Virtual Reality Therapy for the Treatment of Combat-Related Posttraumatic Stress Disorder: A Case Report 10 Years Post Combat Deployment

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Abstract: Important challenges confronting DOD/military and the Department of Veterans Affairs medical care are that of maintaining or increasing the quality of care and increasing the effectiveness of treatments for warriors diagnosed with Posttraumatic Stress Disorder (PTSD) secondary to their combat deployments to Iraq and/or Afghanistan. Virtual Reality Graded Exposure Therapy with Arousal Control (VR-GET) has demonstrated a positive treatment effectiveness resulting in significant reductions of PTSD symptom severity. In this report, we describe the outcome of VR-GET, for the treatment of combat-related PTSD, in a warrior who experienced no treatment for his PTSD for the 10 years following his return from combat duty.

Keywords: Virtual Reality Graded Exposure Therapy (VR-GET), Veterans Administration (VA), Department of Defense (DOD), Posttraumatic Stress Disorder (PTSD), mild Traumatic Brain Injury, Sentinel Events

1. Introduction

Posttraumatic Stress Disorder (PTSD) is a significant problem in active duty warriors returning from combat in Iraq and Afghanistan and also for combat veterans who have left the military [1-7]. Several reports have recommended that the Department of Defense (DoD) and the Veterans Administration (VA) should aggressively develop early intervention strategies and treatments for preventing and treating PTSD [1-9]. Hoge has also suggested that the VA adopt a number of strategies to improve the mental health care engagement and treatment for veterans needing services for PTSD [5].

Virtual Reality Graded Exposure Therapy with arousal control (VR-GET) is a promising, patient centered "strategy" and intervention that has been evaluated in active-duty service members as an early intervention treatment for warriors, diagnosed

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with combat-related PTSD and having been successfully treated within months of having returned to the United States from the combat theater [10 – 13]. As an exposure therapy, VR-GET assists a patient in "learning" to manage fears and anxieties related to his or her combat-traumas (i.e., Sentinel Events) in a controlled, simulated environment which is generated using virtual reality (VR). VR-GET combines graded VR exposure with meditation and attention control (e.g., noticing distractions, letting them go and refocusing on the task at hand) in combination with autonomic nervous system control using

Figure 1. Three computer configuration for VR-GET with Biofeedback being calculated on the laptop computer. Simulated patient is holding a hand-held controller that he is using to "move" through the combat environment. A Head Mounted Display (HMD) and Headphones facilitate the immersion in the VR-GET simulated combat environment.

the J & J Engineering Biofeedback system. VR-GET has resulted in 70% of participants being able to reduce their PTSD severity by 30% or greater [13]. One VR-GET Case Study described a Second Class male Navy Corpsman successfully reducing his PCL-M score by 20% following 10 VR-GET Sessions [10]. Another VR-GET Case Study described a Second Class female Navy Seabee successfully reducing her PCL-M score by 65% following 20 VR-GET Sessions [11].

Recently, a male U.S. Navy Officer, diagnosed with PTSD and mild traumatic brain injury (mTBI), was referred for VR-GET by his Primary Care Provider (PCP). In 2006, this Officer completed six (6) months of a combat deployment to Iraq. Following his having returned to the United States, at the conclusion of his combat deployment and reporting to his new U.S. Navy Command, he reported to his PCP that he was experiencing symptoms consistent with PTSD and mTBI. He was also experiencing profound difficulties with Initial Insomnia, Middle Insomnia and Terminal Insomnia. This Navy Officer informed me that his PCP and his "Shipmates" had reassured him that his PTSD symptoms "would reduce and get better over time". Hence, this Navy Officer did not pursue a referral for treatment of his PTSD until 2015.

Following is the report of the VR-GET, with physiological monitoring, with his male Navy Officer.

Figure 2. What the VR-GET patient sees while immersed in the VR-GET combat environment titled, "Fallujah".

2. Method

A 51 year old, male, U.S. Navy Officer was referred to and volunteered for VR-GET. This participant met the DSM-IV-R [14] criteria for chronic PTSD. This participant's comorbid diagnoses included: mTBI, High Cholesterol and Rheumatoid Arthritis. Prior to this participant's referral for VR-GET, his PCP had prescribed Ambien to assist with improving his sleep. This U.S. Navy

- Upon arrival in country, traveling from BIAP to Mosul, we were packed at night into a C-130 and flew lights out for the entire trip. I remember being in full battle gear, pressed in so tightly with our gear, weapons, and each other that I couldn't move and barely breathe. Multiple bouts of claustrophobia and panic flushed over me throughout the trip and my best effort was to pray to God and sing hymns to myself to keep from going completely out of control.

- At approximately 1500 on March 13, 2006, traveling in a large convoy, my vehicle was struck with a Complex Improvised Explosive Device (IED) attack launched approximately two kilometers from the south gate of the Mosul Air Base. The convoy also encountered machine gun fire from the insurgency. The IED was planted along the right hand side of the road and detonated as my vehicle came alongside the IED. There was a loud explosion, a large fireball, the vehicle was blown sideways and rocks flew everywhere. The vehicle was not rendered inoperable and we executed an evasive maneuver to get away from the point of attack. The gunner above me received only minor injuries, when in fact, he should have been killed by the force of the blast.

- At approximately 0800 hours, 27 April 2006, a suicide bomber detonated a ball-bearing filled vest among a group recruits for the New Iraqi Army. The detonation occurred approximately one kilometer from Al Kasik's Entry Control Point (ECP) in area designated for the recruits to be prescreened to ensure that they were the confirmed recruits. A total of sixty-five recruits were killed or injured by the blast. Twenty-seven recruits died at the scene and nine recruits died after medical evacuation as a result of their wounds. I was scene leader and assisted with the collection of evidence. When I arrived

Figure 3. A few of the Sentinel Events reported by the case study participant while deployed to Iraq.

Officer has served 25 years in the Navy and he has been married three times and divorced twice. He completed a 6 month combat tour to Iraq in 2006. Following this participant's referral for VR-GET and in consultation with his PCP, the PCP discontinued this participant's Ambien and initially prescribed Trazodone (100mg/qhs) and subsequently he additionally prescribed Lexapro (10mg/qday) to assist with improving the participant's sleep quality and improving his mood. Prior to starting VR-GET, this participant completed a structured psychiatric interview, the Posttraumatic Stress Disorder Checklist-Military (PCL-M), the Beck Anxiety Inventory (BAI) and Patient Health Questionnaire-9 item (PHQ-9). This participant's VR-GET followed the VR-GET guidelines previous described [10-13]. Importantly and in keeping with the VR-GET guidelines, the participant's Sentinel Events were incorporated into his VR-GET.

Following 15 VR-GET sessions, the participant again completed the PCL-M, BAI and PHQ-9.

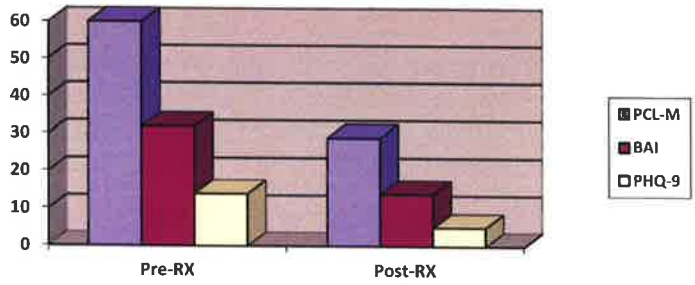

Figure 4. Results for PCL-M, BAI and PHQ-9 administered Pre VR-GET and Post VR-GET

3. Results

Following 15 VR-GET sessions, the participant's symptom severity decreased measurably. He is sleeping 6 – 8 hours a night, with 20 minutes or less sleep onset difficulties four to five nights a week. This participant is continuing in VR-GET for an additional 5 sessions and his post 20-VR-GET session symptom severity will be reported during CYPSY21.

4. Conclusions

Virtual Reality Graded Exposure Therapy (VR-GET) led to measurable reductions in PTSD, anxiety and depression symptoms in our participant and our participant reported easily tolerating the VR-GET combat environments. These measurable reductions on PTSD, anxiety and depression were assisted with the prescription of psychotropic medications. As with other VR-GET participants, our participant described becoming engaged in the graded exposures of the VR simulations/combat-environments and in spite of a busy and hectic active duty Navy position, he was able to consistently keep his scheduled consultations. Of note, this Case Report is the first to describe the utilization of VR-GET more than 5 years post-combat deployment. Other reports describing VR-GET have documented treatment having occurred either proximal to return to the United States following a combat tour [9] or proximal to having returned to the United States following a most recent combat deployment, but with the participant's first combat deployment having been 4 years prior to VR-GET [10]. With the possibility that Virtual Reality Therapy and VR-GET can assist with reducing combat-related PTSD symptom severity many years after a combat tour or combat tours needs to be assessed more inclusively. Such an assessment may lead to the inclusion of Virtual Reality Therapy and VR-GET as being "strategies" that DOD and VA could adopt to improve the mental health care engagement and treatment for veterans needing services for PTSD. Lastly, during CYPSY21,VR-GET treatment limitations and treatment insights, gained from our discussion with our participant, will be presented.

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