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BRAIN INJURY MEDICINE AND REHABILITATION (A WAGNER, SECTION EDITOR)

Symptom Reporting and Management of Chronic Post-Concussive Symptoms in Military Service Members and Veterans

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Abstract

Purpose of Review Mild traumatic brain injury (mTBI)/concussion is a significant health concern for military service members and veterans; however, these are distinct populations that warrant certain considerations related to clinical care and rehabilitation. This review elucidates these key aspects of military mTBI that differ from civilians.

Recent Findings Several contextual variables pertaining to military culture, mechanism and frequency of mTBI in military settings, symptom attribution and over-reporting, potential secondary gain, and elevated mental health comorbidities, including posttraumatic stress disorder (PTSD), sleep disturbance, and chronic pain, are key moderating factors that often influence symptom presentation.

Summary Characteristics of military mTBI differentially affect chronic post-concussive symptom reporting and recovery and are essential to understand to provide effective clinical management with this population. Evidence-based treatments (i.e., psychoeducation, cognitive rehabilitation, cognitive-behavioral psychotherapy) have been developed, though maximally effective mTBI diagnosis/evaluation, clinical management, recovery, and research are best facilitated by interdisciplinary collaboration.

Keywords Mild traumatic brain injury · mTBI · Concussion · Military · Review

Introduction

Mild traumatic brain injury (mTBI), also known as concussion, is a significant health concern for civilian, active duty military, and veteran populations. The Defense and Veterans Brain Injury Center (DVBIC) estimates that annually, over 1.7 million people in the USA sustain a TBI, approximately 84% of which are mild in severity [1]. Military service members (SMs) are at greater risk for mTBI than civilians, due in part to the demographics of the US military. Most SMs are young, healthy males, representing a high risk group for TBI [1]. Additionally, several contextual aspects of military mTBI, including military culture, injury characteristics, symptom (mis)attribution, and co-occurring psychiatric disorders, frequently influence symptom reporting, clinical management, and evidence-based treatment of chronic post-concussive symptoms with this population.

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Impact of Military Context

The circumstances and context of mTBI among SMs are dissimilar in several ways to those sustained by civilians [2•]. The most obvious differences are observed in deployment-related injuries involving potentially austere conditions, disruptions of sleep and dietary schedules, and threats to health from disease and environmental pollutants. Deployments to combat theaters of operation put SMs at risk for concussive blast exposures from improvised explosive devices (IEDs), suicide bombers, land mines, mortar rounds, and rocket-propelled grenades (RPGs). For those who sustain combat-related injuries, threat to life and exposure to psychological trauma represent significant contextual factors.

Although deployment/combat mTBI are notable, most recorded TBIs among SMs occur in non-deployed environments [1]. Military-specific activities such as participation in boxing and mandatory combative training put SMs at risk for concussion and repeated sub-concussive blows. Similar to civilians, SMs also sustain mTBI while participating in sports, driving motor vehicles, and in falls. Many SMs with a history of mTBI who transition out of the military receive subsequent healthcare in the Veterans Health Administration (VHA). As veterans age, the risk for TBI again increases at age 70+, primarily from falls [1].

Due to the lack of an objective biomarker or test confirming mTBI, diagnosis is necessarily based on patient report. Department of Defense (DoD) diagnostic criteria for mTBI require normal structural brain imaging, loss of consciousness less than 30 min, alteration of consciousness less than 24 h, posttraumatic amnesia (PTA) less than 24 h, and highest Glasgow Coma Scale (GCS) score within 24 h of injury of 13–15. According to DoD convention, the terms mTBI and concussion are diagnostically equivalent. It is difficult to verify mTBI among cases in which there is not a documented loss or notable alteration of consciousness from witness or acute medical records. This was frequently the case with mTBI among SMs injured during Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) prior the establishment of DoD policy and algorithms for concussion management in deployed settings [3, 4].

Symptoms following mTBI can be classified broadly into three categories: physical, emotional, and cognitive. Physical symptoms include headaches, sleep disturbance, dizziness/balance problems, nausea, fatigue, vision changes/light sensitivity, and tinnitus. Emotional changes involve irritability, anxiety, depression, and mood swings. Cognitive symptoms include trouble concentrating, attention problems, poor memory, slowed thinking, and word finding difficulty when speaking. The normal recovery trajectory for a single mTBI is back to full function within days to weeks, although contextual factors can lead to longer recovery time. A persistent constellation of symptoms following mTBI, known as post-concussion syndrome (PCS), may arise from the neural injury and become increasingly influenced by other ongoing psychological, social, and environmental factors as time goes on. Current VA/DoD Clinical Practice Guidelines for mTBI [5•] emphasize early identification and repeated symptom assessment in the primary care setting. Psychoeducation and gradual return to activity are key concepts in treatment.

Unique Aspects of TBI in the Military

While commonalities exist between civilian and military TBI, several distinct aspects within the military context are noteworthy as they influence TBI symptom reporting, recovery, and clinical care/rehabilitation with this population.

Mechanism of Injury

Historically, TBIs accounted for approximately 20% of combat-related injuries [6]. Whereas twentieth century wars saw more penetrating TBIs, advances in helmet technology contributed to a shift toward closed head injuries in the recent OEF/OIF wars, particularly blast-related injuries. Estimates of blast-related TBI during deployment range from 14 to 60% [6, 7•]. Primary blast trauma to the brain results when mechanical, thermal, and electromagnetic energy emanating from the explosion is transferred into compressed pressure waves that can pass through tissues within the cranium at rapid speed. The wave induces particle motion through tissues it passes through. Tissues with varying density (e.g., air-fluid or fluid-solid interfaces such as those in the ear region) are particularly vulnerable to blast injury [8]. Blast waves can also reflect off objects (e.g., walls in enclosed spaces) to produce complex wave fields. It is unknown exactly how rapid pressure gradients injure brain tissue, but blast within the context of combat also may be accompanied by secondary, tertiary, and quaternary effects. Secondary injury refers to objects and debris thrown by the explosion hitting the head and causing penetrating or blunt trauma. Energy given off by the blast can also propel SMs into hard surfaces (tertiary injury). Quaternary injuries include other blast effects such as burns or toxic fumes that can cause injury. Because mechanism of injury in primary blast trauma is different from blunt trauma, there have been efforts to examine whether blast-related TBI has different sequelae that require a different pathway of care. A systematic review showed that there is no dramatic difference due to injury mechanism in terms of vision loss, vestibular dysfunction, functional status, depression, sleep disorder, and alcohol misuse, but there are mixed findings with respect to headaches, neurocognitive outcomes, hearing loss, and presence of posttraumatic stress disorder

(PTSD) symptoms [9•, 10–15]. There is mixed evidence of subtle white matter changes following blast using diffusion tensor imaging [16•, 17–20]. Since primary blast injury within the context of combat is almost always accompanied by psychological and/or blunt trauma, injury characteristics (e.g., distance from blast) are often based on self-report that may have questionable veracity because of the intense psychological stress during the time of the injury. Thus, it is difficult to control for injury and psychological variables that likely moderate outcome. Studies of blast exposure unaccompanied by psychological and blunt trauma, such as those experienced during blast-intensive weapons training, may elucidate if blast indeed conveys a different course of outcome compared to blunt mTBI.

Frequency of Injury (Single vs. Multiple)

Effects of repetitive mTBI are not well understood in the military. While many studies among SMs or veterans index deployment or combat related mTBIs, training for combat can also increase risk for mTBI. Military values of self-sacrifice and "warrior ethos" can lead to SMs not reporting or underreporting potential events, especially before the 2007 DoD mandatory concussion screening [21•]. Most of what is known about cumulative effects of TBI comes from civilian athletes. With respect to cognitive functioning, meta-analysis found that multiple mTBIs were associated with poorer performance on executive function and delayed memory, though the overall effect of multiple TBIs was minimal [22]. Miller and colleagues [23] evaluated symptom endorsement in soldiers during peacetime, before OEF/OIF/OND conflicts, and found increased symptom reporting among those with a recent mTBI (within 3 months) who have had a previous history of TBI compared to those with no prior TBI. This latter group did not differ from no-TBI controls in the number of reported symptoms. In contrast, previous TBI history did not affect symptom reporting when the index TBI occurred greater than 3 months prior. This pattern is consistent with a study that showed slower recovery among college football players with history of multiple concussions relative to a single concussion [24]. In contrast, several other studies did not find adverse cognitive performance or slowed recovery in those with multiple TBIs [25–27]. Mixed findings are likely influenced by important moderating variables such as time since injury, time between mTBIs, and injury characteristics such as whether blast exposure was in enclosed space. The current military guideline for acute treatment of recurrent TBI within a 12-month period is seven consecutive days of symptom resolution while on stages 1 (rest) and 2 (light routine activity) before completing the remainder of the progressive return to duty stages to minimize potential cumulative effects of multiple mTBIs [28].

Sensory and Vestibular Symptoms

In military/veteran populations, commonly reported symptoms after mTBI include sensory and vestibular symptoms, such as headaches, dizziness, balance difficulties, and noise sensitivity [29]. The current treatment paradigms for the medical management of persistent PCS symptoms are similar for both civilian and military populations [30, 31] and follow a symptom-based treatment approach. For example, management for persistent vestibular dysfunction (balance/dizziness) should begin with a comprehensive history and neurological examination with emphasis on hearing, balance, coordination, and vision. Once the etiology of the vestibular dysfunction is confirmed, then the treatment plan should ensue. For instance, the most common cause of post-traumatic peripheral vestibular dysfunction is benign paroxysmal positional vertigo, which should be diagnosed using the Dix-Hallpike maneuver, and if positive, treated with canalith repositioning therapy or a trial of vestibular rehabilitation [32]. It is important to remember that the mainstay of treatment of mTBI is education and reassurance of expected recovery trajectories [33].

Symptom Attribution, Over-Reporting, and Disability Status

Since historical mTBI diagnosis is frequently dependent on self-report, the potential for misrepresentation and misattribution of symptoms and problems exist. There often is no medical documentation at the time of the injury because of a lack of medical resources, SM's prioritization of mission over self-care, or an ingrained military ethos of mission forwardness and self-sacrifice. One study examining the consistency of reporting mTBI in theater and post-deployment reported that 86% of soldiers were consistent in their reports of exposure to mTBI [34]. However, of those who were inconsistent, the vast majority (i.e., 90%) denied TBI in theater and affirmed TBI 1 year later. While SMs and veterans may underreport symptoms in order to return to full duty, to project an impression of strength, or to avoid stigma, this section will focus on over-reporting of symptoms/problems.

An important context is disability evaluation via the Integrated Disability Evaluation System, a multistep process that includes a Medical Evaluation Board (MEB) that involves clinical providers and a Physical Evaluation Board (PEB) that is an administrative review (https://health.mil/Military-Health-Topics/Conditions-and-Treatments/Physical-Disability/Disability-Evaluation/Medical-Evaluation). The commanding officer or treating physician requests the MEB; the SM does not self-refer, though the SM can influence treating clinician's decision via their complaints and response to treatment. PEB review can result in return to duty, separation from the military with severance pay, temporary disability retirement, or permanent disability retirement. The amount of severance or retirement pay depends on the percentage of disability, and this determination carries into the Veterans Affairs (VA) benefits system. Veterans who make a claim for service-connected disability after separation from the military go through the VA's Compensation & Pension Exam (https://www.benefits.va.gov/COMPENSATION/index.asp). Since clinical evaluation results can influence monetary benefits, the potential for secondary gain exists. Another context is decreased physical and psychological health post-deployment [34], which combined with media coverage of chronic traumatic encephalopathy, may contribute to a damaged sense of self that the SM attributes to TBI. In these instances, SMs may report symptoms or problems perceived to be related to mTBI without misrepresenting their true belief.

The clinical challenge is separating misrepresentations associated with secondary gain from misattributions of problem sources while maintaining an open mind that there may be biological consequences of mTBI that remain unknown. Efforts to evaluate symptom validity have led to development of screening scales such as the Mild Brain Injury Atypical Symptoms Scale (mBIAS) [35] and the Validity-10 scale of the Neurobehavioral Symptom Inventory (NSI) [36•], which is a DoD/VA core TBI outcome measure. The Validity-10 is composed of 10 symptoms that are infrequently seen in mTBI and reflect negative impression management, as validated against objective personality inventories (i.e., Personality Assessment Inventory [37, 38]; Minnesota Multiphasic Personality Inventory-2-Restructured Form [39, 40]). Cutoffs for symptom exaggeration vary across studies, but there is a general consensus that a higher cutoff is needed for screening for over-reporting in military/veteran populations [37, 38, 40, 41] compared to civilians [42, 43], and a higher cutoff is needed for screening those who have deployed versus those who have not as deployment history is associated with higher NSI scores irrespective of TBI history [44•]. Further, NSI scores are higher in clinical settings compared to research settings [45]. It is also critical to clarify that *symptom validity tests* (*SVTs*) on self-report measures, which assess for over- and underreporting, are different from and only partially overlap with *performance validity tests* (*PVTs*), which assess the credibility of one's performance on objective tests of cognitive functioning [46, 47]. Invalid symptom overreporting may not necessarily result in invalid performance on cognitive measures or vice versa; thus, both symptom and performance validity should be separately evaluated. In addition to symptom over-reporting, disability evaluations are also associated with diminished performance validity on objective PVTs [46, 48], which can limit a clinician's ability to identify whether low cognitive test scores are due to actual neurocognitive impairment or are reflective of reduced task engagement/validity. Performance validity remains an important consideration even outside the context of disability given that 11–35% of active duty/veterans with mTBI who were not involved in disability evaluations fail at least one PVT [46, 47]. One study found abnormal metabolites in the hippocampus of veterans with blast exposure using an experimental 7 T magnet [49], while another found increased white matter burden among veterans with mTBI who failed at least one PVT [50•]. It is unknown whether psychological variables contributed to these findings, or whether blast mTBI may be associated with subtle biological changes that are not yet measurable using current neuropsychological and clinical imaging technology. In the face of these unknowns, each patient should be considered on a case-by-case basis while taking into account the degree to which his/her military experience and ingrained ethos may influence their clinical presentation.

Mental Health Comorbidities

The high comorbidity of mental health conditions among SMs/veterans relative to civilians is another important consideration. Notably, upwards of 89% veterans with TBI history receiving VA services were also diagnosed with a comorbid mental health condition [51]. Regarding specific conditions, PTSD is frequently present with overall prevalence of 23% and rates as high as 44–54% among those with mTBI history [51, 52•, 53]. Other relevant rates include 12–21% for depression [54, 55], 12% for generalized anxiety in isolation and 40% among those with PTSD [56], and 38% for comorbid insomnia and obstructive sleep apnea [57]. Moreover, among those with a psychiatric diagnosis, 24% also had concurrent substance abuse [58]. Finally, pain diagnoses are highly comorbid with approximately half of veterans with TBI being diagnosed with both PTSD and pain. This triad of persisting PCS symptoms, PTSD, and chronic pain is a commonly observed clinical phenomenon and is associated with both higher healthcare expenditure as well as specific clinical practice recommendations, such as providing education to patients/family and providers (e.g., clarifying difference between a history of concussion and current PCS endorsement) and developing interdisciplinary treatment plans that integrate input from all specialty providers to promote more collaborative care [51, 59, 60, 61•].

Mental health comorbidities further complicate TBI clinical care and recovery insomuch as PCS symptoms are nonspecific and mirror symptoms of many major psychiatric conditions. For example, concentration difficulties, sleep disturbance, fatigue, and irritability appear in the diagnostic criteria for PCS [62] as well as for PTSD and Depression [63]. Further, veterans with psychiatric conditions, notably PTSD,

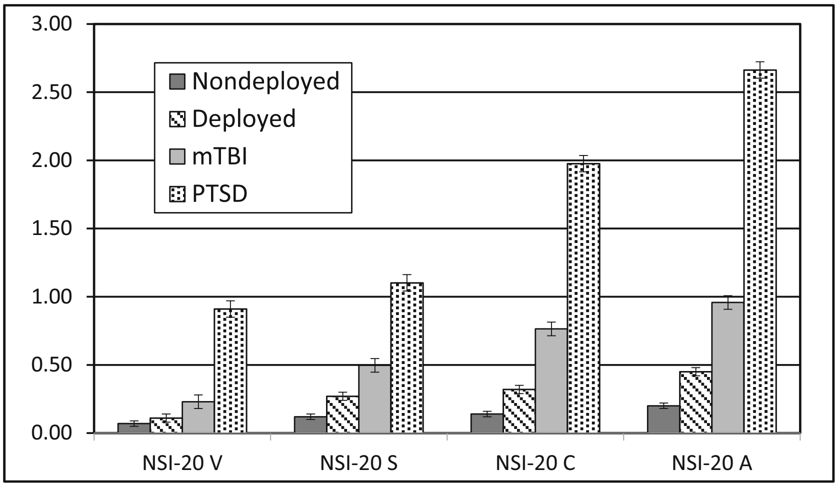

Fig. 1 Graph shows mean scores on the four Neurobehavioral Symptom Inventory (NSI)-20 subscales, V = vestibular; S = somatic; C = cognitive; A = affective, for non-deployed-nonclinical (n = 1453), deployed-nonclinical (n = 1064), deployed-mTBI (n = 108), and deployed-PTSD (n = 52) subgroups. Subscale averages are displayed because of differences in number of items on each subscale. Higher scores indicate greater postconcussion symptom endorsement 44. Reprinted with permission from Taylor & Francis Ltd., www.tandfonline.com

depression, generalized anxiety, and somatization disorders, all met diagnostic criteria for PCS at higher rates than those with actual mTBI history [64]. Similarly, per Fig. 1 below, military personnel with PTSD, but no mTBI history, endorsed significantly higher PCS symptoms relative to those with a history of mTBI, but no psychiatric comorbidity as well as non-deployed and deployed controls [44•]. Yet, despite elevated symptom reporting/cognitive complaints, a recent longitudinal study found veterans with mTBI generally performed within normal limits on *objective* neuropsychological tests, again highlighting that subjective cognitive complaints do not necessarily indicate objective deficits [65]. Nonetheless, symptom over-reporting is an important consideration as it can adversely affect the validity of clinical evaluation and should be assessed via objective measures of response bias [66•].

Meta-analytic studies have consistently demonstrated that while acute mTBI sequelae may be present, symptoms quickly resolve over the ensuing days to weeks with nonsignificant objective cognitive effects generally found after 1–3 months, suggesting that ongoing symptom endorsement is unrelated to the mTBI itself [67–69]. Rather, litigation/compensation seeking status and psychiatric comorbidities, notably PTSD, can be predictive of chronic PCS symptom endorsement above demographics, time since injury, or TBI mechanism [70–73]. From a treatment perspective, this is promising given efficacious, evidence-based treatments for PTSD and other mental health conditions have been developed (see below). Unfortunately, misconceptions about mTBI recovery among both military personnel and behavioral health providers, as well as stigma associated with mental illness, often result in symptom misattribution and underutilization of appropriate mental health services in the military [74, 75, 76•].

Evidence-Based Treatments for MTBI

Several treatment approaches have been examined for PCS symptoms following mTBI including psychoeducation, cognitive rehabilitation (CR), and psychotherapeutic approaches. Several recent reviews have summarized the evidence in support of such interventions in both civilian [77–79] and military/veteran [80•] populations. These systematic reviews have concluded that brief psychoeducational interventions are supported in the acute phase of recovery. Further, these reviews have found limited evidence in support of CR and psychotherapeutic approaches among individuals with chronic symptoms, particularly in military and veteran populations. The empirical evidence underlying their conclusions is described in this section.

Psychoeducational Interventions for PCS

A brief psychoeducational intervention in the acute post-injury period can reduce both the severity and duration of PCS symptoms [78, 81]. Mittenberg et al. [81] demonstrated that providing educational information and meeting with a healthcare provider for 1 h prior to discharge from an emergency room after sustaining a concussion resulted in fewer symptoms and shorter symptom duration at 6-month follow-up compared to a matched control group who received standard care. This brief psychoeducational approach has been replicated in several additional RCTs, including studies with modifications to the delivery of psychoeducational information to include group sessions and handouts [79, 82, 83]. However, an expanded intervention did not demonstrate additional benefit [84, 85]. While using psychoeducational interventions in the acute phase of recovery is considered a standard of care [5•], it has not been shown to be effective among individuals with chronic PCS symptoms. A pilot study of a computer-based psychoeducational intervention specifically adapted for veterans with chronic PCS showed potential [86], although a subsequent randomized replication/extension trial failed to demonstrate effectiveness [87]. In summary, there is empirical support in the early/acute phase of recovery for providing patients with positive expectations of recovery, an explanation of common symptoms after mTBI, and basic strategies for managing symptoms, but research has not shown this intervention to be effective in reducing symptom reporting beyond the acute phase of recovery.

Cognitive Rehabilitation

Cognitive symptoms are frequently reported in chronic PCS, particularly in military/veteran populations [88]. CR interventions have considerable support in the acute and sub-acute phase of recovery from severe TBI [89–91], and several recent studies have examined the efficacy of CR in those with chronic PCS. It is important to note that there are several significant differences between CR interventions among individuals with mTBI and individuals with moderate-severe TBI. Most importantly, since meta-analytic studies have shown little evidence of impairment on neuropsychological measures beyond the acute phase in mTBI [67, 68, 92], CR interventions for PCS typically focus on compensating for subjective, functional cognitive complaints [93, 94], rather than restorative techniques targeting objective cognitive impairments. While a few small studies have demonstrated that the restorative techniques may improve neuropsychological abilities among individuals after mTBI, such studies were limited by small sample sizes [95] and/or potential sampling biases, including performance validity concerns in the subjects described in the treatment sample [96], thereby limiting the strength of the conclusions that can be drawn about the effectiveness of restorative techniques in this population.

Several recent studies have examined compensatory CR approaches in SMs/veterans [97, 98, 99•]. Compensatory techniques involve teaching individuals to cope with cognitive difficulties through training on adaptive functional skills or training in the use of external aids such as smart phone applications and other cognitive mnemonics. CogSMART [98], one of the most widely implemented CR interventions, includes both didactics and compensatory strategy training, organized in cognitive modules, that have been adapted for both individual and group interventions. In their initial RCT, reductions in PCS and improved prospective memory were demonstrated [98], with continued reduction in PCS at 1-year follow-up [100]. Adaptations of the CogSmart CR intervention has been replicated in two additional independent samples [97, 99•] and utilized in combined approaches using both CR and psychotherapy [101–103].

The most recent and largest CR trial to date, the SCORE clinical trial [104•], compared four, 6-week treatment arms: (1) psychoeducation, (2) independent self-administered computer-based CR, (3) therapist-directed manualized CR, and (4) therapist-directed CR integrated with cognitive behavioral therapy (CBT) psychotherapy. Treatment arms that included therapist-directed CR had superior outcomes compared to treatment arms without therapist-directed rehabilitation—on a self-report measure of day-to-day cognitive functioning. The addition of CBT to CR was associated with improved psychological outcomes compared to a treatment arm that only received psychoeducational intervention and medical treatment, but was not significantly better than the therapist-directed CR without CBT. No treatment gains were found on an objective neuropsychological measure of working memory and sustained attention. A detailed guide to CR interventions for chronic PCS in military SMs/veterans is available [105]: http://www.asha.org/uploadedFiles/ASHA/Practice_Portal/Clinical_Topics/Traumatic_Brain_Injury_in_Adults/Clinicians-Guide-to-Cognitive-Rehabilitation-in-Mild-Traumatic-Brain-Injury.pdf.

Psychotherapeutic Approaches

`Given the high comorbidity of psychological conditions (e.g., PTSD; depression) after mTBI, especially in military SMs/veterans [44•], psychotherapeutic approaches have also been examined. In a recent civilian RCT, Potter et al. [106•] used CBT to treat chronic PCS. CBT was focused on individually identified target problems, not any specific underlying psychological condition or problem. They found improvement on a quality of life measure, but not on PCS, global psychosocial functioning, anxiety, or depression. In part due to the potential interactive effect between PTSD and PCS symptom reporting [107], several studies have focused on providing evidence-based PTSD treatment among individuals with both mTBI and PTSD, including both prolonged exposure (PE) and cognitive processing therapy (CPT) [108]. In several independent studies [109–111, 112•], PE is effective not only in reducing PTSD symptoms, but has a generalized effect in reducing PCS and enhancing outcomes for individuals with chronic PCS [113].

Finally, a series of related studies examined treatment outcomes for veterans who were dually diagnosed with mTBI and PTSD using a combined approach of compensatory CR interventions and CPT [101–103], provided during the course of a 7-week intensive residential treatment program. In addition to reduced PTSD symptoms [101], treatment completers showed statistically significant reductions in PCS symptoms [103] with combined treatment, even in those subjects with comorbid depression [102]. Although limited by a pre-post design, these studies are consistent with findings in the combined treatment arm of the SCORE clinical trial104 and a prior RCT in a civilian sample [114], indicating support for the use of combined CR and psychotherapeutic approaches in military SMs/veterans with chronic PCS.

Conclusion

Mild TBI/concussion symptom reporting and recovery trajectories among military SMs/veterans are unique and warrant certain considerations when providing TBI clinical care to these populations. While several moderating factors initially believed to heavily influence mTBI outcomes (e.g., mechanism of injury; single vs. multiple concussions) generally known to exert smaller effects in subsequent research, other discrete contextual aspects (military culture, symptom misattribution, mental health comorbidities, disability status) significantly influence symptom reporting and outcomes. Further, given this heterogeneous population and multifactorial presentation of persistent PCS symptoms, it is important to have well-trained interdisciplinary team to provide the full spectrum of treatment options for optimal management. Currently, there are no urine, serum, blood, or cerebrospinal fluid, or neuroimaging biomarkers that can accurately detect concussion or the extent of damage after mTBI [115•]. Future research should focus on translational research, advanced neuroimaging, genetic studies, and neuroprosthetics (e.g., repetitive transmagnetic stimulation [rTMS]; transcranial direct current stimulation [tDCS]) to gain a better understanding of diagnosis, evaluation, recovery, and treatment after mTBI [116].

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Compliance with Ethical Standards

Disclaimer The view(s) expressed herein are those of the author(s) and do not reflect the official policy or position of Brooke Army Medical Center, the South Texas Veterans Healthcare System, the Army Office of the Surgeon General, the Department of the Army, the Department of Defense, the Department of Veterans Affairs or the U.S. Government.

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