From Disturbing Reality To Virtual Reality

Doctors use VR therapy to help patients with PTSD confront their demons.

By Ann P. Knabe, Associate Editor

The Soldier's convoy rolls along a dusty desert road. Suddenly, an improvised explosive device (IED) goes off and gunfire breaks out in a haze of smoke. The young man's heart races and he gasps for breath, adrenaline pumping through his body. Flight or fight kicks in, and it's all about survival.

The scene could be right out of the alleyways in Iraq. Or it could be the mountains of Afghanistan. But it's actually virtual reality replicating the sights, sounds, and tactile sensations of combat in those places, and it is one of the new technologies being used—often integrated into cognitive behavioral therapy—to treat post-traumatic stress disorder (PTSD) among servicemembers returning from the wars in Iraq and Afghanistan.

The term *virtual reality* (VR) refers to computer-simulated environments; the technology itself has been around for years and is most popularly used in entertainment applications, such as video games. VR therapy most often uses visual displays to re-create experiences, but more sophisticated systems use sound and haptics (tactile or touch) sensations.

"What happens in people with PTSD is they have fragmented memories, and by reliving them, they can reconstitute," said Dr. Mark Wiederhold, an internal medicine specialist with extensive experience in critical care medicine who has partnered with the Naval Medical Center at Camp Pendleton, Calif., and the Navy Medical Center in San Diego to help treat veterans with PTSD. "And you can teach them skills to help them deal with a stressful event. But VR is only one tool in the process," he said. "It does not replace good clinical therapy."

The tool has been used to treat veterans with PTSD at the Madigan Army Medical Center at Fort Lewis, Wash., since 2005. However, clinics such as the Virtual Reality Medical Center with offices in Los Angeles, San Diego, and Orlando have been using VR to treat PTSD associated with nonmilitary trauma for more than 15 years. Today, the popularity of VR in treating PTSD continues to increase as scientific clinical trials show positive results.

Dr. Wiederhold works in close collaboration with ROA Life Member Dr. Dennis Wood, a retired Navy captain and board-certified clinical psychologist who served on the USS *Constellation* in 2001 and again October 2002 to May 2003. Last year, the two doctors conducted the first randomized controlled clinical study using VR to treat PTSD in servicemembers. The study posted an 80 percent success rate among Iraq and Afghanistan veterans. The doctors' success is expected to be published in the *Journal of Traumatic Stress* later this year.

SRA RENAE KLECKNER/U.S. AIR FORCE

SrA Joseph Vargas, USAF, a pharmacy technician with the 779th Medical Support Squadron, uses the Virtual Iraq program at Malcolm Grow Medical Center's Virtually Better training site at Andrews AFB, Md. The 79th Medical Wing is one of eight wings that uses this technology to treat patients suffering from post-traumatic stress disorder.

Not a Game

"Don't be confused with entertainment when we say 'virtual reality.' It's no game," said Dr. Wiederhold. "We have fully developed virtually reality simulations which were developed based on feedback and focus groups of active duty members. Our visual animations are created by former military members at an art school. They have served overseas with the Marines, Navy, and Army. We knew we needed to work with these people to create a level of realism and relevance to our patients' military experiences."

The treatment process takes time. At the Virtual Reality Medical Center, patients first complete thorough evaluations and interviews by specialists to determine if they are an ideal candidate. Patients who participate in VR therapy are completely immersed in a 360-degree environment simulating the conditions they were exposed to in Iraq or Afghanistan. The immersion includes interactive sensory stimuli: sound, visuals, smells, and temperature. Even the vibration of a tank rolling in a convoy can be simulated, as can a busy street market in Baghdad.

"It's extremely immersive," said Dr. Wiederhold. "We bring them back to their experiences, whether it was a convoy, gunfire, base camp, or village. But the real key is the skill of the therapist using these virtual reality tools. And if there's an aspect of

the environment that's not present in our simulations, the patient and therapist can talk about it."

While the VR treatment used at the Virtual Reality Medical Center and Navy Medical Center in San Diego and Navy Hospital at Camp Pendleton is multifaceted, drawing upon the principles of cognitive behavioral and experimental therapies, veteran patients get a bonus when working with Dr. Wood. "They naturally feel a connection with Dennis," said Dr. Wiederhold. "They know he has a military background and can appreciate what they've been through."

Dr. Wood retired from the Navy in 2005 after 34 years of service, of which 22 were in the Reserve. He has been working with Dr. Wiederhold out of the Office of Naval Research since he left the military. In March of 2006, he used VR on his first war veteran with PTSD.

"Our first veteran earned a Purple Heart during an IED attack," Dr. Wood said. "He went through a lot, but he had a very good outcome after integrating virtual reality into his therapy sessions." Since then, Dr. Wood has conducted more than 350 VR sessions with Iraq and Afghanistan veterans, with 32 patients completing the program.

LINSEY PIZZULO/NATIONAL INTREPID CENTER OF EXCELLENCE

LCDR Jena McLellan, USN, a clinical trials coordinator with the National Intrepid Center of Excellence at Bethesda, Md., demonstrates the center's Computer-Assisted Rehabilitation Environment virtual reality system.

Success depends on getting servicemembers beyond the stigma associated with psychotherapy, Dr. Wood said. "In the exposure therapy we use, patients tell me their stories, and we share our military experiences. They are generally more receptive to virtual reality [than traditional talk therapy]."

In Hoffman Estates, Ill., Dr. Patrick McGrath is also exploring VR for PTSD treatment at Alexian Brothers Veterans Center. "I saw a virtual demonstration at a conference a couple of years ago and was impressed," said Dr. McGrath, who specializes in treating anxiety and obsessive compulsive disorders. "We've been using virtual reality for about 15 months now."

Dr. McGrath said the success rate at the clinic is difficult to assess because his sample size of patients using the therapy is small. But his patients' case studies show promise. "We have Soldiers who are no longer drinking or using drugs," he said. "They are holding jobs and are being able to maintain relationships."

Fear of a Memory

The VR treatment at Alexian Village consists first of learning what a particular Soldier has been through. The staff then creates a hierarchy of the individual's fears, ranking them from low to high. "We start with the low-level fears first and the Soldiers habituate to them," explained Dr. McGrath. "Habituate means that the veteran stays in the simulated feared situation without trying to avoid it or distract from it, and the Soldier learns that by doing this, the anxiety will actually decrease over time." By doing the simulations over and over, the patients soon realize that the scenarios, which are a reflection of their nightmares and flashbacks, are not going to harm them.

"PTSD is a fear of a memory," said Dr. McGrath. "Whether it's nightmares, flashbacks, turning to alcohol or drugs, or any other behavior interfering with their lives, we are committed to assisting returning veterans in finding balance in their lives and becoming the people they were prior to deployment."

Dr. Wiederhold says that PTSD in the military differs from PTSD in the general population. "In the military, our servicemembers experience prolonged exposure to a variety of events. The standard therapy for people who have experienced a single incident is not very successful."

Patients at the Virtual Reality Medical Center usually participate in 20 sessions, but some patient cases require up to 40 sessions. About half the patients have mild traumatic brain injury, and others have serious wounds. Patients often have complex issues, necessitating a comprehensive program to treat them. Some patients who worked in the medical field have had to deal with the aftermath of these war scenarios. Other patients may have witnessed civilians or children injured or blown up. As expected, servicemember reactions to the stresses vary a great deal.

Under Dr. Wiederhold's care, once the patients are "brought back" to their experiences in Iraq and Afghanistan, therapists monitor patient heart rates, breathing, blood pressure, and other reactions to the stimuli. The goal is to get the patients to an appropriate level of physiological arousal, and it differs in each individual.

Meanwhile, doctors like Dr. Wiederhold, Dr. Wood, and Dr. McGrath are working closely with Veterans Affairs to implement virtual reality therapies into their daily practice. "We're hoping to integrate this treatment into standard practice at military hospitals," said Dr. Wiederhold. "And maybe, down the road, we can use the Internet to allow therapists across the country to use virtual reality technologies in their own offices."