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How Do We Improve The Diagnosis Of Memory Problems?

Amelia Scott Barrett, MD with James Hamet

Amelia Scott Barrett, MD
Hi there. I'm Dr. 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 has been my life 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 DrTalks. DrTalks aims to empower 1 billion people to get educated about their serious health conditions. Visit them today at DrTalk slash calendar to learn about upcoming summits. Hi everybody. Welcome to the reboot Your Brain podcast. I am your host, Dr. Amelia Scott Barrett. And today I have a very special guest with me, James May. James, tell us a little bit about who you are and what you do.

James Hamet
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.

Amelia Scott Barrett, MD
Wow. Cool. We have a lot in common already. 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?

James Hamet
Yeah. So thank you for the question. It's really hard for me as a person 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 MSI test or a mock up 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.

Amelia Scott Barrett, MD
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 to sort of see how they're thinking is going. Okay. So what do you think we should do to solve this problem?

James Hamet
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.

Amelia Scott Barrett, MD
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 that right? Yeah.

James Hamet
Yeah, I agree. And it sounds crazy. It sounds like not something that's realistic. But, you know, that's definitely not been my experience. There's a lot of ways to build this type of technology.

Amelia Scott Barrett, MD
So tell me a little bit more about that.

James Hamet
Yeah. Thank you so much. So 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 minds. And while I was building that business, I realized, well, if I can figure out what someone's thinking 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 this. Some labs with Nervo, 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 this. 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 is an area where there's compensation that's happening. Here's an area with some normal response to, you know, 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.

Amelia Scott Barrett, MD
So 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?

James Hamet
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 current 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 through 60. 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 have a neuron that, I don't know, detects that it's a line 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. 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 A.I., we can very easily say, okay, based on this patient's profile, how they 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.

Amelia Scott Barrett, MD
Okay. So just to clarify, you're talking about recording from the visual cortex, the occipital cortex in the back of the head.

James Hamet
Yeah, yeah. But surprisingly, not only that, the reason I say it's surprising is because we're not just showing pictures there. The animation component is very important. There's a bit of subliminal messaging 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.

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

James Hamet
Yeah, I'm so glad that you asked. So I think I think of visually evoked potentials 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 300? Did they observe that that was there? The challenge, though, is that the existing way of collecting ERP is it's it's it's a standard, you know, your RFPs are almost all the same there. There are some differences. If you have like a negative ERP type of thing, maybe you'll get 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 IP, but let's just say 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. It's stimulation.

Amelia Scott Barrett, MD
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 a 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.

James Hamet
Yeah, yeah. Because one of the things we're looking at, 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.

Amelia Scott Barrett, MD
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 having some cognitive symptoms. Your spouse is worried about you. You may or may not be, but your spouse is like, honey, something's wrong. We're gonna 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?

James Hamet
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 radiologist. 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 of visits, a spinal tap. Right. That's the most affordable option. My dad's done a lot of spinal taps. And 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 wear any edgy device and then you watch our video. Our video is between ten and 30 minutes. And at the end of the video, the clinician takes 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 result to expect. If you did a spinal tap, this is what to expect. These are the confidence intervals or our estimations of these tests. This is how you perform on a cognitive tests like the FC, SRT or a messy or MOCA. And so now you have this whole report of endpoints where probably most of them are healthy, but some of them are not. Some of them are indicating, okay, this specific diagnostics 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 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 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 end points and see how you've improved. And 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. 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.

Amelia Scott Barrett, MD
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. You can see if you're getting better. If your treatments that you're doing are actually working. Yeah.

James Hamet
The movie's a little boring. Not going to on anything. Sure, 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 5 minutes. It's pretty amazing. They're they're using, you know, a sailing solution for the electrodes. And it's just so easy to 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.

Amelia Scott Barrett, MD
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 changing. Yeah. Yeah, exactly. Yeah. Okay. Talk to talking about that specifically. You know, there are angel solutions that are credit bleed, powerful, you know, medical grade EEG. There are some really good caps as well that already have the locations just preconfigured. So you don't have to individually put electrodes on. I've seen some systems like that as well.

James Hamet
Yeah, no, it's really quite incredible. And you know, for our partners, we make sure that they get the best EEG available and they don't pay for it.

Amelia Scott Barrett, MD
Got it. Okay, cool. So is this covered by insurance yet or is that still down the road?

James Hamet
Yeah, that's a really good question. It already is covered by insurance. There are CPT codes that we have that we use in order to make sure that the patient isn't paying more than $100 out of pocket.

Amelia Scott Barrett, MD
Fantastic. Love that. Okay, great. All right. And you said that 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?

James Hamet
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 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's the one we talk about the most. I know people with Alzheimer's disease, where it's their is 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 has.

Amelia Scott Barrett, MD
Interesting. Okay. So, James, I'm curious what got you into this kind of work?

James Hamet
Yeah, that's an awesome question. And here I get so 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 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 weekends, your uncle, 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 feel that guilt. And so 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 in 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 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 belief that these are preventable. And so my goal is to prevent patients from suffering symptoms of these types of diseases over 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 patented and this type of technology I've published as well. And, you know, I got nature's 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 locations.

Amelia Scott Barrett, MD
Yeah. And on that note, for care providers who are watching, how do they find out more about getting this technology in their offices?

James Hamet
Yeah, I'm easily reached if you email James at there's some labs dot com that is my personal email I'll respond right away. I would love to hear from 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 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 reimbursed technology. 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 process as soon as it's detected, we can stop it with the right therapies. 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 the only way I've made it. You know, 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.

Amelia Scott Barrett, MD
Yeah, yeah. Love it. 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?

James Hamet
Yeah, that's a great question. I have to say that we are still on the newer side, that 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.

Amelia Scott Barrett, MD
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.

James Hamet
Dr. Amelia, thank you so much. It's been really fun.

Amelia Scott Barrett, MD
Yeah. All right. Take care now.