents the majority of work-related cases, all forms of TBI have the potential for acute morbidity, long-term disability, and significant social and economic consequences. The guideline should be used as a tool to guide health care providers of different professional disciplines to provide quality care to injured workers. It provides practical guidance for clinicians, payers, case managers, and other stakeholders to determine whether proposed tests and treatments are medically reasonable and necessary. The guideline is not a substitute for appropriate medical judgment and is broad enough to allow for a range of diagnostic and treatment modalities. Approximately 10% of cases may fall outside the parameters of this guideline and may be reviewed and approved on a case-by-case basis. If objective clinical improvement is delayed or slower than expected, the treating provider should justify continued care with a valid clinical rationale, supported by objective findings. Time frames for specific interventions commence once treatment has been initiated, not on the date of injury.

I. BACKGROUND & DEFINITIONS

- A. Traumatic Brain Injury (TBI):** defined as a structural injury, functional injury, and/or physiological dysfunction of brain function, resulting from trauma or external force.
- a. External forces may include: the head being struck by an object, the head striking an object, the brain undergoing an acceleration or deceleration movement without direct external trauma to the head, a foreign body penetrating the brain, forces generated from events (e.g., a blast or explosion), or other forces. Of note, exposure to such an external force does not necessarily result in sustainment of a TBI, especially in the absence of characteristic TBI signs.
 - b. Involves new onset or worsening of one or more of the following clinical signs immediately following the event:
 - i. Loss of or a decreased level of consciousness (by clinical observation or validated test).
 - ii. Any loss of memory for events immediately before or after the injury (post-traumatic amnesia).
 - iii. Any alteration in mental state at the time of the injury (e.g., confusion, disorientation, slowed thinking, alteration of consciousness/mental state).
 - iv. Neurological deficits (e.g., weakness, loss of balance, dizziness, change in vision, apraxia, paresis/plegia, sensory loss, visual-spatial neglect, aphasia) that may or may not be transient.
 - v. An intracranial lesion.
 - c. Headache, photophobia, phonophobia, nausea, and other neurosensory symptoms may present in mTBI to support the TBI diagnosis, but alone are insufficient to confirm the diagnosis.

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B. Importance of Early Evaluation and Active Management: Prompt clinical evaluation of a concussion/mTBI, early worker education, and a structured progressive return to activity (PRA) plan can optimize recovery and work outcomes. A workplace assault-based TBI often carries both neurological and psychological injury and may require a trauma-informed approach from the first clinical contact, including early referral for trauma focused counseling. A proactive, multidisciplinary approach, including referrals to rehabilitation specialists when indicated, may help accelerate return to baseline neurologic function and address factors associated with delayed recovery. The use of validated measurement tools (discussed further below) is recommended to objectively monitor progress and inform individualized treatment planning. Concussion/mTBI symptom inventories can be helpful in prioritizing which symptoms are impacting function the most, and also in concert with objective clinical assessment what factor to target first in management.

C. Safety Precautions

- a. **Remove from risk** - If a concussion/mTBI is suspected after any work-related incident, the worker should be removed from hazardous duties as well as activities involving significant physical or cognitive exertion that may worsen symptoms, pose a risk for further head injury, and/or contribute to delayed recovery. This may include driving, climbing, operating machinery, heavy physical work, prolonged screen time or light exposure, and/or prolonged cognitively stimulating tasks until medically evaluated and cleared.
- b. **Urgent evaluation for red flag signs** - Workers presenting with severe or worsening headaches, repeated vomiting, seizures, focal neurological signs (e.g. weakness, facial droop, unequal pupils, gait instability), difficulties with speech, or decreasing level of consciousness should be referred for emergent medical evaluation and possible neuroimaging. Pre-hospital stabilization and Advanced Trauma Life Support (ATLS) protocols apply when indicated. Injured workers whose presentation meets criteria for moderate or severe traumatic brain injury require escalation to emergency and inpatient care. Management should be deferred to the acute trauma and neurosurgical teams, as these injuries may necessitate intensive monitoring, neuroimaging, and early rehabilitation services.

This Guideline does not address moderate-severe TBI.

D. Summary of Management: The following systematic method should be followed for appropriate diagnoses and treatment of mTBIs during the first six months post-injury:

1. Confirm the diagnosis. Exclude moderate-severe TBI which is not addressed in the Guideline.
2. Determine whether emergency department evaluation is required.
3. Request neuroimaging and neuropsychological assessment when indicated.
4. Screen for social determinants of health.
5. Provide guidance and suggestions for adaptations when needed for return to usual activities.
6. Screen for ADL/IADL performance.

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7. Educate the patient and family about TBI recovery, symptom management, and warning signs that require immediate medical attention or return to the ER.
8. Assess for risk of persisting symptoms.
9. Prioritize which symptoms to target first.
10. Initiate treatment for post-traumatic headache.
11. Screen and initiate treatment for mental health disorders.
12. Decide if and when to refer to specialty care.
13. Assess for and address psychological trauma and emotional responses related to the injury mechanism and recovery process (e.g. assault, motor vehicle accident, fall, psychological trauma.)

II. DIAGNOSIS, IMAGING, AND SEVERITY CLASSIFICATION

A. Diagnostic Requirements and Severity Classification:

- a. Documented traumatic mechanism involving direct or transmitted force to the head.
- b. At least one acute neurologic feature, including one or more of the following:
 - i. Loss of consciousness (LOC).
 - ii. Post-traumatic amnesia (PTA).
 - iii. Alteration of consciousness (AOC).
 - iv. Focal or diffuse neurologic deficits (e.g., confusion, balance disturbance, dizziness).
- c. Severity classification is determined by the highest criterion met among structural imaging findings and duration of loss of consciousness (LOC), alteration of consciousness (AOC), and/or post-traumatic amnesia (PTA). Glasgow Coma Scale (GCS) is not currently recommended to diagnose TBI, but can be used as a tool for clinical assessment of the patient (*See Table 1*).
 - i. **Concussion/Mild TBI** (mTBI) (includes at least one of the following):
 1. Confused or disoriented state which lasts less than 24 hours.
 2. Loss of consciousness for up to 30 minutes.
 3. Memory loss lasting less than 24 hours.
 - Excludes penetrating TBI.
 - Neuroimaging is not indicated for most patients with a Mild TBI. If obtained, neuroimaging is typically normal and intracranial findings consistent with the mechanism of injury are often indicative of a moderate-severe TBI.
 - ii. **Moderate TBI** (includes at least one of the following):
 1. Confused or disoriented state which lasts more than 24 hours.
 2. Loss of consciousness for more than 30 minutes, but less than 24 hours.
 3. Memory loss lasting greater than 24 hours but less than seven days.
 4. Meets criteria for Mild TBI except an abnormal CT scan is present.
 - Excludes penetrating TBI.
 - A structural brain imaging study may be normal or abnormal.

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iii. **Severe TBI** (includes at least one of the following):

1. Confused or disoriented state which lasts more than 24 hours.
2. Loss of consciousness for more than 24 hours.
3. Memory loss for more than seven days.
 - Excludes penetrating TBI.
 - A structural brain imaging study may be normal but usually is abnormal.

iv. **Penetrating TBI:**

1. A head injury in which the scalp, skull and dura mater (the outer layer of the meninges) are penetrated. Penetrating injuries can be caused by high-velocity projectiles or objects of lower velocity such as knives, or bone fragments from a skull fracture that are driven into the brain.

Table 1			
Criteria	Mild	Moderate	Severe
Structural imaging	Normal	Normal or abnormal	Normal or abnormal
Loss of consciousness (LOC)	0-30 minutes	>30 minutes, <24 hours	>24 hours
Alteration of consciousness (AOC)	Up to 24 hours	>24 hours	>24 hours
Post-traumatic amnesia (PTA)	0-1 day	>1 and <7 days	>7 days
Glasgow Coma Scale (GCS)	13-15	9-12	<9

Severity classification determined by highest criterion met.

AOC: "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/or being unable to describe events immediately before or after the trauma injury event." (VA/DoD)

- d. No alternative diagnosis that better explains the neurologic presentation.

B. Imaging: See Table 2 for imaging indications and frequency. CT or MRI is not required for diagnosis of mTBI. Use to evaluate red flags (worsening headache, repeated emesis, seizure, focal neurologic deficits, GCS <15 at 2 hours, or suspected skull fracture). Abnormal imaging attributable to injury may reclassify severity.

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- a. Consider Canadian CT Head Injury/Trauma Rule.
 - i. Apply to adults (≥ 16 years) with *minor head injury* (GCS 13-15) after blunt trauma with witnessed loss of consciousness, amnesia, or confusion.
 - ii. CT of the head is indicated if any of the following are present:
 - 1. High-risk criteria (for neurosurgical intervention):
 - a. GCS < 15 at 2 hours post-injury.
 - b. Suspected open or depressed skull fracture.
 - c. Any sign of basal skull fracture (hemotympanum, raccoon eyes, CSF otorrhea/rhinorrhea, Battle's sign).
 - d. ≥ 2 episodes of vomiting.
 - e. Age ≥ 65 years.
 - 2. Medium-risk criteria (for brain injury visible on CT):
 - a. Amnesia before impact ≥ 30 minutes.
 - b. Dangerous mechanism (pedestrian struck by vehicle, occupant ejected from vehicle, fall > 3 feet or > 5 stairs).
 - iii. Exclusions: Not applicable to non-trauma cases, GCS < 13 , age < 16 , patients on warfarin or with bleeding disorders, or obvious open skull fracture.
- b. Emergency referral for red flags or LOC > 30 min.

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Table 2		
Imaging Modality	Indication	Frequency
Computed Tomography (CT)	Concern for cranial or skull fracture, intracranial, epidural, or subdural hemorrhage, or other TBIs based on the mechanism of injury. Useful in unstable patients to identify need for surgical intervention. C-spine to evaluate for suspected fracture. Can use Canadian CT Rule for guidance.	Typically, only at initial evaluation.
X-Ray	If CT scan not available for concern for cervical spine fracture or for evaluation of c-spine structure and biomechanics. Can use Canadian C-Spine Rule or NEXUS Criteria for guidance.	Initial evaluation.
Magnetic Resonance (MRI)	Concern for intracranial, epidural, or subdural hemorrhage or other TBIs. Superior to CT for assessing intracranial injuries (esp without hemorrhage). Helpful surgical emergency diagnostics.	At presentation and subsequently for evaluation of ongoing symptoms. Preferred for subacute/chronic parenchymal evaluation.
Vascular Imaging	Signs/symptoms of vascular injury.	One-time assessment.
Electroencephalography (EEG). If ordering an EEG is a consideration, strongly consider consulting Neurology for guidance.	Evaluation of seizure risk in patients. Collect a thorough history prior to consideration of an EEG. Of note, various high-functioning neurodivergent conditions will show abnormal EEG but are not inherently at increased risk for developing seizure.	Typically one-time assessment; repeat only with continued seizure-like activity.

III. CLINICAL ASSESSMENT

A licensed healthcare provider should perform a focused, patient-centered history and physical examination emphasizing symptom burden, functional impact, and factors associated with delayed recovery. Assessment should document injury mechanism, symptom inventory, comprehensive neurological exam, vestibular and oculomotor function, mental health symptoms, ADL/IADL performance, and relevant social determinants of health. Validated tools may be used when appropriate to support clinical decision-making and longitudinal monitoring. Mild TBI/

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concussion can give rise to multiple symptoms that may also be multiple diagnoses and treatment targets. For example, concussion with symptoms of dizziness, neck pain, headache, and low mood could very well lead to diagnoses of 1. Concussion 2. Cervical muscle strain 2. BPPV 3. Chronic daily post-traumatic headache, 4. Major depressive episode, which all have their own treatment.

A. History:

- i. Description of incident.
- ii. Mechanism of injury: impact, acceleration-deceleration, or blast exposure. Presence or absence of personal protection equipment (e.g. seat belt, helmet).
- iii. Immediate symptoms: confusion, amnesia, dizziness, headache, or visual change.
- iv. Symptom evolution: headache, dizziness, visual changes (i.e. double vision, blurred vision), pain (i.e. neck, jaw), cognitive complaints, sleep/mood changes/emotional lability. Note timing, duration, and aggravating factors.
- v. Past Medical History: Prior concussions (especially past 12 months) or history of headache disorder/migraines, depression, anxiety, PTSD, or other mental health concerns. Medical history should include sleep history, neurodevelopmental conditions i.e. ADD/ADHD, memory concerns, dyslexia, and movement disorders such as tics.
- vi. Medications, alcohol, or drug use.
- vii. Social determinants of health relevant to recovery and return to work, including access to transportation, job flexibility, financial stressors, caregiving responsibilities, language barriers, health literacy, intimate partner/domestic violence, and access to follow-up care or rehabilitation services.
- viii. Differential diagnoses and/or concomitant comorbid conditions to be considered include cervical strain, vestibular dysfunction, migraine, psychiatric conditions (e.g., depression, anxiety, PTSD), medication effects, substance or alcohol intoxication, sleep disorders, metabolic or systemic causes, intracranial pathology, temporomandibular disorder (TMD), and functional neurological disorder, among others.

B. Current Job Description:

- i. Detailed description of cognitive and physical work tasks and essential functions, work hours (i.e. hour/week, overtime or shift requirements), and history of injuries for current employment.
- ii. Transportation/commuting requirements.
- iii. Safety-sensitive duties.
- iv. Workplace environment.

C. Physical & Neurologic Exam:

- i. General: affect and speech.
- ii. HEENT: hemotympanum, periorbital or periauricular ecchymoses, drainage of clear fluid from ears or nose, palpable step-off, or stellate laceration.
- iii. Mental status: orientation, concentration, recall, and short-term memory.
- iv. Cranial nerves: particularly III, IV, VI (oculomotor).

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- v. Motor and sensory testing.
- vi. Coordination.
- vii. Balance, gait: tandem walk, Romberg.
- viii. Vestibular/oculomotor function: Vestibular/Ocular-Motor Screening (VOMS), Dynamic Visual Acuity (DVA), Near-Point Convergence (NPC).
- ix. Cervical spine: assess for posterior midline and paraspinal tenderness, active and passive range of motion of neck.
 - a. Obtain imaging to rule out C-spine injury if indicated. See Table 2 for further guidance.
- x. Vital signs and orthostatic testing if indicated.

D. Cognitive/Mood Evaluation with Validated Tools as clinically indicated. Examples of tests include:

- Military Acute Concussion Evaluation 2 (MACE-2), validated cognitive tool for use in acute settings, not a replacement for clinical judgment. Although this was developed in a military setting, it is applicable to civilian and military TBI patients alike. Sport Concussion Assessment Tool (SCAT-6).
- MOOD screen with PHQ-9 (Depression) and GAD-7 (Anxiety) especially in those with persistent symptoms beyond 12 weeks.
- Persistent objective cognitive impairments are exceedingly rare in mTBI. Neuropsychological assessment batteries are almost never indicated in setting of uncomplicated mTBI/concussion. Reserve full neuropsychological testing for cases with persistent symptoms beyond 3-6 months when results are expected to meaningfully inform clinical management, return-to-work decisions, or safety-sensitive duty determinations.

E. Symptom Checklists:

- i. Neurobehavioral Symptom Inventory (NSI), standardized checklist.
- ii. Rivermead Post-Concussion Symptoms Questionnaire (RPQ), self-report tool for tracking symptom burden, not a stand-alone diagnostic measure.
- iii. Post Concussion Symptom Scale (PCSS) symptom severity checklist (22 items) used in SCAT6, appropriate for serial symptom monitoring in occupational or athletic settings.
- iv. Headache diary to monitor post-traumatic headache frequency, severity, triggers, and possible evolution into chronic daily headache or medication-overuse headache. In addition, providers can use the Headache Impact Test to document patient status and progress.

F. Consider Confounding Conditions and Comorbidities such as:

Migraine/headache disorders, cervicogenic, cervicogenic dizziness, vestibular disorders, mood/anxiety disorders, sleep disorders, and medication side effects. In occupational TBI care, conditions such as PTSD, migraine, vestibular dysfunction, and depression often coexist with TBI and may require concurrent management rather than sequential exclusion. Manage or refer as indicated.

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G. Laboratory testing

No routine labs for uncomplicated mTBI. Order only when suggested by history/exam findings.

H. Documentation

Record objective findings in progress notes, validated symptom scale scores (e.g., NPI, RPO, PCSS), expected progress, and RTW plans. Reassess functional capacity every 2-4 weeks until goals are met.

IV. INITIAL TREATMENT AND MANAGEMENT PROGRAM

A. Principles of Outpatient Traumatic Brain Injury Management

Outpatient management of traumatic brain injury should be symptom-guided, functionally focused, and patient-centered. Most workers with TBI who do not require prolonged hospitalization can be effectively managed in primary care with education, early follow-up, graded return to activity, and targeted non-pharmacologic interventions. Routine neuroimaging, prolonged strict rest, and indiscriminate specialty referral are not recommended in the absence of red flags or persistent, functionally limiting symptoms. Early identification of risk factors for delayed recovery (including mental health symptoms, sleep disturbance, and adverse social determinants of health) supports timely escalation of care when indicated.

B. Relative rest (first 24 - 48 hours)

1. **Purpose** - Relative rest reduces metabolic demand on the injured brain and allows early recovery. Evidence shows that strict isolation ("cocoon therapy") is not helpful and may worsen outcomes, whereas relative rest for 24 - 48 hours followed by gradual resumption of activity is associated with better recovery. Avoid strict bed rest.
2. **Physical rest** - For the first 24 - 48 hours, patients should avoid high-intensity activities and any risk of head impact but are encouraged to perform activities of daily living and light walking as tolerated. Prolonged bed rest exceeding three days should be avoided because it is associated with increased symptom burden and delayed return to work.
3. **Cognitive rest** - Patients should limit activities requiring sustained attention (e.g., reading, computer work, video games, texting) for 24 - 48 hours. Activities that do not exacerbate symptoms (listening to music, light conversation) are allowed.
4. **Sleep and hydration** - Adequate sleep (7 - 9 hours/night) and hydration should be emphasized. Caffeine and alcohol should be avoided. Over-the-counter analgesics such as acetaminophen may be used for headache if they do not mask neurological deterioration; non-steroidal anti-inflammatory drugs (NSAIDs) are typically avoided in the first 24 hours due to the risk of intracranial bleeding.

C. Graduated return to activity and work

Early, graded resumption of physical and cognitive activity following a brief period of relative rest is preferred over prolonged inactivity and is associated with improved recovery and reduced risk

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of persistent symptoms. After the initial rest period, activity should be gradually increased while monitoring symptoms. Each stage typically lasts at least 24 hours; if symptoms worsen or new symptoms appear, the patient should drop back to the previous stage and re-attempt after 24 hours. Progression is individualized and may be slower for older adults or those with risk factors for prolonged recovery. Mild, transient symptom provocation is acceptable and safe. The primary goals for return to work are to promote safe, gradual re-engagement in work activities, prevent symptom exacerbation, and reduce prolonged recovery and absence from the workplace.

1. **Stage 1 - Symptom-limited activity (24 - 48 hours)** - Activities of daily living that do not provoke significant symptoms are allowed (e.g., self-care, gentle household tasks). Workers should minimize screen time and take frequent rest breaks. Driving or operating dangerous equipment should be avoided.
2. **Stage 2 - Light aerobic exercise (24 hours minimum)** - Begin walking, stationary cycling or low-intensity aerobic activities at ~55% of predicted maximal heart rate for 10-20 minutes. The goal is to increase heart rate slightly without aggravating symptoms. High-risk activities and resistance training should be avoided.
3. **Stage 3 - Moderate aerobic exercise and work-specific tasks (24 hours minimum)** - Increase exercise intensity to ~70 % of predicted maximal heart rate while monitoring for returning or worsening symptoms. Workers may return to light duty or modified tasks that do not involve risk of head impact. Examples include administrative tasks, phone or video meetings, or supervised training sessions. Cognitive workloads can be increased gradually (short reading or computer sessions with breaks). If symptoms worsen or persist for more than an hour, reduce activity intensity and/or task complexity and retry the following day. Consider shortened shifts.
4. **Stage 4 - Heavy non-contact work or simulated job tasks (24 hours minimum)** - Progress to work-specific training, moderate lifting or balance tasks without risk of impact. At this stage, cognitive demands and work hours may be increased toward baseline. Workers should be free of symptoms at rest and during moderate exertion before advancing.
5. **Stage 5 - Full work participation with restrictions (24 hours minimum)** - Return to usual duties excluding tasks that carry risk of head impact (e.g., working at height, heavy machinery operation, contact sports) while being monitored. When workers can perform their usual tasks symptom-free for **at least 24-48 hours**, full-duty work without restrictions may be authorized.
6. **Stage 6 - Full return to duty** - Return to normal job duties, including tasks with higher risk of contact, is allowed once the worker is symptom-free at rest and during work-specific activities, has normal neurological examination, and has been cleared by an experienced healthcare provider. For safety-sensitive positions (e.g., drivers, pilots), employers may require objective cognitive testing or occupational health clearance.

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D. Non-pharmacological therapies

1. **Environmental modifications** - In the early recovery phase, temporary changes to the home and work environment can greatly aid recovery. Such modifications may include adjusting lighting through the use of indirect light, and avoidance of glare, reducing noise and visual distractions by creating a quieter workspace, using noise-canceling headsets, working in a partitioned area, temporarily allowing flexible scheduling, telework, graded exposure to complex environments, and limiting multitasking or prolonged computer use until cognitive endurance improves.
2. **Sub-symptom threshold aerobic exercise** - After the initial rest period, individualized aerobic exercise performed at an intensity just below the level that provokes symptoms has become a cornerstone of concussion management. Evidence from randomized trials and systematic reviews suggests that individualized sub-threshold aerobic training can improve autonomic function and reduce symptom duration in many patients. In clinical practice, patients may begin with 10-20 minutes of light aerobic activity (such as walking or stationary cycling) at roughly 55-70 % of their age-predicted maximum heart rate ($220 - \text{age}$) and by increasing the duration or intensity only if symptoms remain stable. Patients should reduce intensity or take a rest day if symptoms worsen, and progress gradually as tolerated.
3. **Vestibular and oculomotor rehabilitation** - Persistent dizziness, vertigo, blurred vision or balance problems often reflect vestibular or oculomotor dysfunction. When such symptoms persist beyond three to four weeks, referral to a physiotherapist or specialist trained in vestibular rehabilitation and vision therapy is recommended. Treatment includes gaze stabilization exercises, habituation exercises, and postural training. Cervical dysfunction should be treated first, as patients with neck injury may not tolerate vestibular maneuvers.
4. **Manual therapy and cervical rehabilitation** - Neck injury is common in concussions and can mimic or exacerbate headache, dizziness and cognitive symptoms. Early referral to physical therapy/chiropractic care for manual mobilization, range-of-motion exercises and strengthening of neck musculature can reduce symptom burden and improve tolerance of other therapies. Manual therapies should focus on cervical musculoskeletal dysfunction.
5. **Cognitive-behavioral therapy and mental health support** - Negative affect, anxiety, depressed mood and post-traumatic stress symptoms are strong predictors of delayed recovery. Early mental-health screening (e.g., using PHQ-9 for depression, GAD-7 for anxiety and PC-PTSD-5 for trauma) is recommended. Patients with significant psychological distress should be referred to Cognitive-Behavioral Therapy (CBT) or other evidence-based interventions. Other behavioral interventions may include strategies such as problem solving, goal setting, self-monitoring, coping strategies, and development of compensatory routines to support participation and recovery. A work-focused CBT program combined with gradual activity and social reintegration has been shown to improve return-to-work outcomes in workers with concussion. Workers who sustain TBI through workplace assault may benefit from early referral for trauma-

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focused therapy, including trauma-focused treatment, even in the absence of a formal PTSD diagnosis. Workers in settings with repetitive workplace violence exposure may also warrant proactive psychological treatment and connection to employee assistance or occupational mental health resources.

6. **Sleep hygiene and behavioral interventions** - Insomnia is common after concussion and may predict delayed recovery. First-line symptom management includes education on sleep hygiene (e.g., establishing regular sleep schedules, avoiding screen use and caffeine in the evening). Second-line intervention includes cognitive-behavioral therapy for insomnia (CBTi). Patients should be free from headaches and have good attention prior to starting CBT. When necessary, short-term pharmacologic therapy (see section E) may be added.
7. **Healthy Lifestyle** - Maintaining overall wellness and healthy lifestyle habits support recovery, including minimizing added sugars or processed foods. Encourage adequate hydration and sleep, balanced nutrition, and avoidance of alcohol or excessive caffeine. Magnesium may be considered as an adjunctive treatment for TBI.
8. **Patient and employer education** - Education is a cornerstone of concussion management. Providers should explain the neurometabolic cascade¹, expected recovery time and rationale for relative rest and graded activity. Patients should be taught to monitor symptoms, avoid second injuries and recognize red-flag signs that necessitate urgent care. Written instructions and resources should be provided to workers and employers. Employers should be informed of necessary temporary accommodations, including reduced/flexible hours, modified duties, increased break allowances and restrictions on driving or heavy equipment use.
9. **Social Determinants of Health** - Health care providers should consider relevant social determinants of health in treatment planning. The treatment plan should provide the worker with links to community resources that may assist with social needs.

E. Pharmacologic management

Pharmacologic therapy addresses specific symptoms and does not shorten the underlying injury; medications should not be used to mask symptoms to allow for the premature return to full duties. Evidence for drug therapy in concussion is limited; recommendations are drawn from expert consensus and extrapolation from migraine and insomnia management.

¹ "The neurometabolic cascade of a concussion is a complex wave of cellular events triggered by head trauma. It begins with the stretching and tearing of brain cells, causing a massive release of neurotransmitters, an ionic imbalance, and an energy crisis. This leaves the brain in a state of extreme vulnerability." Source: <https://pmc.ncbi.nlm.nih.gov/articles/PMC155411/>
Giza CC, Hovda DA. The Neurometabolic Cascade of Concussion. J Athl Train. 2001 Sep;36(3):228-235. PMID: 12937489; PMCID: PMC155411.

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1. **Headache** - Headache is the most common post-concussion symptom. A tiered and conservative approach including NSAIDS (also nutraceuticals such as Magnesium) as well as optimizing non-pharmacological treatment such physical medicine (PT, Chiropractic) is recommended. While NSAIDs are widely used for post-traumatic headaches, they should generally be avoided during the first 24 hours following the injury because of the theoretical risk of exacerbating intracranial bleeding. Once that initial period has passed, NSAIDs become a first-line therapy for both tension-type and migraine-type headaches, followed by aspirin-acetaminophen-caffeine combinations or triptans (for the migraine phenotype) if needed. Providers should also remain vigilant for medication-overuse headache - defined as using analgesics on 15 or more days per month - which can perpetuate or worsen post-concussion symptoms. For prophylactic management, amitriptyline, mirtazapine or venlafaxine may benefit tension-type headaches, whereas beta-blockers (atenolol, propranolol, metoprolol), candesartan may benefit migraine-type headaches. Tricyclic antidepressants may be beneficial for chronic daily post-traumatic headaches. In addition, untreated ADHD/ADD, Depression, Anxiety, OCD can all cause headaches so please elucidate this history to ensure their headaches are due to workplace injury. Caution using beta-blockers in patients with history of asthma given the potential for bronchospasm. Avoid using triptans in patients with uncontrolled hypertension, history of ischemic heart disease, MI, or stroke/TIA.
 - a. For workers with persistent or frequent post-traumatic headaches (e.g., occurring ≥ 8 -10 days per month or evolving into a chronic headache pattern), management should align with established headache disorder guidelines, such as those from the [International Headache Society \(ICHD-3\)](#) and [NICE](#), including consideration of preventive strategies when indicated.
2. **Sleep Disturbance** - When CBTi and sleep hygiene are insufficient, short courses (≤ 4 weeks) of melatonin or low-dose amitriptyline may improve sleep. For acute insomnia, medications such as eszopiclone or zolpidem may be used judiciously. Prazosin can reduce nightmares in patients with post-traumatic stress disorder (PTSD).
3. **Mental Health Disorders** - Depression and anxiety after concussion should be treated according to established guidelines for those conditions. Serotonin-norepinephrine reuptake inhibitors (e.g., venlafaxine) and tricyclics (e.g., amitriptyline) have dual benefits for mood and headache. Referral to mental health professionals is recommended. Patients with comorbid PTSD and mTBI are at risk of more severe or persistent symptoms. Non-pharmacological, holistic treatment should be first-line. However, SSRIs and SNRIs can also be helpful in relieving symptoms of PTSD symptoms, potentially assisting mTBI symptom improvement.
4. **Other Symptoms** - Pharmacologic interventions for dizziness, nausea or cognitive impairment lack robust evidence. Antiemetics may be used for nausea; vestibular suppressants (meclizine) should be avoided beyond short-term use as they can hamper vestibular rehabilitation. Stimulants (e.g., methylphenidate) are sometimes prescribed for attentional deficits in persistent symptoms, but evidence remains limited and these medications should be used only in consultation with specialists.

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F. Ongoing management and follow-up

1. **Follow-up appointments** - Patients should be re-evaluated by a healthcare provider 7-10 days post-injury to monitor symptom progression, assess readiness for activity advancement and identify those at risk for persistent symptoms. Continued follow-ups every 1-2 weeks are recommended until full return to work.
2. **Monitoring** - Standardized symptom scales (e.g., PCSS, RPQ), cognitive screening tools and balance assessments may be used to monitor recovery, though are generally not recommended for use beyond 30 days. Providers should assess for emergence of risk factors for persistent symptoms (difficulty concentrating, mood symptoms, sleep disturbance) and initiate appropriate interventions.
3. **Referral to multidisciplinary team** - Patients who are under the care of a health care practitioner and have persistent symptoms without improvement beyond four weeks may benefit from multidisciplinary care. Other determinants include severe initial symptom burden or pre-existing mental health conditions. Evidence suggests that coordinated rehabilitation involving physicians, physiotherapists, occupational therapists, neuropsychologists, chiropractors, and mental health professionals improves mood, quality of life and symptom reduction more effectively than usual care.
4. **Workplace accommodations and return-to-work planning** - The healthcare provider should communicate the worker's restrictions, abilities and anticipated timeline for progression to the employer with appropriate consent. Each return-to-work program must be individualized, considering the worker's job demands, risks of re-injury and symptom profile. Accommodations may include reduced hours, modified tasks, avoidance of night shifts, allowance for rest breaks, and schedule flexibility for therapy appointments. Medically unnecessary delays in return to work should be avoided because gainful employment improves overall health and quality of life. When there is difficulty progressing despite appropriate interventions, consider referral to specialized return-to-work programs or vocational rehabilitation.
5. **Long-term considerations** - Workers who sustain multiple concussions or have prolonged symptoms should be counselled regarding potential cumulative effects. Persisting symptoms >6 weeks or failure of improvement in symptoms >4 weeks require referral to a TBI specialist. Further assessment for differential diagnoses (e.g., migraine, cervical injury, vestibular disorders, depression, PTSD) may be considered. When cognitive symptoms interfere with functional recovery, return-to-work progression, or safety-sensitive job performance, targeted neuropsychological evaluation may be considered to inform rehabilitation, workplace accommodations, or vocational planning; routine testing is not recommended.

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6. **Delayed Recovery and Work-Related Contributors** - Delayed recovery may also reflect the conditions of work to which the worker may be returning. If facilitators and barriers to recovery are identified, the treating provider should provide or facilitate access to appropriate additional resources, usually via referral. Such resources may include consulting with those with expertise in delayed recovery, which will likely include mental health providers. The treating provider may also need to discuss work organization factors and physical workplace exposures with the employer.

G. Considerations for Moderate and Severe TBI

Post-acute management of moderate and severe TBI differs from the approach used for mild TBI. These injuries require structured multidisciplinary rehabilitation, close neurological follow-up, routine reassessment of cognitive and functional status, and long-term planning for return-to-work or independent living. Unlike mild TBI, recovery is often prolonged and may involve permanent deficits. For some patients, mild TBI can be a prolonged recovery as well.

V. Rehabilitation Services After Traumatic Brain Injury

A. Rehabilitation Services for TBI

Rehabilitation needs vary substantially by TBI severity and functional impairment. Rehabilitation should be individualized, goal-oriented, and coordinated across disciplines when multiple deficits are present. Mild TBI typically requires targeted, symptom-specific interventions, whereas moderate and severe TBI often require structured, multidisciplinary programs delivered over an extended period. Providers should base specific treatment recommendations on objective functional deficits, patient goals, and recovery trajectory.

1. **Physical Therapy (PT)**
Addresses balance deficits, postural control, vestibular dysfunction, visual motion sensitivity especially with movement and function, convergence disorder, cervical musculoskeletal injury, gait disturbance, aerobic capacity, and deconditioning. Mild TBI patients may benefit from short-term vestibular or aerobic rehabilitation.
2. **Chiropractic Treatment**
Addresses cervical spine and related musculoskeletal impairments that can occur following concussion/mTBI, including neck pain, cervicogenic headache, joint mobility restrictions, muscle tension, and postural dysfunction. Interventions include spinal or extremity mobilization/manipulation. Addresses activities of daily living and lifestyle that may complicate recovery.
3. **Occupational Therapy (OT)**
Supports functional independence, work-related tasks, visual-motor integration, and compensatory strategy training.

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4. Speech-Language Pathology (SLP)
If indicated, SLP involvement is usually brief and targeted in mTBI.
5. Cognitive Rehabilitation
Includes retraining of attention, memory, executive functioning, and problem-solving skills. Cognitive rehabilitation is typically not required for mTBI unless symptoms persist beyond 4-6 weeks.
6. Behavioral Health/Mental Health Services
Addresses mood, anxiety, irritability, sleep disturbances, trauma-related symptoms, and behavioral dysregulation. Interventions may include CBT, trauma-focused therapy, behavioral management strategies, and pharmacotherapy. Mental health involvement becomes increasingly important with higher TBI severity.
7. Vision Therapy/Neuro-Optometry
Current evidence does not support vision rehab or neuro-optometry in uncomplicated mTBI.
8. Multidisciplinary/Interdisciplinary Rehabilitation Programs.
Multidisciplinary approach may be needed in mTBI/concussion in patients with persistent post concussion symptoms (PPCS) >3 months or complex RTW needs.

The majority of workers with concussions recover within several weeks when managed with early education, relative rest and graduated activity, combined with targeted non-pharmacologic and symptom-directed pharmacologic therapies. Early follow-up, recognition of risk factors for persistent symptoms, and timely referral to multidisciplinary care are essential to optimize recovery and minimize long-term disability.

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Appendix

Table X Glasgow Coma Scale		
BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	<i>Best response</i> <i>Comatose client</i> <i>Totally unresponsive</i>	----- 15 8 or less 3

Table Y Canadian CT Head Rule

Patients would require a CT scan if any of the high-risk (to identify lesions requiring neurosurgical intervention) or medium-risk (to identify any significant CT abnormality) criteria are present.

High-Risk Criteria

- Failure of GCS to reach 15 within 2 hours of injury
- Suspected open or depressed skull fracture
- Any sign of basal skull fracture
- Two or more episodes of vomiting
- Age 65 years or over

Medium-Risk Criteria

- Amnesia extending back more than 30 minutes before injury
- Dangerous mechanism of injury (e.g., pedestrian struck by vehicle, fall from more than 3 feet or down more than 5 stairs, ejection from vehicle during collision)

(Patients could have LOC, some amnesia, and disorientation, as well as a GCS as low as 13 initially; those under age 16 and with focal neurological deficits or anticoagulation/coagulopathy were not included.)