

Using Virtual Reality as Part of an Intensive Treatment Program for PTSD

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ABSTRACT

Up to 18.5% of veterans returning from OIF/OEF are diagnosed with posttraumatic stress disorder (PTSD). In addition to symptoms of anxiety (intrusive thoughts, re-experiencing, hyperarousal, and avoidance), PTSD can result in social maladjustment, poor quality of life, and medical problems. Other emotional problems include guilt, anger, and unemployment, impulsive or violent behavior, and family discord. Many veterans seeking treatment for PTSD also seek disability compensation for debilitating occupational impairment. There are few administrative or research data to indicate veterans are recovering from PTSD. Exposure therapy, a form of behavior therapy, alleviates anxiety symptoms, but may not address the anger, depression and social impairment that accompanies this disorder. In this presentation, we will discuss an intensive treatment program, known as Trauma Management Therapy (TMT), which combines individual virtual reality (VR) assisted exposure therapy with group social and emotional rehabilitation skills training, delivered in a 3 week format. The presentation will demonstrate the VR environment (Virtual Iraq), will discuss how often/successfully various VR elements are integrated into a comprehensive treatment program, and the adaptability of the program for active duty military personnel, as well as veterans. We will discuss the format of the intensive program as well as factors such as compliance and drop-out rates, comparing these important clinical variables to more traditional outpatient treatment programs. Additionally, we will address common clinical concerns regarding the use of VR exposure therapy for individuals suffering from PTSD.

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INTRODUCTION AND BACKGROUND

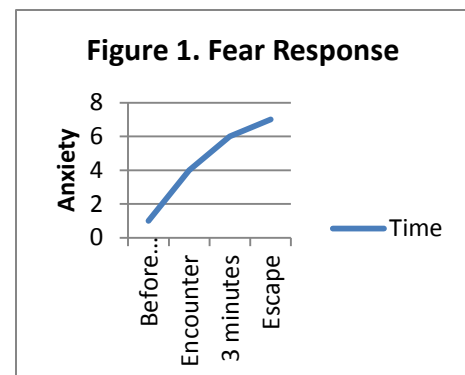
There are high rates of posttraumatic stress disorder (PTSD) in military veterans, including 9.1% among Vietnam veterans (Dohrenwend et al., 2006). Troop deployment for OIF/OEF has been extensive and among returning veterans, 18.5% are diagnosed with PTSD (Tanielian & Jaycox, 2008). However, best estimates are closer to 8% (Richardson, Frueh, & Acierno, 2010; Smith et al., 2008). In addition to its positive symptoms (intrusive thoughts, re-experiencing the event, anxiety, and avoidance), PTSD is associated with social maladjustment, poor quality of life, and medical problems. Other emotional problems include social avoidance, memory disruption, guilt, anger, debilitating unemployment, impulsive or violent behavior, and family discord.

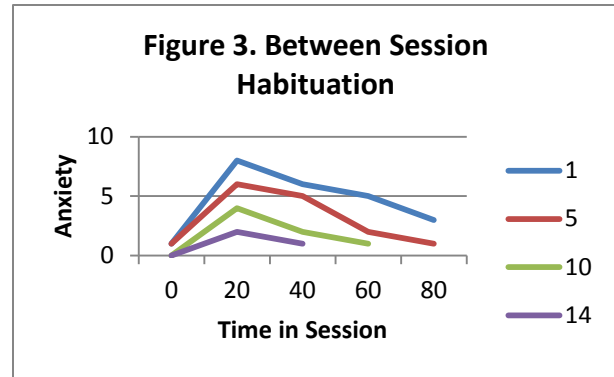
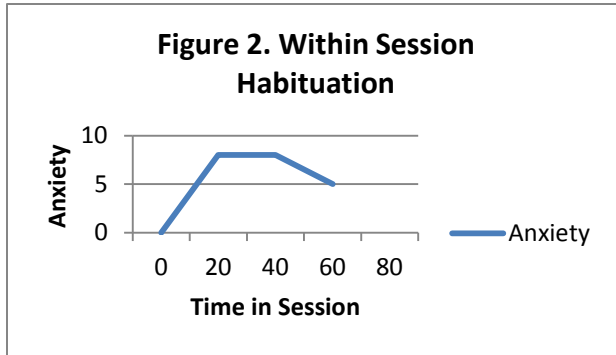
Treatment of Combat-related PTSD

According to the Consensus Statement on PTSD by the International Consensus Group on Depression and Anxiety, the most appropriate psychotherapy for PTSD is exposure therapy (EXP) (Ballenger et al., 2000; Foa, 2000). This conclusion was reaffirmed by the National Institute for Clinical Health and Excellence (NICE, 2005) and the Institute of Medicine (IOM, 2007). Exposure therapy is an effective and accepted intervention for a range of anxiety disorders and offers hope for alleviating acute symptoms of PTSD. However, while there is strong evidence for the effectiveness of exposure therapy for the treatment of PTSD in civilians, there is a striking lack of corresponding evidence to support the treatment of PTSD in combat veterans (Bradley et al., 2005; Frueh et al., 2007; IOM, 2007). Moreover, exposure therapy may not address the “negative” symptoms of PTSD (e.g., social withdrawal, interpersonal difficulties, occupational maladjustment, emotional numbing), or improve emotional regulation such as anger management (Frueh et al., 1995). This is because EXP is specifically focused on anxiety and fear reduction, and hence does not address other features of PTSD. Specifically, it does not address managing depression and guilt, help the veteran reestablish impaired relationships, or learn to control anger. Therefore, it appears that for a treatment to be fully successful, it must address not only the prominent problem of maladaptive anxiety and fear, but also the marked social impairment characteristic of PTSD in veterans.

Exposure Therapy

When someone encounters a feared object, event, or situation, an individual's typical response is to become anxious and then to try to escape from the situation (Figure 1). Escape will temporarily eliminate fear but it will lead to a pattern of further anxiety. The anxious response can be eliminated through the process of exposure therapy. On one level, explaining exposure therapy is easy. If you are afraid of a dog, how do you get over that fear? You have to be around a dog. Exposure therapy requires placing the individual in the situation that creates anxiety and remaining there until the emotional distress elicited by the feared object/situation/event has been extinguished. So if a person was afraid of a dog and they were asked to be in a room with a dog, they would remain in contact with the dog until they were no longer anxious. This is called within-session habituation (see Figure





2). On a neurological level, learning is occurring and the brain is establishing new neural connections about the situation (Davis, Ressler, Rothbaum, & Richardson, 2006) – “just because I am in contact with a dog does not mean that I will get bitten.”

When an exposure session is repeated over a number of days, these neural networks are strengthened to the point that they are stronger than the old fear network. On an emotional level, repeating the anxiety across days results in diminishment of the initial anxiety response and a shorter time to return to a non anxious state, until even immediate contact with the object or event no longer produces an anxious response. This is called between session habituation (Figure 3).

Trauma Management Therapy – Background and Development

Over the past 18 years, we have been involved in the development and evaluation of Trauma Management Therapy (TMT), a multi-component treatment designed to specifically address the multiple problems associated with chronic PTSD. We developed TMT because our initial efforts in the 1990s with Vietnam veterans using exposure therapy did not produce optimal results. Veterans were reporting reduced anxiety, but were not returning to the community. They lacked (or had lost) the social skills necessary for successful social interaction. In addition, they were reporting a high frequency of physical and verbal rage episodes, and feelings of depression and guilt. Thus, we developed TMT to address all of these features. TMT contains two treatment components. The first component is intensive individual exposure therapy, addressing the unique features of each veteran’s trauma. The second component is social and emotional rehabilitation, which uses a skills training format and is conducted in small groups. TMT is not merely a combination of exposure and traditional social skills training. Rather it includes content areas designed to remedy specific difficulties seen in veterans with chronic PTSD.

In our initial pilot investigation with Vietnam veterans, which was an open trial ($n = 11$; Frueh et al., 1996), there was significant pre- to post-treatment improvement on measures of sleep, nightmares, flashbacks, and social withdrawal. Also, there were significant improvements on clinician ratings of general anxiety, PTSD symptoms, and overall level of functioning.

In a follow-up randomized controlled trial (Beidel, Frueh, Uhde, Wong, & Mentrikoski, 2011), we randomized 49 Vietnam-era veterans with combat-related PTSD to either TMT or Exposure plus psychoeducation groups therapy. Each group first received 14 sessions of intensive individual exposure treatment (3 times per week for 5 weeks) followed by once weekly group therapy (either the social and emotional rehabilitation component or psychoeducational group therapy – to provide for equal therapist time). The group intervention met once weekly for 12 weeks. Because we wanted to assess the additive of effects of the social and emotional rehabilitation component of TMT, our study design utilized assessments at pre-treatment, mid-treatment (after exposure but before beginning the group therapy). For ease of communication, we will refer to the control group as exposure therapy alone.

At posttreatment, as predicted, both groups reported significant decreases in primary PTSD symptoms, as a result of exposure therapy (see Table 1 below). There were significant reductions at posttreatment on clinician rated and self-reported measures of PTSD. There were significant decreases in the number of nightmares per week, lowered general anxiety and reduced depression. We hypothesized that the second component of TMT (social and emotional rehabilitation) would result in significant improvement in social functioning, which would not be evident in the group that received exposure therapy alone and which would only occur in the second half of treatment. The results

supported our hypotheses. Veterans who received TMT spent more time in weekly social interactions. Furthermore, although the difference approached, but did not reach, the conventional .05 level, the veterans in the TMT condition were also more likely to engage in a significant number of weekly social activities ($p < .10$). It is important to note that these increases were not evident directly after exposure treatment (labeled as midtreatment on Table 1) but only after the veteran participated in the social and emotional rehabilitation component of TMT (at posttreatment).

Table 1. Results of TMT with Vietnam Veterans

	Trauma Management Therapy			Exposure Only			p
	Pre	Mid	Post	Pre	Mid	Post	
CAPS	84.9		69.0	90.6		65.5	.001 (Time)
PCL-M	67.0		60.9	68.2		63.6	.01 (Time)
Nightmares/week	7.1	4.7	4.9	9.4	8.5	4.5	.01 (Time)
Flashbacks/week	10.0	6.2	5.4	6.5	7.9	5.1	.025 (Time)
General Anxiety	27.0		18.6	27.5		20.4	.001 (Time)
General Depression	22.7		14.1	22.1		16.0	.001 (Time)
# social activities/wk.	3.2	3.8	8.2	2.5	1.2	2.0	.025(TxG)
Time in social activities (min/day)	38.5	60.4	94.6	46.4	24.7	36.6	.05 (TxG)

From Beidel et al. (2011). TxG=Time by Group interaction. CAPS=Clinician Administered PTSD Scale; PCL-M= PTSD Checklist – Military.

TRAUMA MANAGEMENT THERAPY (TMT) – A COMPREHENSIVE TREATMENT PROGRAM

TMT is a multicomponent behavioral treatment program designed to target various aspects of combat-related PTSD - reducing emotional and physiological reactivity to traumatic cues, reducing intrusive symptoms and avoidance behavior, improving interpersonal skills and emotion modulation (e.g., anger control), and increasing the range of enjoyable social activities. TMT consists of several interrelated components: education, intensive exposure, social and emotional rehabilitation, homework assignments, flexibility exercises, and programmed practice. TMT consists of 29 treatment sessions. In a “typical” outpatient program set-up, treatment occurs three times a week during the first 5 weeks and consists of individualized exposure therapy occurs. Upon completion of the exposure therapy phase, the 14 sessions of group therapy over 12 weeks begin, twice per week for the first two weeks and then once a week during social and emotional rehabilitation. There are typically between 3-5 participants in the group although this phase could be delivered in an individual format if necessary. Exposure sessions are terminated when the participant demonstrates habituation (typically 90-120 minutes in the first sessions and then decreasing in length as the number of sessions increases). Group therapy sessions are 90 minutes long. The treatment program as a whole results in approximately 43.5 hours of therapist contact for each patient.

Elements of the Treatment Program

Education. This information is presented in the first meeting with the patient. All veterans are provided with a general overview of chronic PTSD, including common patterns of expression, issues of diagnosis, comorbidity of other anxiety and Axis I disorders, etiological pathways, and a review of current treatment strategies. This phase ensures that veterans not only develop a realistic understanding about treatment prognoses, but also an overall positive expectancy regarding treatment efficacy. Also, this phase educates veterans about TMT and the expectations for treatment.

Exposure Therapy. Individually administered exposure therapy is administered first because it effectively addresses the unique features of each veteran’s fear structure (Foa, 2000). The goal of exposure therapy is to provide prolonged contact with the feared stimuli of sufficient duration that within session habituation occurs (Figure 2). Repeated pairing across a number of days also is important and hastens the habituation process (Figure 30). Exposure therapy occurs first and in “massed” fashion as data indicate that sessions conducted in a temporally short time frame produce quicker results. Exposure consists of 14 individually administered sessions, and average 90 minutes in length (longer in the beginning, shorter at the end) as between sessions habituation is achieved.

Programmed Practice. The programmed practice component is implemented in conjunction with the final 7 exposure sessions. It is a form of exposure therapy that does not necessitate therapist-accompaniment (i.e., it is “homework”). These homework assignments are geared specifically toward the veteran’s individual fear pattern. Examples of suitable assignments include watching movies (e.g., *Black Hawk Down*, *Restrepo*, *Lone Survivor*), visiting war memorials or museums, speaking with other veterans or loved ones about war experiences, and visiting crowded places such as Walmart. Experiences are devised that require the veteran to engage in other feared activities, the avoidance of which may interfere with his quality of life.

Social and Emotional Rehabilitation (SER). This highly structured group component was developed to target the interpersonal difficulties that are often part of PTSD but are not improved by exposure only. These difficulties include social anxiety, social alienation and withdrawal, excessive anger and hostility, explosive episodes, marital and family conflict. The first component, *Interpersonal Skills Enhancement*, teaches veterans how to establish/re-establish and maintain friendships and assertive communication, skills necessary to engage/maintain in new and diverse social activities or to re-establish strained interpersonal relationships with family, friends, and co-workers. The second component *Anger Management*, teaches veterans to better manage anger and other intense emotions. It is designed to reduce temper outbursts and the problematic expression of anger. This component gives veterans a range of strategies for expressing their anger, problem solving, improving their emotional modulation, and communicating assertively with others, so that verbal and physical violence do not continue to disrupt their relationships with others. In the final component, *Behavioral Activation for Depression* (Lejuez, Hopko, Acerno, Daughters, & Pagoto, 2011), veterans learn skills to deal with depression and guilt. Treatment involves identifying areas of functioning (occupational, family, social) in which the individual would like to make changes and examining the values held within those areas. This is followed by identifying and planning daily activities that help one to live in accordance with the values identified as important. Accomplishing activities that are closely linked to core values results in more positive and enjoyable experiences. This, in turn, improves how one thinks and feels and thinks about life. Behavioral Activation for Depression was not included in the first iteration of TMT but was added to the current version because of the depression and guilt expressed by OIF/OEF veterans.

Why Use Virtual Reality

Typically, exposure therapy is conducted using either imaginal or in vivo methods. In vivo means that the individual actually comes into physical contact with the fearful object/event. Many specific phobias (dogs, heights, spiders) can be treated effectively with in vivo exposure therapy. However, there are other situations/events that are not reproducible in real life (such as the events associated with military combat trauma) and in those cases, many clinicians conduct imaginal therapy. Together, the clinician and patient construct a scene based on the traumatic event. The individual imagines this scene until such time as distress is eliminated. Imaginal therapy has been the mainstay form of behavior therapy for complicated anxiety disorders such as PTSD, when actual recreation of the trauma is not possible.

Virtual reality (VR) as a means of augmenting exposure therapy has been recently introduced into many treatment settings. VR is a particularly promising modality for treatment of OIF/OEF veterans, because in vivo exposure to traumatic events precipitating the onset of PTSD is not possible (e.g., car bombings cannot be re-created) and many participants are unable to or do not want to re-imagine the traumatic events. Furthermore, exposure using a VR environment overcomes a significant hurdle for many individuals with PTSD: an inability to engage in imagery of sufficient detail and affective magnitude to re-create essential aspects of the traumatic event. A basic tenant of any form of exposure therapy is the need to engage as many of the senses as possible. VR, with its ability to simultaneously present visual, auditory, olfactory, and tactile cues offers promise of optimizing exposure therapy.

Virtual Iraq/Afghanistan

The University of Southern California (USC) Institute for Creative Technologies (ICT), with funding from the Office of Naval research created Immersive VRET system used in this project. Initially based on recycling virtual assets built for the commercially successful X-Box game and tactical training simulation scenario, *Full Spectrum Warrior*, the *Virtual Iraq/Afghanistan* application consists of a series of virtual scenarios including middle-eastern themed city and desert road environments (Rizzo et al., 2013).



Various auditory stimuli are presented using the Wizard of Oz interface. While many of these stimuli have been taken from commercial sound effects collections, the latest version features a large number of ambient sounds that were recorded specifically for *Virtual Iraq/Afghanistan* throughout Baghdad, including M-4 fire, military banter, Humvees rattling along on bumpy roads, boots on gravel, locally-inflected Iraqi voices, Baghdad traffic, and indigenous birdsong (Rizzo et al., 2013). Clinicians



can utilize helicopter flyovers, bridge attacks, exploding vehicles and IED detonations.

Using off the shelf equipment, the minimum computing requirements for the current application is a Pentium 4 computer with 111 GB RAM, and a 128 MB DirectX 9-compatible 3D graphics card. Two computer monitors are required, one to display the clinician's interface and a second to display the actual simulation scenes that the user sees through the HMD. The user can navigate through the environment using gamepad or gun controller. The HMD is an *eMagin z800*, with displays capable of 800x600 resolution, a 40-degree diagonal field of view and a built-in head tracking system. Real-time 3D scenes are presented using Emergent's *Gamebryo* rendering engine. Olfactory stimuli are produced by *Enviroscent, Inc. Scent Palette*. Using 8 pressurized chambers and individualized scent cartridges, a series of fans and a small air compressor propel the customized scents to participants. Vibration is also used as an additional user sensory input, generated through the use of a *Logitech* force-feedback game control pad and an audio-tactile sound transducers located beneath the patient's floor platform and seat. (photograph of *Virtual Iraq* provided by Rizzo et al., 2013)

THE INTENSIVE (3 WEEK) TREATMENT PROGRAM

Why An Intensive Treatment Program?

A challenge for active duty military is that most available PTSD programs provide services, even efficacious services, once per week. Although interventions such as exposure therapy are very effective, a weekly schedule tends to draw out the intervention over a 3-5 month period of time. This may not be optimal for active duty personnel from either a therapeutic, cost, or feasibility perspective. From a therapeutic perspective, massed exposure sessions are as effective as spaced sessions, and exert that effect in a shorter period of time. From a cost perspective, a shorter intervention time, while retaining efficacy, could reduce medical costs, disability costs, and result in improved occupational productivity. However, from a feasibility perspective, many facilities still do not have cognitive-behavior therapists who are trained in exposure therapy, meaning that many individuals cannot access needed services. The availability of an intensive option, may allow individuals to travel from home to specialty centers for a short period of time in order to receive high quality, efficacious services.

17 Week versus 3 Week Implementation

The 17 week TMT program provides 29 sessions of treatment over 17 weeks. The three week TMT program provides the same 29 sessions in 15 days (Monday through Friday). In the three week program, treatment begins on Monday morning at 8:00 am. All veterans must arrive in Orlando and check into the hotel the Sunday before treatment begins. The treatment lasts for 3 weeks, Monday through Friday, with individual exposure therapy in the morning and group therapy (TMT) in the afternoon. For the group therapy component, there are 5 sessions of social skills training, 5 sessions of anger management, and 4 sessions of behavioral activation delivered as follows (see Table 2).

Table 2. Schedule of topics for group therapy component of 3 week TMT program

WEEK	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	Behavioral Activation	Social Skills	Anger Management	Social Skills	Anger Management
Week 2	Behavioral Activation	Social Skills	Anger Management	Social Skills	Anger Management
Week 3	Behavioral Activation	Social Skills	Anger Management	Behavioral Activation	PARTICIPANTS GO HOME

Programmed practice and group therapy assignments are completed in the evening and on weekends.

The clinical trial is ongoing and outcome data cannot be reported at this time. However, we are able to report on the acceptability and the feasibility of the trial as well as address issues and concerns that clinicians often raise about conducting treatment in such a compressed fashion. In some cases, we are able to compare these data to our 17 week program, which is typical in terms of session frequency and program length, in order to compare and contrast these two delivery modalities.

Recruitment

As a non-VA facility, our program recruits from a variety of community resources. In the three week program we recruit from all service branches. We receive referrals from military bases, warrior transition units, Vet Centers, and from clinicians who are aware of our treatment program. Recruitment is national in scope. Table 3 presents the number of individuals recruited to both our 3 week and 17 week programs and indicates that recruitment rates for the 3 week program are no different than the 17 week program.

Table 3. Recruitment into 3 week vs 17 week program

Program	Recruited
3 week program	
Year 01	31
Year 02	32
17 week program	
Year 01	30
Year 02	43
Year 03	26

Participation by Active Duty Service Members

As depicted in Table 4, participation in both programs is primarily by veterans, but more active duty participants are in the 3 week, than the 17 week program.

Table 4. Participation by Active Duty vs Veterans in 3 week (and 17 week) programs

Program	Active Duty	Non-Active Duty
3 week program	32.8%	67.2%
17 week program	19.8%	80.2%

Retention Rates

As indicated, out of 63 participants, there has been only one dropout from the 3 week program. There is a clear distinction in dropout rates for the two groups. Although the reasons for this difference are not yet fully determined, a number of individuals in the 17 week group cited changes in job status or the need to move to a different city for employment as a reason for leaving the program.

Table 5. Retention Across 3 week (and 17 week) program

Program	Recruited	Never Started	Dropped out	Percent Dropout
3 week program				2%
Year 01	31		1	
Year 02	32		0	
17 week program				32%
Year 01	30	3	9	
Year 02	43	18	13	
Year 03	26	7	1	

Is Virtual Reality Necessary/Appropriate?

It is important to note that the VR is not the therapy. VR could augment exposure therapy and make it more effective. However, the VR must faithfully capture the elements of the traumatic event or it is not therapeutic. In some cases, participants would tell us that the visuals were not accurate and actually interfered with their ability to successfully imagine the event. We collected data on the percentage of participants (n=64) who have thus far participated in the program and examined how many participated used each of the three different modalities. See Table 6.

Table 6. Percentage of Participants Who Used Components of Virtual Iraq/Afghanistan

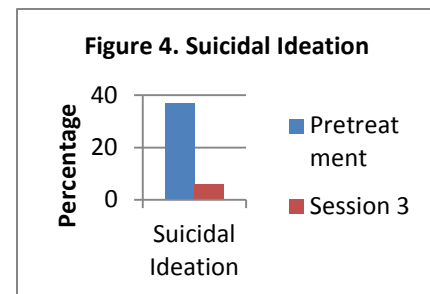
VR Modality	Percent Used in Treatment
Visual	17.2%
Sounds	96.9%
Odors	82.8%

These data suggest that the visual options available in the original Virtual Iraq/Afghanistan were not used for a significant percentage of the participants. This may have been due to the limited number of “scenes” in the original product and the fact that the participants insisted that viewing details of scenarios that were inconsistent with their trauma was “distracting” and interfered with their ability to immerse themselves in the event. The new version has 12 different and customizable scenarios, which would most likely result in an increased use of the visual elements.

Does Compressed Intervention Produce Negative Effects?

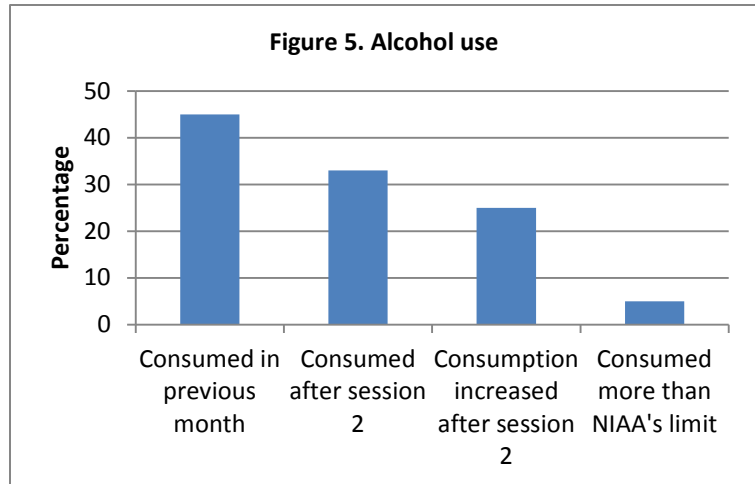
Many clinicians are hesitant to conduct exposure therapy because they believe it is too intense and participants may experience an exacerbation in symptoms. We addressed this issue and preliminary data are presented here.

Suicidal Ideation. Twenty-three out of 62 participants endorsed suicidal ideation in the month prior to treatment. Of these 23 individuals, 9 endorsed vague suicide-related thoughts such as “Life is not worth living,” 6 endorsed thoughts of wishing they were dead or having thoughts of possible death to self, 6 endorsed suicidal ideas or gestures, and 2 endorsed suicide attempts. For all individuals, a thorough risk assessment was conducted prior to each treatment session. Here we present data from session 3 (after exposure has begun). Out of 62 participants, only 4 endorsed the presence of any suicidal thoughts at sessions 3. All 4 individuals who endorsed suicidal thoughts during session 3 had endorsed suicidal thoughts during the month prior to treatment. Thus, onset of exposure therapy is not believed to have caused suicidal ideation for any participant (see Figure 4). Nineteen participants who endorsed any suicidal thoughts during the previous month denied suicidal thoughts during session 3. This is contrary to the belief that exposure therapy onset will worsen suicidal thoughts. Lastly, no participants endorsed any suicide attempts throughout the course of treatment.



Alcohol Use. Pre-treatment alcohol use data was available for 61 participants; 33 participants endorsed alcohol use in the 30 days prior to treatment. Number of standard drinks per month ranged from 0-248 (M = 22.07, SD = 42.33, Skew = 3.37). We transformed this to number of drinks per day during the month prior to beginning treatment (Range [0 to 8.27], M = 0.75, SD = 1.42, Skew = 3.29). Again session 3 data were used to assess increased alcohol use and data were available for 60 participants. Twenty out of 60 participants endorsed any alcohol use following their first exposure session (Range [0 to 7 standard drinks], M = 0.9, SD = 1.59, Skew = 1.97). Fifteen of 60 participants endorsed a greater number of drinks consumed following the first exposure session compared to the daily average number of drinks consumed during the following month. However, only 3 out of the 60 veterans consumed greater than 4 drinks (males) or 3 drinks (females), which is higher than the National Institute on Alcohol Abuse and Alcoholism (NIAAA) recommended drinking for individuals under age 65. Two of these 3 participants consumed higher amounts of alcohol compared to their pre-treatment average daily consumption, while 1 participant’s consumption was consistent with pre-treatment levels. See Figure 5.

In conclusion, if problematic alcohol consumption is defined as consuming a greater amount of alcohol than the NIAAA recommended amount, then 1 participant out of 60 demonstrated an onset of problematic alcohol consumption following the first exposure session. Thus, it does not appear that exposure therapy is associated with a problematic alcohol consumption onset for the vast majority of service personnel undergoing treatment for PTSD.



DISCUSSION AND FUTURE DIRECTIONS

There are many approaches to treating PTSD and they can be broadly categorized as pharmacological or psychological. Medications such as anti-depressants, anti-anxiety agents, sleep medications, and even a medication to decrease nightmares treat some of the symptoms of PTSD but none have been approved specifically for PTSD or recommended by the Institute of Medicine. Similarly various forms of therapy are offered to individuals seeking treatment for PTSD but only exposure therapy has been approved by the Institute of Medicine. Although the evidence remains stronger for civilian PTSD than combat-related PTSD, there are accumulating data (Rothbaum et al., 2014) that exposure therapy, either alone or as part of a multi-component treatment package such as TMT, is effective for combat trauma. Preliminary results from the TMT program indicate that it was efficacious with a very chronic and severe group of Vietnam veterans. Clinical impressions suggest that the program may be equally, if not even more, efficacious for OIF/OEF veterans. The results of the ongoing trial, as for several other ongoing trials at other universities, will not be available for several years.

Most of the programs follow a typical outpatient program with treatment sessions scheduled once or twice weekly. Our intensive, twice daily treatment program is quite unique and data indicate that the program is feasible and acceptable, results in a very low dropout rate, and does not produce negative “side effects” despite the intensive nature of the treatment program.

Virtual reality appears to be a useful addition to exposure therapy. Although the visual aspect of the first generation of Virtual Iraq/Afghanistan was used less frequently than smells or sounds, the newly released version provides clinicians with many more scenarios, which should address some of the concerns of participants, i.e., that the visuals were “not right”. Being able to engage all participants with this additional, and important, sensory modality will undoubtedly increase the utility of VR as a tool for enhancing treatment outcome. Combining simulation with an intensive, multicomponent treatment program, accessible to active duty as well as veterans, offers a viable and efficacious treatment for military personnel with combat-related PTSD.

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