# Neurocognitive and Psychological Health Treatment Strategies

## The Efficacy of a Transdisciplinary Intensive Outpatient Program for Treating Active Duty Service Members with Traumatic Brain Injury and Associated Disorders

It is estimated there were 200,000 cases of head injury during Operation Iraqi Freedom/Operation Enduring Freedom deployments with most being mild and many resulting from blast exposure (*DVBIC 2011*). Treatment efforts have faced serious challenges including understanding the comorbidity between traumatic brain injury (TBI), posttraumatic stress disorder (PTSD) and chronic pain and a lack of standardized evidenced-based treatments (*Logan et al. 2013*). Although interdisciplinary programs have shown promise, they have been directed towards Veterans and not active duties Service members (*Walter, Kiefer, and Chard 2012*). Active duty patients consistently show a wide range of physical and emotional symptoms that are grouped under the rubric "consequences of war and chronic post-deployment adjustment issues" (*Dieter and Engel 2016*). Along with a history of TBI and PTSD, patients usually experience anxiety, chronic insomnia and headache, depression, functional cognitive complaints, orthopedic and muscular disorders, and symptoms of vestibular and somatosensory dysfunction. Furthermore, these symptoms will likely interact and over time, can lead to serious impairment, and a change in how the individual perceives him/herself (Figure 1). The Fort Hood Intrepid Spirit Center (ISC) offers comprehensive, interdisciplinary care to Service members experiencing symptoms associated with the consequences of war. A six-week intensive outpatient program (IOP) cares for Service members with more intractable conditions. Cohorts consist of closed-groups of up to seven Service members. Evidence-based group interventions include Stress Inoculation Training, Cognitive Process Therapy – PTSD, Cognitive-Behavioral Therapy – Insomnia, Cognitive Rehabilitation, Mindfulness, Spirituality, Yoga, Art and Music Therapy, Nutrition, and Wellness. Individual treatments include pain and medication management, occupational, physical and speech therapy, chiropractic, psychotherapy, biofeedback, medical massage and acupuncture.

This study empirically evaluated IOP efficacy on 84 active duty Service members. There were 75 men (89.29 percent) and 9 women (10.71 percent). Their mean age was 34.60 (standard deviation = 6.21) years with 12.90 (standard deviation = 5.73) years time in service. Most were enlisted (90.4 percent) with a rank of E6 and above (58.5 percent). They had a mean of 2.76 (standard deviation = 1.41) deployments with most (57.5 percent) deploying to Iraq and Afghanistan. Average time since last deployment was 3.15 (standard deviation = 2.14) years. A longitudinal design examined Service members before and after participation. Computerized neuropsychological testing evaluated cognitive functioning prior to and one-month post-treatment. Responses to established self-report instruments monitored symptomatology (anxiety, depression, headache, insomnia, neurobehavioral dysfunction, PTSD; Table 2) across three

data collection points: pre-treatment (obtained on the first day of participation), immediate post-treatment (at the conclusion of the sixth week) and at one month post-treatment.

The researchers found that every self-report measure was significantly lower at the conclusion of care (Table 1). Three of these measures remained significantly lower at one-month. On average, Service members rated the overall quality of the IOP as 8.98 (standard deviation = 1.24) out-of-10 and their global improvement as 7.47 (standard deviation = 2.06) out-of-10. Regarding neuropsychological functioning, six of the nine MicroCog Indexes showed significantly improved cognitive functioning at one-month post-IOP (Table 2).

This preliminary study supports the IOP for ameliorating the multi-systemic conditions associated with the consequences of war. Service members endorsed a significant reduction in self-reported physical, emotional and cognitive difficulties. Objective neuropsychological testing revealed a significant improvement in cognitive functioning one month after Service members resumed their work and social demands. Future efforts will examine patient variables that may predict treatment response. A longitudinal study has recently been implemented to examine the efficacy of ISC care in non-IOP patients (results not yet available).

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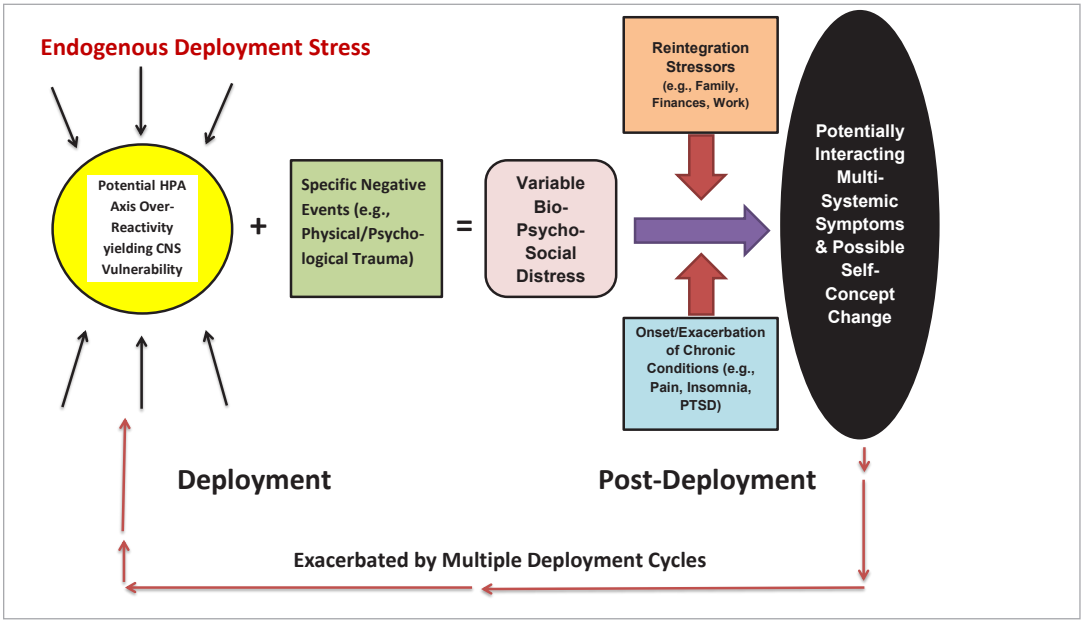


**FIGURE 1:** A Proposed Model of the Relationship Between the Consequences of War & Chronic Post-Deployment Adjustment Issues (Figure 1 from Dieter and Engel (2016) used with permission from the authors)

**TABLE 1:** The Effects of the Six-Week Intensive Outpatient Program on Self-Reported Symptomatology (Table 1 from Dieter and Engel (2016) used with permission from the authors) References within the table: [6] = Wilkins, Lang, and Norman 2011, [7] = Martin et al. 2006, [8] = Norman et al. 2006, [9] = King et al. 2012, [10] = Morin et al. 2011, [11] = Kosinski et al. 2003.

**The Effects of the Six-Week Intensive Outpatient Program on Self-Reported Symptomatology**

| Measure | Pre-Treatment | Immediate Post-Treatment | p Value | 1-Month Post-Treatment | p Value |
|---|---|---|---|---|---|
| PCL-M (PTSD) [6] | 59.62 (12.22) | 54.04 (13.24) | $p < .001$ | 54.42 (13.48) | $p = .001$ |
| PHQ-9 (Depression) [7] | 15.36 (4.78) | 12.99 (5.25) | $p < .001$ | 13.98 (5.14) | $p = .043$ |
| OASIS (Anxiety) [8] | 13.31 (3.82) | 10.94 (4.09) | $p < .001$ | 11.98 (4.01) | $p < .177$ |
| NSI (Neurobeh SXs) [9] | 47.33 (14.86) | 42.03 (15.83) | $p = .001$ | 44.25 (15.83) | $p = .392$ |
| ISI (Insomnia) [10] | 19.31 (5.59) | 16.74 (5.25) | $p < .001$ | 16.84 (6.78) | $p = .01$ |
| HIT-6 (Headache) [11] | 63.32 (6.11) | 61.28 (6.33) | $p = .006$ | 60.98 (7.08) | $p = .08$ |

**TABLE 2:** The Effects of the Six-Week Intensive Outpatient Program on Neuropsychological Functioning (Table 2 from Dieter and Engel (2016) used with permission from the authors) Reference with the table: [5] = Powell et al. 1993.

**The Effects of the Six-Week Intensive Outpatient Program on Neuropsychological Functioning**

| Measure [5] | Pre-Treatment | Interpretation | 1-Month Post-Treatment | Interpretation | p Value |
|---|---|---|---|---|---|
| General Cognitive Functioning | 78.58 (14.92) | Borderline | 84.10 (14.52) | Low Average | $p = .009$ |
| General Cognitive Proficiency | 81.80 (12.20) | Low Average | 86.18 (12.26) | Low Average | $p = .006$ |
| Information Processing Speed | 91.84 (14.28) | Average | 98.88 (14.01) | Average | $p < .001$ |
| Information Processing Accuracy | 73.14 (16.72) | Borderline | 76.50 (2.56) | Borderline | $p = .071$ |
| Attention/Mental Control | 78.74 (16.46) | Borderline | 85.10 (16.80) | Low Average | $p = .003$ |
| Reasoning/Calculation | 86.44 (15.30) | Low Average | 93.44 (12.69) | Average | $p = .001$ |
| Memory | 84.88 (17.09) | Low Average | 90.88 (18.89) | Average | $p = .019$ |
| Spatial Processing | 80.92 (17.21) | Low Average | 80.86 (13.96) | Low Average | $p = .976$ |
| Reaction Time | 77.98 (19.04) | Borderline | 77.32 (22.82) | Borderline | $p = .976$ |

## REFERENCES:

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