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### Virtual Reality as a Digital Therapeutic

Dr. Nandi:

Virtual reality, better known as VR, is one of the most rapidly developing technologies in digital therapeutics. Yes, you heard that right – digital therapeutics. Today, over five thousand VR studies have demonstrated the capability of VR to decrease pain, opioid dependence, even boost mental health, and have specific applications in the realm of gastroenterology.

Welcome to *GI Insights* on ReachMD. I'm Dr. Neil Nandi, and joining me today to discuss virtual reality and digital therapeutics is Dr. Brennan Spiegel. Dr. Spiegel is the Director of the Cedars-Sinai CORE program, the Center for Outcomes Research and Education. He is also the Editor-in-Chief of the *American Journal of Gastroenterology*, which is the leading clinical GI journal in North America.

What you may not know is that Dr. Spiegel has been listed as one of the Top 100 Influencers for Digital Health, and his innovative research was even awarded the 2017 Webby Award for best technology on the internet. On this episode, I hope that his insights will help blow your mind and change the way you think about virtual reality. Dr. Spiegel, welcome to the program.

Dr. Spiegel:

Well, thanks for having me.

Dr. Nandi:

Now, virtual reality has really come a long way. Technologically, the hardware and software has been really transformed from a clunky, hardwired helmet to an all-in-one truly wireless and responsive headset. Many physicians may have thought this platform was for gaming alone but are now just understanding that there are opportunities to implement this into the GI clinic. How can GIs reset their barostats or their opinions about VR? And what are some of the common myths and misconceptions about VR amongst physicians that maybe we can begin to change with this program?

Dr. Spiegel:

We've known for decades that VR has this uncanny ability to spark emotions in the human brain and in the human body, and this initially came out of work from the military when it was being used as a flight simulator program, but over time, we've come to realize that it can be used for a wide variety of health conditions, and most of this research has been focused on conditions like pain and anxiety, depression, but now we're seeing everything from eating disorders to schizophrenia to cardiac rehabilitation. The list goes on and on, and within gastroenterology, we're seeing that it can be very useful for chronic abdominal pain, for irritable bowel syndrome, dyspepsia. We've even done a study with sphincter of Oddi dysfunction or papillary stenosis from sphincter of Oddi dysfunction. So, there's many interesting applications that we can talk about today, and it's certainly far more than a gaming platform.

Dr. Nandi:

And so I think it's so important that we highlight that it's beyond the gaming, like you said. Can you perhaps highlight some of those niches or a couple use case examples that maybe our GI listening can say, "You know what, I would love if I could implement that VR therapeutic in my clinic today?"

Dr. Spiegel:

It's often helpful to sort of tell stories initially, and then we can back into the science and the neuroscience of all this, but just for example it was a couple years ago when I was first experimenting with virtual reality and had seen some successes, and I was called as the inpatient GI consultant to see a patient who had very severe and recurrent abdominal pain. She had an endoscopy, a colonoscopy, CT scans, tested for celiac disease, all sorts of lab tests, and nothing was positive, but she was hospitalized because the pain was so

severe, and she had sort of held a diagnosis of functional abdominal pain, was getting ketamine, was getting all sorts of different treatments. So, I get called in thinking, “Oh my god, what am I going to add to this?” And I decided to use virtual reality cause I had heard a lot about it and was seeing some successes. So, we used a VR experience where you go underwater, and all of a sudden you’re surrounded by dolphins, and there’s beautiful music, and you can hear these dolphins squealing, and it’s sort of otherworldly, and you have to imagine if you’re listening in a hospital room in pain how unexpected it is that all of a sudden you’re swimming with dolphins, and so we put her in the headset, and she was quiet for several minutes, and then about four or five minutes in, she started to cry, and I said, “Are you okay?” and she said, “Yeah, I’m okay but I think I’ve figured out why I have this pain,” and I said, “Really?” you know, “Tell me more,” and she said, “It’s because of my brother,” and I thought, “Oh my god, your brother? What about your brother?” and she said, “You know, he had stomach cancer, and he died, and I’m gonna die the way he died,” and I said, “But you know we’ve done this endoscopy, we’ve looked in your stomach. You don’t have cancer.” She said, “I know, I know, and you’ve told me that, and everyone’s told me that. I haven’t been willing to accept it, but these dolphins, they’re telling me I need to move on with my life.” She said, “I could’ve sat on the couch for a year at the therapist’s, I wouldn’t have figured it out, but there’s something about this experience that I’ve figured it out.” She says, “You know what, my pain’s already better. I want to go home.” Now, it’s a striking example, and this isn’t a miracle wand, and it doesn’t work like that in everybody, but man, when it works, it definitely works, and so since that time we’ve been doing studies and research to kind of learn more about this.

Dr. Nandi:

I think that is one of the most fascinating examples. Are there any particular platforms or apps that you might recommend in the VR space that you found helpful for yourself or for your patients or for clinicians who want to get into VR?

Dr. Spiegel:

Yeah, in fact we have a website where we’ve just recently updated it with our favorite VR programs cause I get this question a lot, so our website is [virtualmedicine.org](http://virtualmedicine.org), and on the website, we now have a tab up at the top called Clinical Resources, and there’s a few different resources, including how to find a VR provider but also our favorite VR programs, and we have 14 of them right now, and it’s going to expand over time. Some of these require almost like a prescription through a clinician, but others are available right now through different platforms, like the Oculus store.

Dr. Nandi:

For those just joining us, this is *GI Insights* on ReachMD. I’m Dr. Neil Nandi, and today I’m speaking with Dr. Brennan Spiegel about the use of virtual reality as a digital therapeutic in gastroenterology and hepatology. Dr. Spiegel, more recently, medical extended reality, including virtual and augmented reality, has received FDA-designated approval for some programs. Already, we’ve even seen that COVID-19 has truly catalyzed both acceptance and innovation in telemedicine. Do you see such a spark in regards to VR with the pandemic, and if so, what is to come of VR as we go forth and, and how do we handle clinical trials even to start exploring VR efficacy?

Dr. Spiegel:

Yeah, there’s a lot in those questions, and they’re great ones. We’re doing an NIH trial right now delivering VR headsets to people’s homes to help with chronic pain, and that trial’s completely remote. We’re able to do all of it without seeing the patient at all. We can consent them remotely, send them a FedEx with the VR headset, with the instructions, and we can call them with a help desk to work them through the technology if they have questions, and they can complete all of their responses on an app and do the whole thing remotely, but beyond research, with this pandemic of mental health distress we’re seeing, we need to find ways to close the gap between supply and demand of mental health resources. Even before the pandemic, there was a shortfall in mental health practitioners, and now that disconnect has just grown into a huge chasm, so we need to find ways to deliver evidence-based mental health treatments like cognitive behavioral therapy to people’s homes, and that applies to GI, too. You think about irritable bowel syndrome, where we know it’s a complex disease, we know that pharmacotherapies can be very effective, but we also know it’s a disease of the brain-gut axis, and it’s complicated, and that comorbid anxiety and depression can certainly contribute to the illness experience of IBS. In some cases, it’s causal; in other cases, it’s just aggravating organic problems. In either event, if we had ways to provide evidence-based CBT at home, that would be profound, so our team right now is building an IBS VR treatment program that we hope will address patients’ needs at home because even before the pandemic, it’s hard to find a therapist who’s really trained in IBS-related CBT or hypnotherapy or psychoeducation that’s related to the gut. So, if we can package all that up into an evidence-based VR app, then we can start to deliver this outside the four walls of a clinic where we really don’t have the time and often don’t have the training as gastroenterologists to deliver this kind of treatment.

Dr. Nandi:

You know, I think this is really innovative obviously, and I want our listeners to understand that what Dr. Spiegel just said was evidence-based VR. Dr. Spiegel, I know that you are on the committee with the FDA, and you and your coauthors have published some guidance on VR clinical trials, VR phases 1, 2, and 3; can you tell us a little bit more about what that looks like?

Dr. Spiegel:

Yeah, absolutely. I always say, if VR is a treatment, then we need a VR pharmacy. We need to, as doctors, be able to reach onto these digital shelves and pick the right treatment for the right patient at the right time – you know, it's the three rights of precision medicine, and here we're talking about precision immersion – and so there are best practices for how developers should create healthcare-related VR applications as opposed to gaming or entertainment or even just general wellbeing. We need to tailor these treatments in an increasingly sophisticated ways. So, we've developed guidelines for VR1, VR2, and VR3 trials, and without getting too deep into the weeds on this, the VR1 trial begins by working with patients directly and understanding what are their unmet needs, what are their knowledge, attitudes, beliefs, preferences regarding their condition, and what would they be looking for in a VR experience? And we work with them to develop the storyboards and experiences and emotionally evocative landscapes and 3D environments, and then in the VR2, we test it looking at safety in terms of whether it causes people to feel dizzy or triggers negative emotions, but also initial evidence of efficacy, and then VR3 is a proper prospective randomized control trial.

Dr. Nandi:

So, you've really laid out the framework for anybody who wants to start to design their own VR trial at their own institution, which is pretty amazing. You also alluded to a fascinating concept of someone who is a virtualist or someone prescribing VR or monitoring VR. What is that? Who is that person? How does one become more engaged or become a virtualist.

Dr. Spiegel:

Absolutely, and, in fact, right now at Cedars-Sinai, we are finalizing plans to have a proper clinical VR service. You know, right now we have a big research operation, but I get contacted very frequently just from the wards, from the ICUs, from the clinics, from pediatrics, adult, saying, "Hey, we need somebody who, we have somebody who needs VR. Can you come over here and do it?" And I can't because I'm doing research. We don't have a VR clinical team, but we're building one right now and hope to have that fully operational in the next couple months, but the idea of the virtualist is this is somebody who has expertise in clinical medicine but also in immersive therapeutics, and that includes VR but also AR, augmented reality, mixed reality like the HoloLens and other types of immersive technologies, and the person that probably is going to be first to do this is likely a psychiatrist or a therapist. So, we are actually recruiting a psychiatrist who uses VR in his clinical practice, and so because this is ultimately a mental health intervention we do think it's important to have people with training in mental health, but I don't see why a gastroenterologist can't learn to use virtual reality as part of their practice for managing chronic abdominal pain, IBS, and not as some substitute for treatment. We're not saying that this is going to, you know, replace medications, but to augment it I think is something that GI docs should learn more about, and their patients will very likely appreciate that this service is available.

Dr. Nandi:

To our listeners, that's all the time we have for this episode. I want to thank Dr. Brennan Spiegel for joining us to discuss how virtual reality is not just a clinical tool but is actually a digital therapeutic that we can utilize in the gastroenterology and hepatology space. Dr. Spiegel, it has indeed been my pleasure. Thank you for being on our program.

Dr. Spiegel:

Thank you very much.

Dr. Nandi:

For ReachMD, I'm Dr. Neil Nandi. To access this episode and others from *GI Insights*, visit [ReachMD.com/GI-Insights](https://ReachMD.com/GI-Insights), where you can Be Part of the Knowledge. Thanks for listening.