

HEAD INJURY AND BEWILDERMENT

BRINGING CLARITY TO CONFUSION IN CASES OF HEAD INJURY/ MILD TRAUMATIC BRAIN INJURY (MTBI) AND POSTCONCUSSIVE SYNDROME (PCS)

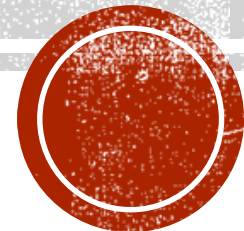
Alexander E. Obolsky, MD

Health & Law Resource, Inc.

Presentation for

Workers' Compensation Lawyers Association

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QUESTION

TBI is...

- A. A life altering injury for survivors and their families, profoundly impacting the patient's neuropsychiatric status
- B. A very common injury that is essentially inconsequential to the individual's neuropsychiatric status following recovery
- C. Is this some sort of trick question?

ANSWER

- Either may be true in a given case
- Addressing the neuropsychiatric needs of an individual with history of TBI requires identifying injuries and their sequelae
- It also requires evaluating the person with that injury and identifying other treatable neuropsychiatric conditions and psychosocial contributors – which often are present after TBI
- A useful diagnostic system will facilitate this process

DSM-5 (2013)

- TBI and its neuropsychiatric sequelae are considered in detail
- Criteria for diagnosing an injury event as TBI, and attributing neurocognitive problems to it, are offered

TBI IN DSM-5:

- A Neurocognitive Disorder (NCD)
- TBI and its neuropsychiatric sequelae are addressed principally within framework of the neurocognitive disorders (NCD)
- The NCDs are conditions in which impaired cognition is present and is not the result of a congenital or early developmental cause

MILD NEUROCOGNITIVE DISORDER

A. Evidence of modest* cognitive decline from a previous level of performance in one or more cognitive domains (complex attention, executive function, learning and memory, language, perceptual-motor, or social cognition) based on:

1. Concern of the individual, a knowledgeable informant, or the clinician that there has been a significant decline in cognitive function; and
2. A substantial impairment in cognitive performance, preferably documented by standardized neuropsychological testing or, in its absence, another quantified clinical assessment.

B. The cognitive deficits do not interfere with independence in everyday activities (but greater effort, compensatory strategies, or accommodation may be required).

C. The cognitive deficits do not occur exclusively in the context of a delirium.

D. The cognitive deficits are not better explained by another mental disorder (e.g., major depressive disorder, schizophrenia)

* “modest” cognitive decline is defined in the DSM-5 as performance on standardized cognitive tests between the 3rd -16th %-ile.

MAJOR NEUROCOGNITIVE DISORDER

A. Evidence of significant* cognitive decline from a previous level of performance in one or more cognitive domains (complex attention, executive function, learning and memory, language, perceptual-motor, or social cognition) based on:

1. Concern of the individual, a knowledgeable informant, or the clinician that there has been a significant decline in cognitive function; and
2. A substantial impairment in cognitive performance, preferably documented by standardized neuropsychological testing or, in its absence, another quantified clinical assessment.

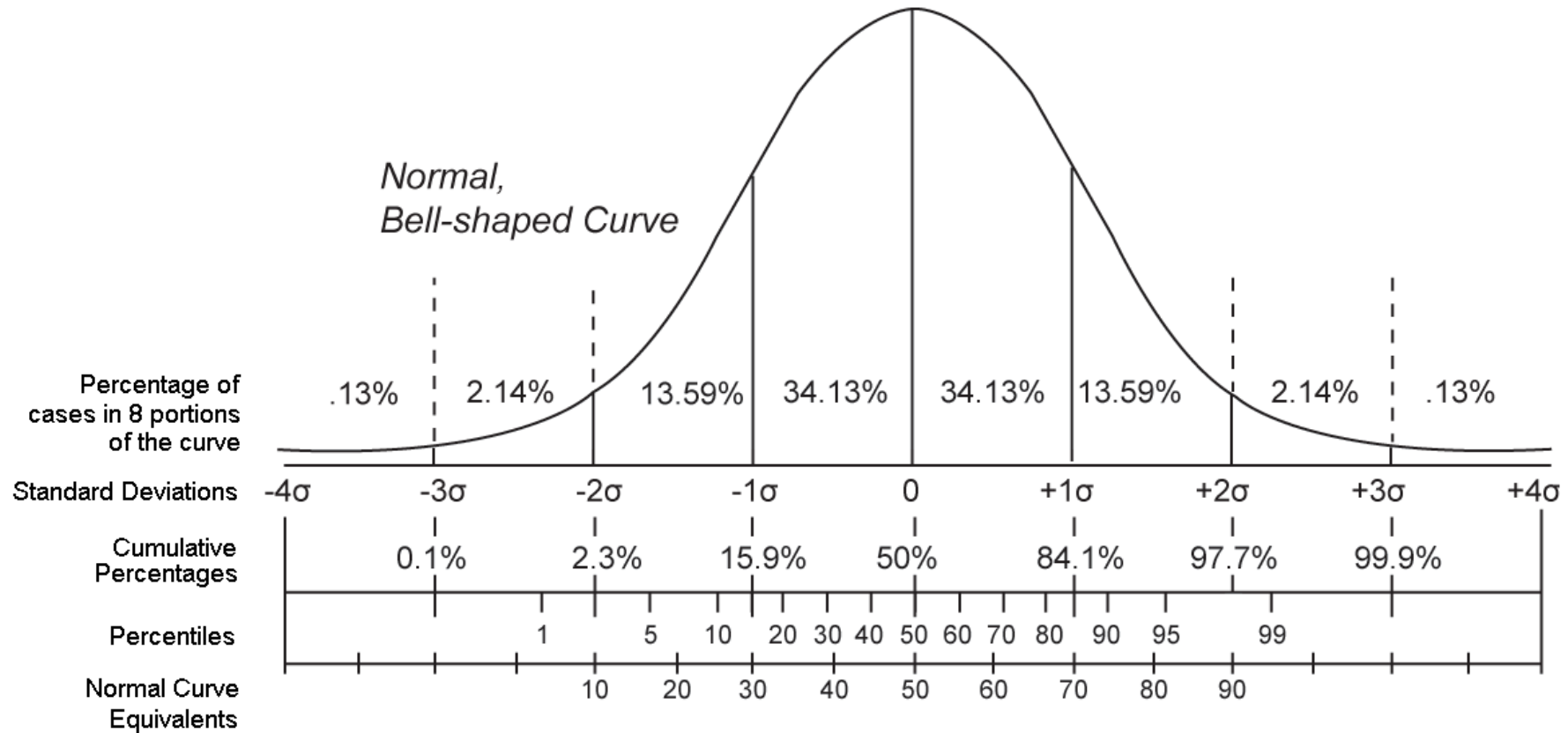
B. The cognitive deficits interfere with independence in everyday activities (i.e., at a minimum, requiring assistance with complex instrumental activities of daily living).

C. The cognitive deficits do not occur exclusively in the context of a delirium.

D. The cognitive deficits are not better explained by another mental disorder (e.g., major depressive disorder, schizophrenia)

* **“significant” cognitive decline is defined in the DSM-5 as performance on standardized cognitive tests equivalent to $\leq 3^{\text{rd}}$ %-ile.**

COGNITIVE EXAMINATION INTERPRETATION



Major or Mild Neurocognitive Disorder Due to Traumatic Brain Injury

Diagnostic Criteria

- A. The criteria are met for major or mild neurocognitive disorder.
- B. There is evidence of a traumatic brain injury—that is, an impact to the head or other mechanisms of rapid movement or displacement of the brain within the skull, with one or more of the following:
 - 1. Loss of consciousness.
 - 2. Posttraumatic amnesia.
 - 3. Disorientation and confusion.
 - 4. Neurological signs (e.g., neuroimaging demonstrating injury; a new onset of seizures; a marked worsening of a preexisting seizure disorder; visual field cuts; anosmia; hemiparesis).
- C. The neurocognitive disorder presents immediately after the occurrence of the traumatic brain injury or immediately after recovery of consciousness and persists past the acute post-injury period.

Coding note: For major neurocognitive disorder due to traumatic brain injury, with behavioral disturbance: For ICD-9-CM, first code **907.0** late effect of intracranial injury without skull fracture, followed by **294.11** major neurocognitive disorder due to traumatic brain injury, with behavioral disturbance. For ICD-10-CM, first code **S06.2X9S** diffuse traumatic brain injury with loss of consciousness of unspecified duration, sequela; followed by **F02.81** major neurocognitive disorder due to traumatic brain injury, with behavioral disturbance.

For major neurocognitive disorder due to traumatic brain injury, without behavioral disturbance: For ICD-9-CM, first code **907.0** late effect of intracranial injury without skull fracture, followed by **294.10** major neurocognitive disorder due to traumatic brain injury, without behavioral disturbance. For ICD-10-CM, first code **S06.2X9S** diffuse traumatic brain injury with loss of consciousness of unspecified duration, sequela; followed by **F02.80** major neurocognitive disorder due to traumatic brain injury, without behavioral disturbance.

For mild neurocognitive disorder due to traumatic brain injury, code **331.83 (G31.84)**. (**Note:** Do *not* use the additional code for traumatic brain injury. Behavioral disturbance cannot be coded but should still be indicated in writing.)

POLL QUESTION

TBI severity classification is based on:

- A) clinical phenomena at the time of injury
- B) long-term symptomatic and functional outcome

DEFINITION OF MILD TBI

Developed by the Mild Traumatic Brain Injury Committee of the Head Injury Interdisciplinary Special Interest Group of the American Congress of Rehabilitation Medicine

DEFINITION

A patient with mild traumatic brain injury is a person who has had a traumatically induced physiological disruption of brain function, as manifested by **at least** one of the following:

1. any period of loss of consciousness;
2. any loss of memory for events immediately before or after the accident;
3. any alteration in mental state at the time of the accident (eg, feeling dazed, disoriented, or confused); and
4. focal neurological deficit(s) that may or may not be transient;

but where the severity of the injury does not exceed the following:

- loss of consciousness of approximately 30 minutes or less;
- after 30 minutes, an initial Glasgow Coma Scale (GCS) of 13-15; and
- posttraumatic amnesia (PTA) not greater than 24 hours.

TBI SEVERITY CLASSIFICATION

TABLE 2 Severity ratings for traumatic brain injury

| Injury characteristic | Mild TBI | Moderate TBI | Severe TBI |
|---|------------------------------------|---------------------|------------|
| Loss of consciousness | <30 min | 30 minutes–24 hours | >24 hours |
| Posttraumatic amnesia | <24 hours | 24 hours–7 days | >7 days |
| Disorientation and confusion at initial assessment (Glasgow Coma Scale Score) | 13–15 (not below 13 at 30 minutes) | 9–12 | 3–8 |

TBI SEVERITY CLASSIFICATION

Table A-1. 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 hrs | > 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 |
| Glascow 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.

TBI SEVERITY CLASSIFICATION

| Modified VA/DoD TBI Severity Classification System | | | | | |
|--|----------------|---------------|---------------|--------------|--------------------|
| | LOC (hours) | PTA (days) | AOC (days) | GCS score | CT or MRI |
| Mild TBI | ≤ 0.5 | ≤ 1 | ≤ 1 | 13-15 | Normal |
| Complicated Mild TBI | ≤ 0.5 | ≤ 1 | ≤ 1 | 13-15 | Abnormal |
| Moderate TBI | > 0.5 to < 24 | > 1 to < 7 | > 1 | 9-12 | Normal or abnormal |
| Severe TBI | ≥ 24 | ≥ 7 | > 1 | 3-8 | Normal or abnormal |

DIFFERENTIAL DIAGNOSIS

Box 2-1. COMMON ELEMENTS OF THE DIFFERENTIAL DIAGNOSIS OF INJURY EVENT-RELATED DISTURBANCES OF CONSCIOUSNESS

Traumatic brain injury

Preinjury medical or neurological condition altering consciousness (e.g., delirium)

Preinjury intoxication or withdrawal from alcohol or other substances

Peri-injury dehydration and/or hypovolemia

Peri-injury hypotension

Peri-injury hyperthermia or hypothermia

Peri-injury toxin inhalation

Cerebrovascular events (e.g., transient ischemic attack, stroke)

Cardiovascular compromise (e.g., cardiac arrest)

Cerebral hypoxia or hypoxia-ischemia

Seizure/postictal confusion due to preexisting epilepsy

Neurotrauma-induced seizures/postictal confusion

Medication-induced (iatrogenic) confusional state

Acute stress responses (e.g., severe anxiety reaction, acute stress-induced dissociative state)

Box 2-2. COMMON ELEMENTS OF THE DIFFERENTIAL DIAGNOSIS OF EVENT-RELATED SENSORIMOTOR ABNORMALITIES

Preinjury sensorimotor disorders (e.g., headaches, tinnitus, vertigo)

Focal cerebral, cerebellar, and/or brain stem injuries

Cerebrovascular events (e.g., stroke, transient ischemic attack, vasoconstriction)

Cerebral hypoxia or hypoxia-ischemia

Subdural or epidural hematomas without overt brain injury

Simple partial (focal motor or sensory) seizure or postictal paralysis

Sensory organ injury (e.g., eye, middle or inner ear, nasal or oropharyngeal tissues)

Cranial nerve injury

Head and neck injuries

Spinal cord injury

Brachial or sacral plexus injury

Peripheral nerve injury

Limb or other bodily injury

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FEATURES OF NEUROCOGNITIVE DISORDER DUE TO TBI

- Cognitive impairments among persons with NCD due to TBI are most common in the domains of
 - Processing speed
 - Complex attention
 - Declarative memory
 - Executive function
 - Social cognition
- Among persons with more severe TBI, particularly when associated with brain contusion, intracranial hemorrhage, or penetrating injury, additional deficits may also be present (e.g., aphasia, neglect, and constructional dyspraxia)

ASSOCIATED BEHAVIORAL DISTURBANCES

- Criteria for both Mild and Major NCD instruct specification of NCD-associated behavioral disturbances
 - delusions
 - hallucinations
 - mood disturbance
 - affective lability
 - agitation
 - disinhibition
 - wandering
 - apathy

NCD-ASSOCIATED BEHAVIORAL DISTURBANCES

Among persons with mild TBI, other symptoms may potentially co-occur with neurocognitive symptoms

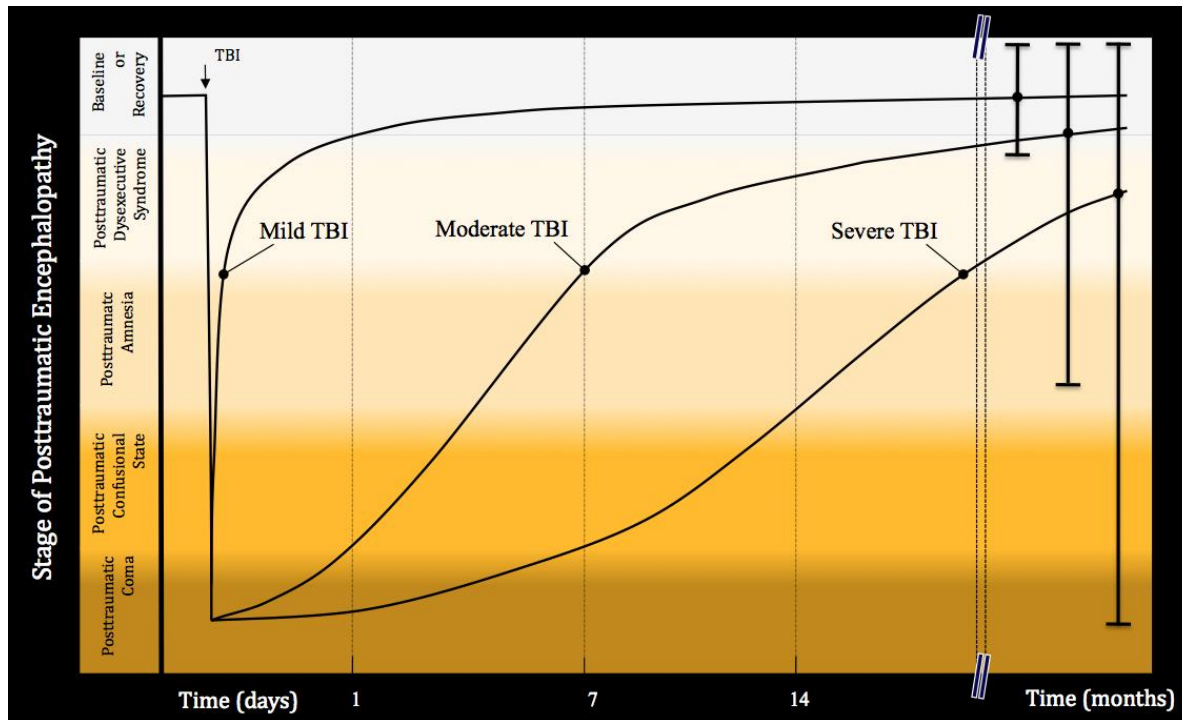
- Depression
 - Irritability
 - Fatigue
 - Headache
 - Photosensitivity
 - Sleep disturbance
-
- Like neurocognitive symptoms, these also tend to resolve in the weeks following mild TBI
 - Substantial subsequent deterioration in these areas should trigger consideration of additional diagnoses

NCD-ASSOCIATED BEHAVIORAL DISTURBANCES

Moderate and severe TBI may be associated with neurophysiological, emotional, and behavioral complications

- seizures
- photosensitivity
- hyperacusis
- irritability
- depression
- inability to resume occupational and social functioning at pre-injury level
- deterioration in interpersonal relationships
- possibly neurodegenerative diseases

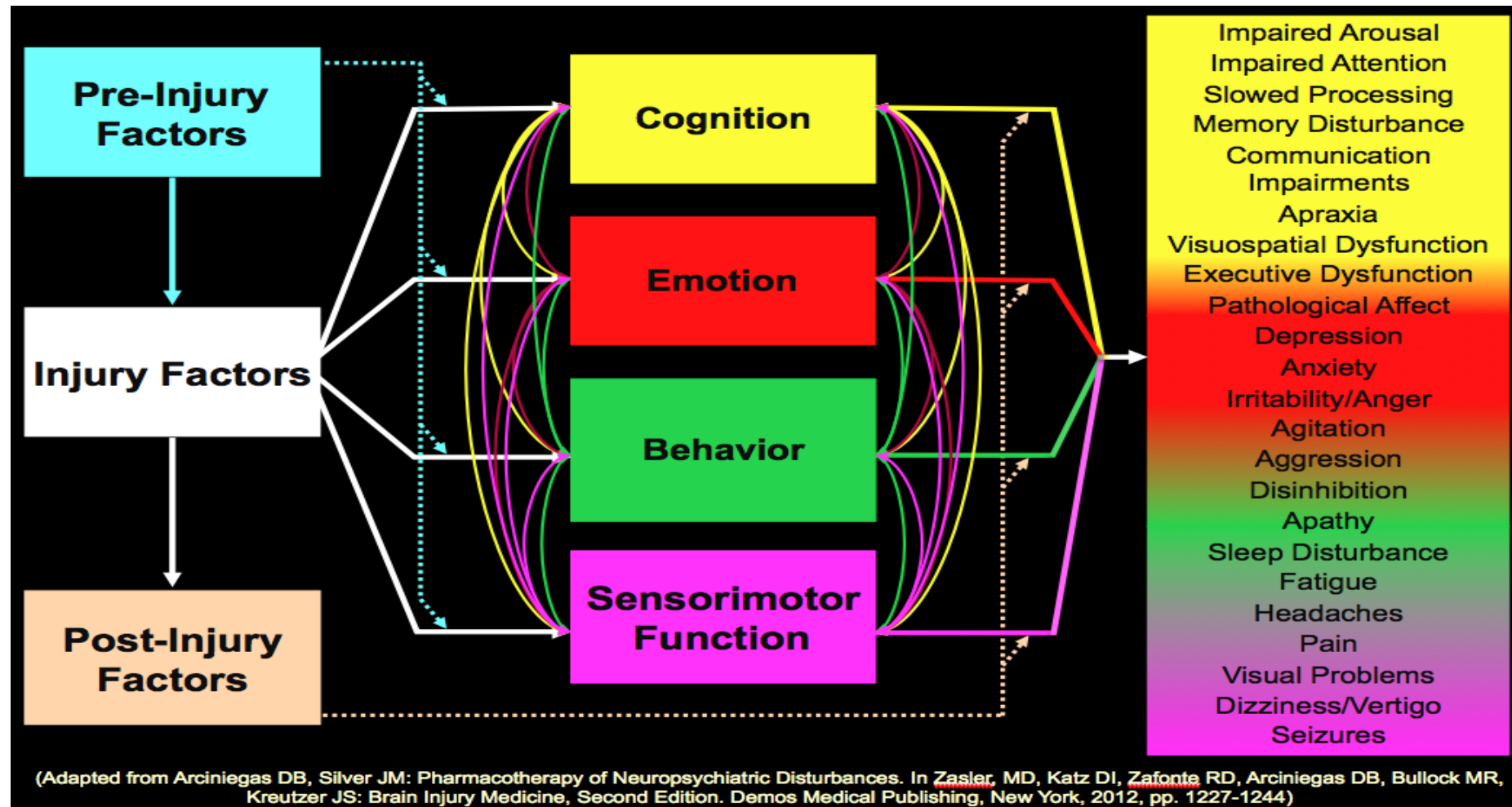
TYPICAL COURSES AFTER TBI



TBI SYMPTOMS: DEVELOPMENT AND COURSE

- Course and outcomes vary with many factors, including TBI severity, complications, age, pre- and post-injury neurological, psychiatric, substance abuse, and post-injury psychosocial factors
- Repeated mild TBI may be (but is not necessarily) associated with persisting neurocognitive disturbance
- Consequently, initial TBI severity does not bear a strict relationship to neurocognitive disorder severity
 - Most persons with mild TBI recover fully and do not develop either Mild or Major NCD
 - Outcome after moderate or severe TBI is variable, ranging from full recovery to severe Major NCD

PUTTING IT ALL TOGETHER



OTHER PSYCHIATRIC DISORDERS DUE TO TBI

- A wide variety of psychiatric disorders, including: depressive disorder; bipolar and related disorder; anxiety disorder; psychotic disorder; personality changes (e.g., labile, disinhibited, aggressive, apathetic, paranoid)
- DSM-5 leaves somewhat unclear when NCD associated behavioral disturbance as opposed to psychiatric disorder due to another medical condition is most appropriate diagnosis
- When specific symptoms fall short of criteria for another psychiatric disorder, symptoms may be subsumed under the NCD diagnosis

OTHER PSYCHIATRIC DISORDERS DUE TO TBI

- When specific psychiatric symptoms (e.g., prominent and persistent depression) begins to predominate clinical picture with course independent of NCD, and
- Clear relationship between symptoms and pathophysiological consequences of TBI,
- Diagnosis of symptom specific disorder due to TBI is reasonable

DIAGNOSTIC CRITERIA FOR POST-CONCUSSION SYNDROME (ICD-10)

History of head trauma with loss of consciousness preceding symptom onset by a maximum of 4 weeks.

Symptoms in 3 or more of the following symptom categories:

- Headache, dizziness, malaise, fatigue, noise tolerance
- Irritability, depression, anxiety, emotional lability
- Subjective concentration, memory, or intellectual difficulties without neuropsychological evidence of marked impairment
- Insomnia
- Reduced alcohol tolerance
- Preoccupation with above symptoms and fear of brain damage with hypochondriacal concern and adoption of sick role

RESEARCH DIAGNOSTIC CRITERIA FOR POSTCONCUSSIONAL DISORDER (DSM-IV)

- A.** A history of head trauma that has caused significant cerebral concussion.
Note: The manifestations of concussion include loss of consciousness, posttraumatic amnesia, and less commonly, posttraumatic onset of seizures. The specific method of defining this criterion needs to be established by further research.
- B.** Evidence from neuropsychological testing or quantified cognitive assessment of difficulty in attention (concentrating, shifting focus of attention, performing simultaneous cognitive tasks) or memory (learning or recall of information).
- C.** Three (or more) of the following occur shortly after the trauma and last at least 3 months:
1. Becoming fatigued easily
 2. Disordered sleep
 3. Headache
 4. Vertigo or dizziness
 5. Irritability or aggression on little or no provocation
 6. Anxiety, depression, or affective instability
 7. Changes in personality (e.g., social or sexual inappropriateness)
 8. Apathy or lack of spontaneity
- D.** The symptoms in criteria B and C have their onset following head trauma or else represent a substantial worsening of preexisting symptoms.
- E.** The disturbance causes significant impairment in social or occupational functioning and represents a significant decline from a previous level of functioning. In school-age children, the impairment may be manifested by a significant worsening in school or academic performance dating from the trauma.
- F.** The symptoms do not meet criteria for Dementia Due to Head Trauma and are not better accounted for by another mental disorder (e.g., Amnesic Disorder Due to Head Trauma, Personality Change Due to Head Trauma).

DR. ALEXANDER E. OBOLSKY

- Psychiatrist in Clinical and Forensic Practice
- Specialization in Trauma, Stress, and Conflict
- Board Certified in General, Addiction, and Forensic Psychiatry
- Assistant Professor of Clinical Psychiatry at Northwestern University Feinberg School of Medicine
- On staff at Northwestern Memorial Hospital, Rehabilitation Institute of Chicago, and NorthShore University
- Medical Director at Health & Law Resource, Inc.
- Dr. Obolsky may be reached at 312.456.4343
- www.northwesternpsychiatrist.com