

Case Report on the Effects of Cognitive Processing Therapy on Psychological, Neuropsychological, and Speech Symptoms in Comorbid PTSD and TBI

Briana Boyd, *Veteran's Medical Research Foundation, San Diego*

Carie Rodgers, *Veteran's Medical Research Foundation, San Diego, VA Center of Excellence for Stress and Mental Health, University of California, San Diego*

Robin Aupperle, *Laureate Institute for Brain Research, Tulsa*

Amy Jak, *Psychology Service-VA San Diego Healthcare System, San Diego, VA Center of Excellence for Stress and Mental Health, San Diego, University of California, San Diego*

Both posttraumatic stress disorder (PTSD) and history of traumatic brain injury (TBI) are prevalent conditions in military veterans, frequently co-occur in this population, and have substantial symptom overlap. Cognitive processing therapy (CPT) is an empirically supported treatment for PTSD but questions have arisen about its efficacy for individuals with a history of TBI, particularly those experiencing cognitive or other neurologic symptoms. Research examining the generalizability of CPT to veterans with both PTSD and a history of TBI has been limited. We describe the use of CPT with a veteran who presented with PTSD, a history of mild TBI, subjective cognitive complaints, objective cognitive deficits, and speech disturbance (stuttering). This case study demonstrates that CPT can effectively and significantly reduce core PTSD symptoms as well as cognitive symptoms and speech disturbances in this comorbid presentation.

APPROXIMATELY 1.4 million people sustain a traumatic brain injury (TBI) in the United States each year (Centers for Disease Control and Prevention [CDC], 2006). An estimated 75-80% of all TBIs are classified as mild, which is defined as involving loss of consciousness for less than 30 minutes, posttraumatic amnesia for less than 24 hours, and a Glasgow Coma Scale (GCS) score of 13-15 (VA/DoD, 2009). Cognitive deficits after TBI have been observed in attention, memory, executive functioning, and processing speed (Konrad et al., 2011; Mittenberg & Roberts, 2008; Roebuck-Spencer & Sherer, 2008). Other commonly observed symptoms include headaches, chronic pain, sensitivities to light and sound, dizziness/nausea, fatigue, depression, and irritability (McCrea, 2008). Dysarthria following TBI is not uncommon; anywhere from 10% to 65% of those with acquired brain injury may experience speech symptoms (Wang, Kent, Duffy, & Thomas, 2004). Acquired stuttering, however, is uncommon (Lundgren, Helm-Estabrooks, & Klein, 2010), and stuttering overall affects only approximately 1% of individuals (Catalano, Robben, & Catalano, 2009). Following *mild* TBI, however,

neither speech problems nor stuttering are among common postconcussive symptoms (Cicerone & Kalmar, 1995). While complete resolution of cognitive symptoms is usually expected within 3 months following mild TBI (mTBI), a sizable minority of cases (15%-30%) experience persistent postconcussive syndrome (Belanger, Kretzmer, Vanderploeg, & French, 2009; Konrad et al., 2011). In addition, functional outcome of those with mTBI is not reliably predicted by measures of injury severity (i.e., GCS score, duration of loss of consciousness) or objective assessment of cognitive deficits (Carroll et al., 2004; Dawson, Schwartz, Winocur, & Stuss, 2007; Iverson, 2006; Roebuck-Spencer & Sherer, 2008).

Military members are at particularly high risk for sustaining a TBI (CDC, 2006). Approximately 89% of TBIs experienced by military members are characterized as mild to moderate (Congressional Research Service, 2007). Overall, an estimated 20% of those deployed to combat in Iraq and Afghanistan (i.e., Operation Iraqi Freedom [OIF], Operation Enduring Freedom [OEF], Operation New Dawn [OND]) sustained a mild TBI, and 56,695 OEF/OIF/OND veterans enrolled in VA healthcare have been evaluated or treated for conditions possibly related to TBI (Bagalman, 2013; Sayer, Cifu, et al., 2009). In the veteran population, 40% of patients with a history of mTBI report at least one postconcussive symptom after 1 year post injury. This protracted recovery from mTBI is especially notable in the OEF/OIF/OND population, who endorse more severe

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psychiatric symptoms and more neurobehavioral symptoms (Belanger et al., 2009).

Comorbidity of mTBI with other mental health conditions is common, especially in the veteran population, where 80% of those with positive TBI screens have psychiatric diagnoses (Carlson et al., 2010). Comorbidity of psychiatric disorders contributes significantly to poorer functional outcomes for those with mTBI. This includes outcomes associated with cognitive and somatic complaints, social functioning, and quality of life (Corrigan, Bogner, Lamb-Hart, Heinemann, & Moore, 2005; McCrea, 2008; Polusny et al., 2011). In fact, some studies have found the presence of psychiatric disorders to be greater predictors of postconcussive syndrome than history of mTBI itself (Meares et al., 2008; Schneiderman, Braver, & Kang, 2008).

One of the most common psychiatric comorbidities of OEF/OIF/OND veterans with mTBI is posttraumatic stress disorder (PTSD). In veterans with a history of mild TBI, the rate of PTSD is 43.9% as compared to 16.2% in those with other types of injuries and only 9.1% in those without physical injuries (Hoge et al., 2008). The core symptoms of PTSD include reexperiencing symptoms and intrusive thoughts, avoidance of traumatic stimuli, negative alterations in thoughts and mood, and increased physiological arousal (including sleep and concentration difficulties). In addition to these core symptoms of PTSD, other neuropsychological or somatic symptoms are often observed. Individuals with PTSD often report problems not only related to concentration and attention but also learning and memory (Kennedy, Tarokh, & Stein, 2001; Uddo, Vasterling, Brailey, & Sutker, 1993). The most robust findings in neuropsychological studies investigating objective cognitive functioning of PTSD patients have been in the domains of executive function, processing speed, and verbal learning (for recent review, see Aupperle, Melrose, Stein, & Paulus, 2012; Johnsen & Asbjornsen, 2008; Moore, 2009; Vasterling & Proctor, 2011). Language symptoms are not typical in PTSD but psychogenic stuttering can arise from mental health conditions (Lundgren et al., 2010).

The overlap in cognitive symptoms associated with mTBI and PTSD can make it difficult to differentiate the etiology of these symptoms (M. B. Stein & McAllister, 2009).

Treatment for PTSD usually includes psychotherapy, medication, or a combination of both (Foa, 2006; D. J. Stein, Ipser, & Seedat, 2006). There is strong empirical support for use of cognitive-behavioral therapies (CBT), including Cognitive Processing Therapy (CPT) for PTSD (Resick & Schnicke, 1992). Response rates for CBTs are relatively high, with 50% to 80% of completers reporting significant symptom reduction (Schottenbauer, Glass, Arnkoff, Tendick, & Gray, 2008). However, treatment outcome research has been primarily focused on the impact of treatment on the core symptoms of PTSD (i.e.,

reexperiencing, hyperarousal/hypervigilance, avoidance, cognitive distortions, etc.). In contrast, there have been very few studies reporting the effects of PTSD treatment on the associated neuropsychological symptoms.

Studies investigating the neuropsychological impact of PTSD treatment have usually not included information concerning comorbid TBI status and most have been conducted without an untreated control group for comparison. Walter, Palmieri, and Gunstad (2010) reported that trauma-focused therapy (CPT or prolonged exposure therapy) for a small group of women ($N = 10$) resulted in significant improvement in attentional switching and visual organization. However, another study investigated the effects of psychotherapeutic treatment (CBT or supportive psychotherapy) on a measure of response inhibition in PTSD and found no significant effects (Devineni, Blanchard, Hickling, & Buckley, 2004). Psychoeducation and cognitive rehabilitation are the most supported strategies for targeting cognitive symptoms associated with mTBI (Cicerone et al., 2011; Novakovic-Agopian et al., 2011; O'Neil-Pirozzi et al., 2010; Stringer & Small, 2011). However, there have been no studies investigating the effectiveness of such interventions with those who have comorbid PTSD.

There has been a great deal of concern that the cognitive impairment and emotional control problems associated with mild to moderate TBI and PTSD may complicate or possibly impede recovery from either problem (Bogdanova & Verfaellie, 2012; Sayer, Rettmann, et al., 2009; Verfaellie, Lafleche, Spiro, Tun, & Bousquet, 2013). Because mild cognitive impairments due to PTSD and/or TBI may hinder the retention of educational material and reduce the effectiveness of some cognitive therapy techniques, there are concerns about using CPT in this comorbid population (Cook et al., 2014). Anecdotally, clinicians often report a hesitancy to use CPT for patients with comorbid TBI given the cognitive complexity of the sessions and homework. However, cognitive behavioral-based therapies such as CPT may be good choices for use in veterans with comorbid PTSD and TBI because of their structure, directive nature, concrete goals, and psychoeducation. Bryant et al. (Bryant, Moulds, Guthrie, & Nixon, 2003) reported that CBT (including exposure-based components and cognitive restructuring) for acute stress disorder with comorbid TBI was more effective at preventing the continuation of PTSD symptoms than supportive therapy. Chard et al. (2011) reported that CPT-C (CPT without the trauma narrative) was effective in reducing PTSD and depressive symptoms for veterans in a residential TBI/PTSD program. And most recently, Davis et al. (2013) demonstrated the feasibility of conducting CPT with comorbid PTSD/TBI populations, providing initial support that a history of mTBI does not necessarily influence treatment adherence. However, none of these studies assessed changes in neuropsychological symptoms of comorbid mTBI/PTSD.

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