

## Rehabilitation of Co-Morbid Polytrauma and Mental Health Disturbances

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### ***ABSTRACT***

*Current evidence indicate that there is no sole etiology for the various (negative) health effects documented in the literature regarding mild TBI; rather, that a composite interaction of neurological and psychological features is responsible for their origin and persistence. Another factor that has to be taken into considerations, is the effects of co-morbid physical and mental health difficulties that occur as a result of the MTBI incident. These factors have been identified as likely conditions that can impact on MTBI symptom recovery and prolong symptom experience. Specifically, post-traumatic stress disorder (PTSD) and complex physical injuries leading to chronic pain have been identified as such factors.*

*This document aims to discuss the impact of specifically PTSD on mTBI recovery and the significant overlap of symptom experience shared by these two conditions. The lecture will also focus on co-morbid poly-trauma and the impact of chronic pain on mTBI assessment and treatment.*

### **1.0 INTRODUCTION**

Those who experience a multitude of symptoms many months following a history of deployment related mTBI present a complex clinical picture. Soldiers who have returned from deployment to a combat zone frequently experience ill health from a variety of causes, many of which are not well understood. There is abundant data which shows that an important minority of soldiers returning from combat experience psychological illnesses such as PTSD, depression and substance abuse [1]-[3]. Others experience a variety of medically unexplained physical symptoms, an observation that initially emanated from Gulf War I but is now largely recognized to have existed even before that particular conflict [4]. The diagnostic dilemma is further compounded by the fact that post-concussive symptoms are common in the general population and are non-specific.

The best scientific studies in the sports literature (primarily dealing with impact injuries) suggests that in the majority of cases of a first mTBI, symptoms and measurable neurological deficits resolve within a week [5] and most other studies show resolution within a few weeks to months [6]. Although it was postulated that the clinical course of mTBI following primary blast wave exposure might differ from impact injuries, the evidence to date has not supported this [7].

A minority of cases of civilian mTBI have persistent symptoms [6]. The more common of these symptoms often occur together and have been given varying terms such as post-concussion syndrome or post-concussion disorder [8]. There is little uniformity in the identification of predictors of delayed recovery after mTBI [6]. This is because there is little consistency in the predictors studied and an absence of confirmatory studies. Moreover the symptoms that may occur following concussion (e.g., headache, dizziness, fatigue, irritability, insomnia, memory or concentration difficulties) can overlap with symptoms of other conditions, further complicating the ability to attribute symptoms to a specific cause. This has been demonstrated in at least one prospective study in a civilian trauma population that showed that the prevalence of such symptoms was equivalent in trauma patients with and without head injury [9].

## 2.0 MTBI AND PTSD

Within the military context, PTSD appears to be an important mediator of the relationship between mild traumatic brain injury and physical health outcomes. A seminal study was published in 2008 that looked at health outcomes in US Army Infantry Soldiers 3-4 months after deployment [1]. The authors found that soldiers with mild traumatic brain injury, primarily those who had loss of consciousness, were significantly more likely to report poor general health, missed work days, medical visits, and a higher number of somatic and post-concussive symptoms than soldiers with other injuries. However, after adjustment for PTSD and depression, mild traumatic brain injury was no longer significantly associated with these physical health outcomes or symptoms, except for headache.

A separate study was performed in 2009, which used a cross-sectional survey design to examine the prevalence of a history of MTBI, current PTSD and post-concussive syndrome in veterans who had been deployed to Iraq or Afghanistan [10]. Of the 2,235 survey respondents, about 12% reported a history of MTBI and 11% screened positive for PTSD using the PCL-17 checklist. The strongest factor associated with post-concussive symptoms was PTSD even after overlapping symptoms were removed from the PTSD score (prevalence ratio = 3.79, 95% confidence interval: 2.57, 5.59).

A subsequent study sought to evaluate the prevalence and comorbidity of MTBI and PTSD in a sample of predominantly National Guard and reserve OEF/OIF veterans and to determine whether PTSD may mediate the relationship between a positive MTBI screen and general health, psychosocial functioning and perceived barriers to mental health care 2 years following return from deployment [11]. Again a cross-sectional survey design was used with a much smaller sample size of 277 respondents. Using similar tools to screen for MTBI and PTSD as the previous study, they found that 18.8% of respondents reported a history consistent with MTBI during deployment. Although the overall prevalence of PTSD is not reported, it was far higher in those with a history of MTBI than those without (65.4% vs 24.4% respectively). Similarly, those with a history of MTBI also were more likely to report fair/poor overall health.

Polusny et al used a longitudinal cohort design in which participants were surveyed in Iraq 1 month before returning home (time 1) and 1 year later (time 2) [12]. The cohort consisted of nine hundred fifty-three US National Guard Soldiers who had deployed for a 16 month combat deployment from 2006 to 2007. The rate of self-reported concussion/MTBI during deployment was 9.2% at time 1 and 22% at time 2. Soldiers with a

history of MTBI were more likely than those without to report post deployment post concussive symptoms and poorer psychosocial outcomes. Time 1 PTSD symptoms more strongly predicted post deployment symptoms and outcomes than did MTBI history. The authors concluded that PTSD often underlies persisting post concussive symptoms and that this further suggests that early identification and evidence based treatment of PTSD may be critical to the management of post deployment post concussive syndrome.

Cooper et al reported a study, which looked at 472 active US duty service members who had been evaluated and diagnosed with MTBI during their combat deployment [13]. The group were evaluated for current PTSD symptoms using the PCL-C checklist and post-concussive symptoms. They found that those members reporting high levels of combat stress (defined as a PCL-C  $\geq 60$ ) reported a 3-8 fold increase in post-concussive symptoms compared to service without a comorbid stress disorder. Consequently they concluded that considerable caution should be exercised in making the diagnosis of PCS in concussed members with co-occurring combat stress disorders.

The important association of MTBI, mental health problems and post-concussive symptoms is seen in studies of militaries other than the US. Rona et al examined a cohort of deployed UK military personnel and found only 3 of 9 PCS symptoms remained associated with MTBI after adjustment for current PTSD symptoms as well as psychological distress and alcohol misuse recorded before deployment [14]. A more recent Canadian study of a cohort of approximately 17,000 Canadian Forces members deployed to Afghanistan found that 5.2% reported deployment related MTBI during post-deployment screening [15]. Three quarters of those with MTBI were free of post-concussive symptoms when screened 3-6 months after deployment return. A history of MTBI failed to show an independent association with persistent post-concussive symptoms after controlling for confounding. However, the presence of one or more mental health diagnosis (primarily PTSD and depression) showed a powerful association with PCS after adjustment for potential confounders.

In summary, there are now five published reports showing that current PTSD symptoms and a history of deployment related MTBI can be found in those who meet criteria for post-concussive symptoms. Whether, MTBI and PTSD are seen as two comorbid illnesses in those with post-concussive syndrome or whether PTSD largely accounts for persistent post-concussive symptoms is hotly contested and has led to divergent treatment approaches. The fact remains that PCS symptoms are common and that both PCS and PTSD remain symptom based diagnostic constructs. In the absence of objective diagnostic tests that could discriminate between PCS and PTSD, this debate will continue.

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