

Can virtual reality help your patients?

Advances have made modality less expensive, more “realistic.”

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Imagine helping your patient overcome acrophobia by sending her “up” to the 80th floor, or telling a patient to get “behind the wheel” to see if he can drive safely.

The ability to simulate real situations with virtual reality (VR) technology has shown promise for treating phobias, assessing patient function, diagnosing anxiety disorders, and other psychiatric clinical applications. Though used predominantly in academic settings, technological advances have made VR less expensive and more “realistic.”

VR'S EARLY PROMISE

In 1991, psychiatrists were introduced to VR at the American Psychiatric Association annual meeting. By donning a headset and cyber glove, exhibit hall passers-by could tour the optic nerve.

The experience revealed VR's promise and limitations. The head-mounted display (HMD) was heavy, graphics were rudimentary, and distracting delays between user movements and visuals plagued the tracking system. Also, the system cost about \$50,000. Even so, this glimpse of a burgeoning technology wowed participants. I was sure that VR would become commonplace within a few years.

Fifteen years later, however, VR remains on the cutting edge, mostly because no VR application has been popular enough to drive its use. Consumer demand for more-intuitive and interactive electronic games has pushed computer development in many areas, but most gamers consider VR too awkward and nausea producing to justify the expense.

VR ADVANCES

Some industries—particularly aerospace and the military—took interest in simulating objects and environments and spearheaded gradual improvements to VR technology. HMDs are lighter, graphic displays and sounds are more realistic, and touch, smell, and other sensory inputs can be added. Many VR systems run on today's faster personal computers.

Virtually Better, a corporation formed in 2000 by researchers at Georgia Tech's Graphics Visualization and Usability (GVU) Center, develops applications for VR systems and licenses and supports the hardware and software for psychiatric clinical uses.

Virtually Better has improved VR technology and greatly broadened the situations targeted for desensitization—from airplane flights, storms, and combat, to job interviews, public speaking, and environments that cue substance use. The GVU center uses VR to simulate a skyscraper and elevator, and VR systems can create a virtual Vietnam, World Trade Center, or “crack house.”

VR IN PSYCHIATRIC CARE

Exposure therapy. The GVU Center uses VR to expose patients with posttraumatic stress disorder and various phobias to feared stimuli.¹ The center uses a virtual skyscraper and elevator to treat acrophobia, for example.

Assessing patient function. The ability to create controlled, predictable conditions that mimic real-world situations could also help assess patient function:

- Rizzo et al have shown that the current battery of tests used to gauge ability to drive² does not adequately predict real-world driver safety. His team is experimenting with driving simulators as being more accurate than

routine cognitive testing and safer than a real road test.

- Zhang et al³ used a virtual kitchen to assess patients' functioning after a brain injury. Two assessments 7 to 10 days apart showed the patients were less able than non-injured controls to process information, identify logical sequencing, and complete the assessment. The findings suggest that a virtual environment can supplement traditional rehabilitation assessment.

Diagnosis. VR could be used to diagnose and treat primary psychiatric disorders. By "creating" people and environments, psychiatrists could invent standardized interpersonal interactions that would be difficult to duplicate in the real world.

Freeman et al⁴ created a neutral virtual environment (a library) populated by computer-generated characters. The investigators used a Cave Automatic Virtual Environment (CAVE) system to project images on the walls while subjects wore 3-D glasses, allowing them to walk through the environment. The subjects, college students without psychiatric disorders, then recorded their thoughts after interacting with the characters. Though most experiences were positive, some reported ideas of reference and persecutory thoughts. These students were more likely than those without such thoughts to report anxiety and high interpersonal sensitivity.

Although the study was devised to investigate how persecutory thoughts originate, it also showed how VR convincingly replicates human interaction, suggesting endless treatment possibilities.

Further research will determine whether:

- VR offers a tangible advantage over more-traditional techniques
- that advantage would justify the expense of a VR system.

CAN VR HELP YOUR PATIENTS?

VR system prices, though still substantial, have decreased considerably over 15 years. Depending on configuration, hardware/software systems supported by Virtually Better cost \$5,500 to \$7,000.

Third-party payers generally have been covering VR, and some VR therapists are "preferred providers" for major insurers in their areas. Some providers bill the insurer, while others request payment up front and require the patient to seek reimbursement.

Related resources

HPCCV Publications. The CAVE: A virtual reality theater. <http://www.evl.uic.edu/pape/CAVE/oldCAVE/CAVE.html>

Georgia Institute of Technology. Graphics Visualization & Usability (GVU) Center. <http://www-static.cc.gatech.edu/gvu>

Virtually Better www.virtuallybetter.com

Disclosure

Dr. Boland report no financial relationship with any company whose products are mentioned in this article, or with manufacturers of competing products. The opinions he expresses in this column are his own and do not necessarily reflect those of CURRENT PSYCHIATRY.

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