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The Pain Practitioner

July/August 2017

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The Power of Virtual Reality

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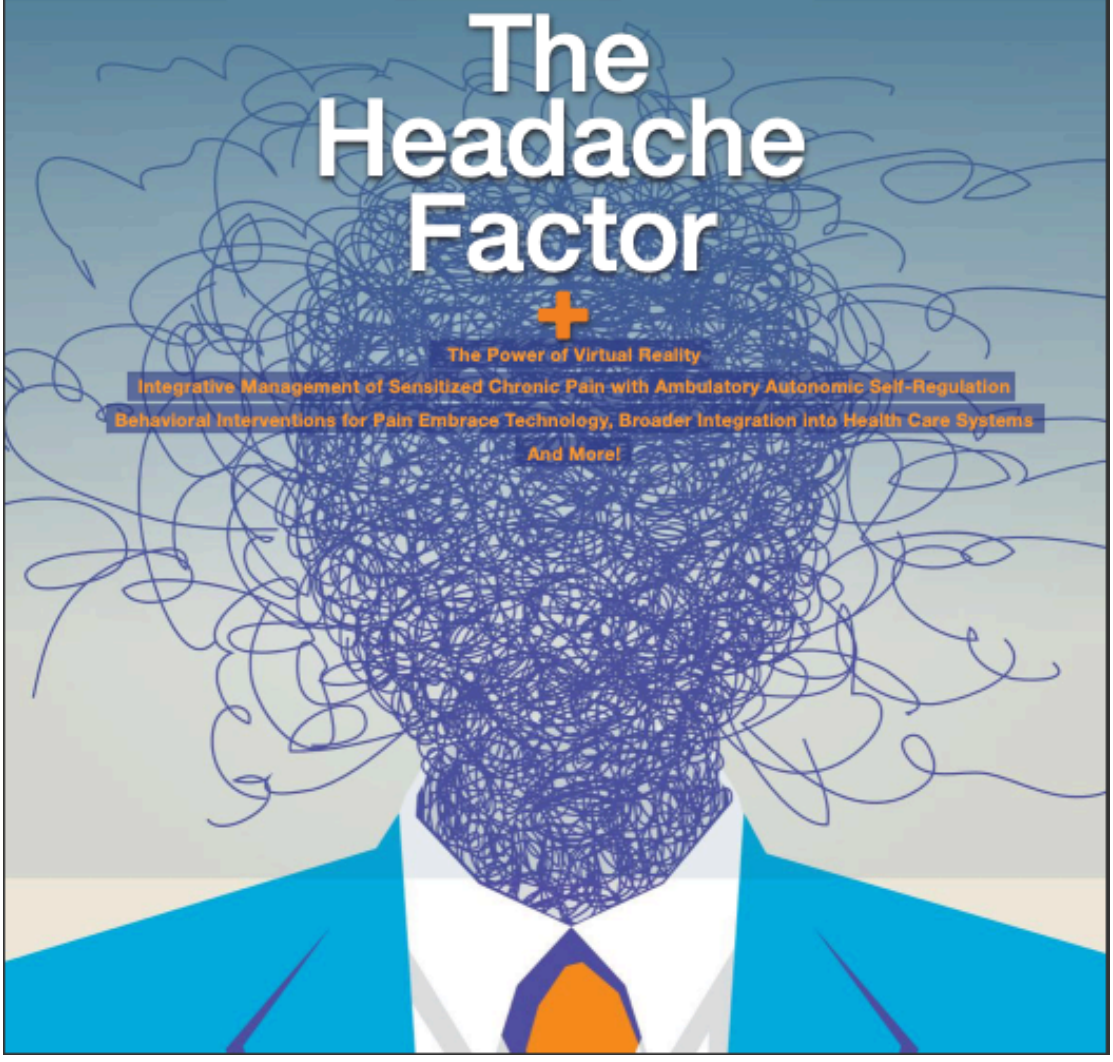

The Power of Virtual Reality

By Christine Rhodes, MS

The Pain Practitioner interviewed Brenda K. Wiederhold, PhD, MBA, Chief Executive Officer of the Interactive Media Institute and President of the Virtual Reality Medical Center, which develops virtual reality (VR) environments and clinical protocols as well as conducting clinical research studies using VR and internet-based worlds.

CR: How did you get interested in virtual reality (VR) for chronic pain?

BW: I started using virtual reality to treat people with phobias and anxiety disorders, and then we started treating people who had presurgical anxiety or pain and anxiety during medical procedures. We were funded by the National Institute on Drug Abuse, National Institutes of Health, to create software and protocols to deal with procedural pain and anxiety for medical and dental procedures.

After patients reported that it also helped their chronic pain conditions, we performed a small study at Balboa Naval Hospital in patients with migraine headaches, fibromyalgia, and back pain. We found that patients' pain decreased when they distracted themselves with virtual reality during sessions, and, in addition, they were able to decrease their pain between sessions. For example, they learned that if they sit at home and focus on their pain, it will become worse. If they start doing some activities of daily living, some movement, something besides just sitting and focusing on their pain, the pain will go down. We also started using VR in our clinical practices both here and in Europe to treat patients with chronic pain.

CR: How long are the sessions?

BW: We find that 15- to 20-minute sessions are more effective. The brain starts to remember those positive emotions, that feeling of being without pain. And, as we know, our brains are very plastic, so they start attaching to those new memories. We add exercises for the upper and lower extremities in the virtual reality so that patients start losing their fear of movement … New technology allows us to provide exercise programs at home, either online or for use with a VR device.

CR: Are the exercise sessions conducted while the patient wears the virtual reality device?

BW: No, we found using a big screen is better because the head mount inhibits movement. Patients see their hands, their arms, their legs on the screen and, at the same time, see them in the real world. It's very powerful. Seeing your body in the real world and having it reflected in the virtual world, is called augmented reality versus traditional virtual reality.

CR: How often does a patient undergo a virtual reality or an augmented reality treatment?

BW: We normally see patients once a week. Most people take 10 sessions.

CR: How would you rate their reduction in pain?

BW: We're seeing about a 50% to 70% reduction in pain. Many people who have had chronic pain are able to quit taking medication, and others are able to reduce their medication dose. We're starting to combine the virtual reality, cognitive behavioral therapy, and biofeedback with other medical devices, and we're finding that the combination works even better than just virtual reality by itself or the device by itself.

CR: Which types of pain conditions are particularly suitable for VR therapy?

BW: It works for shoulder pain, back pain, elbow pain, knee pain, migraine, fibromyalgia, complex regional pain. It has worked for every condition we've tried it, but we haven't tried it on everything. We haven't done a lot with diabetic neuropathy or neck pain.

CR: Is VR covered by insurance?

BW: We add VR as part of a traditional psychotherapy session. We're monitoring patients' vital signs and teaching them to control their physiology with biofeedback, which is all part of the psychotherapy session. PPOs and some HMOs have covered psychotherapy. If insurance doesn't cover mental health services, then they would not, of course, cover this either.

CR: How do you think VR will advance in the future?

BW: The exciting thing is that it's starting to become more popular, more accepted by psychologists and the medical community. The cost has come down, and the usability has gone up with the recent technologies. When we started using this in 1996 for phobias and then pain conditions in

the early 2000s, VR was expensive and the equipment was temperamental. But it's much easier to use, and the cost is not prohibitive, even for the individual therapist or physician, so I think we'll start seeing it more widely disseminated and used.

We hold clinician training courses that are American Psychological Association (APA) accredited, we hold a conference every year, we hold specialized workshops, and I send out several publications, for both patients and for clinicians. I tell patients that there are treatments available that may provide a nice addition to their treatment protocol. It won't take the place of medicine, necessarily, but it may help to reduce their meds or it may help them start thinking differently. I have a gentleman who has had five shoulder surgeries and two traumatic brain injuries; he was in a very high-risk occupation. He knows he will probably always have some pain, but he doesn't want to stay in a completely medicated state for the rest of his life, so he controls some of that pain with these technologies.

CR: Could a patient have an at-home VR set that they could use? Or is this only done in the office?

BW: Right now, I send it home with my patients, but we don't have it completely available for the consumer yet. We hope to do that within the next six months.

CR: Does VR actually rewire the brain?

BW: Yes. We know that when someone has chronic pain, the brain starts changing and adapting. The brain looks very different in a person with chronic pain than it does in someone not in chronic pain.

CR: Have imaging studies been done to document these changes?

BW: Yes, there have been some fMRI studies. Right now we're working on a study with an implantable device. And we're going to be using virtual reality enhanced cognitive behavioral therapy in addition to a naltrexone implant to help with the opioid crisis. The combination will help with addiction as well as pain management.

CR: I think if I were introduced to a virtual reality landscape and my pain was relieved, I wouldn't want to leave!

BW: A lot of people say that. They ask if they will become addicted or prefer to be in the virtual world. In my 21 years of using VR that has not happened, even with the realistic worlds. It's very empowering to go into that world, to escape that pain, to go into another dimension, and then to translate the new skill set and positive emotions in the real-world setting.

CR: What kind of skills? Slowing down their breathing and heart rate?

BW: That, as well as starting to understand that when they distracted themselves in the virtual world their pain level was a 1 out of 10 instead of 8 out of 10.

CR: Who designs the virtual reality world?

BW: We've developed everything in-house. Patients work with the clinician, the graphic artist, and the computer scientist or the programmer. We work in a team to make sure we're designing what patients need.

CR: So it really is individualized?

BW: It is, and we've found that you don't have to have a 100% realistic virtual world, it just must have the proper cues. For instance, when we developed a world for patients undergoing chemotherapy after breast cancer, we used very soothing music, we had them walking very slowly so they didn't get nauseous or cybersick. We used muted colors, nothing sharp or loud, music-wise or color-wise. We wanted everything with a soft touch.

CR: What would someone coming back from war with PTSD need?

BW: It varies. We've created 12 worlds for PTSD with the people coming back from Iraq and Afghanistan. One is a hospital for people that were combat medics or doctors or nurses. Another is a convoy, and it has IEDs [improvised explosive devices] on the roadside so they're able to see those and react to them. Another is a crowded marketplace. In another, they are walking through the streets and on patrol. In some cases, we found that we had the cues wrong. So they needed the curbs formed differently. They needed the hands shaped differently and larger. If we haven't been to Iraq or Afghanistan we wouldn't think those cues were important, but they are.

CR: Is their goal to have greater control over their surroundings?

BW: No, they need to go back into those surroundings and bring together all the fragmented memories they often have in post-traumatic stress and consolidate those memories, process those emotions, and then move through those memories.

VR is becoming more affordable, it is supported by studies proving it's a useful adjunct. Many people have heard about it now and we have a more active consumer, a more active patient. The internet has allowed people to become much more educated about what is going on in the world as well as with their disorder. The power of the technology is translating technology and treatment into the home setting and letting patients help themselves in the future. As soon as we are able to get these into the hands of patients themselves, they're going to be able to start self-treating in addition to coming in to their appointments.❑