

Major or Mild Neurocognitive Disorder Due to Traumatic Brain Injury

DSM-5-TR 294.1X / 331.83 | ICD-10-CM S06.2X9S WITH F02.8X OR G31.84

Cognitive decline beginning immediately after head trauma, with attention, memory, and executive deficits plus prominent neurobehavioral change.

INCIDENCE

~2.9M US TBI ED visits/yr

SEVERITY MIX

~75-90% are mild TBI

PEAK AGES

0-4, 15-24, and 75+

COURSE

Most mild TBI resolve <3 mo

CLINICAL PICTURE

- Slowed processing speed, divided-attention failure, and word-finding pauses dominate, and patients describe mental fog and effortful thinking.
- Neurobehavioral change is often disproportionate to test scores: irritability, low frustration tolerance, disinhibition, emotional lability, and apathy.
- Duration of post-traumatic amnesia predicts outcome better than initial Glasgow Coma Scale score, and patients rarely recall the injury itself.
- Somatic symptoms cluster with the cognitive ones: headache, dizziness, photophobia, noise sensitivity, fatigue, and fragmented sleep.
- Frontal injury produces intact knowledge with failed application, so patients describe the correct plan in clinic and cannot execute it at home.
- Symptoms worsen under fatigue, time pressure, and sensory load, which is why deficits surface at work long before they show up on office testing.

DIAGNOSTIC CRITERIA AT A GLANCE

- Requires evidence of head impact or rapid brain movement plus at least one acute sign: loss of consciousness, post-traumatic amnesia, disorientation, or focal findings.
- The neurocognitive deficits must appear immediately after the injury or immediately after recovery of consciousness, not emerge months later.
- Deficits must persist past the acute post-injury period, which DSM-5-TR anchors at beyond one week following the event.
- Major versus mild turns on independence: major means the person requires assistance with instrumental activities of daily living.
- Severity of the brain injury and severity of the resulting neurocognitive disorder are separate judgments and need not match.

NEUROBIOLOGY & PHYSIOLOGY

- Diffuse axonal injury from rotational shear disrupts white matter tracts, seen as reduced fractional anisotropy on **diffusion tensor imaging**.
- A secondary injury cascade unfolds over hours to days: glutamate excitotoxicity, calcium influx, mitochondrial failure, inflammation, and oxidative stress.
- Frontal and anterior temporal poles bear the brunt of contusion against bony ridges, which explains the executive and behavioral phenotype.
- Catecholaminergic signaling is disrupted, which is the rationale for **methylphenidate** and **amantadine** improving arousal and processing speed.
- APOE e4** carriers show poorer recovery, and repetitive head impacts are linked to chronic traumatic encephalopathy tau pathology at autopsy.
- Post-traumatic epilepsy, pituitary dysfunction with hypogonadism or hypothyroidism, and sleep apnea are common, treatable, and routinely missed.

PSYCHOLOGICAL MECHANISMS

- Impaired self-awareness is neurologic rather than denial, and it undermines safety judgment and rehabilitation adherence more than any single test score.
- Premorbid factors including prior injuries, psychiatric history, and litigation or compensation context strongly shape persistent symptom reporting.
- Expectation shapes outcome: beliefs about permanent brain damage and misattribution of ordinary symptoms maintain post-concussive complaints.
- Grief over the pre-injury self drives depression, which affects roughly half of patients within the first year after moderate to severe injury.
- Fatigue combined with disinhibition strains family systems, and caregiver-reported behavior change predicts return-to-work failure better than imaging.

DIFFERENTIAL & COMORBIDITY

- PTSD and TBI overlap heavily in veterans and share insomnia, irritability, and concentration failure, so both are treated rather than ranked.
- Depression, substance use, chronic pain, and sleep apnea each independently degrade cognition and must be treated before deficits are attributed to the injury.
- Suicide risk is roughly doubled after traumatic brain injury, and impulsivity with disinhibition converts ideation into action rapidly.
- Assess performance validity in medicolegal contexts, which is standard practice in traumatic brain injury neuropsychological evaluation.
- Consider post-traumatic hydrocephalus, chronic subdural hematoma, seizures, and endocrine failure when decline is late, sudden, or stepwise.

Treatment EVIDENCE-BASED MANAGEMENT

PHARMACOLOGIC

- No agent is approved for post-traumatic cognition, so treat discrete targets such as attention, mood, headache, and sleep with the fewest drugs possible.
- Amantadine 100-200 mg twice daily** accelerates functional recovery in disorders of consciousness and is the best-supported cognitive agent.
- Methylphenidate 5-20 mg twice daily** improves processing speed and attention; monitor blood pressure, appetite, sleep, and irritability.
- Sertraline** or **escitalopram** are first-line for post-injury depression, started low because this population is sensitive to side effects.
- Avoid benzodiazepines, anticholinergics, and typical antipsychotics; antiseizure prophylaxis beyond 7 days does not prevent post-traumatic epilepsy.

PSYCHOTHERAPY

- Cognitive rehabilitation** using metacognitive strategy training carries the strongest evidence for executive dysfunction and attention deficits.
- Early education and reassurance after mild injury reduces persistent post-concussive symptoms and is the single best-supported intervention.
- CBT** adapted for cognitive load, using written summaries, repetition, and shorter sessions, treats post-injury depression, anxiety, and insomnia.
- Applied behavior analysis with antecedent management is preferred over medication for aggression and disinhibition after brain injury.
- Family therapy and caregiver training address role change, supervision needs, and unrealistic recovery timelines that fuel conflict.

ADJUNCT & SUPPORTIVE

- Graded return to activity within 24 to 48 hours after concussion outperforms strict rest, which prolongs symptom duration.
- Use external compensatory aids relentlessly: smartphone alarms, written checklists, one shared calendar, and highly structured daily routines.
- Vestibular and oculomotor rehabilitation plus cervical physical therapy resolve much of the dizziness and headache burden after concussion.
- Screen for post-traumatic hypopituitarism at 3 to 6 months and evaluate for sleep apnea, both frequently missed drivers of persistent fatigue.
- Track outcomes with the **MoCA**, the Rivermead Post-Concussion Questionnaire, and return-to-work status rather than repeat neuroimaging.

CLINICAL PEARLS

- Post-traumatic amnesia length predicts outcome better than GCS or CT findings.
- Strict rest after concussion prolongs recovery; graded activity by 48 hours is better.
- In veterans, assume PTSD and TBI coexist and treat both rather than picking one.

References

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.).

<https://doi.org/10.1176/appi.books.9780890425787>

Boland, R., Verduin, M. L., & Ruiz, P. (2021). *Kaplan & Sadock's synopsis of psychiatry* (12th ed.). Wolters Kluwer.

Giacino, J. T., Whyte, J., Bagiella, E., Kalmar, K., Childs, N., Khademi, A., Eifert, B., Long, D., Katz, D. I., Cho, S., Yablon, S. A., Luther, M., Hammond, F. M., Nordenbo, A., Novak, P., Mercer, W., Maurer-Karattup, P., & Sherer, M. (2012). Placebo-controlled trial of amantadine for severe traumatic brain injury. *The New England Journal of Medicine*, 366(9), 819-826. <https://doi.org/10.1056/NEJMoa1102609>

Maas, A. I. R., Menon, D. K., Adelson, P. D., Andelic, N., Bell, M. J., Belli, A., Bragge, P., Brazinova, A., Buki, A., Chesnut, R. M., Citerio, G., Coburn, M., Cooper, D. J., Crowder, A. T., Czeiter, E., Czosnyka, M., Diaz-Arrastia, R., Dreier, J. P., Duhaime, A.-C., ... Yaffe, K. (2017). Traumatic brain injury: Integrated approaches to improve prevention, clinical care, and research. *The Lancet Neurology*, 16(12), 987-1048. [https://doi.org/10.1016/S1474-4422\(17\)30371-X](https://doi.org/10.1016/S1474-4422(17)30371-X)

National Institute of Neurological Disorders and Stroke. (n.d.). *Traumatic brain injury (TBI)*. U.S. Department of Health and Human Services. <https://www.ninds.nih.gov/health-information/disorders/traumatic-brain-injury-tbi>

Silver, J. M., McAllister, T. W., & Arciniegas, D. B. (Eds.). (2019). *Textbook of traumatic brain injury* (3rd ed.). American Psychiatric Association Publishing.

U.S. Department of Veterans Affairs & U.S. Department of Defense. (2021). *VA/DoD clinical practice guideline for the management and rehabilitation of post-acute mild traumatic brain injury*. <https://www.healthquality.va.gov/guidelines/Rehab/mtbi/>

NOTE

References are formatted in APA 7th edition style with hanging indents. Diagnostic terminology, criteria structure, and coding follow the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., text rev.; APA, 2022); criteria are paraphrased for instructional use and are not reproduced verbatim. Verify all citations against the original sources before use in academic work, and confirm medication dosing against current prescribing information.