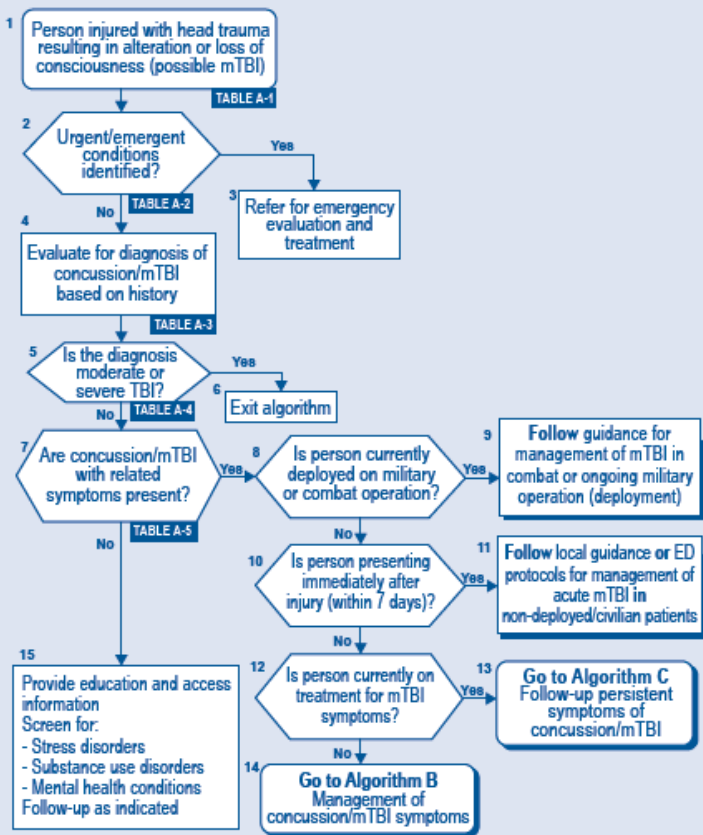


VA/DoD Clinical Practice Guideline for Management of Concussion/mild-Traumatic Brain Injury

A: Initial Presentation



Initial Stages following mTBI/Concussion

TABLE A-1 | Possible Causes for Head Trauma

- Blast or explosion
- Head striking or being struck by object or fall
- Undergoing acceleration/deceleration movement (e.g., Motor vehicle accident)

TABLE A-2 | Indicators for Immediate Referral

- Current altered consciousness
- Progressively declining neurological exam
- Pupillary asymmetry
- Seizures
- Repeated vomiting
- Double vision
- Worsening headache
- Cannot recognize people or disoriented to place
- Confused, irritable, or other unusual behavior
- Slurred speech
- Unsteady on feet
- Weakness or numbness in arms/legs

TABLE A-3 | Diagnostic Criteria for Concussion/mTBI

- Loss of or a decreased level of consciousness for less than 30 minutes
- Loss of memory for events immediately up to a one day after the injury
- Alteration of consciousness/mental state for 0-24 hours after the injury
- Normal structural imaging
- Glasgow Coma Score: 13-15 (best value within first 24 hours if available)

TABLE A-4 | Classification of TBI Severity

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 hrs
Alteration of consciousness/mental state (AOC) *	a moment up to 24 hrs	> 24 hours. Severity based on other criteria	
Post-traumatic amnesia (PTA)	0-1 day	> 1 and < 7 days	> 7 days
Glasgow Coma Scale (best available score in first 24 hours)	13-15	9-12	< 9

* 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.

TABLE A-5 | Post-Concussion Symptoms

Somatic Symptoms	Psychological	Cognitive
<ul style="list-style-type: none"> - Headache * - Fatigue * - Sensitivity to light/noise * - Insomnia & sleep disturbances * - Drowsiness * - Dizziness * - Nausea & vomiting * - Vision problems * - Transient neurological abnormalities - Seizures - Balance problems 	<ul style="list-style-type: none"> - Problems controlling emotions * - Irritability * - Anxiety * - Depression * 	<ul style="list-style-type: none"> - Problems with memory * - Cognitive disorders * - Problems with concentration * - Functional status limitations *

* In common with Post Concussive Syndrome (PCS)

B: Management of Symptoms following Concussion/mTBI

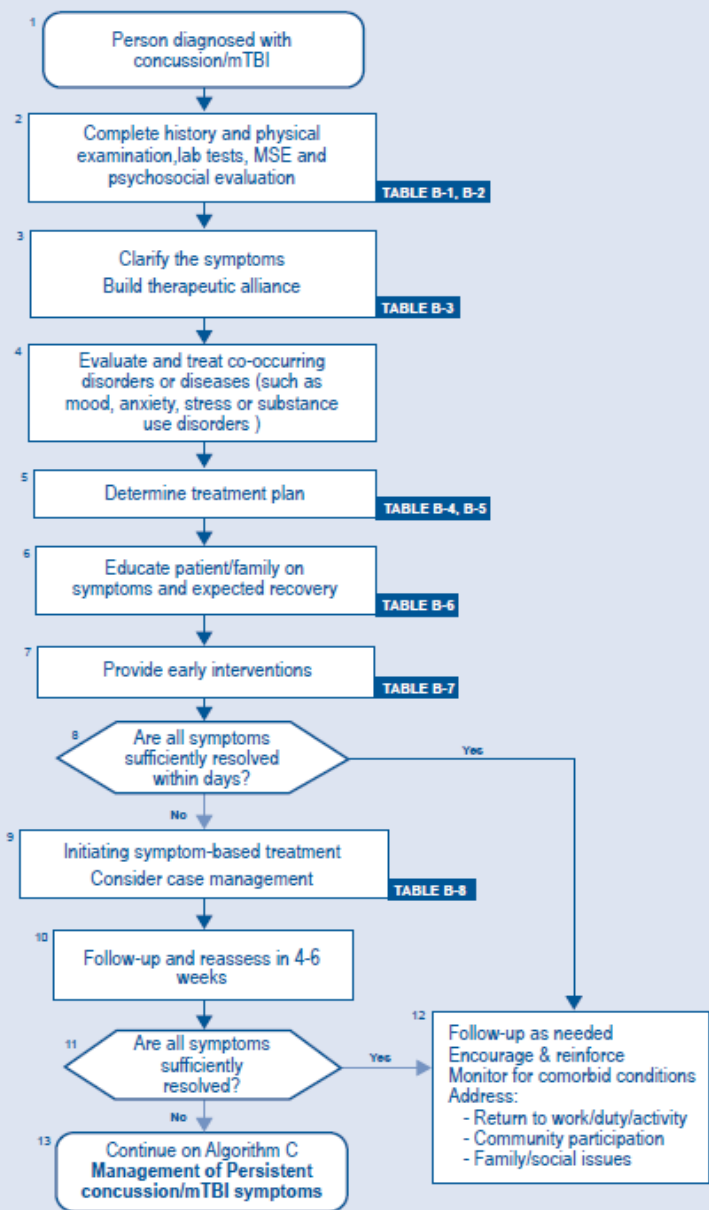


TABLE B-1 | Assessment - Physical Symptoms

Symptoms	Meds Review	Assess for HTN	Physical Examination	Sleep Review	Differential Diagnoses Include:
Headaches	√	√	√ Neuro √ Muscular √ Vision √ Otological	√	Pre-existing headache disorder (migraine, tension) Cervical spine or musculature abnormality or pain CSF leak or pressure abnormality Sinus infection Visual acuity issues (needs glasses)
Feeling dizzy - Loss of balance - Poor coordination - Clumsy	√	--	√ Neuro √ Muscular √ Vision √ Otological	--	Inner ear infection Labyrinthitis CSF leak or pressure abnormality Meniere's disease Orthostatic hypotension Central medication effect
Nausea	√	--	√ GI √ Muscular √ Vision √ Otological	--	GI ulcer GERD Medication effect
Change in appetite	√	--	√ GI	--	Nasal polyps Sinus infection Traumatic injury to olfactory or lingual nerves
Sleep disturbance - Difficulty falling or staying a sleep (insomnia)	√	--	√ Screen for Depression	√	Behavioral health issues Sleep disorders Pain
Vision problems - Blurring - Trouble seeing - Sensitivity to light	√	--	√ Muscular √ Vision √ Otological	√	Retinal detachment Traumatic injury to lens Corneal abrasion Optic nerve damage
Hearing difficulty - Sensitivity to noise	√	--	√ Otological	--	Inner ear infection Ear drum inflammation Ear drum injury Traumatic auditory nerve injury

* Other less common symptoms following concussion/mTBI include: - Numbness or tingling on parts of the body – Review of medications, neurological exam and EMG to rule out stroke, multiple sclerosis, spinal cord injury, peripheral neuropathy, or thoracic outlet syndrome
 - Change in taste and/or smell – neurological exam to rule out nasal polyps, sinus infection, or traumatic injury to olfactory or lingual nerves

TABLE B-2 | Assessment - Behavioral and Cognitive Symptoms

Symptoms	Evaluations	Differential Diagnosis or Comorbidity include:
Fatigue - Loss of energy - Getting tired easily Cognitive difficulties - Concentration - Memory - Decision-making Feeling anxious Emotional difficulties - Feeling depressed - Irritability - Poor frustration tolerance	√ Review Medications √ Lab Tests: - Electrolytes - CBC - TFT √ Review Sleep Habits √ Screen for: - Depression - PTSD - SUD √ Job review	- Anxiety disorders - Chronic Fatigue Syndrome - Chronic pain - Depression-other mood disorders - Insomnia - Metabolic disorders - Sleep Apnea - Stress disorders - Substance use disorder

TABLE B-3 | Assessment - Symptom Attributes

- Duration of symptom
- Onset and triggers
- Location
- Previous episodes
- Intensity and impact
- Previous treatment and response
- Patient perception of symptom
- Impact on functioning

TABLE B-4 | Management - Physical Symptoms

Symptoms	Pharmacologic	Non Pharmacologic
Headaches	Non narcotic pain meds NSAIDs Triptans (migraine type)	Sleep hygiene education Physical therapy Relaxation
Feeling dizzy - Loss of balance - Poor coordination - Clumsy	Antibiotic for infection decongestants for fluid	Physical therapy
Nausea	Antiemetics	Sleep hygiene education
Change in appetite	--	--
Sleep disturbance - Difficulty falling or staying a sleep (insomnia)	Sleep medications	Sleep hygiene education
Vision problems - Blurring - Trouble seeing - Sensitivity to light	--	Sleep hygiene education Light desensitization Sunglasses
Hearing difficulty - Sensitivity to noise	--	Environmental modifications

TABLE B-5 | Management - Behavioral and Cognitive Symptoms

Symptoms	Pharmacologic Treatment	Non-Pharmacologic Treatment	Referral after failed response to initial intervention
Fatigue - Loss of energy - Getting tired easily	--	- Reassurance - Encourage regular scheduled aerobic exercise	- Mental Health
Cognitive difficulties - Concentration - Memory - Decision-making	SSRI	- Activity restriction adjustment	Consider referral to: - Cognitive rehabilitation - Mental Health - TBI specialist
Feeling anxious	Anxiolytic (short term) SSRI	- Sleep hygiene education	- Mental Health - Social support
Emotional difficulties - Feeling depressed - Irritability - Poor frustration tolerance	Antiepileptics SSRI	- Sleep study	- Mental Health - Social support

TABLE B-6 | Components of Patient Education

- Provision of information about concussion/mTBI
- Strategies for prevention of further injury
- Education/normalization
- Awareness of limitation
- Self-monitoring of symptoms
- Contact information.

TABLE B-7 | Early Intervention

- Provide information and education on symptoms and recovery
- Educate about prevention of further injuries
- Reassure on positive recovery expectation
- Empower patient for self management
- Provide sleep hygiene education
- Teach relaxation techniques
- Recommend limiting use of caffeine/tobacco/alcohol
- Recommend graded exercise with close monitoring
- Encourage monitored progressive return to normal duty/work/activity

TABLE B-8 | Case Management

Assign case manager to:

- Follow-up and coordinate future appointments
- Reinforce early interventions and education
- Address psychosocial issues (financial, family, housing or school/work)
- Connect to available resources

ACRONYMS

CBC – Complete Blood Count

CSF - Cerebrospinal Fluid

ED – Emergency Department

ENT – Ear, Nose, Throat

EMG - Electromyogram

GERD - Gastroesophageal Reflux Disease

GI – Gastrointestinal

HTN – Hypertension

MSE - Mental Status Exam

mTBI – Mild Traumatic Brain Injury

NSAIDs – Non-steroidal Anti-inflammatory Drugs

PM&R - Physical Medicine and Rehabilitation

PTSD – Post-Traumatic Stress Disorder

SSRI - Selective Serotonin Reuptake Inhibitors

SUD – Substance Use Disorder

TBI - Traumatic Brain Injury

TFT – Thyroid Function Test

C: Follow-up Persistent Post-Concussion Symptoms

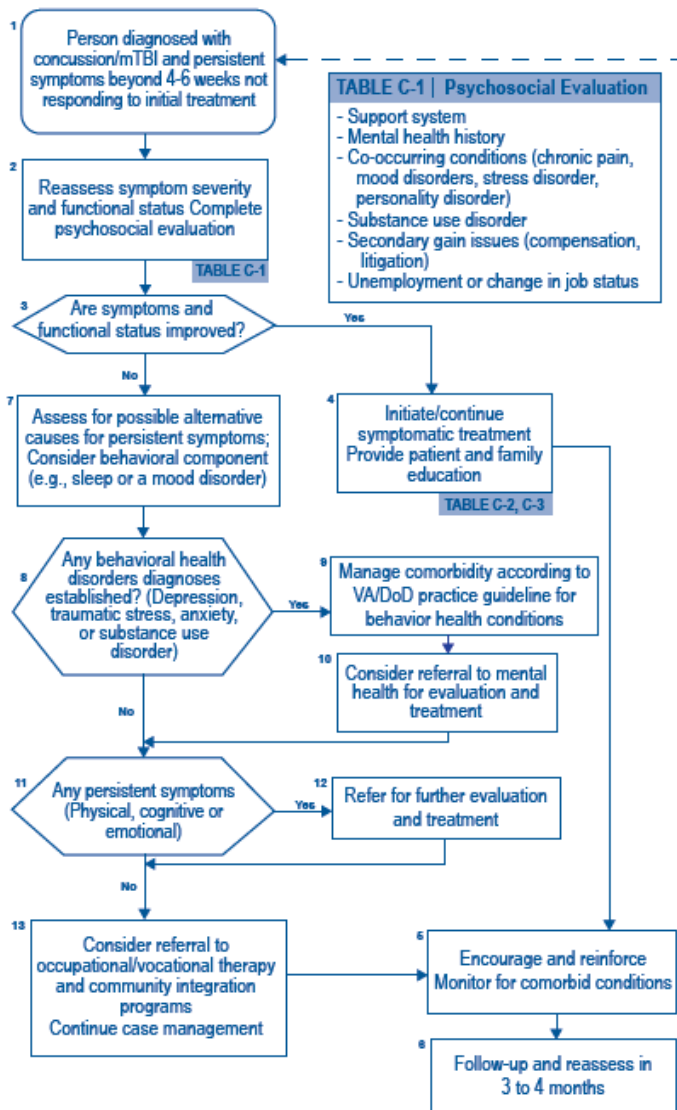


TABLE C-2 | Management of Persistent Physical Symptoms

Symptoms	Pharmacologic Treatment	Non-Pharmacologic Treatment	Referral After Failed Response to Initial Treatment
Headaches	Non narcotic pain meds NSAIDs Triptans (migraine type)	Sleep education Physical therapy Relaxation	Neurology Pain clinic
Feeling dizzy	Antibiotics, decongestants for infections and fluid	--	Dizzy: ENT/Neurology after ENT interventions
Loss of balance Poor coordination	--	Physical therapy	Neurology
Nausea	Antiemetics	Sleep education	Gastrointestinal
Change in appetite	--	--	Consider Mental Health
Sleep disturbances - Difficulty falling or staying a sleep (insomnia)	Sleep medications	Sleep education	Mental health PM&R Neurology
Vision problems - Blurring - Trouble seeing - Sensitivity to light	--	Sleep education Light desensitization Sunglasses	Optometry Ophthalmology **
Hearing difficulty - Sensitivity to noise	--	Environmental modifications	Audiology ENT Sensitivity to Noise: Speech and Language Pathology

** Depending on the local resources, impaired vision may be referred in some facilities to neuro-ophthalmologists. Note that the impaired vision may be due to problems with oculomotility as well as due to disorders of the retina and visual pathways.

TABLE C-3 | Management of Persistent Behavioral and Cognitive Symptoms

Symptoms	Job Review	Pharmacologic Treatment	Non-Pharmacologic Treatment	Referral After Failed Response
Fatigue - Loss of energy - Getting tired easily	✓	Stimulant*	- Reassurance	- Mental Health
Cognitive difficulties - Concentration - Memory - Decision-making	✓	SSRI Stimulant*	- Encourage regular scheduled aerobic exercise	- TBI specialist for cognitive rehabilitation or mental health
Feeling anxious	✓	Anxiolytic (short term) SSRI	- Activity restriction adjustment	- Mental Health - Social support
Emotional difficulties - Feeling depressed - Irritability - Poor frustration tolerance	✓	Antiepileptics SSRI	- Sleep hygiene education - Sleep study	- Mental Health - Social support

* Consider in the specialty care setting after ruling out a sleep disorder