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Tuning the Brain: Personalized Anxiety Relief with Neurofeedback-Driven Headphones

Dr. Greenberg:
You're listening to *NeuroFrontiers* on ReachMD. I'm Dr. Michael Greenberg, and joining me today to discuss how neurofeedback-driven headphones can help reduce anxiety is Vital Neuro CEO John Golden. John, thank you so much for being here today.

Mr. Golden:
It's a real pleasure to be with you, Michael.

Dr. Greenberg:
I actually bought a pair of these headphones before I knew anything about the company. I use them every day. I think that they are terrific.

So, John, let's start with the really big picture here. What inspired the creation of Vital Neuro?

Mr. Golden:
The original idea behind Vital came from Dr. Kamran Fallahpour, who's a clinical psychologist in New York, and he had a desire to come up with a better solution than wired headphones. I always picture when I think of neurofeedback a colander on your head with spark plugs. It's very unnerving, it's very scientific, and it's difficult. People can only do it when they can schedule it. So Kamran had this idea, and since then it's become a mission of many of us to bring this incredible science of neurofeedback out of the back office in the clinics and leverage this tremendous technology so everybody can use it everywhere.

Dr. Greenberg:
So people can even use it in their homes?

Mr. Golden:
Yeah, in their homes, and they can do it while they're doing other things. When you think about being overwhelmed, a lot of our customers use it while they're vacuuming, while they're doing dishes. I use it every day when I do emails.

Dr. Greenberg:
Can you tell us about the science behind the headphones in a way that even someone like me could understand?

Mr. Golden:
In the simplest principle, we use these gold sensors to monitor the brain activity and understand where it's occurring and how it's occurring. We use that to determine your current state of mind. As a user, you select your desired state of mind. Let's say you're feeling very burned out and you want to get relaxed. You select relax. Basically, what we'll do is we'll go to work. Our system will, by sliding the headphone on and pressing the button for relax, sense where you're at. We'll then begin to compose music real time. That music plays to your brain, not to your ear. And by playing to your brain, we get to your unconscious, and we start to shift your brain state. There's plenty of science around neurofeedback and psychoacoustically designed music. I can go into all the different things. We use operant conditioning. All these techniques are used and proven to alter the state of mind. What we've done is two things. We moved it into a completely mobile platform. And the second thing we've done is, we not only just play calm music like you could get from meditation, but our music actually is neuroresponsive, meaning we're reading your brain in real time and composing the music right alongside, so it's highly personalized music guaranteed to get you to the changed state of mind.

Dr. Greenberg:

So is this feedback going on in the headphones or going up to the cloud and then coming back down again?

Mr. Golden:
The simple technology is you're wearing a headphone that has three sensors on it. That goes to the phone. Within the phone, we send it off to the cloud to process the brain activity to understand it, compose the music, and send that back real time back to your headphones.

Dr. Greenberg:
Let's expand on that a little bit, John. Can you walk us through how brain wave targeting is used in different cognitive states?

Mr. Golden:
I don't want to come across as an expert in clinical psychology. That's my partner Kamran Fallahpour's role. But if I could give it in layman's term, the front part of your brain is around executive function, the middle is focus, and the back is relaxation. And so what you want to understand is what's the desired state and then what frequencies, alpha, theta, beta, etc. are elevated or are underperforming, and how can you alter those? And so what we use is very specific changes in music from tone, tenor, frequency, left, right, surround and sound. With all these different techniques that we have, we're able to use to cause the brain to change the way it's reacting based on the music so we can drive that state.

Now, clearly, you don't stay in that state. You get distracted. So that's where techniques like operant conditioning come in—where you start to take things away to cause the brain to do something different. We also have a lot of other techniques that we use around coaching. But the most important thing around brain training is to be able to capture quality EEG, and that's one of our secret sauces to do that in mobile. And then the second thing is to be able to train the right regions of the brain. Capturing EEG from a place like the forehead or your neck is okay, but if you need to train, you need to train specific regions of the brain.

Dr. Greenberg:
And so this is not putting you into a state of sleep or anything. You shouldn't probably drive with these, but it's not making you somnolescent. It's really working on your brain, not your mind.

Mr. Golden:
Correct. It does put people to sleep if that's the desired state you choose. There is sleep. Most people find enjoyment in relaxation, which really just takes the noise down. Everybody's busy because your noise is full of just so much sound. You can take that down with our relax. The most common one is focus, which allows you to stay on task. And so those are the most common, but we can put you to sleep for sure. Meditation is really powerful for folks. We can do pain management, and we can do what we call optimized. I like to call it the eye of the tiger. You know in the middle of the afternoon when you want to get out and get that workout in? Or, in your case, Michael, you love to swim. If you need that little energy to be able to go swim, that's what that'll do for you.

Dr. Greenberg:
I think the best thing is I call it that squirrel cage in your head, and what it does, it puts the squirrels to sleep, or at least organized so they start talking to each other intelligently.

For those just tuning in, you're listening to *Neuro Frontiers* on ReachMD. I'm Dr. Michael Greenberg, and I'm speaking with John Golden of Vital Neuro about how his EEG-based headphones can aid in anxiety relief.

So let's go on, John. If we turn now to the potential impacts of these headphones, what can you tell us about real-world outcomes in patients with anxiety? Make it real for us.

Mr. Golden:
Make it real, yeah. We had a person going in to have oral surgery, and they wore their headphones in the physician's office before they walked in, and the lady said the 12 minutes she had the headphones on before her procedure, she said, "It was the best 12 minutes of my week," and she's about to have a tooth extracted. When we look at actual numbers, we do things like a GAD-7 survey. There's other surveys that we have done, and we've done them with some more of the more challenging populations. Think about flight attendants, nurses, teachers, first responders. Across all those populations, we achieve about a 45 percent reduction in anxiety symptoms. We improve focus by 45 percent. We've improved sleep by 30 percent. So we've done those studies. In addition, because we're monitoring the brain real time, we're able to look at the neurophysiological change, and we've been able to statistically demonstrate that that happens also. So we reached that gold standard where we can show that the brain is changing, and we hear from the patients in the surveys that we take.

Dr. Greenberg:
So what role do you see EEG-guided devices like yours playing in the broader conversation around digital therapeutics and mental

health technologies for the future?

Mr. Golden:
Our goal is to bring it into the mainstream. Make it really possible for folks. Vital is less about a therapy and more about a lifestyle. The foundation that used to provide mental stability—a lot of that is changing and shifting. There's a lot of great things happening in the world, but at the same time, those great changes create unsettling things. Those unsettling movements—societal, technology, etc—causes people to have difficulty, and so mental and stress and anxiety are big deals today. And the benefit of this is let's take this therapy, which is simply putting a headphone on, pressing a button, and using it while you're at school or walking around, and let's help you upgrade your human operating system real time and not have to go into the clinician's office or find your way into a doctor's office and schedule it. You get to have it when you need it, where you need it.

Dr. Greenberg:
So, do you think that this would be something good to get people off of their medications, their anti-anxiety medications, while they're doing therapy and place more focus on the actual therapy and less on the meds?

Mr. Golden:
In the medical setting, pre-op and inter-op, we're demonstrating that Vital can coexist right along with anxiety medication—sedatives in particular. And we can reduce the need for sedatives or the chance of over-administering sedatives. In day-to-day life, there's no question that if people could develop this into their lifestyle, it would have a profound impact on the sensation that people have around ADHD or PTSD. I'm not suggesting in any way that we cure those, but when you think about where we all exist, if we could better manage every day and do a little better every day, just like you do when you exercise a little bit every day, these mental exercises, which Vital will allow you to do, would create less chronic issues and lead to bigger issues that may require medication. So Vital can help people today that are in crisis, but more importantly can help people from getting into crisis.

Dr. Greenberg:
John, is there a different way that Vital takes care of physicians' offices where you have groups of patients compared to having your own individual headphones? How does that work?

Mr. Golden:
We go to market a couple different ways. In a medical pre-op, inter-op, and post-op, we've been working with ophthalmologists, dentists, and dermatologists like yourself, and we're able to help them create a better experience for their patients before they go in for the procedure. And so that's sold through physicians and healthcare systems. We also sell online direct to consumer and to coaches, and the subscriptions are slightly different —a sedative session runs an hour, hour and a half, where most of our consumer clients are running 15, 20-minute sessions.

Dr. Greenberg:
Before we wrap up, John, two questions. What's next for Vital Neuro? And are there any new developments on the horizon we should look out for?

Mr. Golden:
I'd just say, Michael, it's exciting. We're just at the beginning stages. The technology is here and ready to go. If we can create awareness in the industry that this revolution is here, that's great. Beyond that, we're going to introduce into sports performance education. The impacts on healthcare, we're seeing that not only we're reducing patient anxiety, but we're reducing heart rate variability and blood pressure. We're improving sleep. All these things have long-term ramifications. And again, it's simple lifestyle. So I think I would expect those changes.

And then also, because personalization of medicine is such a powerful field, Vital is the first company that will be able to bring mind/brain data together with body data. So we're excited to work with all these different devices that are out there that are tracking your movement, your exercise, your heart rate. Imagine combining that with the brain data that we're getting. And now we're going to have powerful insights and be able to offer people very personalized solutions to help them achieve their personal goals.

Dr. Greenberg:
I want to thank my guest, John Golden, for joining me to discuss Vital Neuro's aim to mitigate anxiety through the power of sound. John, it was a pleasure having you on the program, and it's www.vitalneuro.com. Correct?

Mr. Golden:
That's correct, sir. Thank you so much.

Dr. Greenberg:

For ReachMD, I'm Dr. Michael Greenberg. To access this and other exciting episodes in our series, visit *NeuroFrontiers* on ReachMD.com, where you can Be Part of the Knowledge. And we thank you for listening.