Virtual Reality in the Treatment of Combat-Related PTSD with Warfighters

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“…psychological trauma is an experience of a threat to life, body, or sanity so severe as to overwhelm the ordinary process of emotional integration.”

Cobb & Cobb, 2005
What We Know about PTSD and Combat

♦ One of most disabling psychological disorder affecting warfighters
♦ Intensity and frequency of violence and threat of death in combat increases risk for PTSD
♦ Significantly higher levels of PTSD were found in U.S. combat units returning from deployment to Iraq and Afghanistan
  ‣ 1 in 8 returning soldiers from Iraq had PTSD
♦ 8% of peacekeeping forces in Somalia and 15% in Bosnia developed PTSD
♦ Highly refractory disorder--835,000 Vietnam War veterans reported PTSD symptoms 30 years after the war

Prevalence & Recovery from PTSD

▪ Risk for chronic PTSD increases with greater frequency and intensity of involvement in combat operations
▪ Estimated 18% risk for PTSD from service in Iraq, and 11% from Afghanistan
▪ Most soldiers in war zones do not develop PTSD
  ‣ Most with PTSD eventually recover to a great extent
▪ Those who do not recover naturally, untreated PTSD develop into chronic PTSD that is resistant to treatment
▪ High co-morbidity with PTSD: alcohol abuse, drug abuse, medical problems, depression and other psychiatric disorders
Exposure Therapy

- Strong evidence for effectiveness when used with CBT in civilians
- Involves repeated exposure to feared stimulus
- Repeated exposures lead to habituation and extinction

Types of Exposure Therapy

- Imaginal exposure: person repeatedly describes traumatic events
- In vivo exposure: visits to place where event occurred or feared stimulus is present
- Virtual reality exposure: computer-generated simulation of traumatic event
Virtual Reality Treatment for PTSD

- Early studies show promising results
  - Rothbaum et al (2001)
  - Difede and Hoffman (2002)
- No controlled studies to date
- More empirical evidence required

Rothbaum, Hodges, Ready, Graap, & Alarcon (2001)-Virtual Vietnam

- First reported study to use VR in treating PTSD
- Treated 10 Vietnam veterans with chronic PTSD
- Used CBT and graded exposure to VR auditory and visual stimuli
- Significant reductions in PTSD symptoms 6 months later
Difede and Hoffman (2002)-World Trade Center

- Case study of survivor who failed to improve with traditional imaginal exposure therapy
- Graded exposure to visual and auditory stimuli
- After 6 sessions: 90% reduction in PTSD symptoms and 83% decrease in depression

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- Randomized controlled study
- Test efficacy of CBT with VR exposure treatment for PTSD in returning warfighters from Iraq and Afghanistan
- Between group pre-post experimental design
- Comparison of outcomes between 2 conditions: treatment (CBT-VRE) and minimal attention
- Total subjects: N=60, 30 each condition
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Treatment Condition

- 10 treatment sessions: 2 per week over 5 weeks
- Graded exposure to auditory, visual, and kinesthetic stimuli
- Physiologic monitoring during session, e.g., heart rate, blood pressure, skin conductance
- Clinical interview and questionnaires completed at pre and post-treatment, and at 6 and 12-month follow-ups

Description of VR Environment

- Convoy in urban setting with graphics, sounds, and animation to promote immersion
- Chair vibrations later added to enhance presence
- Environment designed to permit therapist activation and deactivation of graphics, sounds, and animation
  - Individual customization of stressful events
  - Increase or decrease level of stress arousal
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Development Considerations

► Intellectual Property: graphics and audio
► Software development tools: flexibility, compatibility with other software, license costs
► Environment Design: storyboarding, visual effects, communication with programmer
► Sensory Experiences: visual, audio, kinesthetics

VR Environment: Middle East World
VR Environment: Middle East World

Status of VR Treatment Approach

- Clinical trial will provide data to evaluate approach
- Advantages of Immersive VR:
  - Able to confront feared stimuli in environments not readily available, e.g., combat
  - Enhances memory retrieval of traumatic events
  - Activates therapeutic emotional engagement that is important to recovery
- VR therapy requires experienced, competent therapist
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