Mild traumatic brain injury in soldiers returning from combat

Erin D. Bigler, PhD
Jack W. Tsao, MD, DPhil

Correspondence to
Dr. Bigler:
erin_bigler@byu.edu

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During times of war, advances in civilian medical practice often occur from lessons learned treating battlefield injuries, especially true for the field of traumatic brain injury (TBI). September 11, 2001, is a sentinel date, after which over 2 million US military service members were deployed to Afghanistan and Iraq (Operation Enduring Freedom [OEF] and Operation Iraqi Freedom [OIF]). Estimates (dvbic.dcoe.mil) indicate that more than 350,000 US service members have sustained a TBI, 82.3% mild TBI (mTBI; synonymous with concussion). Prior to 2001, there were few military mTBI cohort studies (figure). With the high prevalence of mTBI in OEF/OIF, the dramatic increase in mTBI research is obvious, with military-sponsored studies addressing many important questions, including how to assess, train, treat, and track service members with such injuries, including documenting duration of persisting symptoms.

As shown in the middle figure plot, prior to 2001 there was also little interest in mTBI in general, possibly related to the frequency of good clinical outcomes following an uncomplicated mTBI/concussion. Also, mTBI nosology and nomenclature includes a lexicon of adjectives like mild, minor, or minimal head injury in conjunction with concussion, all inferring something short-lived, potentially inconsequential, and transient. Prior to 2001 and the current focus on mTBI, the 1997 American Academy of Neurology (AAN) concussion guidelines allowed return to play in sports within minutes of symptom resolution in the setting of a mild (grade 1) concussion. The newest AAN guideline advocates for immediate removal from play, with no return even after the mildest injury; “When in doubt, sit them out,” is now the mantra.

While there has never been a dispute that long-term sequelae may attend moderate to severe TBI, the persistence of symptoms following mTBI has been an ongoing controversy in the medical literature for over a century.1 With mTBI representing >80% of all TBIs, its commonness and acute symptoms have long been established, but prolongation of symptoms, considered postconcussive symptoms (PCS), has often been interpreted in the context of psychological factors and secondary gain.2

That concussions occur in war time is nothing new and long written about,3 including psychiatric dimensions of combat.4–6 However, if relegated to only minor effects that do not persist, then those with complaints following mTBI may be perceived as just having a psychiatric disorder. Indeed, many PCS overlap with those associated with posttraumatic stress, affective, anxiety, and somatic disorders. In addition, if during combat bodily injury occurred, elements of pain produce symptoms similar or identical to PCS. Thus, differentiating mTBI/concussion effects from other factors has been a perennial problem for clinicians and researchers, hampered by the problematic quality of past mTBI research, based mostly on samples of convenience with cross-sectional design and statistically underpowered.7

In this issue of Neurology®, in a well-designed cohort study of 24,674 returning soldiers from Afghanistan or Iraq, Schwab and colleagues8 report on the nature of persisting symptoms at postdeployment associated with mTBI. What is particularly important about this sample is that it was nonclinical, meaning these soldiers were screened for mTBI but may not have been diagnosed with mTBI while deployed. Prior to the United States Department of Defense changing mTBI diagnoses in June 2010 from self-report to mandatory screening following exposure to specific high-risk events, combat mTBIs were not consistently medically diagnosed or clinically documented. Therefore, the first element of this investigation was to identify those soldiers with probable mTBI and then assess symptoms. Importantly, not only were multiple screening factors considered in the identification of mTBI, but additional measures included assessing posttraumatic stress, noncerebral pain, and neurobehavioral symptoms along with rehabilitation services received, work problems, and general health status.

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From Brigham Young University (E.D.B.), Provo, UT; University of Tennessee Health Science Center (J.W.T.); Children’s Foundation Research Institute (J.W.T.), Le Bonheur Children’s Hospital, Memphis; and Memphis Veterans Affairs Medical Center (J.W.T.), TN.

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At 3 months postdeployment, Schwab et al. found their screening method had good sensitivity and specificity, with nearly half (47%) of the soldiers meeting criteria for mTBI reporting PCS vs 25% of controls. The most prominent residual PCS complaints, in descending order, were problems with sleep, cognition, irritability, and headache.

Since the mTBI occurred during deployment, all of these service members presumably had persistent symptoms exceeding 3 months following injury.

The Schwab et al. study is by far the largest to date to address PCS following mTBI, establishing that a sizeable number of service members with mTBI experience persisting symptoms. Since this was
a nonclinical sample and not treatment-seeking, this finding likely reflects a more accurate prevalence of PCS beyond 3 months post mTBI. Since PCS endorsement was 25% in controls, this also reflects the problem of overlapping symptoms. In addition, the 53% who screened positive for mTBI but did not exhibit PCS reflect the common remission of symptoms. This study also demonstrates the complexity and multifaceted nature of symptoms associated with mTBI. For example, the top 4 symptom endorsements, while each unique, all interact at some level. Sleep quality influences cognition as well as mood regulation and perception of pain. Given these interrelationships, moving forward with this information, future mTBI studies need to examine their associations supplemented with other objective measures, like advanced neuroimaging methods.9,10 The findings also have implications for health care use by military service members and the resources necessary to provide the best care for those who have served our country.

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