

# Virtual Reality Graded Exposure Therapy with Arousal Control for the Treatment of Combat Related Posttraumatic Stress Disorder: A Follow Up Case Series

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**Abstract:** Important challenges confronting DOD/military medical care are that of maintaining or increasing 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. This positive treatment effectiveness has been maintained for up to 22 weeks after VR-GET therapy was completed. A robust methodology for the assessment of Virtual Reality efficacy suggests that the ideal time for follow-up begins at twelve months. Others have suggested that follow-up should occur between two and four years post treatment. In this report we describe the outcome of VR-GET for the treatment of combat-related PTSD with three warriors between five and seven years following their having completed treatment.

**Keywords:** Virtual Reality Graded Exposure Therapy (VR-GET), Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), Posttraumatic Stress Disorder (PTSD), follow-up, Naval Medical Center San Diego (NMCS), Naval Hospital Camp Pendleton (NHCP)

## Introduction

A Department of Defense Task Force report concluded that 11 - 25% of OIF and/or OEF veterans have been diagnosed with Posttraumatic Stress Disorder (PTSD) and this report recommended that DOD should aggressively develop effective PTSD treatment

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programs [1]. A recently published meta-analysis of studies published between 2001 and 2010 reported that the PTSD prevalence was 13.2% in operational infantry units and increased to 25% to 30% in infantry units with the highest level of direct combat [2]. In spite of the variance in the exact percentage of service members diagnosed with PTSD, studies have documented the PTSD is a severe problem [3]. 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, 3 – 6]. More recently, Hoge [7] has suggested that the VA adopt a number of strategies to improve the mental health care engagement and treatment for veterans needing services for PTSD. These strategies are designed to increase the focus of treatment on patient-centered care and include but are not limited to the improved access to care, improved responsiveness to patient preferences for care and careful coordination of care, improved understanding what motivates a veteran's willingness to engage in or to continue with care, establishing ongoing measures of patient feedback, and providing a wide range of treatment options [7].



**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 and Headphones facilitate the immersion in the VR-GET simulated combat environment.

Virtual Reality Graded Exposure Therapy with arousal control (VR-GET) is a promising intervention that has been evaluated in active-duty service members [8 – 11]. VR-GET is a type of exposure therapy in which a patient takes on fears related to his or her combat-traumas in a controlled, simulated environment which is generated using virtual reality (VR). VR-GET differs from other forms of VR exposure therapy, such as Virtual Reality Exposure Therapy (VRET) [12], in that rather than adding VR to a traditional session of prolonged exposure, 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 control using 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 [11].



**Figure 2.** What the VR-GET participant sees while immersed in the VR-GET combat environment titled, “Fallujah”.

Of note, VR-GET participants received follow-up evaluations between 10 and 22 weeks after treatment completion with the follow-up results indicating that the reduction in PTSD severity had been maintained [8 - 11]. In September 2009, the Virtual Reality Medical Center, Naval Medical Center San Diego and Navy Hospital Camp Pendleton VR-GET research project was concluded with there being no provision to re-evaluate the participants who had completed VR-GET.

**Table 1.** Age, sex, military status and other demographic information of the former VR-GET patients.

Patient	Age	Sex	Service	Military Status	Marital Status	School Completed Since VRGET	Employment Status
1	34	Male	USMC	Active	Married with 2 children	Various military schools	Active Military
2	40	Male	USN	Medically Retired	Divorced, no children	2 years technical college	Not working
3	32	Female	USN	Medically Retired	Married with 2 children	Junior college	Stay-at-home mother

A robust follow-up methodology following PTSD treatment includes a follow-up assessment that begins at twelve months [13]. Other PTSD research has suggested that robust follow-up methodology can occur between 2 and 4 years following the termination of treatment [14, 15]. However, there is a dearth of research that reports follow-up outcomes for PTSD treatment in the military beyond 6 months. Hence, recently we contacted three of the participants who had completed VR-GET to assess

not only the severity of their current difficulties with PTSD, but we also obtain information concerning their current quality of life including the status of their current interpersonal relationships, employment, schooling completed and status of military service.

## 1. Method

Three of twenty-two participants who had completed VR-GET between 2006 and 2009 were contacted by the therapist who previously provided them VR-GET during the studies and they were asked to participate in the VR-GET follow-up project. Utilizing the patient assessment previously employed with these participants while they were involved in the VR-GET pilot or randomization study [8 -11], these three former participants agreed to complete a structured psychiatric interview, the Posttraumatic Stress Disorder Checklist-Military (PCL-M), the Patient Health Questionnaire-9 item (PHQ-9), and the Beck Anxiety Inventory (BAI).

## 2. Results

Our results will be presented during the CYPsy19 Conference in June 2014.

## Conclusions

Our findings and conclusions, while limited to a small percentage of participants who completed VR-GET, will address not only the importance of long-term follow-up with patients treated with VR-GET for combat-related PTSD but also insights regarding VR-GET, gained from our discussion with our previous participants, will be presented.

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