

Military studies virtual reality as therapy for post traumatic stress disorder

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SAN DIEGO - On a stretch of desert highway in Iraq, an American convoy has just come under fire. The sounds of automatic weapons and whizzing bullets are quickly buried by the blast of a roadside bomb. Smoke rolls out across the road obscuring the view through a windshield already punctured by a gunshot. A helicopter rattles by overhead and in the passenger seat of the lead Humvee, a wounded soldier writhes in pain.

But none of this is real.

The "attack" is a software simulation, a virtual-reality scenario designed to re-immense combat veterans with post traumatic stress disorder into an environment filled with the same kind of stimuli responsible for their condition.

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U.S. Navy Cmdr. Scott L. Johnston, Ph.D., director of clinical research for mental health at the Naval Medical Center San Diego, says he hopes virtual reality can help treat veterans returning from Iraq and Afghanistan with post traumatic stress disorder.

"We can also make it day or night, or change the weather," says Naval Cmdr. Scott L. Johnston, as he clicks across a menu on a computer screen that also shows the battle scene and billowing smoke from the programmed explosion.

Making Marines and soldiers re-experience their wartime traumas to help them heal may seem counterintuitive. But the virtual reality therapy being used at the Naval Medical Center here is designed to do just that. And it seems to be working.

Nearing the end of a three-year study, Johnston, a clinical psychologist and the director of clinical research for mental health, says nine out of 10 subjects receiving the therapy showed reduced levels of anxiety and eight had a complete remission of post traumatic stress symptoms.

Johnson is encouraged by the results and hopes it will be an added tool for mental health specialists involved in treating those returning from Iraq and Afghanistan. A recent study by the Rand Corp. estimated that as many as 300,000 service personnel have been affected to some degree by post traumatic stress.

Disorder Not New

The condition can be triggered by any trauma such as rape or physical abuse, but it is often associated with combat veterans. While it emerged under its current name from the battle scars of the Vietnam War, it was previously referred to as battle fatigue or shell shock. It was recognized as far back as the Civil War, when it was called soldier's heart. The disorder's symptoms include flashbacks of the trauma, night terrors and unexplained anger.

Until recently, treatment has been limited primarily to traditional talking therapies and medication. Patients are encouraged to face their fears and come to terms with them. Now new strategies are emerging.

Prolonged exposure therapy requires patients to listen repeatedly to tape recordings of their own recounting of their battlefield experiences, as well as exposing themselves to anxiety-inducing environments such as highway driving or crowded shopping centers.

Eye movement desensitization and reprocessing uses a combination of spoken memories, directed eye movement and relaxation techniques to help the brain reprocess traumatic experiences.

One researcher is even investigating using the drug ecstasy, and the feelings of trust it often engenders, to help patients face their trauma.

Researchers and therapists at New York's Weill Cornell Medical Center used virtual-reality therapy after the terrorist attacks of 9/11 to help survivors with post traumatic stress deal with their symptoms. In 2005, the Navy commissioned the first studies to determine the efficacy of the treatment for combat personnel.

Because his study is still under way, Johnston said those undergoing the therapy were not available to be interviewed. The symptoms can be serious.

Andy Grow is a Vietnam veteran who lives in Desert Hot Springs. He is on full disability because of his post traumatic symptoms, which he says ruined his marriages and led him into alcohol and drug addictions, from which he is recovering.

"I'm really screwed up mentally," Grow said. "I've got a lot of anger."

Grow is in ongoing group therapy for his post traumatic stress and said, "I am much, much better than when I came home." But he is still struggling more than 40 years later.

Subjects in the current study wear a headset that projects a video image on a lens for each eye, creating a three-dimensional image. A separate set of headphones provides sounds such as the rumble of the Humvee's engine, explosions and the cries of Marines. Because they are in a virtual environment, as subjects turn their heads, the computer generated scene changes accordingly. For instance, they can look to the right and see the virtual Marine sitting in the seat next to them.

'Call of Duty'

Johnston knows how quickly the visuals can induce a response, not just from watching the study subjects, but also from his own experience. He was embedded with a combat group in Ramadi. He was surprised to find that after coming in from patrol, Marines would often sit down and play "Call of Duty" and other combat video games.

Using the same kind of medium for therapy, he said, "may be a more comfortable modality for them."

Johnston had to make his own adjustments after returning from Iraq. He was reluctant to go into details, but said he returned from the war a changed person. Running the virtual-reality program for others, he said, brought on a certain anxiety for him.

"When I first sat down with it," he said, "it definitely brought back some experiences."

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The virtual-reality equipment for post-traumatic stress disorder can simulate combat situations that the clinician controls.

He can thank Albert "Skip" Rizzo for that. Rizzo is with USC's Institute for Creative Technologies and studies the possible therapeutic applications of virtual reality. He began using video programs in the 1990s to treat brain-injured patients and designed the software Johnston uses.

In 2003, he says, he ran across a battle simulation game that the Army had helped develop. He knew that exposure therapies had been shown to work for trauma cases.

"I said why not take this and modify this and use it as a virtual Iraq for people that come back from the war with PTSD?" Rizzo said.

The idea is to allow patients to gradually confront their trauma through a series of increasingly intense scenarios in the safety of a clinical setting. He developed three scenarios, a sniper situation, a market place and the convoy on the highway.

"You can start off just driving through the desert and it looks like Arizona," Rizzo said. "The clinician is kind of the Wizard of Oz and he can make things happen."

Patients are monitored on biofeedback equipment that measures their sweat response, heart rate and respiration. The clinician can gradually introduce elements such as enemy fire and roadside bombs.

"You can get attacked and the guy sitting next to you can get wounded in his arm," said Rizzo. "You can set the trauma level on high and the guy slumps over and it's pretty dramatic. As they face it and confront it and narrate their story, it seems to sort of dislodge the blockage, so to speak. They can share things they went through."

And in so doing, come to terms with the experience.

As the program has developed, the simulation has become more real. Soldiers in the field are never without their M-16s, so instead of a standard game control, Rizzo incorporated the toggle switches and buttons into a fully weighted model of the gun.

"We have a smell machine that puffs out stuff like gasoline, or burning rubber," he said. He also added a chair that vibrates from the explosions. "We have this multi-sensory approach."

More Studies

While the San Diego study is unique, it is not the only one. Sara Miyahira, a research psychologist with the Veterans Affairs Hospital in Honolulu, is also trying to determine how effective virtual-reality therapy might be. Her software is different, but the study she has been engaged with for the past three years is similar to Johnston's.

Miyahira said she doesn't expect to have publishable data until the end of this year.

"I think it has very high potential," Miyahira said. "One of the things we were surprised about was the response we got from the soldiers."

With exposure to even a very generic desert environment, she said, "we get comments like, 'This really takes me back.' It helps them to access their memories of the event."

Those memories, she said, are the key to recovery. Often memories are repressed and, as a result, have been altered by the patient.

"Part of the therapy is to help them reconstruct the memories in the actual way it happened," Miyahira said. "We're helping them to put things in a time sequence so they have a better idea of what the reality was."

While initial results are encouraging, she said, she echoes Johnston in saying more research is needed to understand how and why the therapy works.

"What we really need to do is establish a base of evidence," she said. But "because it holds such promise in getting people into working on their trauma, I think it should be explored."

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POST TRAUMATIC STRESS

Troops deployed to Iraq and Afghanistan:

1.6 million

Iraq and Afghanistan veterans expected to be affected to some degree by post traumatic stress:

300,000

Military personnel to serve in Vietnam War:

3.1 million

Vietnam veterans afflicted with some form of post traumatic stress disorder:

830,000

Sources: 2008 Rand Corp report "Invisible Wounds of War," 1990 National Vietnam Veterans Readjustment Study

ON THE WEB

[More about the Rand Corp.'s study of post traumatic stress among Iraq and Afghanistan combat veterans.](#)