

Virtual Reality a Game Changer for Psychiatry

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SAN DIEGO, California — Children with autism learn to recognize when their mom is angry or sad. Traumatized veterans develop skills to deal with their flashbacks. Patients forget their intractable pain.

All this is thanks to virtual reality (VR) and augmented reality technology.

With state-of-the-art software and graphics, the technology has progressed in leaps and bound in the past few years.

Related developments in the field of behavioral and mental health were showcased during special sessions in an Innovation Zone held here at the American Psychiatric Association (APA) 2017 Annual Meeting.

VR is an entirely computer-generated environment that immerses patients in a virtual world. With augmented reality, the device or software adds virtual elements to the "real world."

These technologies have been around for decades, but with recent dramatic decreases in costs and improved image quality and technologic components, there is now a growing commercial interest in their use, Arshya Vahabzadeh, MD, instructor in [sychiatry, Harvard Medical School, and chief medical officer, Brain Power, a neurotechnology company, told *Medscape Medical News*.



Dr Arshya Vahabzadeh

Brain Power partnered with Affectiva, a technology company that grew out of the Massachusetts Institute of Technology's Media Lab, and with Google to develop augmented reality "smart glasses" for children with autism. Using "gamified apps," the children learn to recognize emotions and to interact with family members and therapists.

Children with autism often struggle with understanding other people's emotions and with reading their faces. "This device gives them feedback, monitors their responses, and collects data," said Dr Vahabzadeh.

"We are finding ways to essentially provide an artificially intelligent 'coach' to help a child determine what emotion their mom is showing. For example, is it happy or sad? Is it frightened or neutral?"

He likened it to using training wheels to learn to ride a bike. "Some children struggle to ride bikes and may benefit from supports."

Calming Anxiety

Other researchers are using VR to treat a myriad of mental health conditions in adults. The most commonly researched

area is in anxiety, said Dr Vahabzadeh.

"If you're afraid of heights, we can generate an augmented or virtual experience for you where you may feel anxious or uncomfortable, and then within that environment, we can digitally create interventions that help you feel comfortable or help you manage a panic attack."

As an example, he said that for someone fearful of heights, the virtual environment might be an elevator.

The technology is also being used to teach skills to trauma patients – for example, mindfulness and deep breathing techniques – to cope with flashbacks.

During one Innovation Zone session, Brennan Spiegel, MD, director of health services research in academic affairs and clinical transformation, Cedars-Sinai Medical Center, Los Angeles, California, described how veterans with posttraumatic stress disorder can, for example, be transported to Afghanistan to experience a virtual mortar fire attack. The patient can "walk around and navigate the environment," he said.

"Clinicians have a control panel where they can adjust the time of day, the lighting, the sound effects, and help pace the exposure," said Dr Spiegel.

One of the aims of virtual exposure therapy is to improve attention, memory, and executive function within a military context.

There has been "good deal of research" on the effectiveness of this approach, said Dr Spiegel. "The worst data show we are equivalent to the evidence-based approach of natural exposure, and the best data show that we outperform it."

Beyond the military, the technology is being used to conduct physical and occupational therapy in the patient's home. It can be a fun and engaging experience, said Dr Spiegel. He added that patients don't persevere with traditional rehabilitation because it's "boring, repetitive, and frustrating."

Pain Reduction

He demonstrated a special computer game that a young girl with cerebral palsy, who is only able to raise and lower one arm, could play and enjoy for the first time.

He also showed how virtual reality can have a huge impact in the hospital environment. He described two patients with severe pain – an older female cancer patient, and a boy with sickle cell disease.

Both were transported to a virtual world in which they could focus on something pleasurable and forget their pain and the cold impersonal institutional environment they were in.

Research is showing that these approaches are effective in terms of clinical outcomes. One study cited by Dr Spiegel compared mean pain scores in 50 patients using VR to a control group of 50 patients. The clinical response was 65% in the VR group compared to 40% in the control group ($P = .01$), with a number needed to treat of 4.

He and his colleagues are launching a randomized controlled trial of therapeutic VR in the hospital setting to determine whether this intervention can affect the prescribing of opioids and anxiolytics, among other things.

A meta-analysis published earlier this year *Clinical Neuroscience* included 11 randomized controlled trials of the use of VR for everything from cancer pain and obesity to stroke rehabilitation and traumatic brain injury. The investigators found that VR "clearly appears to be effective in most studies, and it appears to be well tolerated," said Dr Spiegel.

"But there are limitations to these studies. They tend to be small, and they tend to be methodologically heterogeneous. We need larger, higher-quality trials."

Researchers are also creating "virtual humans" that could be used as a teaching tool for carrying out clinical interviews, noted Dr Spiegel.

Elsewhere, researchers at Shire PLC, a specialty biopharmaceutical company, have created a virtual reality educational

tool concerning attention-deficit/hyperactivity disorder (ADHD). The tool allows users to spend a virtual day as a person with ADHD, having to deal with distractions at home, at work, and in a social environment.

Who Pays?

At the end of one of the Innovation Zone sessions, a delegate asked who will pay for this new technology. That's unclear, said Dr Spiegel. "If we create a virtual reality clinic or VR consult service, is there going to be an ICD-10 code for that? Is it a procedure?"

But researchers are already studying the health economics of VR in the hospital environment.

"We have done some cost-effective modeling and concluded that if VR can reduce the length of stay even by about 10%, which is a matter of hours generally, then it quickly pays for itself, the entire VR consult service," said Dr Spiegel.

"What we need to know is whether VR does reduce inpatient stays, and we are looking at that now in a clinical trial."

Another speaker at this session, Skip Rizzo, PhD, director for medical virtual reality, University of Southern California (USC) Institute for Creative Technologies, and research professor, USC Davis School of Gerontology and USC Keck School of Medicine Department of Psychiatry and Behavioral Sciences, predicted a growing awareness and use of VR technology and continued decreases in its costs.

"It will become like toasters, where every house has one. They might not use it every day, but everyone has one."

Dr Vahabzadeh noted that iPhones and Facebook did not exist a few years ago, and although VR and augmented reality technologies still need more research and are still not widely used clinically, that could change quickly.

That's especially true when "there simply aren't enough human providers," he said.

"The discussion is, how can we use this technology to augment the care that we provide, perhaps increase its intensity, and perhaps lower the barrier to accessibility?"

But Dr Vahabzadeh cautioned there may be conditions in which VR and augmented reality may not be appropriate. For example, he said, it may be difficult to use immersive or perceptual technologies for patients with seizure disorders.

Elsewhere at the Innovation Zone, experts discussed machine learning, wearables, implantables, smart homes, and the use of artificial intelligence to help psychiatric patients.

Tim Peters-Strickland, MD, a psychiatrist and senior director of global clinical development CNS, Otsuka America Pharmaceutical, Inc, Princeton, New Jersey, discussed how Instagram is being used to detect depression.

"This has huge ramifications, if you can harness social media to identify patients for early screening. It's really fascinating."

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