How Do We Improve The Diagnosis Of Memory Problems? Transcript

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Introduction and Podcast Welcome

Hi there. I'm doctor Amelia Scott Barrett. I'm a neurologist and specialist in headaches with a background in functional medicine and biohacking. My own personal journey has brought me to truly understand what it means to live with migraines.

So I know that what we all really want is to heal from those underlying conditions that are causing the headaches, so that we can get back to the life and the people that we love.

Because of this, it's been my life's mission to empower others to take charge of their health. Join me today as we interview leading experts to uncover the latest cutting edge medical techniques and the most actionable health insights to power your health journey.

This podcast is reaching you thanks to Doctor Talks. Doctor talks aims to empower 1 billion people to get educated about their serious health conditions.

Visit them today at Doctor Talk's dot com slash calendar to learn about upcoming summits. Hi everybody. Welcome to the Reboot Your Brain podcast. I am your host, Doctor Amelia Scott Barrett, and today I have a very special guest with me.

James. James, tell us a little bit about who you are and what you do. Yeah. Hi, everyone. I'm an inventor. I work in neurotechnology, and my favorite thing is to learn things about the brain and apply it to the world.

Wow. Cool. We have a lot in common already.

Cognitive Decline Diagnosis Challenges

Okay, so I know a little bit about the work you do, and I'm curious. I know you work in the field of cognitive decline. What are the problems with the way we currently diagnose cognitive decline, given the tools that we have in conventional neurology today?

Yeah. So thank you for the question. It's it's really hard for me as a person to, to learn about these problems and document them, because you realize just how far behind we may be right now with our diagnostic tools.

Today, when a patient makes their first cognitive complaint and speaks with a physician, there's not a lot that the physician can do. Besides, you know, run a basic NMC test or a Moca test where you're asking them to say, count backwards from 100 or to draw a picture that they see on to another piece of paper.

These are very simple tests, you know, asking someone where they live. And the sad truth is that these are the most objective ways that we have for evaluating someone's cognitive condition.

And we need to do this step first before we do something like a Pet scan or an MRI. Because if we don't have an idea of the patient's symptoms, then there's a high likelihood that the next diagnostic test is going to be inconclusive.

In the US today, with Pet scans taking around 18 months to schedule and costing patients entirely out of pocket, it's not realistic to be sending patients to, you know, these advanced diagnostics on their first visit.

Yeah, yeah, I totally agree with that. And you're right, there's not a lot that we can do in the office other than talk to somebody and run a few tests just to sort of see how they're thinking.

Is going, okay, so what do you think we should do to solve this problem? Yeah, that's a great question. I think that the way we solve this problem is with a new type of diagnostic.

We need to have same day in office brain scans. And I think that that's possible. It's one of the things that I'm working on right now. We're bringing it to market.

It's a company called System Labs, and I'm extremely, extremely excited about what it can be to have a patient walk in. Yes. You start with the questions.

Make sure you understand the history of disease that might run in that family. But then to actually have information about this individual the same day that they walk in, I think that's huge.

Then you can figure out, well, maybe there is a diagnostic tool that we should put them on today. Wow. Okay. So for those of you who don't know, this is fundamentally different from how things currently go.

You said in office same day brain scan that changes everything. About that person, is it? Yeah, right. I agree and it sounds crazy.

Same-Day Brain Scans and Vista Labs

It sounds like not something that's realistic, but, you know, that's that's definitely not in my experience, there's a lot of ways to, to build this type of technology.

So tell me a little bit more about that. Yeah. Thank you so much. So it previously I started a company called durable where we were reading People's Brains, and we were enabling people to control wheelchairs and cars and all sorts of things with their mind.

And while I was building that business, I realized, well, if I can figure out what someone's thinking with with simple off the shelf technology available already in the neurology clinics, then how come I couldn't use a similar approach to figure out what type of diseases that they have?

And so that's what I've done here with Vista Labs. With durable, we're looking at how people's brains responds to images that indicate an action. So for example, an arrow, if someone's brain sort of lights up to a left arrow, that means moving left is where they want to go.

With Vista, I'm showing images of all sorts of all varieties, and I'm looking specifically at parts of the brain that are normally responsible for processing that type of image.

And I can see that, okay, depending on the image, you know, different parts of the brain should be activating. Here's an area where there's compensation that's happening.

Here's an area with some normal response to you know, what's what should be, what is characterized as a healthy response. And we're able to use AI on top of that in order to figure out how someone would test on a Pet scan, an MRI, what spinal tap results would look like for this individual?

It's really quite powerful. So I'd tell me a little bit more about how you're figuring out which parts of the brain are working and not working. How do you detect that?

Yeah, that's a fantastic question. One of the earliest studies done on the brain using electrodes was to identify how neurons in the visual cortex identify and process images.

It's very similar to currents, you know, machine learning, visual models, where you have neurons that are dedicated to edge detection, you have neurons that are dedicated to, you know, different distances as well as different, orientations of lines.

The first experiment was with this line that started off horizontal. And then it would rotate, rotate, rotate all the way 360. And what they found was that different neurons would be activated for different degrees of the line.

You would I would have expected that maybe we maybe we have a neuron that I don't know detects that it's aligned, and maybe there's another one that detects the rotation.

But these are completely different clusters of neurons. The neurons that saw the line when it was horizontal were off when it was vertical.

How the Brain Response Technology Works

So this is a very similar, approach here where we are showing specific types of imagery. We're using animations and we're looking to see is the brain responding the right way.

And we have over 150 patients that we've tested this with in clinical studies. We have healthy patients. We have disease patients. We have patients in between.

And so using AI, we can very easily say, okay, based on this patient's profile, how they've responded, and the locations of electrodes on their head, we can localize the damage in their brain and we can correlate that damage to how they would perform in those other tests.

Okay. So just to clarify, you're talking about recording from the visual cortex, the occipital cortex in the back of the head. Yeah, yeah. But surprisingly, not only that.

The reason I say it's surprising is because we're not just showing pictures. They're the animation component is very importance. There's a bit of subliminal messaging in the, in the video as well, where you're not necessarily aware that you're seeing something, and it triggers activity that cascades from the visual cortex through the parietal lobe as well.

Okay. Got it. So for the clinicians in the audience, how is this similar to or different from visual evoked potentials? Because that's certainly something that neurologists are used to doing in their office.

Yeah. I'm so glad that you asked. So I think I think of, I think of visually evoked potentials, ERPs as well, as like a reflex test on someone's knee.

Right? Like you hit the hammer, you put the picture up and you see, okay, is there a P300? Did they did they observe that that was there? The challenge, though, is that the existing way of collecting ERPs, it's it's it's a standard.

You know, ERPs are almost all the same. There are some differences. If you have like a negative ERP type of thing, maybe like an error detection type of method.

But, I digress. The interesting thing here is it's not just a picture appears. Some of these pictures are hardly visible at all. Some of them are appearing.

I mean, I don't want to disclose too much of my AP. But let's just say that the that the waves that we're collecting are several seconds long. They're very long waves.

And that's because there's a lot happening at once. It's not just an apparition. It's not just, an onset stimulation. Got it. Okay. So it's similar to but different from a very similar in the sense that you're recording, responses over the occipital lobe.

But the input is different. It's not just as simple, you know, record how long it takes the signal to get from, you know, through the eye, back to the occipital cortex.

It's more than that, right? Yes. Yeah. Yeah. Because one of the things we're looking at and one of the reasons the parietal lobe is important, is we're looking at how the person's brain navigates an environment.

So what happens when an object looks like it's getting further away from you? For example, how does your brain process and track that image? That's just an example. But there are many.

Cool. Interesting. Okay, so walk me through what this feels like from the patient perspective. You go to your doctor's office. You've been, you know, having some cognitive symptoms.

Patient Experience and Rapid Reporting

Your spouse is worried about you. You may or may not be, but your spouse is like, honey, something's wrong. Where can you go get your checked out? Maybe it's just a vitamin deficiency, I don't know, or maybe it's Alzheimer's, but we got to. We got to do something here.

They go to their doctor. What would this look like from the patient experience? Yeah, that's a great question. And I want to add some color, some context.

You know, my parents are both physicians. My father's, interventional neuro radiology is. And so I would go to the hospital and watch some of these procedures sometimes, or at least, like, you know, he would tell me a little bit of the details.

And it's. Yeah. So right now, you know, you're not getting a lot of help. Maybe after a couple visits a spinal tap. Right. That's that's the most affordable option.

My dad's done a lot of spinal taps, and the, the way that this technology is so different truly is from day one. You have a patient who comes in with a cognitive complaint.

Well, they wear an EEG device, which most neurology clinics have because it's useful for seizures, epilepsy, sleep studies. You wearing EEG device, and then you watch our video.

Our video is between 10 and 30 minutes. And at the end of the video, the clinician takes that that data set uploads it to our servers. We do the processing that's a little outside the patient experience.

But so the patients watch the video. And then 30 minutes later they get a report. And the report says, hey, if you took a Pet scan, this is the results we expect.

If you did a spinal tap, this is what to expect. These are the confidence intervals or our our, estimations of these tests. This is how you perform on a cognitive test like the FCS or MSI or Moca.

And so now you have this whole report of of endpoints where probably most of them are healthy, but some of them are not. Some of them are indicating, okay, this specific diagnostic should be run next.

There may be a problem here and it won't be conclusive. If we run the tests, it'll be, definitive. So the patient now has a better idea. Okay, doctor, I see that this thing is is low.

What does that mean? Doctor says. Oh, well, you know, we should run this type of test. It means that there are these types of diseases that are possibly affecting you.

And honestly, one of the ways that this will impact the patient's life. And now I'm going into a bit more detail that I, you know, normally would I like to be concise.

But my favorite thing is that imagine you get a therapy, you know, maybe that day maybe, the next week or the next month, and then you can come back and do this test again and get all those endpoints and see how you've improved.

It might be a small amount, but this is not something you could do with any other technology today. It's not even realistic to do. You can't do a Pet scan once a month that, you know, it's dangerous for your health.

At that sense, an MRI, it's a little too high level, you know, you see, if neurons are there or not. With our technology, we would be able to track sensitively how someone's cognitive ability is changing.

And ideally, we can stop this disease before the symptoms become worse. Okay. I mean, it sounds pretty easy. From the patient experience. You get hooked up to electrodes, you watch a movie, it's easy to repeat and see if you're getting better, if your treatments that you're doing are actually working.

Yeah, the movie is a little boring. Not gonna lie, if you feature versions of it can be more fun. That could be a way to improve the product. But yeah, it's very simple. It's very easy.

You know, some people have used EEG before, and they're probably familiar with caps that are difficult to set up. You know, we work with a variety of EEG companies.

One of them in particular, you know, you can actually set up the device in less than five minutes. It's pretty amazing. They're they're using, you know, a saline solution for the electrodes.

And it's just so easy. So I just put it on, take it off. Really painless process. It's been amazing to be part of this industry and watch how these technologies have become easier to use.

Insurance, Access, and Clinical Use

Okay, so you're saying that they don't have to get the electrodes pasted onto their head and ruin their hairdo for the day, because nobody likes that about it.

Changes. Yeah. Yeah, exactly. Yeah. Okay. I'm talking about that specifically. You know there are non gel solutions that are incredibly powerful. You know medical grade EEG.

There are some really good caps as well that already have the locations just, you know pre-configured. So you don't have to individually electrodes on.

I've seen some systems like that as well. Yeah. No it's it's really quite incredible. And, you know, for our partners, we make sure that they get the, the best EEG available and they don't pay for it.

Got it. Okay, cool. So is this covered by insurance yet or is that still down the road? Yeah, that's a really good question. It already is covered by insurance.

There are CPT codes that we're that we use in order to make sure that the patient isn't paying more than $100 out of pocket. Fantastic. Love that. Okay. Great.

All right. And you said that the the results come back right away. So the patient walks out of the office that day with kind of an objective, measure of how their brain is functioning and how likely that pattern of functioning is to be correlated with dementia.

Right. Yeah. But we are taking it a step further than that. We're correlating it with the endpoints of dementia. So that way it's way more specific. For example, with Alzheimer's disease, there are different categories of Alzheimer's that, that cause different, you know, types of symptoms at different types, at different points of life for the person.

Some forms of Alzheimer's can reduce vision. Some of it is cognition that someone we talk about the most. I know people with Alzheimer's disease where it's their it's their ability to move that has been mostly, impacted, in a similar way as to Parkinson's.

And, as a result, you know, our ability to look at those endpoints, it really helps get the right intervention to the right

patient, because, you know, Alzheimer's may be a complex category of diseases, and it's important to look at, you know, the symptoms and, create the right interventions for the right type of disease.

The person who has. Interesting. Okay. So, James, I'm curious what got you into this kind of work. Yeah, that's a awesome question. And here I get to thank my parents.

My parents are both physicians, and they've always inspired me. I never wanted to be a physician myself. I had an issue with needles, and. And I get squeamish around blood.

But that said, you know, growing up with parents who are always helping patients and who know what it means to go into work on the weekend beyond called, you know, you're doing everything you can because you're saving people's lives.

And if you don't do your job right, you know, you you feel that guilt. And so I, I feel that guilt myself. You know, I'm a healthy person. I've read autobiographies about patients, you know, some of them who are completely paralyzed.

And that's what inspired my last company. And so I continue to stay inspired along the same path. I want to help patients. And I think that the biggest challenge we have right now is a neurological care.

I found out recently that, you know, the majority of wheelchair users are there because of neurodegeneration. It wasn't a car accident. It wasn't a fall down the staircase.

It really was a neurodegenerative condition that that paralyzed them. And so I think, wow, if we can diagnose timely, and properly, then there's no question in my mind that these diseases can't be prevented.

They are, in my opinion, metabolic conditions. What we've seen from the genetic effects is that they're there, but the genetic factors aren't necessarily as strong as the metabolic factors.

And so I have a ton of hope and and belief that these are preventable.

James's Motivation and Future Rollout

And so my goal is to prevent patients from suffering symptoms of these types of diseases ever again. That's what motivates me. And I'm very lucky that, you know, I'm already in this space.

I've started a business before in this category. I've I've patented in this type of technology. I've published, as well. And, you know, I got Nature Scientific Reports last year, which is exciting.

I'm just excited by the ability to help patients. And I get emails all the time from people asking to use the technology. And I'm so grateful for the clinicians who have decided to, you know, be part of the first wave of users and send the patients to their to their locations.

Yeah. And on that note, for, care providers who are watching, how do they find out more about getting this technology in their offices? Yeah. I'm easily, reached if you email James at Vista labs.com, that is my personal email.

Our respond right away. I would love to hear from you if you if you want to share your perspective, if you just want to say hi, you know, the relationship is totally in your hands.

I will share that we are rolling out our products in September to a new wave of US clinics. So if you're interested in being part of that wave, let's talk.

I am ready to give this technology to you for free just so that you can show your your, you know, you can evaluate for yourself. Its ability to help you with patients.

And one of the really great things is that, you know, we're not trying to charge a lot here. It's a reimburse technology. This this can help you generate more revenue for your clinic.

You can offer more services to your patients. I truly believe that with this technology out there, we can stop Alzheimer's disease and other neurodegenerative diseases in its in its process.

As soon as it's detected, we can stop it with the right therapy. We just need a way like what we have to to check that the therapy has been successful.

So if you are interested in being more involved, please also let me know. We're looking for all types of partnerships. I believe in collaboration. And that's that's the only way I've made it.

You know, I don't I don't think I've done this all on my own. It's always thanks to help that I've received, and, projects that I've accomplished with others.

Yeah, yeah. Love it. And, and one last question. For any, patients who are listening or watching, is there a way for them to find a doctor's office near them that offers this technology?

Yeah, that's a great question. I have to say that we are still on the newer side. We don't have a list available right now, but if patients reach out, I'm more than happy to help them individually with finding a clinic that can work with us.

Yeah. Awesome. Well, thank you so much. Thank you for the work that you do. The contribution that you're making to the field of cognitive decline. Thank you.

Appreciate it. And thank you for being here today, doctor Amalia, thank you so much. It's been really fun. Yeah. All right. Take care now.