



Getting Real about Post-Traumatic Stress Disorder in the Department of Defense: Augmenting Exposure Therapy through Virtual Reality

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ABSTRACT

Post-Traumatic Stress Disorder (PTSD) is a mental health condition that occurs after experiencing or witnessing a terrifying event. The condition may persist for months or years with symptoms such as intense nightmares, unwanted memories of the traumatic event, heightened reactions, anxiety, and depressive-mood periods. Conversations around PTSD among military members and veterans are ubiquitous, but integration of technologically advanced, evidence-based care is currently underleveraged. The need for treatment of PTSD in the United States armed forces is significant and growing. Since 2001, the US has deployed more than 2.7 million men and women to contingency operations in or supporting the wars in Iraq and Afghanistan. Availability of evidence-based care for all our veterans and servicemembers who need treatment is critical to enhance full-spectrum societal health and military readiness. Virtual reality aided exposure therapy is among the leading technologies that can offer dramatic enhancement of the effectiveness and availability of treatment of our men and women who have served—or continue to serve—in uniform. As the US ends two decades of deployment engagement in Afghanistan, we cannot forget how invisible wounds of war remain with the servicemembers. Virtual reality therapy should be leveraged to increase treatment quality and capacity of PTSD. The consequences of poorly or untreated PTSD produces deleterious effects on the armed forces and society at-large; virtual reality therapy creates an opportunity to minimize or reverse that effect.

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Figure 1 US Marine Gysgt. Carlos “OJ” Orjuela, age 31, Garmsir District, Helmand Province, Afghanistan, 2008.
Note: Photo Credit: Louie Palu.

Burning flesh, gunpowder, dirt, rotting garbage, and the unmistakable iron-rich bite of blood. Smells redolent of contemporary combat environments snake through the room. A roadside improvised explosive device (IED) explodes and overturns a convoy of armored vehicles, engulfing men and machines in a thick, black smoke and billowing flames. Beads of sweat bud and collect on the hairline of the young woman wearing a portable virtual reality headset as her clinician carefully observes her response.

“What would you rate your stress level, ma’am, on a scale of one to eight, if eight is the most distressed you’ve ever felt?” She manages to respond between short, belabored breaths, “Sev ... Seven. I’m dizzy. I think ... I think I’m gonna be sick.”

The military comprises an indispensable pillar of our national security, but the unique capabilities and skills of our men and women in uniform are cultivated and utilized at a cost: risk to life and limb. Post-traumatic stress disorder (PTSD) is a frequent topic of conversation and concern among military members and veterans, but missing from these conversations are the clinical advancements in technology that could mitigate the impact of PTSD. For some veterans and servicemembers suffering from PTSD, or the more generalized post-traumatic stress (PTS), exposure therapy augmented by virtual reality technology has paved their road to relief and recovery (Boeldt, 2019). For



Figure 2 Aftermath of a Roadside IED Explosion in Afghanistan.

Note: Many servicemembers experience traumatic stress linked to IED attacks. Photo Credit: Ahmad Nadeem, Reuters.

two continuous decades, our men and women in uniform have been returning home from Iraq and Afghanistan (see **Figure 1** above), the longest conflicts in American history. While the intensity and nature of fighting has evolved throughout that time period (see **Figure 2** above), one trend is certain: the demand for treatment of PTSD will persist. A host of reasons suggests that the demand for treatment may, on the contrary, increase (Reisman, 2016). As the definition of PTSD has broadened to contain not only direct traumatic experiences, but also learning of a traumatic event in which violent or accidental death threatened a close family member or friend, the number of people who meet the clinical threshold for PTSD is expected to steadily grow (American Psychiatric Association, 2013).

Moreover, if current destigmatization efforts are successful, it is likely that more servicemembers will self-report symptoms and seek treatment. Paired with those destigmatization efforts is a recognition of PTSD emanating *not just* from combat-related experiences. For non-combat traumas sustained at home or in deployed locations such as sexual assault, training accidents, and first responder situations (e.g., security forces or military firefighters), exposure therapy is often unavailable (Rauch, 2010).

Virtual reality exposure therapy (VRET) offers a cost-effective and timely way to increase treatment availability to the broad spectrum of traumas impacting military members. Eventually, all servicemembers—active duty, National Guard, and Reserve—will leave the military and join the veteran population. Failure to recognize and treat PTSD as early as possible results in an unwieldy problem for the US Department of Veterans Affairs (VA). As PTSD symptoms worsen and comorbidities develop, the VA will need robust and advanced treatment protocols to meet demand. Timely treatment, not the passage of time, is what our servicemembers and veterans need and deserve.

By the numbers, the need for treatment is significant. Since 2001, the US has deployed more than 2.7 million men and women to contingency operations in or supporting the wars in Iraq and Afghanistan. Between 2000 and 2015, the number of PTSD cases in the military totaled to over 138,000, not including the 40,000 cases that were not related to deployment (Ramchand et al., 2015). Not surprisingly, frequency and intensity of combat experiences influence the incidence of PTSD (Tanielian et al., 2008). This is reflected in the higher rate among Army infantry members that hovers between 10–20% (Post Traumatic Stress, 2020). Beyond the moral obligation to provide treatment for our servicemembers and veterans who suffer from PTSD symptoms as a result of duty-related experiences, the cost implications of untreated PTSD—or any mental health condition—creates serious cost ramifications that exacerbate over time.

The World Health Organization estimates that neuropsychiatric disorders, a category in which PTSD belongs, is the leading contributor to Disability-Adjusted Life Years (DALY) in the US, where a DALY represents the total number of years lost to illness, disability, or premature death within a given population (Ayuso-Mateos, 2000). Furthermore, neuropsychiatric disorders are responsible for nearly twice as many DALYs as cardiovascular disease and cancers. The financial impact to society in terms of lost productivity, unemployment, and early retirement is tremendous. However, broadening the aperture beyond a public health perspective to include the Department of Defense's (DoD) mission effectiveness as a function of the performance of its servicemembers, the costs are even more alarming.

The DoD's capability to operationalize the National Defense Strategy is directly dependent on the performance of its servicemembers (Mattis, 2018); across multiple cohorts of servicemembers, evidence strongly suggests that PTSD degrades performance (Scott, 2015). Despite the demographic differences across generations of servicemembers, each having contended with unique threats, PTSD symptoms have consistently produced adverse outcomes (Scott, 2015). Clinical studies have revealed a correlation between PTSD symptomology and degraded verbal memory, attention, and executive function (Vasterling et al., 2002). As we near the two-decade mark of overseas contingency operations, the population of servicemembers who will have trauma exposure from the current conflicts will continue to rise. The exact effects for these servicemembers will remain unknown for years to come, but the insight from historical clinical evidence is clear: making PTSD treatment available now, albeit imperfect, is far superior to no treatment (Zoellner et al., 2001). While the US is currently conducting a retrograde of its forces in Afghanistan, the invisible wounds of this war will remain with the men and women who fought it. Attention on the advancement and availability of treatment is still paramount.

At the University of Central Florida (UCF), behind a set of unassuming double doors on the second floor of the UCF psychology building, a team of talented clinicians guide veterans, active-duty servicemembers, and first-responders through an intensive, 3-week exposure therapy treatment protocol. In 2019, the DoD awarded the RESTORES team, led by Dr. Deborah Beidel, with a \$3 million US Army contract to further develop its novel virtual reality system (Miller, 2018). The system prototype, the Traumatic Event Scene Creation System that utilizes VRET, portends a major shift in how the DoD can approach the traumatic experiences of its servicemembers. Beyond just a virtual reality headset, VRET incorporates physiological response sensors and software that enables clinicians to tailor the virtual reality scene with nuanced, critical details.



Figure 3 Artistic Rendering of RESTORES' Virtual Reality Exposure Therapy (VRET) Experience.
 Note: Photo Credit: Larry Moore.

Across the country, at the University of Southern California's Institute for Creative Technologies, the pioneering BraveMind technology has immersed servicemembers in pre-built scenes to treat PTSD since the mid-2000s (Rizzo et al., 2010). BraveMind exposure therapy system continues to produce groundbreaking results, but its focus is caged on scenes that typify the current generation's combat experience: city and desert road environments in Iraq and Afghanistan. While BraveMind informs the foundational blueprint of the RESTORES' VRET prototype, Dr. Beidel stresses the novel feature of VRET that adds immense value—the ability to specify the placement and actions of people in the traumatic scene. Moreover, VRET is the first of its kind to include scenes that approximate experiences related to sexual assault, accidents, first response and second-hand trauma that civilian spouses or family members may suffer (Rizzo & Shilling, 2017). Clinicians, in conjunction with software engineers who steward VRET's digital infrastructure, can edit a baseline scene to reflect a patient's specific traumatic memory environment (see *Figure 3* above). As patient scenes gradually accumulate in the VRET database, the potential for implementing machine learning algorithms to quickly customize a scene for a patient will grow. With a growing body of patient scenes and recorded clinical observations, the use of artificial intelligence to make the scene more interactively dynamic also burgeons with possibility.

With its extensive potential, one might assume that the BraveMind treatment protocol is expensive and available only to a select few with ample financial resources (Rizzo et al., 2020). On the contrary, the virtual reality (VR)-aided exposure therapy treatment protocol, relative to other evidence-based practices, is inexpensive. The estimated cost of the VRET prototype to include the customizable software, multiple headsets, and audio equipment is \$5,000, whereas the 3-week intensive therapy protocol offered at RESTORES, whereby patients work with Master's-level or higher clinicians 5 days a week, 4–5 hours per day, carries a moderate price tag of \$7,000 (D. Beidel, personal communication, April 19, 2020). Sixty-six percent of veterans depart RESTORES, following the treatment protocol, no longer meeting the diagnostic criteria (Beidel et al., 2017). Dr. Beidel highlighted a vision of RESTORES to “do therapy differently,” specifically with respect to migrating away from the traditional model of one 50-minute session per week over several months, which can actually reactivate or agitate the trauma (D. Beidel, personal communication, April 19, 2020). With the RESTORES model, activation of that trauma is still possible, but it is addressed quickly via the daily treatment sessions and patients are ensconced in a system of continuous support and monitoring.

In discussion with Dr. Beidel, she highlighted several innovative aspects of her “do therapy differently” approach to treating PTSD (D. Beidel, personal communication, April

19, 2020). First, she pointed out that the VR is *not* the treatment; rather, it is used to make the exposure therapy treatment more powerful. This obviates the need to rely on someone's imagination to recall the sights, sounds, and smells of the traumatic event. VR allows the patient to experience the event, taking away any concerns about whether the patient can effectively use imagination. In effect, VR is a treatment enhancer, making exposure therapy stronger.

Second, when deciding to implement this intensive treatment, members in the mental health community raised concerns about the potential negative effects of such an intensive approach, specifically increased suicidal ideation/attempts and increased substance use. The program tracked these behaviors at every visit. Across the 102 patients in the initial trial, there were no increased instances of suicidal ideation or intent or any increased substance use (Beidel et al., 2017). Third, exposure treatment programs, and treatment for PTSD in general, is plagued by high drop-out rates (in the VA system, averaging 28% and going as high as 40%; Hoge, 2017). The drop-out rate in the Intensive Outpatient Program (IOP) was 2% with a relapse rate (assessed at 6 months post treatment) of 1%. It is unclear if these impressive statistics are due to the intensive nature of the IOP format, the use of VR, or a combination, but Dr. Beidel's future studies aim to identify the relative impact of these important factors (Beidel et al., 2017).

Monitoring the potential negative impact of treatments, such as increased suicidal ideation or increased substance use, highlights the importance of considering medical ethics when new treatments are introduced. In addition to monitoring the emergence of negative behaviors, other issues that sometimes arise include the concern that exposure therapists are trying to reduce anxiety around traumatic events such as sexual assault. They misunderstand the goal of the therapy—it is not to make someone comfortable being sexually assaulted. However, if part of the assault involved a particular sight, sound, or smell—let's say the smell of whiskey—and now every time and anywhere the survivor smells whiskey she has a panic attack and flees the situation, then that is a problem. Because of the trauma, whiskey has now become a signal for danger and a sexual assault. The goal of exposure therapy is to remove that connection of whiskey signaling danger. The goal of treatment is that the survivor no longer has a panic attack or avoids social situations where there might be whiskey. Yes, once whiskey was part of a horrific event, but the survivor now understands that not every time whiskey is present, she will be assaulted.

Another concern Dr. Beidel has addressed about exposure therapy is the claim that treatment can make someone's symptoms worse, rather than better (D. Beidel,

personal communication, April 19, 2020). She admitted this is possible when therapists are not sufficiently trained in exposure therapy or they end a session prematurely. The idea of exposure therapy is to put the person in contact with the cues that trigger their anxiety and keep them in touch until their anxiety is reduced. If, for whatever reason, the patient or therapist is unwilling to continue the treatment sessions until that anxiety reduction occurs (and it will), the patient may experience a worsening of their condition. Dr. Beidel also noted that another reason that patients may experience worsening symptoms as a result of exposure therapy is that the sessions are spaced too far apart for reducing the power of those triggers. Think of this like a wildfire—if you are trying to put out the flames with a garden hose (weekly or month exposure therapy sessions) you will have a hard time getting control of the fire and putting it out—it is possible, but it will not be easy. On the other hand, if you use water cannons and even airplanes to drop water and flame retardant (daily treatment sessions), you more quickly get control over the wildfire, which likely leads to people having confidence in the treatment. Patients begin to see results after a few days—they do not have to wait for months (D. Beidel, personal communication, April 19, 2020).

In the conventional medical lexicon, a treatment's success ultimately distills to a single word—*cure*, which implies an end-state return to health or absence of disease. For PTS, the cure is not so black-and-white, but rather a reduction of functional impairment. If a servicemember is no longer suffering from impairment to the point that they can regain the ability to function in daily life, the treatment is effective (Watkins et al., 2018). The longer a patient retains this ability to function (and eventually thrive) in daily life, the more cost-effective the treatment (Ramchand et al., 2015). Considering the economic and societal value of a servicemember's return to the workforce, participation in family life, and improved health trajectory, both mental and physical—the costs of treatment, relative to savings, grow increasingly paltry. Prioritizing the recovery of servicemembers suffering from PTS demands that we ensure they do not drift to the sidelines of society. According to Dr. Beidel, "We have to get people to stop thinking you're broken ... rather, you're changed forever" (D. Beidel, personal communication, April 19, 2020).

What makes this treatment program uniquely valuable and effective? The answer lies squarely in the capacity to customize VR scenes to aid both the clinician and patient in pinpointing the traumatic stressor(s). The feeling of realness to the patient is a critical factor in accessing the source of the traumatic trigger and its associated, debilitating stress. The construction of a customized VR scene makes it less likely to overlook meaningful nuances or seemingly innocuous sensory experiences that can galvanize a major

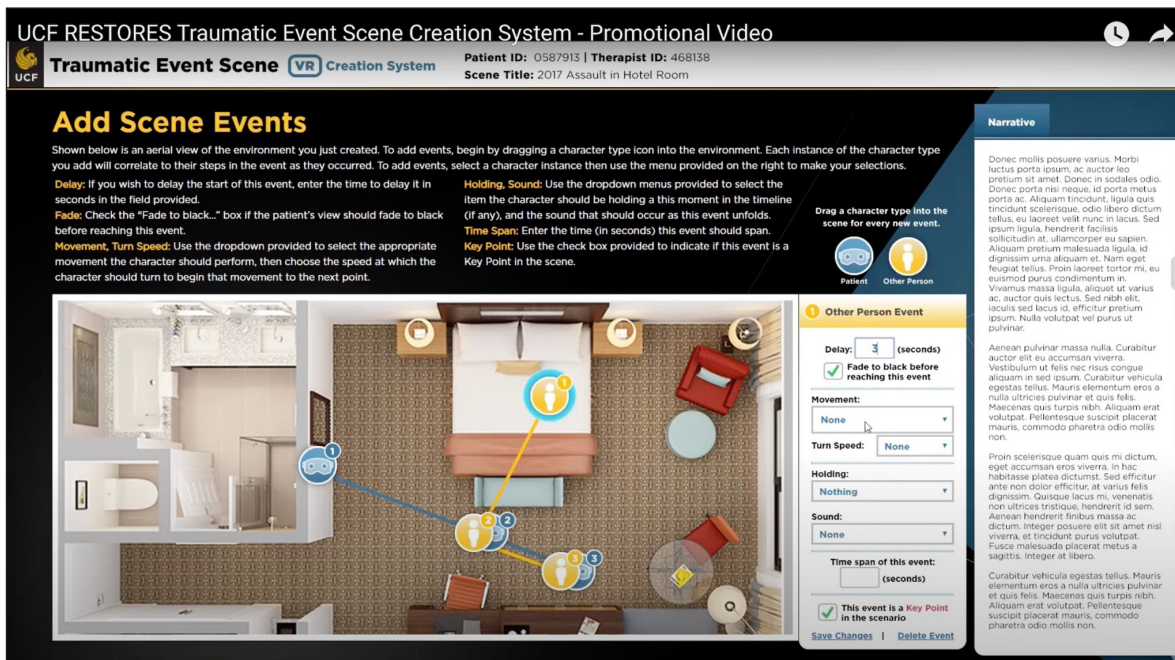


Figure 4 UCF RESTORES Virtual Reality Software, Example of a Customizable Scene.
 Note: Photo Credit: Dr. Deborah Beidel, UCF Restores.

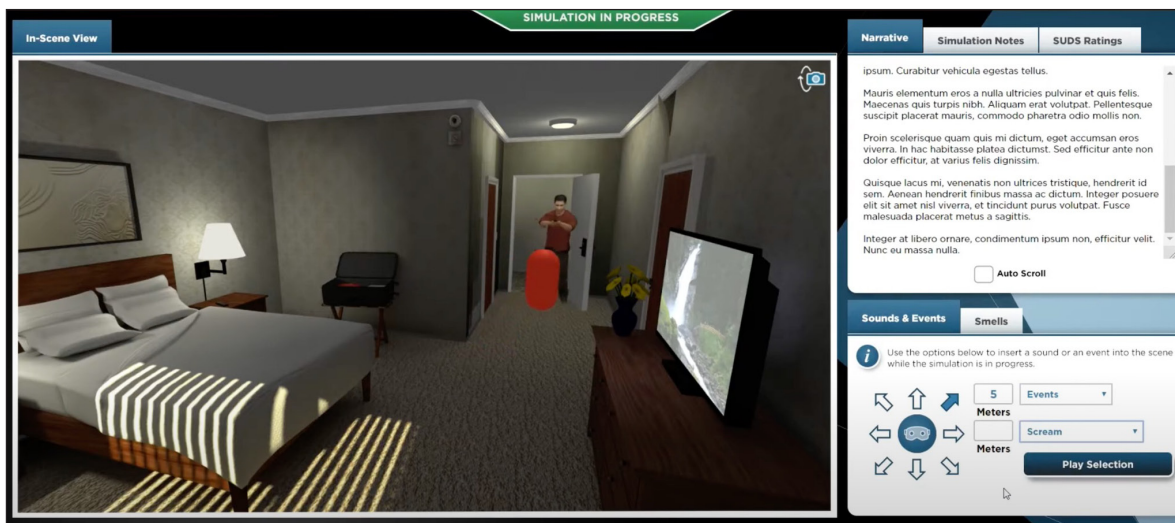


Figure 5 Customizing Scene Details and Updating of Patient Narrative.
 Note; Photo Credit: Dr. Deborah Beidel, UCF Restores.

stress response (see **Figures 4** and **5** below). Creating realness hinges on details, demonstrated in one Army veteran’s difficulty in connecting with a scene because his fellow soldiers were wearing Marine uniforms. VR not only allows for quick identification of these oversights, but it can also correct them.

Beyond the visual element, recreation of aural and scent cues enlivens the VR scene with significant features of memory. The bright, blinking glow of a ringing cell phone or the incessant cacophony of text message chimes are oft-cited as traumatic stressors for

first responders at mass shootings (D. Beidel, personal communication, April 19, 2020). While the pungent nose-tickle of a magic marker conjures a childhood recollection for the average person, for first responders that smell is often an olfactory igniter of traumatic memories tagging bodies for bagging in a mass casualty situation. As Dr. Beidel noted, the hardwired connections from the olfactory bulb to the amygdala and hippocampus that govern our emotions and memory respectively, form a “fourway highway, no turns, off-ramps or intersections that would allow the information to be degraded on its

way to forming a memory. The result is the processing of a very powerful and very emotional memory” (D. Beidel, personal communication, April 19, 2020). Exposure therapy with the aid of interactive, multisensory VR provides a vehicle to a comprehensive experience of the traumatic stressor.

Once the traumatic stressor(s) have been identified and depicted in the scene (see **Figure 6** above), the clinician has the difficult task of tracking if the patient’s stress response is truly abating. As the patient immerses in the VR scene, the clinician can observe and monitor both the subjective *and* objective measures of stress. While traditional exposure therapy relies heavily on the

patient’s self-reported and inherently subjective stress level, RESTORES has incorporated objective, physiological data such as heart rate and skin conductance sensors (not unlike those used in polygraph machines) to measure a patient’s stress response (see **Figure 7** below). The side-by-side comparison of the patient’s self-reported stress and objective physiological data points strongly to whether the VR scene is accurate, and by extension, a useful, targeted treatment tool. Irrespective of the patient’s self-reported stress levels, if physiological measures do not vary, that may suggest to the clinician that the VR scene does not conjure the traumatic event with sufficient verisimilitude (Beidel et al., 2017).

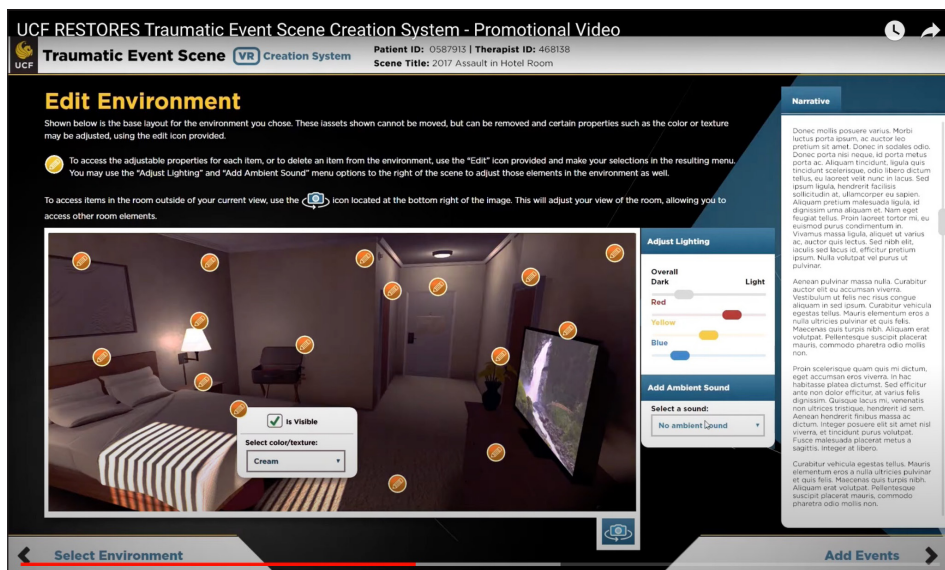


Figure 6 Software Allows Clinicians to Pinpoint Scene Segments that Produce Most Significant Stress Response.
 Note: Photo Credit: Dr. Deborah Beidel, UCF Restores.

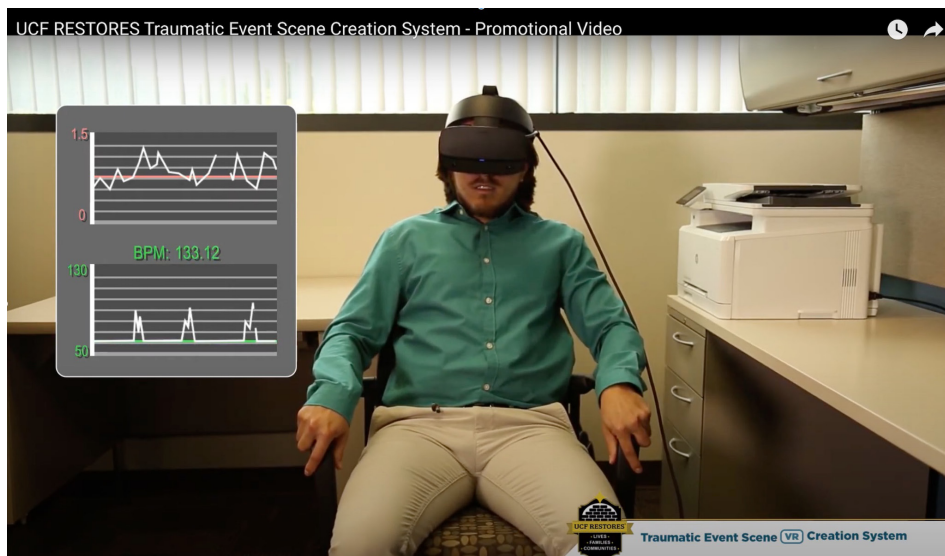


Figure 7 Heart Rate and Skin Conductance Monitored as the Patient Immerses in Scene.
 Note: Photo Credit: Dr. Deborah Beidel, UCF Restores.

Because VR scenes offer a portal into a shared representation, clinicians can rectify scenes that are not approximating reality for the patient. When a patient's physiological stress markers do spike, the data can suggest the part of the scene that aggravates the patient's stress response. For individuals accustomed to encountering and managing high levels of stress, perceived stress level may vary significantly from physiological stress. The ability to monitor physiological response along the timeline of a traumatic scene gives clinicians the unprecedented opportunity to track if stress is attenuating. Only with the use of VR does a clinician have the opportunity to see what the patient sees, study the components, and potentially modify the scene to home in precisely on the traumatic triggers (Maples-Keller et al., 2017).

Heart rate and skin conductance unveil a sphere of information previously unavailable to the clinician about the patient's experience, reducing overreliance on patient-described distress and broadening the scope of clinical assessment beyond the traditional format (van't Wout et al., 2017). Examining current best practices in the treatment of PTSD such as exposure therapy and eye movement desensitization and reprocessing (EMDR), disconnects between the clinician, patient, and the traumatic stressor are difficult to identify and resolve as the patient relies on memory and depicts fragments verbally. VRET not only provides a tool for clinicians to navigate the landscape of a patient's traumatic stressor, but it also equips them with the capability to measure with more specificity, document with more detail and iteratively learn from the patient's response (Costanzo et al., 2014).

VRET fosters a potent blend of patient narrative, empirical data, and VR stimuli. Why, then, should servicemembers wait until retirement, medical discharge, or even their return from deployment to receive treatment that can alleviate or at least ameliorate the negative health outcomes of traumatic stress? The rapidly growing sector of portable VR can shorten—or possibly altogether end—that agonizing wait. A technology that can be employed and maintained remotely confers immense benefit. Specifically in the case of Forward Operating Bases (FOBs), the value of remote VR therapy cannot be overstated. When servicemembers experience a traumatic event while deployed, portable VR therapy provides the opportunity to address and potentially dramatically curtail long-term stress through timely treatment. If a soldier had a stress fracture, would a doctor send him back on his feet and worsen the injury until it eventually resulted in potentially permanent damage like a bone break?

The answer is an unequivocal no. This attitude of proactive identification and rehabilitation must be mirrored in the sphere of mental health. Both traumatic

and chronic stress are inevitable byproducts of the jobs servicemembers perform and the environments into which they are embedded. Ignoring or delaying treatment only increases the likelihood of an acute stress episode that can remove a servicemember from the deployed environment altogether. For conditions of a more physical nature, problems are matched with a fix: an orthopedic injury requires a methodical protocol for recovery. For traumatic stress, with its often insidious onset and devastating consequences, the same attitude is not present. From a readiness perspective, this conclusion should be avoided at all costs, as the servicemember is no longer able to perform their duties, which are then redistributed to their organization.

When a servicemember requires treatment for PTS (either by request or medical recommendation), portable VR therapy could allow for a brief but intensive treatment protocol similar to the one employed at UCF RESTORES. Three continuous weeks of treatment at a FOB affords the servicemember the chance to realign and rehabilitate, enhancing readiness and performance for the remainder of their deployed duty. Another advantage of portable VR therapy is decreased on-site clinical personnel support. Rather than rely strictly on mental healthcare providers who are in high demand and short supply in a deployed environment, technologies like BraveMind or UCF's software can link servicemembers to clinical providers who, while not collocated, can guide the exposure therapy session through the portable VR headset. These VR-based protocols lend to computer-based training modules that teach clinicians how to use the software. When in-person treatment is not possible, VRET offers the flexibility for clinicians to apply the protocol remotely. Telemedicine, specifically in the field of mental health, has been growing at an increasingly rapid rate for years, most drastically in the past year. As the pandemic relegated much of non-emergency healthcare onto phones and computers, perceptions on how healthcare can be provided has changed. The military has a rare chance to capitalize on this change in mindset to benefit its servicemembers while also embracing portable VR in its earlier stages of scaled commercialization.

The implementation of portable VR is not a faraway goal requiring exorbitant monetary and time investment—commercial off-the-shelf (COTS) products are available for purchase and programming now. Joe Connelly, Chief of Product at Sketchbox, a leading portable VR company with headquarters in the Bay Area, estimated the price point for each portable headset hovers around \$400 and is expected to remain at that point for the foreseeable future, "The reason portable VR is so cheap is because they are based on the same components as a modern-day cell phone" (J. Connelly, personal communication, May 15, 2020).

When discussing the feasibility of customizing portable VR headsets for the exposure therapy, he envisioned the building of a database similar to that of BraveMind, “We would start by categorizing data into different vignettes, the ones that affect the most people. There is no reason we couldn’t develop that” (J. Connelly, personal communication, May 15, 2020).

Although desktop-based VR sets offer a more robust graphic processing unit and higher computing power, the associated drawbacks are higher cost, software maintenance, and the obvious limitations imposed by permanent stationing of the equipment (Connelly, 2020; Park et al., 2019). Portable VR headsets provide a more economical route to creating a diffuse, flexible infrastructure of remotely conducted exposure therapy. Notionally, the process from traumatic exposure in a deployed environment to treatment protocol is simple and capitalizes on everyday technology: an application that uses phone video function enables face-to-face consultation, the servicemember describes their experience, the clinician selects a scene that most closely approximates the experience, and can control and view the video feed that is ported in from the servicemember’s headset.

Like the iPhone in its first iteration, portable VR has positively disrupted its industry, but significant, rapid improvement is on the horizon. For example, pupil tracking technology, which captures the exact trajectory of the wearer’s eyes, can aid clinicians in determining the point(s) of the traumatic scene on which the servicemember focuses most or where stress spiked most significantly. To scale the distribution and use of portable VR headsets for deployed servicemembers, enterprise tools such as user accounts, dashboard sites, and technical support can smooth the implementation process and long-term HIPAA-sensitive data management.

Currently, the DoD is balancing an unprecedented set of threats and crises. Thrust into a state of deep uncertainty, the COVID-19 global pandemic forced the military into responses ranging from reactionary damage control to desperate triage. Communities near and far have reevaluated what really constitutes “normal,” how we define a best practice, and most importantly, where our blind spots lurk. Quarantine measures highlighted a particular deficiency—mental health problems are exacerbating when servicemembers are isolated. As many servicemembers continue work from home on a regular basis, access to vital mental health resources must pivot away from traditional face-to-face formats (Czeisler et al., 2020). As the country continues to cautiously return to in-person work environments, the potential for future widespread and abrupt quarantine to curb virus transmission must enter our planning

frameworks. Preparation for these scenarios is critical to the provision of effective and timely mental health treatment.

The abrupt changes to the rhythms and routines of our lives through the pandemic continue to reveal areas in which we can improve. VR-aided therapy for PTSD is a prime example of how we can leverage technology to increase high-quality treatment access and quality without prohibitive cost consequences. Importantly, the cost of treating PTSD, however, must be compared with the cost of not treating PTSD. To quantify the value of quality of life—and life itself—is a fraught and complex calculus, but one that cannot go understated when assessing the need for PTSD treatment. While we cannot draw a causal relationship between PTSD and suicide, studies suggest that PTSD contributes to suicide risk (Fox et al., 2021).

This is particularly alarming when one considers the recent trends in military suicides. Since 2010, 65,000 veterans have died by suicide, which is more than the total number of deaths from combat during the Vietnam War and the operations in Iraq and Afghanistan combined (White House, 2021). Looking strictly at servicemembers who served after 9/11, 30,177 active duty personnel and veterans have died by suicide, approximately four times the 7,057 who died in combat (Suitt, 2021). In 2020, 580 active duty members died by suicide. This represents a significant increase; in 2015, the active duty suicide rate was 20.2 per 100,000 compared to the 28.7 per 100,000 observed in 2020 (DoD, 2020). With human life on the line, expansion of this PTSD treatment that may prevent or mitigate suicide demands urgent and thorough exploration.

Today for those servicemembers and veterans who carry untreated trauma, the need for treatment has never been more urgent. Portable VR technology offers a viable alternative to deliver exposure therapy to more of our servicemembers. Our nation’s security relies on the leadership and service of men and women who are willing to put themselves in harm’s way. They deserve healthcare today that recognizes their sacrifices, alleviates trauma of the past, and safeguards hope for the future.

COMPETING INTERESTS

The authors have no competing interests to declare.

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