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BRIEF REPORT

Exploring the Efficacy of a Residential Treatment Program Incorporating Cognitive Processing Therapy-Cognitive for Veterans With PTSD and Traumatic Brain Injury*

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As the numbers of military personnel participating in the wars in Afghanistan and Iraq continue to grow, the percentage of individuals who return with both a traumatic brain injury (TBI) and posttraumatic stress disorder (PTSD) also increases. Although there appears to be significant overlap in the symptoms resulting from PTSD and TBI, the best course of treatment remains an area of controversy. The authors present initial findings from a Veterans Administration residential program for comorbid PTSD and TBI. Forty-two participants completed a program comprising psychoeducational groups and cognitive skill building that was augmented with a modification of standard cognitive processing therapy. The results suggest that residential programs that incorporate this form of cognitive therapy can anticipate meaningful participation from patients, and that it may be an effective approach to treat PTSD in individuals with a history of TBI.

Mental health clinicians in the Veterans Health Administration system are seeing increasingly greater numbers of veterans who have experienced traumatic brain injury (TBI) with comorbid posttraumatic stress disorder (PTSD; Stein & McAllister, 2009). In the United States military, TBI is the most common type of physical injury sustained by combatants in Afghanistan and Iraq (Stein & McAllister, 2009), and surveys of soldiers returning from Iraq show that being wounded or injured is associated with increased prevalence for PTSD (Hoge et al., 2004). In addition, combat troops reporting exposure to blasts have significantly higher levels of PTSD (Kennedy et al., 2007; Vasterling, Verfaellie, & Sullivan, 2009). A recent RAND report suggests that of the estimated 1.64 million U.S. troops deployed since October 2001, 18.5% of service members who have returned from Afghanistan and Iraq currently have PTSD and/or depression; and 19.5% report experiencing a TBI while deployed (Tanielian & Jaycox, 2008).

Many PTSD symptoms (American Psychiatric Association [APA], 2000) overlap with postconcussive cognitive and affective symptoms (e.g., deficits in memory, attention problems, disordered sleep, and social withdrawal) that may result from a TBI (Kennedy et al., 2007). Due to the significant comorbidity of these two diagnoses, there has been much controversy as to how to best care for individuals returning with symptoms that may stem from both diagnoses (Hoge, Goldberg, & Castro, 2009). Although those with a history of TBI appear to exhibit a poorer prognosis with regard to recovery from PTSD versus those who do not have a TBI history (Vanderploeg, Belanger, & Curtiss, 2009), a recent study (Belanger, Kretzmer, Vanderploeg, & French, 2009) found that veterans with mild TBI histories report more severe PTSD symptoms than those with moderate/severe TBI histories. But, once PTSD symptoms were entered into the equation, group differences on postconcussive symptoms disappeared. Although these findings suggest that it may be important to consider differences in PTSD severity, what remains unclear is the degree to which TBI severity might impact response to PTSD-focused treatment. This

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overlap suggests the need for effective treatments that can address the symptoms of PTSD as well as the related sequelae of TBI. Given that TBI may inhibit PTSD recovery and the clear overlap between PTSD and postconcussive symptoms, it is imperative to empirically examine treatment approaches for these co-occurring issues.

To date, we know of no study of treatment for individuals with PTSD and TBI. Yet, there is a growing body of literature supporting the use of cognitive-behavioral therapy (CBT) to reduce symptoms of anxiety and depression following TBI (Bryant, Moulds, Guthrie, & Nixon, 2003; Fann, Hart, & Schomer, 2009). Studies have found that individuals with a mild TBI who receive a brief cognitive-behavioral intervention reported shorter symptom duration and significantly fewer symptoms 6 months after injury than do groups receiving routine care (Al Sayegh, Sandford, & Carson, 2010).

Cognitive processing therapy (CPT; Resick & Schnicke, 1992) is a type of CBT that has been shown to be effective in the treatment of PTSD for a variety of traumatic experiences, including rape, assault, combat, and child abuse (Chard, 2005; Monson et al., 2006; Resick, Nishith, Weaver, Astin, & Feuer, 2002). A dismantling study of CPT indicated that a version that omits the writing/reading of trauma accounts, CPT-Cognitive Only (CPT-C), was as effective as the full protocol (Resick et al., 2008). CPT-C was chosen as the main treatment paradigm because this format of CPT allows for more focus on cognitive challenging and rehearsal, which we hypothesized might be helpful in patients with cognitive deficits or complaints. Here we report on the preliminary outcomes on a residential PTSD-TBI treatment program that includes CPT-C as the central treatment for PTSD among veterans with histories of TBI. Based upon results from prior studies of CPT, we hypothesized that PTSD and depressive symptoms would decrease from pre- to posttreatment. In the current study, we examined TBI severity as a potential moderator of PTSD treatment response.

METHOD

Participants

Of 47 male veterans (or active service members) who participated in a VA TBI-PTSD residential program, five were discharged early: one due to family obligations and the others for failure to comply with treatment guidelines. Therefore, the sample comprised 42 participants who met criteria for current PTSD according to the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995) using the worst reported trauma, and who had a history of TBI. A TBI was defined as an event in which the individual experienced external force(s) to the head (i.e., direct head trauma or blast) resulting in loss of consciousness, posttraumatic amnesia, or being dazed/confused. Severity definitions of TBI were based on guidelines provided by the Departments of Veterans Affairs and Defense (Department of Veterans Affairs & Department of Defense, 2009), and severity of TBI was determined by examination of available medical records and patient interview. Twenty-eight patients reported a history consistent with mild TBI (i.e., concussion), 12 patients reported a history consistent with TBI in the moderate range, and two in the severe range. All but nine patients reported multiple brain injury events, and the general severity was classified according to the most severe event. All patients were at least 1-year postinjury (6 patients were <2-years postinjury; 21 were 2–5 years postinjury, and 15 were > 5 years postinjury). The causes of these injuries varied, with 29 patients reporting injuries due to blast, 17 due to motor vehicle accidents, 13 due to falls, 6 due to assaults/fights, 8 were sports-related, and 8 patients reported injuries due to striking their head on other objects. At the time of their admission to the program 29 patients had neuroimaging studies available in their medical records (10 computed tomography [CT] and 19 magnetic resonance imaging [MRI] scans), 9 of which were reported as abnormal (2 were described in radiology reports as TBI-related changes, 2 from preexisting conditions, and 5 with nonspecific white matter changes). All patients had a history of ongoing cognitive complaints (e.g., memory, concentration, etc.) thought to be specifically related to the TBI either by the patient himself or by the referring clinician.

Measures and Procedures

This study was approved by the local institutional review board and research and development committees for review of archival records. In addition to the CAPS, the following assessments were performed as part of a larger assessment battery: the PTSD Checklist (PCL-S; Weathers, Litz, Herman, Huska, & Keane, 1993) the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) and the Structured Clinical Interview for the DSM-IV-TR (First, Spitzer, Gibbon, & Williams, 2002). The neuropsychologist provided education to the patient and treatment team to guide individualized treatment planning. Participants were assessed at posttreatment by independent evaluators who did not conduct their individual psychotherapy.

Participants completed 7 weeks of residential therapy with CPT-C in a combined group and individual format as the primary focus of active-trauma treatment (Chard, Resick, Monson, & Kattar, 2008). The CPT-C group was held twice a week and individual CPT-C sessions were conducted a minimum of twice a week. The CPT-C treatment was augmented with individual speech therapy (i.e., cognitive rehabilitation) 2–3 times per week and 23 hours a week of psychoeducational groups including distress tolerance, spirituality, nutrition, anger management, self-defeating behaviors, and CogSmart (Twamley, Noonan, Savla, Schiehser, & Jak, 2008), a cognitive enhancement group. CPT principles were woven throughout the program, for example when stuck points became apparent in non-CPT groups they were highlighted and at

Table 1. Comparison of Male Veterans With Mild Versus Moderate/Severe TBI Histories on Demographic and Treatment-Related Characteristics

	Mild TBI ($n = 28$)		Moderate/severe TBI ($n = 14$)		
Variable	*M* or *n*	*SD* or %	*M* or *n*	*SD* or %	*t* or χ^2
Age: *M SD*	33.93	8.59	38.07	10.59	$t(41) = 1.36$
Years of education: *M SD*	12.89	1.40	13.21	1.85	$t(41) = 0.63$
No. sessions attended: *M SD*	14.11	1.17	14.71	1.98	$t(41) = 1.25$
White: *n %*	22	77	9	64	$\chi^2(1) = 0.99$
Currently married: *n %*	13	46	22	57	$\chi^2(1) = 0.43$
PTSD service-connected disability: *n %*	16	57	5	36	$\chi^2(1) = 1.71$
OEF/OIF service era: *n %*	23	82	7	50	$\chi^2(1) = 4.73$[a]
Served in combat: *n %*	25	89	10	71	$\chi^2(1) = 2.14$
Combat worst trauma: *n %*	23	82	9	64	$\chi^2(1) = 1.64$
Psychiatric medications: *n %*	19	68	11	79	$\chi^2(1) = 0.53$

Note. TBI = Traumatic brain injury; OEF/OIF = Operation Enduring Freedom/Operation Iraqi Freedom.
[a] $p = .03$ prior to Bonferroni correction being applied. Comparisons were nonsignificant after applying the Bonferroni correction.

times CPT worksheets were used to challenge disruptive cognitions related to that group topic (e.g., anger).

RESULTS

Veterans with mild TBI were compared to veterans with moderate/severe TBI on demographic and treatment-related variables with no differences found when the Bonferroni correction was used (see Table 1). In addition, the two groups did not differ on pretreatment diagnosis with major depressive disorder, 75% versus 79%, $\chi^2(1, N = 42) = 0.07$, *ns*; or having a history of an alcohol, 54% verus 71%, $\chi^2(1, N = 42) = 1.24$, *ns*; or drug use disorder, 29% versus 43%, $\chi^2(1, N = 42) = 0.88$, *ns*.

Next the two groups were compared at pre- and posttreatment for differences in treatment response. Results from analyses of variance (ANOVAs) did not show a significant main effect for mild versus moderate/severe TBI on any outcome measure (see Table 2). However, significant effects for time were found on all measures and suggested large effect size reductions on the CAPS, PCL, and BDI-II from pre- to posttreatment. In addition, there was a significant group by time interaction on the CAPS and PCL such that the difference between the mild and moderate/severe groups was larger at posttreatment and suggested more improvement in the moderate/severe group (see Table 2). However, post-hoc comparisons of the mild versus moderate/severe TBI group failed to reach significance: pretreatment CAPS, $t(40) = 1.18$, *ns*; posttreatment CAPS, $t(40) = 1.65$, *ns*; pretreatment PCL, $t(40) = 0.94$, *ns*; and posttreatment PCL, $t(40) = 1.60$, *ns*.

DISCUSSION

Results from the present study show that a comprehensive residential treatment that includes CPT-C may be a promising intervention for veterans with PTSD and TBI histories. Veterans

Table 2. Effect of Group, Time, and Group x Time on Treatment Outcomes From Analysis of Variance

	Mild TBI ($n = 28$)				Moderate/Severe TBI ($n = 14$)						
	Pretreatment		Posttreatment		Pretreatment		Posttreatment		Partial η^2		
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Group	Time	Group × Time
CAPS	75.14	5.85	48.96	22.29	81.36	16.52	37.64	17.79	0.01	0.79***	0.19**
PCL	61.82	10.32	46.54	16.11	64.93	9.63	38.71	12.11	0.01	0.67***	0.12*
BDI-II	32.64	10.71	23.71	10.98	31.57	11.88	18.07	10.03	0.03	0.52***	0.04

Note. CAPS = Clinician-administered PTSD Scale; PCL = PTSD Checklist; BDI-II = Beck Depression Inventory-II. Degrees of freedom for *F* tests (not shown) were 1, 40.
* $p < .05$. ** $p < .01$. *** $p < .001$.

with PTSD and TBI showed statistically significant, large effect size reductions from pre- to posttreatment on measures of PTSD and depression. This is the first study of which we are aware to demonstrate that veterans with PTSD and TBI may exhibit declines in their PTSD and depression symptoms following cognitive–behavioral, trauma-focused residential treatment.

Unlike Belanger et al. (2009), who found significantly higher PTSD symptoms among veterans with mild versus moderate/severe TBI, we did not find pretreatment differences between these groups. Our lack of pretreatment differences between these groups should be cautiously interpreted, given our smaller sample size. Our findings did show that veterans with mild TBI histories had less improvement in PTSD symptoms on the CAPS and PCL versus those with moderate/severe TBI histories. These findings add to the literature by showing that TBI severity may be a factor that influences recovery from PTSD. Additional research is needed to discern which aspects of TBI severity might influence PTSD symptom presentation and responses to PTSD treatments.

Weaknesses of the present study should be noted. First, due to multifaceted nature of the residential program described in this study, we are unable to determine the extent to which aspects of the residential program, including CPT-C, individually contributed to the demonstrated improvements in clinical outcomes. Second, because there is no comparison condition or follow-up data, it is unclear how the improvements found in this treatment program would compare to that of other treatments and if they continue to last over time. Future research is needed to determine which interventions in the residential program accounted for the most improvement and if CPT-C is as effective as other trauma treatments at addressing PTSD in patients with a history of TBI.

REFERENCES

Al Sayegh, A., Sandford, D., & Carson, A. J. (2010). Psychological approaches to treatment of postconcussion syndrome: a systematic review. *Journal of Neurology, Neurosurgery and Psychiatry, 81*, 1128–1134. doi:10.1136/jnnp.2008.170092

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental Disorders* (4th ed., text rev.). Washington, DC: Author.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression Inventory-II manual* (2nd ed.). San Antonio, TX: Psychological Corp.

Belanger, H. G., Kretzmer, T., Vanderploeg, R. D., & French, L. M. (2009). Symptom complaints following combat-related traumatic brain injury: Relationship to traumatic injury severity and posttraumatic stress disorder. *Journal of the International Neuropsychological Society, 16*, 194–199. doi:10.1017/S1355617709990841

Blake, D., Weathers, F., Nagy, L. M., Kaloupek, D. G., Gusman, F. D., Charney, D. S., & Keane, T. M. (1995). The development of a Clinician-Administered PTSD scale. *Journal of Traumatic Stress, 8*, 75–90. doi:10.1007/BF02105408

Bryant, R. A., Moulds, M., Guthrie, R., & Nixon, R. D. V. (2003). Treating acute stress disorder following mild traumatic brain injury. *American Journal of Psychiatry, 160*, 585–587. doi:10.1176/appi.ajp.160.3.585

Chard, K. M. (2005). An evaluation of cognitive processing therapy for the treatment of posttraumatic stress disorder related to childhood sexual abuse. *Journal of Consulting and Clinical Psychology, 73*, 965–971. doi:10.1037/0022-006X.73.5.965

Chard, K. M., Resick, P. A., Monson, C. M., & Kattar, K. A. (2008). *Cognitive processing thempy group manual: Veteran/military version*. Washington, DC: Department of Veterans Affairs.

Department of Veterans Affairs & Department of Defense. (2009). *VA/DoD clinical practice guideline for management of concussion/mild traumatic brain injury*. Washington, DC: Author.

Fann, J. R., Hart, T., & Schomer, K. G. (2009). Treatment for depression after traumatic brain injury: A systematic review. *Journal of Neurotrauma, 26*, 1–20. doi:10.1089/neu.2009.1091

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2002). Structured Clinical Interview for DSM-IV-TR Axis I Disorders-Non-patient edition. New York, NY: New York State Psychiatric Institute, Biometrics Research Department.

Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine, 351*, 13–22. doi:10.1056/NEJMoa040603

Hoge, C. W., Goldberg, H. M., & Castro, C. A. (2009). Care of war veterans with mild traumatic brain injury: Flawed perspectives. *The New England Journal of Medicine, 360*, 1588–1591. doi:10.1056/NEJMp0810606

Kennedy, J. E., Jaffee, M. S., Leskin, G. A., Stokes, J. W., Leal, F. O., & Fitzpatrick, P. J. (2007). Posttraumatic stress disorder and posttraumatic stress disorder-like symptoms and mild traumatic brain injury. *Journal of Rehabilitation Research and Development, 44*, 895–920. doi:10.1682/JRRD.2006.12.0166

Monson, C. M., Schnurr, P. P., Resick, P. A., Friedman, M. J., Young-Xu, Y., & Stevens, S. P. (2006). Cognitive processing therapy for Veterans with military-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 74*, 898–907. doi:10.1037/0022-006X.74.5.898

Resick, P. A., Galovski, T. E., Uhlmansiek, M. O., Scher, C. D., Clum, G. A., & Young-Xu, Y. (2008). A randomized clinical trial to dismantle components of cognitive processing therapy for posttraumatic stress disorder in female victims of interpersonal violence. *Journal of Consulting and Clinical Psychology, 76*, 243–258. doi:10.1037/0022-006X.76.2.243

Resick, P. A., Nishith, P. Weaver, T. L., Astin, M. C., & Feuer, C. A. (2002). A comparison of cognitive processing therapy with prolonged exposure and a waiting condition for the treatment of chronic posttraumatic stress disorder in female rape victims. *Journal of Consulting and Clinical Psychology, 70*, 867–879. doi:10.1037//0022-006X.70.4.867

Resick, P. A., & Schnicke, M. K. (1992). Cognitive processing therapy for sexual assault victims. *Journal of Consulting and Clinical Psychology, 60*, 748–756. doi:10.1037//0022-006X.60.5.748

Stein, M. B., & McAllister, T. W. (2009). Exploring the convergence of posttraumatic stress disorder and mild traumatic brain injury. *American Journal of Psychiatry, 166*, 768–776. doi:10.1176/appi.ajp.2009.08101604

Tanielian, T., & Jaycox, L. H. (Eds.). (2008). Invisible wounds of war: Psychological and cognitive injuries, their consequences, and services to assist recovery. Santa Monica, CA: RAND Corp.

Twamley, E. W., Noonan, S. K., Savla, G. N., Schiehser, D., & Jak, A. (2008). *Cognitive symptom management and rehabilitation therapy (CogSMART) for traumatic brain injury-individual manual*. Unpublished manuscript, University of California, San Diego/VA San Diego Healthcare System.

Vanderploeg, R. D., Belanger, H. G., & Curtiss, G. (2009). Mild traumatic brain injury and posttraumatic stress disorder and their association with health symptoms. *Archives of Physical Medicine and Rehabilitation, 90,* 1084–1093. doi:10.1016/j.apmr.2009.01.023

Vasterling, J. J., Verfaellie, M., & Sullivan, K. D. (2009). Mild traumatic brain injury and posttraumatic stress disorder in returning veterans: Perspectives from cognitive neuroscience. *Clinical Psychology Review, 29,* 674–684. doi:10.1016/j.cpr.2009.08.004

Weathers, F. W., Litz, B. T., Herman, J. A., Huska, J. A., & Keane, T. M. (1993, October). *The PTSD Checklist (PCL): Reliability, validity and diagnostic utility.* Paper presented at the 9th Annual Conference of the International Society for Traumatic Stress Studies, San Antonio, TX.