Virtual Iraq: Initial Results from a VR Exposure Therapy Application for OIF/OEF Combat-Related Post Traumatic Stress Disorder

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Background: War is perhaps one of the most challenging situations that a human being can experience. The physical, emotional, cognitive and psychological demands of a combat environment place enormous stress on even the best-prepared military personnel. Such stressful experiences that commonly occur in warfighting environments have a considerable likelihood for producing significant numbers of returning soldiers at risk for developing PTSD. The initial data coming from both survey studies and anecdotal observations indicate that a large number of returning military personnel from the Iraq/Afghanistan conflicts are reporting symptoms that are congruent with the diagnosis of PTSD. In the first systematic study of mental health problems due to the Iraq/Afghanistan conflicts revealed that “…The percentage of study subjects whose responses met the screening criteria for major depression, generalized anxiety, or PTSD was significantly higher after duty in Iraq (15.6 to 17.1 percent) than after duty in Afghanistan (11.2 percent) or before deployment to Iraq (9.3 percent)” (Hoge et al., 2004). These estimates were made before the violence escalated even further in the last 2 years. In 1997, researchers at Georgia Tech released the first version of the Virtual Vietnam VR scenario for use as a graduated exposure therapy treatment for Post Traumatic Stress Disorder (PTSD) with Vietnam veterans. This application of VR therapy built on the best documented standard of care for PTSD: imaginal exposure therapy. Such treatment typically involves the graded and repeated imaginal reliving of the traumatic event within the therapeutic setting. This approach is believed to provide a low-threat context where the patient can begin to therapeutically process the emotions that are relevant to the traumatic event as well as de-condition the learning cycle of the disorder via a habituation/extinction process.

Tools and Methods: The USC ICT Virtual Iraq application consists of a series of virtual scenarios designed to represent relevant contexts for VR exposure therapy, including middle-eastern themed city and desert road environments (Figures 1-6). In addition to the visual stimuli presented in the VR HMD, directional 3D audio, vibrotactile and olfactory stimuli of relevance can be delivered. The clinician can deliver additive, combat-relevant stimuli in the VR scenarios via a separate “wizard of oz” clinical interface while they are in full audio contact with the patient. The clinical interface is a key feature in that it provides a clinician with the capacity to customize the therapy experience to the individual needs of the patient (Fig. 7). The clinician can place the patient in VR scenario locations that resemble the setting in which the traumatic events initially occurred and can gradually introduce and control real time “trigger” stimuli (visual, auditory, olfactory and tactile) as is required to foster the anxiety modulation needed for therapeutic habituation. A full description of the application and treatment protocol can be found in (Rizzo et al., 2006).

Results: User-Centered tests with the application were conducted within an Army Combat Stress Control Team in Iraq (Fig. 8) and at the Naval Medical Center–San Diego. Such feedback by non-diagnosed Iraq-experienced military personnel provided information on the content and usability of the prototype system application that fed an iterative design process. A clinical trial version of the application built from this process is currently being tested with PTSD-diagnosed personnel at a variety of sites. The primary test sites at the Naval Medical Center–San Diego (NMCSD) and at Camp Pendleton are conducting an open clinical trial to evaluate the system’s efficacy for PTSD exposure therapy with active duty military personnel recently redeployed from Iraq. The presentation at MMVR2008 will provide an updated set of results from all patients treated with the Virtual Iraq system at that time. As of the submission date for this paper (07/15/07), we have successfully treated five of seven active duty patients at NMCSD (Fig. 9) and one National Guard veteran was successfully treated as part of the Emory University study (Fig. 10) that has just begun.

Conclusions: The positive clinical outcomes observed from our initial eight patients are encouraging, although we are cautious not to make excessive claims based on these early results. At the current time we are continuing to gather data and feedback from patients regarding the therapy and the Virtual Iraq environment in order to continue our iterative system development process. As such, we intend to use such initial results to develop, explore and test hypotheses as to how we can improve assessment, treatment, and most importantly, determine what patient characteristics may predict who will benefit from VRET and who may be best served by other approaches.
References:

Figs. 1-2 Virtual Iraq City Scenes

Figs. 3-4 Driver & Turret View in Desert Road Scenario

Figs. 5-6 IED Attacks in City & Desert Road Scenarios

Fig. 7 “Wizard of Oz” Clinical Interface

Fig. 8. User feedback - Iraq Combat Stress Control Team

Fig. 9 Treatment results from NMCSD as of 7/2007

Fig. 10 Treatment result from Emory Univ. study as of 7/2007