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Challenges in Assessing and Assisting Military Personnel with Mild Traumatic Brain Injuries

Robert A. Seegmiller, Ph.D., ABPP*

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I. THE SCOPE OF THE PROBLEM

Early in the course of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), traumatic brain injury (TBI) was recognized as one of the major injuries being sustained by military personnel serving in these conflicts.¹ In fact, TBI has been identified as

* Director, Postdoctoral Fellowship in Clinical Neuropsychology, Brooke Army Medical Center, Joint Base San Antonio, Texas. I would like to express my gratitude to the many dedicated people at the University of Miami School of Law who organized the National Security and Armed Conflict Law Review symposium. By raising awareness of the social, medical, and legal challenges facing veterans, lawyers and other helping professionals will be in a better position to assist those who have served in the military. Every aspect of the symposium was managed with exceptional courtesy and professionalism. I am deeply honored to have been invited to participate. The views expressed herein are those of the author and do not reflect the official policy or position of Brooke Army Medical Center, the U.S. Army Medical Department, the U.S. Army Office of the Surgeon General, the Department of the Army and Department of Defense or the U.S. Government.

¹ Rosene, Jeremy, *Implications of Traumatic Brain Injury in the Military* (2013), available at http://opensiuc.lib.siu.edu/gs_rp/335.

the “Signature Injury” of the war by military authorities, politicians, and the popular media.² This attention was undoubtedly due to the prevalence of such injuries. Soldiers, marines, and to a lesser extent airmen and sailors were experiencing TBIs in unprecedented numbers, at least in part due to the nature of the conflicts in Iraq and Afghanistan. Many of the injuries sustained were the result of exposure to improvised explosive devices (IEDs), which are “homemade” bomb[s] and/or destructive device[s] [designed] to destroy, incapacitate, harass, or distract”³ and are commonly employed weapons in terrorist actions and unconventional warfare.³ Primary blast injuries caused by IEDs are the result of “sudden increase[s] [in] environmental air pressure resulting from the detonation of a high-energy explosive charge.”⁴ Persons injured by explosive blasts also frequently sustain high velocity missile wounds from flying debris (secondary blast injuries), “blunt trauma from displacement of the body and its forceful impact with rigid and stationary objects (tertiary blast injuries), and, finally, burns received from the flash of the explosion or from open fire, and smoke and dust inhalation.”⁵

Improvements in body and vehicle armor, along with state-of-the-art medical intervention reduced the number of casualties sustained in OEF and OIF.⁶ When compared with previous conflicts, a larger percentage of military personnel have returned home from alive, yet injured.⁷ 78% of combat injuries in OEF and OIF were attributed to explosive blasts;⁸ and the percentage of persons sustaining traumatic brain injuries when hit by IEDs has been estimated at 61%.⁹ One study found that 88% of combat-related TBIs involved exposure to explosions (e.g., improvised explosive devices, mortars, mines, rocket-propelled grenades); and wounds to the

² Charles W. Hoge et al, *Mild Traumatic Brain Injury in US Soldiers Returning From Iraq*. 358 N. ENGL. J. MED., 453 at 484 (2008).

³ NAT’L ACADEMIES & DEP’T OF HOMELAND SEC., IED ATTACK: IMPROVISED EXPLOSIVE DEVICES 1, available at https://www.dhs.gov/xlibrary/assets/prep_ied_fact_sheet.pdf.

⁴ Eliezer Katz et al., *Primary Blast Injury After a Bomb Explosion in a Civilian Bus*, 209 ANNALS OF SURGERY 484 (1989); NAT’L ACADEMIES, *supra* note 3 at 2.

⁵ Katz et al, *supra* note 4.

⁶ Joseph S. Gondusky & Michael P. Reiter, *Protecting Military Convoys in Iraq: An Examination of Battle Injuries Sustained by a Mechanized Battalion During Operation Iraqi Freedom II*. 170 MIL. MED. 546 (2005); Tarak H. Patel et al, *A U.S. Army Forward Surgical Team’s experience in Operation Iraqi Freedom*. 57 J. TRAUMA 201 (2004).

⁷ Susan Okie, *Traumatic Brain Injury in the War Zone*. 352 N. ENGL. J. MED. 2043 (2005).

⁸ Brett D. Owens et al, *Combat Wounds in Operation Iraqi Freedom and Operation Enduring Freedom*. 64 J. OF TRAUMA AND ACUTE CARE SURGERY 295 (2008).’

⁹ Cheryl Lehman, *Mechanisms of Injury in Wartime*, 33 REHABILITATION NURSING 192, 193 (2008).

head and neck region constitute approximately 30% of all battle related injuries.¹⁰ Estimates as to the total number of TBIs sustained by U.S. military personnel in OEF and OIF vary depending on the survey methods and statistical analyses employed. Numbers based on self-reported injuries must be viewed cautiously due to the inherent unreliability of retrospective memories, as well as uncertainty in the general population regarding what constitutes a traumatic brain injury. Some widely cited estimates are of disputable accuracy because they were derived by extrapolating from small samples of redeployed service members.¹¹ Perhaps the best estimate of the total number of military personnel sustaining traumatic brain injuries in Operations Enduring Freedom and Iraqi Freedom has been compiled by the Defense and Veterans Brain Injury Center (DVBIC) based on the number of brain injuries documented in military medical records.¹² The latest DVBIC numbers indicate that approximately 320,000 military members sustained TBIs between 2000 and 2014.¹³

II. THE IMPLICATIONS OF INJURY SEVERITY

The resulting impact of these injuries is even more difficult to estimate than the total number, as the long-term consequences of injuries classified as TBIs vary greatly, ranging from complete recovery with no residual deficits to permanent, devastating disability.¹⁴ The primary factor impacting the degree of impairment and expected recovery from TBI is the severity of the initial trauma.¹⁵ No universally accepted criteria exist for classifying the severity of TBIs, but some of the most often considered determinants include the length of loss of consciousness (LOC), alteration of consciousness (AOC), length of posttraumatic

¹⁰ Michael Galarneau et al., *Traumatic Brain Injury During Operation Iraqi Freedom: Findings From the United States Navy–Marine Corps Combat Trauma Registry*, 108 J. of Neurosurgery 950, (2008); Owens et al, *supra* note 8 at 296.

¹¹ Terri Tanielian et al., *Invisible Wounds of War: Summary and Recommendations for Addressing Psychological and Cognitive Injuries* at 9-10, available at <http://justiceforvets.org/sites/default/files/files/RAND%20invisible%20wounds%20of%20war.pdf>.

¹² Def. and Veterans Brain Injury Ctr., *DoD Worldwide Numbers for TBI Worldwide Totals*, available at <http://dvvic.dcoe.mil/sites/default/files/DoD-TBI-Worldwide-Totals-2000-2014-Q1-Q4-Feb23-2015.pdf>.

¹³ *Id.*

¹⁴ Centers for Disease Control and Protection, *Injury Prevention & Control: Traumatic Brain Injury*, available at <http://www.cdc.gov/TraumaticBrainInjury/outcomes.html>.

¹⁵ Leslie W. Johnson, *Factors Influencing Recovery from Mild Traumatic Brain Injury* at 6-7, available at http://libres.uncg.edu/ir/uncg/f/Johnson_uncg_0154D_11381.pdf.

amnesia (PTA),¹⁶ and the presence or absence of neuroimaging evidence of a physical brain injury, e.g., computed tomography (CT) or magnetic resonance imaging (MRI) findings of hemorrhagic bleeding in or around the brain, cerebral contusions, swelling, or neuronal damage.¹⁷ Based on such criteria, traumatic brain injuries are usually classified as either mild, moderate, or severe.¹⁸ The term “complicated” mild traumatic brain injury has been used to describe injuries that meet criteria for a mild TBI (mTBI) based on length of LOC and PTA, but for which neuroimaging evidence of a physical injury to the brain is discovered.¹⁹ Although the correlation is imprecise, more severe brain injuries typically result in more severe and enduring disability.²⁰ The milder the initial injury, the better the prognosis.

When working with military personnel who have sustained traumatic brain injuries, it is important to understand the significant differences between mild, moderate, and severe TBIs. All brain injuries are not equal, and conceptualizing or treating them similarly can have serious negative repercussions. It is vital that service members be correctly diagnosed if they are to receive appropriate follow-up treatment and services. Paradoxically, case management for persons who have sustained more severe brain injuries can be more straightforward than the case management for those who have sustained milder TBIs. The reason for this is that those with severe TBIs are easily identified, their impairments are usually obvious, and extensive rehabilitative services have been established to assist those who are seriously handicapped. Numerous brain injury and polytrauma rehabilitation centers have been established at Department of Defense (DoD), Veterans Affairs (VA) and civilian medical centers across the United States, and are staffed by a wide range of professionals, including physical medicine and rehabilitation physicians, neuropsychologists, other mental health providers, physical and occupational therapists, speech therapists, and

¹⁶ A state of confusion that occurs immediately following a traumatic brain injury in which the injured person is disoriented and unable to remember events that occur after the injury.

¹⁷ See generally Bruce Lee & Andrew Newberg, *Neuroimaging in Traumatic Brain Imaging*, NeuroRx®: 2 J. AM. SOC’Y EXPERIMENTAL NEUROTHERAPEUTICS 372 (2005).

¹⁸ *DoD/VA Code Proposal*, available at <http://www.cdc.gov/nchs/data/icd/Sep08TBI.pdf> at 2; see also Thomas A. Gennarelli & D.I. Graham, *Textbook of Traumatic Brain Injury*, 27-50 (2005); Louis M. French, *Military Traumatic Brain Injury: An Examination of Important Differences*, 1208 ANNALS N.Y. ACAD. SCI. 38 (2010).

¹⁹ Rael T. Lange, Grant L. Iverson & Michael D. Franzen, *Neuropsychological Functioning Following Complicated vs.*

Uncomplicated Mild Traumatic Brain Injury, 23 BRAIN INJ. 83 (2009).

²⁰ *Id.*

other support staff to assist military personnel who have sustained severe TBIs with their recovery and rehabilitation. Those who have sustained severe TBIs are more “visible,” require greater assistance, and are more likely to experience long-term social and occupational impairment.

From a social perspective, working with military members who sustained mTBIs may be an even greater challenge than assisting those who suffered more severe brain injuries. There are a number of reasons for this. One reason is that the number of military personnel who sustained mTBIs in OEF and OIF is much greater than the number of those who sustained more severe brain injuries. Statistics provided by the Defense and Veterans Brain Injury Center indicate that nearly 83% of all military TBIs documented since 2000 were mild.²¹ In other words, approximately five out of every six brain injuries experienced by service members since the turn of the century involved comparatively minor injuries, resulting in less than 30 minutes LOC, less than 24 hours of AOC and PTA, and in most cases, no neuroimaging evidence of physical brain injury. This is good news, since the prognosis for those who sustain mTBIs is usually very good. In fact, the typical course of recovery following mTBIs is complete resolution of symptoms, with no permanent residual deficits. Immediate symptoms commonly experienced by those with mTBIs include headaches, dizziness, nausea, alteration of consciousness (e.g., feeling dazed), impaired cognitive functioning (e.g., difficulty with attention/concentration, slowed information processing speed), dysphoria, and fatigue that typically resolve within days to weeks, with minimal or no medical intervention. A prospective longitudinal study found that mTBI patients performed the same on neuropsychological tests as patients with orthopedic injuries (control subjects) when tested one year post injury.²² Meta-analyses of neuropsychological studies have consistently found that the cognitive impairments associated with concussions usually resolve within three months.²³ A comprehensive review of available research by the World

²¹ DoD Numbers for Traumatic Brain Injury, *Defense and Veterans Brain Injury Center*, available at <http://dvbic.dcoe.mil/sites/default/files/DoD-TBI-Worldwide-Totals-2000-2014-Q1-Q4-Feb23-2015.pdf>.

²² Sureyya S. Dikmen et al., *Neuropsychological Outcome at 1-Year Post Head Injury*, 9 *NEUROPSYCHOL.* 80 (1995).

²³ Lawrence M. Binder et al., *A Review of Mild Head Trauma Part I: Meta-Analytic Review of Neuropsychological Studies*, 19 *J. CLIN. & EXPERIM'L NEUROPSYCHOL.* 421 (1997); See also Glenn Larrabee, *Neuropsychological Outcome, Post Concussion Symptoms, and Forensic Considerations in Mild Closed Head Trauma*, 2 *SEMINARS IN CLIN. NEUROPSYCHIATRY* 196 (1997); Heather G. Belanger et al., *Factors Moderating Neuropsychological Outcomes Following Mild Traumatic Brain Injury: A Meta-Analysis*, 11 *J. INT'L NEUROPSYCHOL. SOC'Y* 215 (2005); Martin L. Rohling et al., *A Meta-Analysis of Neuropsychological Outcome After Mild Traumatic Brain Injury: Re-analyses and*

Health Organization found consistent and methodologically sound evidence that prognosis following mTBI is good, with quick recovery and little evidence of residual deficits.²⁴ Unlike those who sustained severe or penetrating TBIs (approximately 2.5% according to DVBIC statistics), the large majority of military personnel diagnosed with a traumatic brain injury can expect a full return to their premorbid level of functioning within a relatively brief of time.²⁵

III. THE NATURE OF PERSISTENT POSTCONCUSSIVE SYMPTOMS

While complete, relatively rapid recovery from mTBI is the norm, a minority of persons who sustain mTBIs experience slow or incomplete recoveries, and in some cases, chronic complaints and impairment. The subgroup of people who fail to recover as expected from their mild TBIs have been called the “miserable minority.”²⁶ Early estimates suggested that the “miserable minority” comprise up to 15% of the total population of persons who sustain mTBIs, although this number has been disputed as being an overestimate due to misinterpretation of the results of previous studies.²⁷ A more accurate estimate of the percentage of persons who experience persistent postconcussive symptoms following a mTBI is probably closer to 1-5%,²⁸ although service members with reported histories of mTBI are presenting at both military and VA medical settings with symptoms in excess of what would be expected based on initial injury characteristics and/or at unexpected time periods post-injury.²⁹

Reconsiderations of Binder et al (1997), Frencham et al (2005), and Pertab et al (2009), 25 CLIN. NEUROPSYCHOL. 608, (2011).

²⁴ Linda J. Carroll et. al., (2004), *Prognosis for Mild Traumatic Brain Injury: Results of the WHO Collaborating Centre Task Force on Mild Traumatic Brain Injury*, 43 J. OF REHAB. MED. 84 (2004).

²⁵ Tresa M. Roebuck-Spencer et al., *Cognitive Change Associated With Self-Reported Mild Traumatic Brain Injury Sustained During the OEF/OIF Conflicts*, 26 CLIN. NEUROPSYCHOL. 473 (2012).

²⁶ R. Ruff, *Two Decades of Advances in Understanding of Mild Traumatic Brain Injury*, 20 J. HEAD TRAUMA REHAB. 5 (2005); See also Ronald Ruff et al, *Miserable Minority: Emotional Risk Factors That Influence the Outcome of a Mild Traumatic Brain Injury*, 10 BRAIN INJURY 551 (Aug. 1996).

²⁷ Manfred F. Greiffenstein, *Clinical Myths of Forensic Neuropsychology*, 23 CLINICAL NEUROPSYCHOL. 286-296 (2009).

²⁸ Michael McCrea, *Mild Traumatic Brain Injury and Postconcussion Syndrome: The New Evidence Base for Diagnosis and Treatment* 3 (2008).

²⁹ Laura Lee Shaw Howe, *Giving Context to Post-Deployment Postconcussive-Like Symptoms: Blast-Related Rotential Mild Traumatic Brain Injury and Comorbidities*, 23 CLINICAL NEUROPSYCHOL. 1315 (2009).

The constellation of persistent physical, cognitive, emotional, and behavioral symptoms reported by a small percentage of patients more than three months after sustaining mTBIs is known as postconcussive syndrome (PCS). While the symptoms of PCS vary from person to person, unremitting sequelae of acute concussion are often reported.³⁰ Symptoms not typically associated with concussion (e.g., mutism, monochromatic vision, temporary deafness, bilateral arm numbness, difficulty swallowing) are also sometimes claimed.³¹ The etiology of PCS has been a topic of significant debate in the scientific community, with some researchers arguing that persistent postconcussive symptoms may be associated with structural brain damage and related neuropathology.³² There is general agreement, however, that various non-neurological factors contribute significantly to the persistence of postconcussive symptoms following mTBIs, resulting in greater disability than would be expected based on the severity of the initial injury.³³

A. *The Problem of Iatrogenesis*

One of the unintended adverse consequences of efforts to assist military members who have sustained mild traumatic brain injuries is the potential for iatrogenic disability.³⁴ Iatrogenesis involves the “inadvertent and preventable induction of disease or complications by the medical treatment or procedures of a physician or surgeon.”³⁵ Extensive post-deployment efforts to identify, evaluate, and treat service members who previously sustained concussions may inadvertently yet erroneously send

³⁰ Wiley Mittenberg et al, *Symptoms Following Mild Head Injury: Expectation as Aetiology*, 55 J. OF NEUROLOGY, NEUROSURGERY & PSYCHIATRY 200 (1992).

³¹ David B. Cooper et al, *Utility of the Mild Brain Injury Atypical Symptoms Scale as a Screening Measure for Symptom Over-Reporting in Operation Enduring Freedom/Operation Iraqi Freedom Service Members with Postconcussive Complaints*, 26 ARCHIVES OF CLINICAL NEUROPSYCHOL. 724 (2011).

³² See generally Erin D. Bigler, *Neurobiology and Neuropathology Underlie the Neuropsychological Deficits Associated with Traumatic Brain Injury*, 18 ARCHIVES OF CLINICAL NEUROPSYCHOLOGY 595-621 (2003); see also Erin D. Bigler, *Neuropsychology and Clinical Neuroscience of Persistent Postconcussive Syndrome*, 14 J. OF INT'L NEUROPSYCHOL. SOCIETY 1 (2008).

³³ Ruihua Hou et al, *When a Minor Head Injury Results in Enduring Symptoms: A Prospective Investigation of Risk Factors for Postconcussional Syndrome After Mild Traumatic Brain Injury*, 83 J. OF NEUROLOGY, NEUROSURGERY & PSYCHIATRY 217 (2012).

³⁴ See generally Randy S. Roth & Robert J. Spencer, *Iatrogenic Risk in the Management of Mild Traumatic Brain Injury Among Combat Veterans: A Case Illustration and Commentary*, 1 INT'L J. OF PHYSICAL MED. & REHAB. 2 (2013).

³⁵ Merriam-Webster Online Dictionary (2015) available at <http://www.merriam-webster.com/dictionary/iatrogenic> (last visited 4/19/2015).

the message that prolonged recoveries or residual deficits are common, or that personnel who experienced deployment-related concussions may have sustained serious, permanent brain injuries. Patients unfamiliar with the normal course of recovery following concussions may be led to believe they are “brain damaged” based on misdiagnoses or misinformation provided by well-intentioned medical and mental health providers. The result may be a “nocebo” effect, whereby expectations of adverse outcomes following mTBIs, conveyed by trusted medical authorities, may actually harm patients by hindering their normal recovery. Simply drawing attention to a prior history of mild head injury (i.e., introducing a “diagnosis threat”) and planting negative expectations for cognitive functioning has been shown to result in worse performance on neuropsychological tests of intellect and memory.³⁶ In addition to the potential dangers of over-diagnosis and conveying negative expectation following mTBIs, medical providers with good intentions may also unintentionally delay or prolong normal recovery by over-prescribing cognitive and physical rest after concussions.³⁷

Iatrogenic pathology may be perpetuated by a number of common misunderstandings. One popular myth is that mTBIs sustained by military members constitute “silent injuries” that can be hard to identify and diagnose, and may go unrecognized even by those who are afflicted. The implication is that countless military members are suffering from a variety of physical, emotional, and behavioral problems as a result of undetected brain injuries supposedly sustained during their OIF and OEF deployments. Unfortunately this notion, which is most often espoused by persons who advocate for veterans, may lead some veterans to erroneously conclude that they suffered permanent, insidious brain damage as a result of their mild concussions.

B. *The Problem of Misattribution*

Another factor contributing to the misperception that mild TBIs cause long-term problems or disability is misattribution, which occurs when persisting symptoms are mistakenly attributed to remote concussions. mTBIs are known to be associated with a number of immediate pathophysiological changes, including neurometabolic dysfunction within the brain that normally resolves in about a week, or

³⁶ See generally Julie A. Suhr & John Gunstad, “*Diagnosis threat*”: *The Effect of Negative Expectations on Cognitive Performance in Head Injury*, 24 J. OF CLINICAL AND EXPERIMENTAL NEUROPSYCHOL., 448 (2002).

³⁷ See generally Noah D. Silverberg & Grant L. Iverson, *Is Rest After Concussion “The Best Medicine?”: Recommendations for Activity Resumption Following Concussion in Athletes, Civilians, and Military Service Members*. 28 J. OF HEAD TRAUMA REHAB. 250 (2013).

possibly a little longer in cases of complicated mTBIs where there is neuroimaging evidence of brain injury.³⁸ Acute concussions are also commonly associated with a number of distressing symptoms, including physical manifestations (e.g., headaches, dizziness, nausea, balance problems, visual disturbance, sensitivity to light and noise), disruption of normal sleep patterns (e.g., fatigue, drowsiness, excessive sleep or difficulty falling asleep), alterations in consciousness and cognitive functioning (e.g., feeling “dazed” or “in a fog,” altered time perception, impaired concentration, memory problems), and emotional/behavioral changes (e.g., anxiety, depression, apathy, irritability). Although these are normal symptoms soon after a concussion, they are also non-specific, meaning that they can be associated with a wide range of psychiatric and medical conditions.³⁹ A moderately high correlation between self-reported “postconcussive” symptoms and depression has been observed.⁴⁰ Chronic pain patients⁴¹ and personal injury claimants with no history of head injury⁴² have been found to report higher level of “postconcussive” symptoms than persons with a history of mTBI. In fact, many “postconcussive” symptoms occur with regular frequency in healthy people who have never sustained a concussion.⁴³ ; ‘

Misattribution of various somatic, cognitive, emotional, and behavioral symptoms to remote mTBIs is fueled by misunderstanding regarding the normal course of recovery following concussion. Semantics may also play a role. The term “mild traumatic brain injury,” which was broadly adopted during Operations Enduring Freedom and Iraqi Freedom, is technically correct. Head trauma resulting in an alteration of consciousness does involve immediate adverse physiological changes to the brain. However, a common mistaken belief

³⁸ Christopher C. Giza & David A. Hovda, *The Neurometabolic Cascade of Concussion*. 36 J. OF ATHLETIC TRAINING 228 (2001).

³⁹ Steven H. Putnam & Scott R. Millis, *Psychological Factors in the Development and Maintenance of Chronic Somatic and Functional Symptoms Following Mild Traumatic Brain Injury*. 7 ADVANCES IN MEDICAL PSYCHOTHERAPY 1 (1994).

⁴⁰ Grant L. Iverson, *Misdiagnosis of the Persistent Postconcussion Syndrome in Patients with Depression*. 21 ARCH. CLIN. NEUROPSYCHOL. 303; Grant L. Iverson & Rael T. Lange, *Examination of “Postconcussion-Like” Symptoms in a Healthy Sample*. 10 APPLIED NEUROPSYCHOLOGY 137 (2003).

⁴¹ Bogdan P. Radanov & Ladislav Valach, *Cognitive Deficits in Patients After Soft Tissue Injury of the Cervical Spine*. 17 SPINE 127 (1992).

⁴² John T. Dunn et al, *Neurotoxic Complaint Base Rates of Personal Injury Claimants: Implications for Neuropsychological Assessment*. 51 JOURNAL OF CLINICAL PSYCHOLOGY 577 (1995).

⁴³ *Examination of “Postconcussion-Like” Symptoms in a Healthy Sample*; Philip J.A. Dean, Darragh O’Neill & Annette Sterr, *Postconcussion Syndrome: Prevalence After Mild Traumatic Brain Injury in Comparison with a Sample Without Head Injury*. 26 BRAIN INJURY 14 (2012).

is that such injuries result in permanent, severe, and/or unpredictable brain damage when, in fact, the opposite is true. The cognitive and neurobehavioral sequelae of mTBIs are typically self-limiting and reasonably predictable.⁴⁴ There is little evidence of a neurological basis for most persisting postconcussive complaints.⁴⁵ Nevertheless, persons who are told they have sustained “brain injuries” may assume the worst and anticipate long-term problems unless provided with accurate information regarding their injuries. Incorrectly attributing “postconcussive symptoms” to a remote mTBI may result in misdiagnoses and inappropriate treatments. Recent VA/DoD clinical practice guidelines state: “The terms ‘concussion’ and ‘mTBI’ are used interchangeably. The use of the term concussion or history of mild TBI may be preferred when communicating with the patient, indicating a transient condition, avoiding the use of the terms “brain damage” or “brain injury” that may inadvertently reinforce misperceptions of symptoms or insecurities about recovery.”⁴⁶

Most postconcussive symptoms are non-specific and can be associated with a wide range of medical conditions including sleep disturbances,⁴⁷ chronic pain,⁴⁸ medication side effects, and substance abuse. As the time from concussion passes, and in the absence of other complicating medical conditions, social and psychological rather than physiological factors appear to best account for the expression of persistent postconcussive symptoms.⁴⁹

C. *Psychiatric Comorbidity*

When postconcussive symptoms persist well past the normal recovery period, when they worsen rather than improve over time, or when they reemerge months to years after initially resolving, the chronic

⁴⁴ Grant L. Iverson, *Outcome from Mild Traumatic Brain Injury*. 18 CURRENT OPINION IN PSYCHIATRY 301 (2005).

⁴⁵ Lawrence M. Binder, *A Review of Mild Head Trauma. Part II: Clinical Implications*. 19 J. CLINICAL AND EXPERIMENTAL NEUROPSYCHOL. 432 (1997).

⁴⁶ Department of Veterans Affairs, *VA/DoD Clinical Practice Guidelines for Management of Concussion/Mild Traumatic Brain Injury* (2013).

⁴⁷ Julio Fernandez-Mendoza et al, *Insomnia with Objective Short Sleep Duration is Associated with Deficits in Neuropsychological Performance: A General Population Study*. 33 SLEEP 459 (2010).

⁴⁸ Laura Smith-Seemiller et al, *Presence of Postconcussion Syndrome Symptoms in Patients with Chronic Pain vs. Mild Traumatic Brain Injury*. 17 BRAIN INJURY 199 (2003).

⁴⁹ James R. Youngjohn, Lisa Burrows & Kristi Erdal, *Brain Damage or Compensation Neurosis? The Controversial Postconcussion Syndrome*. 9 CLINICAL NEUROPSYCHOL. 112 (1995); Robert L. Heilbronner et al, *Brain injury and Functional Disorders Part IV*. 9 J. CONTROVERSIAL MED. CLAIMS 1 (2002).

problems are most likely due to something other than mTBI. Unfortunately, persons with a history of concussion, their families and associates, as well as misinformed medical or mental health providers, may mistakenly attribute patients' persistent symptoms to mTBI. A growing body of evidence suggests that the "postconcussive" symptoms reported by military personnel who experienced concussions in OIF and OEF are actually better accounted for by emotional/psychological factors. This finding is not surprising given the fact that most concussions sustained by deployed service members occurred in the context of life-threatening, and often psychologically traumatizing events (e.g., direct combat, explosive blast exposure). Among veterans with a history of mTBI, psychiatric comorbidity is common and may complicate or confuse diagnostic assessment and treatment planning. A seminal study of over 2500 soldiers following their return from deployment found that after adjusting for Post-traumatic Stress Disorder (PTSD) and depression, mild traumatic brain injury was no longer significantly associated with the wide range of reported somatic problems and postconcussive symptoms, other than headaches.⁵⁰ Another study found that cumulative psychiatric distress was the only significant predictor of post-deployment functional disability among military personnel with a history of mTBI.⁵¹ High levels of posttraumatic stress have been reported by a substantial proportion of service members who sustained mTBIs during OIF/OEF,⁵² and screening for PTSD and depression has been recommended when determining the appropriate treatment for veterans reporting postconcussive symptoms.⁵³

Persistent postconcussive symptoms can be manifestations of somatic symptom disorders,⁵⁴ which are characterized by distressing physical symptoms plus abnormal thoughts, feelings, and behaviors in response to these symptoms.⁵⁵ The most recent Diagnostic and Statistical

⁵⁰ Hoge, *supra* note 2 at 453-463.

⁵¹ Czipi S.L., Lu, L.H., Pape, T.L., Smith, B., High, W.M. & Evans, C.T., *The Impact of Psychiatric Distress and Neurocognitive Performance on Daily Functioning in a Veteran Population with mTBI*. Poster presented at the annual meeting of the International Neuropsychological Society, Denver, CO (2015).

⁵² Jan E. Kennedy et al, *Posttraumatic Stress Symptoms in OIF/OEF Service Members with Blast-Related and Non-Blast-Related Mild TBI*. 26 NEUROREHAB. 223 (2010).

⁵³ Aaron I. Schneiderman, Elisa R. Braver & Han K. Kang, *Understanding Sequelae of Injury Mechanisms and Mild Traumatic Brain Injury Incurred During the Conflicts in Iraq and Afghanistan: Persistent Postconcussive Symptoms and Posttraumatic Stress Disorder*. 167 AM. J. EPIDEMIOLOGY 1446 (2008).

⁵⁴ Glenn Larrabee, *Neuropsychology Outcome, Post Concussion Symptoms, and Forensic Consideration in Mild Closed Head Trauma*. 2 SEMINARS IN CLINICAL NEUROPSYCHIATRY 196 (1997).

⁵⁵ American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders (DSM-V)*. American Psychiatric Pub. (2013).

Manual of Mental Disorders, Fifth Edition (DSM-V) does not require that medical symptoms be “unexplained,” only that they are distressing or result in significant disruption of daily life. Hence, service members who sustain concussions and subsequently experience disproportionate and persistent thoughts about the seriousness of their condition, accompanied by high levels of anxiety about their health or symptoms, and who devote excessive time or energy to their symptoms or health concerns, may be displaying symptoms of a somatic symptom disorder rather than a physiological brain injury. In other words, an initial mild traumatic brain injury, rather than resolving as expected, may devolve into a psychiatric condition that involves high levels of worry or fear regarding the medical seriousness of symptoms, significant impairment of health-related quality of life, and often a high level of medical care utilization, which rarely alleviates the individual’s concerns.

D. Functional Impairment

It is widely recognized that in many patients, persistent postconcussive symptoms following mild head injuries are likely to be “functional” rather than “organic.”⁵⁶ Functional or psychogenic disorders are conditions with physical symptoms that are thought to be due primarily to psychological rather than underlying medical or neurological disorders. Conversion disorders are conditions in which psychological distress is unconsciously “converted” into physical (typically neurological) symptoms. Increased stress has been associated with increased reporting of “postconcussive” symptoms, even in persons without a history of head injury.⁵⁷ Functional postconcussive symptoms may also be inadvertently perpetuated by reinforcement or “rewards.” The terms “primary gain” and “secondary gain” are commonly used to describe such rewards. “Primary gain” refers to the psychological or emotional benefits patients may obtain as a consequence of symptom reporting. Such motivations may not be apparent to the patient or others, but typically involve the alleviation of guilt or anxiety in patients who are unable to perform up to expectations.

“Secondary gain” refers to the social, occupational, or interpersonal advantages a patient may derive from their symptoms. Examples of secondary gain include social benefits such as positive attention or sympathy, avoidance of duty or responsibility, or tangible rewards including financial compensation or disability benefits. Research has

⁵⁶ *Brain Damage or Compensation Neurosis?*, *supra* note 49.

⁵⁷ William Drew Gouvier et al, *Postconcussion Symptoms and Daily Stress in Normal and Head-Injured college populations*. 7 ARCHIVES OF CLINICAL NEUROPSYCHOLOGY 193 (1992).

found a strong relationship between financial compensation status and symptom reporting following mild traumatic brain injury.⁵⁸ Compensation seeking has also been found to be correlated with delayed return to work in persons who sustained mild TBIs.⁵⁹ One comprehensive, evidence-based review of studies investigating outcomes following mild traumatic brain injury found that for adults, cognitive deficits and symptoms are common in the acute postconcussion stage, with most studies showing normal recovery within months. Where symptoms persist, compensation/litigation was found to be a significant contributing factor, with little consistent evidence for other predictors.⁶⁰

The intentional production of false or grossly exaggerated physical or psychological symptoms, motivated by external incentives (i.e., secondary gain), is an essential feature of malingering.⁶¹ Feigned or exaggerated cognitive dysfunction following mild traumatic brain injuries can lead to misdiagnoses, inappropriate interventions, and unwarranted disability compensation. Malingered symptoms or functional impairment, if not detected, may be incorrectly attributed to neuropathology and financially rewarded. Patients who would otherwise be expected to make rapid recoveries can become chronically “disabled” by assuming long-term patient roles. Appropriately assisting persons who have sustained traumatic brain injuries first requires accurate assessment of their cognitive and psychological functioning, and accurate assessment requires valid data. Failure to evaluate the validity of patients’ subjective complaints and neuropsychological test performance may result in erroneous conclusions regarding the etiology of their symptoms.

Recognizing the importance of distinguishing between genuine impairment and feigned or exaggerated cognitive deficits, neuropsychologists have developed a wide range of extensively researched “performance validity” tests (PVTs).⁶² Properly used, PVTs can differentiate between credible and non-credible neurocognitive complaints with a high degree of accuracy.⁶³ It is important to note that

⁵⁸ Chris Paniak et al, *A Longitudinal Study of the Relationship Between Financial Compensation and Symptoms After Treated Mild Traumatic Brain Injury*. 24 J. CLINICAL AND EXPERIMENTAL NEUROPSYCHOL. 187 (2002).

⁵⁹ *Id.*

⁶⁰ *Prognosis for Mild Traumatic Brain Injury*, *supra* note 24.

⁶¹ American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders: Diagnostic Criteria from DSM-IV*. American Psychiatric Association (1994).

⁶² Kyle Brauer Boone (Ed.), *Assessment of Feigned Cognitive Impairment: A Neuropsychological Perspective*. Guilford Press (2007); Glenn Larrabee, *Assessment of Malingered Neuropsychological Deficits*. Oxford University Press (2007).

⁶³ Glenn Larrabee, *Performance Validity and Symptom Validity in Neuropsychological Assessment*. 18 J. INT'L NEUROPSYCHOL. SOCIETY 625 (2012).

“failures” on PVTs do not necessarily equate to malingering, but do signal the need to carefully investigate the potential reasons for a patient’s worse than expected performance on what are normally simple tasks.⁶⁴ The importance of assessing performance and symptom validity in neuropsychological evaluations, including the assessment of patients with traumatic brain injuries, has been strongly endorsed by both the National Academy of Neuropsychology⁶⁵ and the American Academy of Clinical Neuropsychology.⁶⁶ A position statement by the Association for the Scientific Advancement in Psychological Injury and Law also emphasizes “the importance of adopting a comprehensive, impartial, and scientific approach to validity assessment.”⁶⁷ When assessing patients with a history of mTBI, it is recommended that providers not base their decisions solely on clinical judgment, since evidence overwhelmingly supports the need to rely on well-validated performance validity measures.⁶⁸

Failure on performance validity tests is fairly common in settings where impairment may be associated with secondary gain. A survey of the American Board of Clinical Neuropsychology membership found that 39% of mild head injury cases involved probable malingering and symptom exaggeration, based on multiple sources of evidence.⁶⁹ Other studies investigating the frequency of feigned or exaggerated cognitive impairment on neuropsychological evaluations in settings with potential for secondary gain (i.e., civil forensic contexts) have yielded varying results, partly due to differences in research methods and classification criteria. Combining the results from eleven studies, 548 out of 1363

⁶⁴ Bernice A. Marcopulos et al, *Clinical Decision Making in Response to Performance Validity Test Failure in a Psychiatric Setting*. 28 CLINICAL NEUROPSYCHOL. 633 (2014).

⁶⁵ Bush et al. (2005). *Symptom Validity Assessment: Practice Issues and Medical Necessity: NAN Policy & Planning Committee*. 20 ARCH. CLIN. NEUROPSYCHOL. 419-426.

⁶⁶ Heilbronner et al., (2009). *American Academy of Clinical Neuropsychology Consensus Conference Statement on the Neuropsychological Assessment of Effort, Response Bias, and Malingering*. 23 CLIN. NEUROPSYCHOL. 1093.

⁶⁷ Shane S. Bush et al, *Psychological Assessment of Symptom and Performance Validity, Response Bias, and Malingering: Official Position of the Association for Scientific Advancement in Psychological Injury and Law*. 7 PSYCH. INJURY AND LAW 197 (2014).

⁶⁸ Thomas J. Guilmette, *The Role of Clinical Judgment in Symptom Validity Assessment*. *Mild Traumatic Brain Injury: Symptom Validity Assessment and Malingering* (Dominic A. Carone & Shane S. Bush, eds.) at 32-33.

⁶⁹ Wiley Mittenberg et al, *Base Rates of Malingering and Symptom Exaggeration*. 24 J. CLIN. AND EXPERIMENTAL NEUROPSYCHOL. 1094 (2002).

subjects (40%) were identified with performance deficits suggestive of malingering.⁷⁰

Evidence of symptom and performance invalidity has also been observed in samples of service members and veterans undergoing neuropsychological evaluations,⁷¹ although PVT failure rates vary significantly across studies. In one group of OIF/OEF veterans who were referred for neuropsychological evaluations after screening "positive" on a Veterans Health Administration TBI questionnaire, 58% failed the Medical Symptom Validity Test.⁷² In a separate study using different symptom validity measures, Armistead-Jehle & Hansen found symptom validity failure rates ranging from 8 to 30%.⁷³ The context of service members' neuropsychological evaluations appears to make a difference.⁷⁴ Service members being evaluated as part of a military Medical Evaluation Board (Fitness for Duty/Disability evaluation) failed performance validity testing at a higher rate (58%) than personnel seen for clinical (non-disability) evaluations (35%).⁷⁵ In one study of veterans referred for neuropsychological evaluations following positive TBI screening evaluations, 68% failed a recognition memory performance validity task.⁷⁶ Another study of veterans with a history of mTBI referred for comprehensive neuropsychological evaluations at a consortium of five Veterans Affairs hospitals found that 68 of 134 participants (51%) failed a performance validity test.⁷⁷ Military members with histories of

⁷⁰ Glenn Larrabee, *Detection of Malingering Using Atypical Performance Patterns on Standard Neuropsychological Tests*. 17 CLIN. NEUROPSYCHOL. 410 (2003).

⁷¹ Shane S. Bush, *Symptom Validity Assessment of Military and Veteran Populations Following Mild Traumatic Brain Injury*. *Mild Traumatic Brain Injury: Symptom Validity Assessment and Malingering* (Dominic A. Carone & Shane S. Bush, eds.), 381-397.

⁷² Patrick Armistead-Jehle, *Symptom Validity Test Performance in US veterans Referred for Evaluation of Mild TBI*. 17 APPLIED NEUROPSYCHOL. 52 (2010).

⁷³ Patrick Armistead-Jehle & Christopher L. Hansen, *Comparison of the Repeatable Battery for the Assessment of Neuropsychological Status Effort Index and Stand-Alone Symptom Validity Tests in a Military Sample*. 26 ARCH. CLIN. NEUROPSYCHOL. 592 (2011).

⁷⁴ Courtney L. McCormick et al, *Performance on the Green Word Memory Test following Operation Enduring Freedom/Operation Iraqi Freedom-Era Military Service: Test Failure is Related to Evaluation Context*. 28 ARCH. CLIN. NEUROPSYCHOL. 808 (2013).

⁷⁵ Patrick Armistead-Jehle & Brett Buican, *Evaluation Context and Symptom Validity Test Performances in a U.S. Military Sample*. 26 ARCH. CLIN. NEUROPSYCHOL. 592 (2012).

⁷⁶ Arthur C. Russo, *Symptom Validity Test Performance and Consistency of Self-Reported Memory Functioning of Operation Enduring Freedom/Operation Iraqi Freedom Veterans with Positive Veteran Health Administration Comprehensive Traumatic Brain Injury Evaluations*. 27 ARCH. CLIN. NEUROPSYCHOL. 840 (2012).

⁷⁷ Nick M. Wisdom et al, *PTSD and Cognitive Functioning: Importance of Including Performance Validity Testing*. 28 CLIN. NEUROPSYCHOL. 128 (2014).

mTBIs exhibited higher rates of neuropsychiatric symptomology and also had higher PVT failure rates (18%) than civilian mTBI patients (3%).⁷⁸ In another study examining the influence of suboptimal effort on neuropsychological test performance in military personnel who had sustained traumatic brain injuries, 21 of 143 participants (15%) failed performance validity measures. Mild TBI patients who failed performance validity measures actually performed worse on objective measures of cognitive functioning than patients who had sustained severe traumatic brain injuries. Symptom reporting by those who fail performance validity testing is likely to be inaccurate, and may put them at risk for being misdiagnosed with severe cognitive impairment.⁷⁹

IV. LAWYERS, VETERANS, AND MILD TRAUMATIC BRAIN INJURY

Lawyers may be inclined to assist military members and veterans who have sustained service connected injuries, particularly if they perceive that these patients have not received the treatment or disability compensation they deserve. While their motives may be altruistic, overzealous advocacy for service members who have sustained mTBIs may, however, have unintended adverse consequences. Nearly half a century ago lawyers recognized that “litigation for personal injury following accidental trauma is an expensive and confused process . . . Although post-traumatic conditions can be elaborately classified, the intrinsic validity of such classifications is often questionable.” In addition to the limitations inherent in the evaluation of traumatic injuries, it was recognized that “there is no really satisfactory method of (a) determining and quantifying minor but significant degrees of brain damage, (b) distinguishing these from “post-traumatic neurosis”, or (c) determining the relationship between the trauma and subsequent disturbance of function.”⁸⁰ While there have certainly been advances in medicine, understanding of TBI, and the objective assessment of brain functioning in the past half-century, mild traumatic brain injuries and persistent postconcussion syndromes are only partially understood, and

⁷⁸ Jeffrey F. Gfeller & P. Tyler Roskos, *A Comparison of Insufficient Effort Rates, Neuropsychological Functioning, and Neuropsychiatric Symptom Reporting in Military Veterans and Civilians with Chronic Traumatic Brain Injury*, 31 BEHAVIORAL SCI. & LAW 833 (2013).

⁷⁹ Rael T. Lange et al, *Influence of Poor Effort on Neuropsychological Test Performance in US Military Personnel Following Mild Traumatic Brain Injury*, 34 J. CLIN. EXPERIMENTAL NEUROPSYCHOL. 453 (2012).

⁸⁰ Alan M. Mann & Ellen M. Gold, *Psychological Sequelae of Accidental Injury: A Medico-Legal Quagmire*, 95 CAN. MED. ASSOC. J. 1359 (1966).

continue to be topics of ongoing debate. In a review of outcomes following mild traumatic brain injury, Iverson concluded that “some people have slow or incomplete recovery following an accident or injury, and this might be related to structural damage (macroscopic and microscopic) to the brain; preexisting life stress, psychiatric conditions, or substance abuse problems; comorbid conditions, such as chronic pain, depression, PTSD, life stress, or substance abuse; litigation; exaggeration or malingering; symptom expectations, misattribution, and response bias; or some combination of factors.”⁸¹

It is precisely because of this complexity that advocates, whether family members, friends, medical providers, or lawyers, may mistakenly misdiagnose individuals who have sustained mild traumatic brain injuries simply on the basis of their self-reported histories and symptoms. This can be a problem because the self-reported symptoms of OIF/OEF veterans with mTBI histories do not correlate well with their objective performance on neuropsychological tests.⁸² Attorneys who rush to assist veterans based solely on their self-reported concussion histories and reported symptoms run the risk of propagating misinformation and intervening in ways that may actually hinder recovery. Assuming a veteran's ongoing symptoms are solely due to a remote concussion can be problematic for a couple of reasons. First, it may distract the person from considering or addressing other factors that might be contributing to his or her symptoms, and second, it may accidentally perpetuate the misconception that mTBIs/concussions result in serious, long-term problems or disability. In the worst case, imprudent lawyers may overestimate their expertise as it relates to brain injuries, and undermine the credibility and trust that veterans hopefully have in their medical and mental health providers. This risk is reflected in the comments on one law office web site that asserts, “Unfortunately, medical professionals sometimes ignore or discount mild brain injury as an ongoing problem because the patient outwardly appears normal: he or she walks, talks and looks normal and the medical imaging studies are negative. In fact, it may be the lawyer, if knowledgeable in brain injuries, who is the first professional to take the time to fully evaluate and appreciate the nature and extent of brain injuries in these cases. Typically, the client is embarrassed and confused and has been told to expect full recovery from what was a minor trauma. Psychological reasons are given for ongoing confusion and disability and the client may feel guilty she or he has not

⁸¹ *Outcome from Mild Traumatic Brain Injury*, *supra* note 44.

⁸² Robert J. Spencer et al, *Self-Reported Cognitive Symptoms Following Mild Traumatic Brain Injury Are Poorly Associated with Neuropsychological Performance in OIF/OEF Veterans*. 47 J. CLIN. EXPERIMENTAL NEUROPSYCHOL. 521 (2010).

been able to fully recover. Nonetheless, the brain injuries are very real and have a physical basis which, although producing psychological effects, are rooted in the microscopic disturbance of cells in the brain.”⁸³

Another way in which lawyers may unintentionally provide a disservice to military members and veterans with histories of mTBI is by equating advocacy or assistance with litigation. As previously noted, the prospect of financial compensation (i.e., potential secondary gain) may be a strong disincentive to recovery. A meta-analytic review of eighteen study groups addressing the effects of financial incentives on recovery after closed-head injury found a significant correlation between the presence of financial incentives and reported postconcussive symptoms, particularly among those who had sustained mild head trauma.⁸⁴ Another study investigating the long-term neuropsychological impact of mTBI found no residual neuropsychological impairment by three months post-injury, however, individuals in litigation reported greater cognitive sequelae of mTBI. “Indeed,” the authors concluded, “litigation was associated with stable or worsening of cognitive functioning over time.”⁸⁵ Of all the factors influencing recovery following mTBI, “Research has shown that compensation and litigation factors are the single most stable predictor of prolonged post-concussive symptoms in concussion samples.”⁸⁶ While compensation for serious injuries may be justifiable and appropriate, caution should be exercised to ensure that disability compensation does not promote disability in those who have sustained minor injuries.

Lawyers seeking to assist military members and veterans with histories of mTBI should understand that mild, uncomplicated TBIs typically do not result in long-term impairment or disability. Educating those who have sustained concussions regarding the true nature of their injuries, helping them understand that their “postconcussive” symptoms are likely due to other physical or psychological causes, and promoting an expectation of recovery and resiliency will benefit veterans more than interventions that focus on infirmity and compensation. Those who experience persistent postconcussive symptoms should be referred for comprehensive medical, psychiatric, and neuropsychological evaluations,

⁸³ David L. Golden, *What is “Mild” Brain Injury?* <http://headlaw.com/Articles/mild-brain-injury.htm> (last visited May 1, 2015).

⁸⁴ Lawrence M. Binder & Martin L. Rohling, *Money Matters: A Meta-Analytic Review of the Effects of Financial Incentives on Recovery After Closed-Head Injury*. 153 AM. J. OF PSYCHIATRY, 153(1), 7-10 (1996).

⁸⁵ *Factors Moderating Neuropsychological Outcomes Following Mild Traumatic Brain Injury*, *supra* note 23.

⁸⁶ Rodney D. Vanderploeg, Heather G. Belanger & Paul M. Kaufmann, *Nocebo Effects and Mild Traumatic Brain Injury: Legal Implications*. 7 PSYCHOLOGY INJURY AND LAW 245 (2014).

including standardized symptom and performance validity testing. Such evaluations are necessary to identify all the factors, whether physical, emotional, or social, that might be contributing to the individual's ongoing difficulties. Only then can appropriate, individualized treatment plans be developed. The focus of all interventions should be on helping injured or ailing military personnel recover as quickly as possible, and normalize their lifestyles to the greatest extent possible. Lawyers desiring to assist veterans who have sustained TBIs may be able to help service members locate and obtain professional services that promote health and functional independence. Along with others desiring to assist veterans who have sustained mTBIs, lawyers should support proposed public health initiatives that promote appropriate postconcussion screening and intervention, disseminate accurate information about brain injuries, and avoid reinforcement of debility. Such efforts are most likely to "enhance patients' expectations of recovery, reduce the severity of symptoms, prevent long-term disability, and provide optimal care for service members and veterans returning from war."⁸⁷



⁸⁷ Charles W. Hoge, Herb M. Goldberg & Carl A. Castro, *Care of War Veterans with Mild Traumatic Brain Injury-Flawed Perspectives*. 360 N. ENGL. J. MED. 1591 (2009).