

Mild Traumatic Brain Injury and Malingered Cognitive Symptoms: Part I  
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## Mild Traumatic Brain Injury and Malingered Cognitive Symptoms: Part I Elizabeth L. Leonard, PhD

This is the first of a two-part article discussing mild traumatic brain injury (mTBI) and malingered cognitive symptoms. Traumatic brain injury is a major public health problem affecting all age groups resulting from falls, accidents, and sports injuries producing mild to severe injury. According to the Centers for Disease Control and Prevention,<sup>1</sup> there are an estimated 1.5 million annual traumatic brain injuries. Approximately eighty percent of all brain injuries are classified as mild and are identified by the term mild traumatic brain injury that may be used interchangeably with the terms concussion, minor head injury and mild closed-head injury. Mild concussions imply some degree of brain injury although it does not necessarily presuppose permanent deficits. The terms mild closed-head injury and mild traumatic brain injury may be used interchangeably although only mTBI is consistent with the presence of cerebral injury.<sup>2</sup> Many individuals sustaining mild injury may not consult a physician until several days post injury and some never consult a health care practitioner leading the National Institutes of Health to conclude that mTBI was under diagnosed and a major health problem.<sup>3 4</sup>

The Centers for Disease Control and Prevention define mTBI as a complex pathophysiologic process affecting the brain induced by traumatic biomechanical forces secondary to direct or indirect forces to the head. Individuals who are at greatest risk include infants and preschool children (birth-4), children and young adults (ages 5-21) and older adults (age >75).<sup>5</sup>

One reason that mTBI may go initially untreated is that symptoms may abate relatively rapidly in some individuals. Unlike moderate and severe brain trauma, mTBI does not require the presence of positive imaging findings to establish a diagnosis. There is medical consensus of acute neurological disruption leading to symptoms in the immediate period following mTBI that can include deficits in attention, impaired verbal retrieval and forgetfulness. Neurological and behavioral symptoms may be recognized immediately, within hours, or a few days following injury. Headache, dizziness, irritability, confusion, disinhibition, drowsiness, sleep disturbance and fatigability are common early sequelae. These symptoms are nonspecific to head injury, and should not be used solely to assess patient complaints one-month post injury for individuals presenting late for evaluation or treatment. Early diagnosis and management help address acute complaints and reduce secondary neurological, psychological and psychosocial morbidity.

Postconcussive symptoms attributed to mTBI may persist in children and adults in the absence of positive brain imaging. Symptoms are multidimensional and present along neurological and behavioral continua ranging from mild to severe. Both psychological and physical complaints affect education, work and psychosocial function regarding return to school, work, and resumption of pre-accident functional levels.

While most individuals with mTBI recover within three months of injury, a distinct subgroup of individuals with negative brain imaging are known to have poor long term

outcome.<sup>3</sup> About fifteen percent of individuals sustaining mTBI have persistent symptoms after three months consistent with a diagnosis of postconcussion syndrome.

Head injuries may not occur in isolation. It is important to evaluate somatic symptoms from associated injuries that may include orthopedic complications from whiplash, pain from fractures, and injuries to internal organs. Associated behavioral complications include depression, anxiety, posttraumatic stress disorder and pain syndromes that may share symptoms with mTBI. These conditions can be comorbid with mTBI or independent of the injury. Clinical decision-making regarding symptom attribution presents challenges for diagnosis and treatment as well as special consideration for selecting assessment protocols for forensic assessments in personal injury and workers' compensation claims. Mild traumatic brain injury requires a comprehensive evaluation including a relevant history, clinical presentation and confirmation of residual symptoms on neuropsychological examination.<sup>6</sup>

Although symptoms from concussive injury are known to be persistent, until recently there was no recognition of the impact from residual trauma within the standard nosology classifying psychiatric and behavioral disorders. The 2013 edition of the Diagnostic and Statistical Manual for Mental Diseases (DSM-5)<sup>7</sup> now recognizes sequelae of traumatic brain injury in a new category covering neurocognitive disorders with two severity levels classifying residual cognitive symptoms from craniocerebral trauma. The distinction between mild and major neurocognitive disorders associated with brain trauma is partially dependent on functional criteria related to symptom severity.

Mild Neurocognitive Disorder (NCD) from Traumatic Brain Injury is diagnosed when there is evidence of a modest cognitive decline from a previous level of performance documented by neuropsychological testing or another quantified clinical assessment. To meet diagnostic criteria for mild NCD, cognitive deficits *do not have to interfere with independence in activities of daily living* but there is recognition that activities of daily living tasks require greater cognitive effort and may employ compensatory strategies or other accommodations.

To meet DSM diagnostic criteria for mild or major Neurocognitive Disorder due to TBI, there must be *evidence of impact to the head or recognition of a mechanism that produces 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 include
  - a. Neuroimaging demonstrating injury
  - b. New onset seizures
  - c. Worsening of a pre-existing seizure disorder
  - d. Visual field cuts, hemiparesis, or sensory changes

DSM-5 defines the severity of brain trauma by identifying symptoms at initial evaluation specifying the duration of loss of consciousness, posttraumatic amnesia, disorientation and confusion. Symptoms of Neurocognitive Disorder must present immediately after the occurrence of the TBI or immediately after recovery of consciousness and persist past the acute post-injury period. DSM-5 acknowledges the presence of behavioral disturbances such as irritability, disinhibition and impulsivity as associated features supporting a diagnosis of mild or major Neurocognitive Disorder due to brain trauma. The presence of behavioral symptoms is an important, relevant new change in psychiatric nosology in recognizing persistent, disabling symptoms experienced by some individuals. In evaluating sequelae of mTBI, neuropsychological testing offers several advantages over the standard neurological examination. The standard neurological examination is frequently unable to identify subtle changes in cognitive function in memory and executive skills that cannot be assessed with standard imaging procedures.

That a specific symptom profile must be present in the immediate period following injury is an important consideration when evaluating the veracity of medical/legal complaints. Neuropsychologists frequently obtain histories of symptom onset weeks or months following injury with a variety of complaints relating to memory impairment, disorientation, confusion and dissociation. In compensation seeking litigants, these symptoms are particularly challenging in determining whether they truly represent cognitive impairment or better explained by psychiatric illness or malingering.

### **Neuropsychological Testing for Mild Traumatic Brain Injury**

Neuropsychologists frequently evaluate children and adults with mTBI because of persistent symptoms affecting daily function, education and employment. The sequelae of mTBI have neurological and behavioral dimensions. Neuropsychological testing is a valid method for assessing cognitive and behavioral function because it employs a systematic approach for obtaining information about cognition and behavior through multiple measures that include a clinical interview and standardized tests. Tests may involve paper and pencil or computer administration and evaluate intelligence, memory, language, perceptual and information processing, personality, emotional function and academic achievement. Neuropsychologists are well trained to assess and treat individuals with mTBI using effective practices based on evidence-based care.

Neuropsychologists assess symptom presentation, evolution, and persistence in determining whether residual symptoms in mTBI cases reflect actual neurological and cognitive deficits. Symptom validity testing is recommended to determine whether an individual's performance reflects reasonable effort or whether there is dissimulation or feigned neurocognitive dysfunction. Rates of malingering associated with TBI in litigants seeking compensation approach twenty-five to thirty percent in some reported studies.

Neuropsychologists employ a battery of robust tests for diagnosing and identifying cognitive deficits in TBI and are frequently asked to testify regarding causation and the degree of cognitive impairment in legal proceedings in civil, criminal and educational arenas. The rigorous training of neuropsychologists in evaluating normal and abnormal cognition and behavior and their ability to assess cognitive function through reproducible,

valid measures is one reason neuropsychological expert testimony is frequently sought in litigation.

Neuropsychological tests are designed to meet high standards for reliability and validity to insure diagnostic accuracy and have strong utility when employed in forensic assessments where causation and damages are considerations. Most cognitive neuropsychological instruments meet *Daubert* evidentiary standards while the same may not be true for tests employed in effort testing and for assessing self-reported symptoms on questionnaires.

Most psychological tests used for forensic evaluation were constructed to have both discriminant and predictive validity. Validity is an important statistical construct employed in determining whether performance on cognitive tests reflects actual neurological impairment. Discriminant validity assesses whether the performance of an individual is statistically different from the persons on whom a test was developed. Predictive validity determines whether symptoms that are present will continue to impair an individual at a future point in time and is important in determining long-term function for assessing damages. Tests that have established reliability and validity satisfy *Daubert* criteria and are statistically robust to withstand cross examination regarding opinions relating to diagnostic certainty and implications for future function.

Symptom checklists that depend on self-report for assessing head injury symptoms generally do not convey the same level of test validity. Attorneys should be familiar with which measures used to assess cognitive and behavioral function in mTBI have been determined to have a sound scientific foundation. Many self-report questionnaires used to assess brain injury are neither normed nor standardized. Attorneys should carefully review expert reports to determine whether the methods and tests employed meet accepted scientific standards. Intelligence and personality tests can only be purchased by qualified examiners and are published by major test manufacturers. Tests that are sold by individuals on their website and self-report inventories may be self-published and only available by their authors on their websites. It is increasingly easy to self-publish and sell instruments through Internet marketing and there are several instruments in general clinical use that do not meet acceptable standards for test development set by professional organizations governing educational and psychological testing.<sup>8</sup> The Buros Center for Testing ([www.buros.org](http://www.buros.org)) at the University of Nebraska maintains a national repository of all tests in print. For a nominal fee, attorneys can obtain information about any published test.

Psychometric rigor employed in test construction demands that published instruments are free of measurement error. Test developers expend considerable effort to obtain valid information that conforms to the population sampled to obtain information relating to gender, age, education, ethnicity, socioeconomic status, and geography. The purchase and use of psychological instruments is regulated much like the prescribing process for physicians. Psychologists are ethically bound to maintain security of test information. Most tests employed in clinical assessment require license verification of training before purchase.

Updated norms for most intelligence tests are published about once a decade. Once test security has been breached, there is no way to utilize this information to obtain valid clinical data. This is one reason psychologists take seriously the exchange of raw test data with attorneys. Raw data includes actual test questions, examinee responses and examiner remarks made during test administration. Raw test data also includes reports generated through computerized scoring and interpretation.

In this era of Internet accessibility, test security is not a trivial issue. There is some concern, that test coaching can occur especially in cases where symptoms of mTBI are mild and not confirmed by brain imaging. Tests commonly employed by neuropsychologists are listed on many health plan websites. A simple Internet search revealed directions and samples of three commonly employed executive function tests – the Rey-Osterrieth Complex Figure Test, Trail Making and Stroop tests. Public availability of this information is one reason that symptom validity testing is increasingly employed in clinical as well as forensic evaluations and why neuropsychologists go to great lengths to maintain test security.

Part two will consider the basis for malingered cognitive symptoms associated with traumatic brain injury and methods for forensic assessment.

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<sup>1</sup> Centers for Disease Control and Prevention (2006) National Center for injury prevention and control. Retrieved from <http://www.cdc.gov>

<sup>2</sup> Kirkwood MW Yeates KO Taylor HG et al. Management of pediatric mild traumatic brain injury: A neuropsychological review from injury through recovery. *Clinical Neuropsychologist*, 2008, 22,5, 769-800.

<sup>3</sup> National Institutes of Health, Rehabilitation of persons with traumatic brain injury, *NIH Consensus Statement*, 1998, 16, 1, 141.

<sup>4</sup> Ruff RM Iverson GL Barth JT et al. Recommendations for diagnosing a mild traumatic brain injury: A National Academy of Neuropsychology Education Paper, *Archives of Clinical Neuropsychology*, 2009, 24, 3-10.

<sup>5</sup> Heads Up: Facts for Physicians, Centers for Disease Control and Prevention, US Department of Health and Human Services.

<sup>6</sup> Lezak MD Howieson DB Bigler ED Tranel D. Neuropsychological Assessment (5<sup>th</sup> Ed.) Oxford University Press:NY, 2012.

<sup>7</sup> Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. American Psychiatric Association, 2013.

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<sup>8</sup> American Psychological Association Guidelines for Test User Qualifications: Executive Summary, *American Psychologist*, 2001-1099-1113.