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DIGITAL THERAPEUTICS - BEHAVIORAL HEALTH

Comorbidities Associated with Traumatic Brain Injury (TBI)

Comorbidities are very common with Traumatic Brain Injury (TBI) because the injury can disrupt multiple brain systems (emotional regulation, attention, sleep, hormonal balance, etc.). These comorbid conditions often complicate recovery and require integrated care.

Psychiatric and Emotional Comorbidities

TBI can precipitate or worsen several mental-health conditions:

Condition	Key Features	Notes
Depression	Persistent sadness, loss of interest, low motivation	Most common psychiatric outcome after TBI; affects up to 50% of moderate–severe cases.
Anxiety Disorders	Generalized anxiety, panic attacks, excessive worry	Often tied to fear of re-injury, uncertainty, and life changes.
Post-Traumatic Stress Disorder (PTSD)	Intrusive memories, hypervigilance, avoidance	Common in combat, accident, or assault-related TBI. May overlap with cognitive symptoms of TBI.
Irritability / Emotional Dysregulation	Anger, frustration, tearfulness	Linked to frontal-lobe damage or impaired impulse control.
Personality Change	Apathy, impulsivity, disinhibition, lack of empathy	Results from injury to orbitofrontal or temporal regions.

Cognitive and Neurobehavioral Comorbidities

Condition	Key Features
Attention Deficits	Poor focus, distractibility, mental fatigue
Memory Impairment	Short-term memory loss, trouble learning new information
Executive Dysfunction	Difficulty planning, organizing, problem-solving
Processing Speed Reduction	Slower thought and response time
Aphasia or Communication Problems	Difficulty expressing or understanding language

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Neurological and Physical Comorbidities

Condition	Description
Headache Disorders	Migraine or tension-type headaches are extremely common post-TBI.
Seizure Disorders (Post-Traumatic Epilepsy)	Can occur weeks to years after moderate/severe TBI.
Sleep Disorders	Insomnia, hypersomnia, circadian rhythm disruptions.
Hormonal (Endocrine) Dysfunction	Pituitary or hypothalamic damage may cause fatigue, libido loss, or metabolic changes.
Chronic Pain & Fatigue	Both neurological and psychological in origin.

Substance Use Comorbidities

- Alcohol and Drug Misuse are common before and after TBI.
    - Some individuals self-medicate for pain, anxiety, or mood regulation.
    - Substance use worsens cognitive recovery and increases risk of re-injury.
- **Social and Functional Comorbidities**
- Social isolation, relationship strain, and unemployment are common secondary effects.
- Cognitive and emotional symptoms often affect social interactions and self-esteem.
- These consequences can reinforce depression and anxiety — creating a feedback loop that hinders rehabilitation.

Developmental and Aging Comorbidities

- Children: TBI can disrupt learning, emotional regulation, and development.
- Older adults: TBI increases risk for dementia, especially Alzheimer's disease and CTE (Chronic Traumatic Encephalopathy).

Summary Table: Major Comorbid Categories

Category	Examples
Psychiatric	Depression, PTSD, anxiety, irritability
Cognitive	Memory, attention, executive dysfunction
Neurological	Headaches, seizures, endocrine issues
Sleep	Insomnia, hypersomnia, fatigue
Substance	Alcohol or drug misuse
Social	Relationship strain, isolation, unemployment