Can You Train Your Brain Like a Muscle? Transcript

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Introduction to brain health and the podcast

The brain is not as big a mystery as people like to, Oh, it's, you know, there's nothing that we can do. That's bull. There is a lot we do to fix your brain, but just get some tools and do it.

And don't, don' just say, oh, time to go to the nursing home. No, out of the fricking nursing. It's not a good. Yeah. You can. Do it by doing exercises and you.

A few other things, monitoring your. Brain function can really, really help. Everything is connected and I'm here to tell you how. I am Dr. Laura Hanson with Connect My Brain.

This podcast is for moms who are concerned about their child's development. The brain impacts our mind, body, and overall health. I explain how your brain is wired, what happens when it's out of balance, and how early childhood development not only impacts your child but can affect you as an adult years later.

Want to know how to improve your life? Join me and learn about your amazing brain and what it can do for you. Hey everybody, it's Dr. Laura with Connect My Child's Brain.

But you know me, I like to say connect my brain, connect your brain. So welcome to the show. I'm pretty excited about this because we're going to be talking about brain health.

and how we can really have really good tools that we Can use at home, especially, you know, depending upon where you are in the world. But of course, if you ever have an opportunity to come to the office, we'd love for you to Come to The office.

but today we have Mark Tommerdahl with us and he has a program called Brain Gauge And I'm going to let him really explain it because we just had a fun little conversation and I wanted us to get going so that we could get this information to you.

So Mark, thank you so much for coming on the podcast and tell us, tell about you, Tell us about BrainGage. Yeah, thank you. Thanks for having me and tell you about brain gauge is a product of 45 years of research.

Meet Mark Tommerdahl and BrainGauge research

And it's basically, I went to university, North Carolina as a grad student and started studying how, as I graduated in 1980 and starting studying, how the brain worked.

I studied this in the animal lab, but then, you know, for about 20, 25 years, But we were always studying what we call fundamental building blocks and I do love physical analogies to the brain because when people say, what the heck is a building block?

Well, your muscles are building blocks of how strong you are. That's one way to think about it. One thing that we always do is we studied how the brains worked in the lab, but then we wanted to say how can we measure how well people's brains are functioning.

And so we want to study, you know, basic building blocks in humans. What we did was develop this brain gauge. The braingauge now, which has lost 100 pounds in 20 years, I'm holding it up.

It looks like a computer mouse, but it's really not a computers mouse. There's a lab in a mouse where it vibrates your two fingertips. and what it is doing is it driving information into your brain.

And a really, really accurate way, a high fidelity way to target different places in the brain and get them to talk to each other. And how those different place in brain talk with each is a good way of studying it.

We use these techniques to study all kinds of things and many, many different areas and developmental disorders like autism and ADHD and Tourette's and the generative disorders, like Parkinson's aging dimensions and pain disorders.

Any neurological disorder you can think of and traumatic disorders was a big one too. Things like the eyes and concussions. And you know, the big question with concussion was always, how do you when somebody's ready to return to play?

You know somebody gets injured and you want to make sure everything's back to normal and totally healed before you, you're okay. So anyway, so we've got about 150 publications that targeted all these different areas.

And when I say we, I mean, we work with a lot of different people. We sort of with, a lotta different researchers around the world. But what's more exciting is what we did was we found all these measures that are really accurate and really objective ways to differentiate, say, somebody with ADHD from somebody without ADHD.

or somebody with concussion versus somebody who didn't have a concusion or, you know, somebody, who is aging or had a stroke or people who. weren't impacted by unhealthy aging.

And so what does that all mean is like you have all these measures and that's just kind of like, okay, this is a way to measure and see what's going wrong.

So for a long time, what we did was we helped a lot of clinicians out and said, all right, let's see if these interventions are working and we could track and if somebody's interventions were working.

So if they were getting treated for something, they'd get better. But then we developed said, well, if these measures are getting better, that means they're getting.

And it does, it actually does mean they are. Getting better and we develop the, what we call the brain gauge gym. It's designed just like a physical fitness gym it's just going in the weight room.

And it's working out with the brain gauge so that you can strengthen different building blocks. And those different blocks really do contribute a lot.

For example, we have exercises that improve your focus. A lot of people are using this for kids with ADHD and seeing if they can improve their attention.

Well, before we go too deep, I think there's a few things we got to clarify. So how do you do the assessment? What's part of the assignment to figure out what somebody needs to work on?

Sure. Like I said, what we're doing over there, we were just vibrating your fingertips and then we are asking questions. And those questions start out, and when you are doing the assessment, it's just a little bit like reading an eye chart.

It starts out really easy and gets harder and harder. But when we vibrate your fingers, were asking really, easy questions, which one came first or which lasted longer.

or which one was felt bigger. And those questions, what we deliver to the fingers, What type vibrations we delivered can be very complex. The questions are always really, really easy.

But we can learn a lot by how you answer those questions. So you're changing the frequency that's being perceived? Frequency and amplitude. It's like a sine wave that we're delivering.

And think about it, sine waves gets bigger and smaller, or it gets faster, higher frequencies. Different frequencies target different parts of the brain, different amplitudes.

drive the brain to communicate better. But these are all measures of connectivity on how's the Brain connected, how are different parts connected together.

And that's kind of the cool part. So what does a test result look like? looks like a bar chart. What you see on the left is you're vibrating the fingertips and that's what we do.

We're actually vibrating both fingers and then targeting these different mechanisms. It's not important if you remember which mechanisms they are. That's all nerd speak for different functional aspects or different fundamental building blocks.

lateral inhibition and plasticity. They are basic building blocks of memory. So we never do a memory test. We just actually say, okay, what do you need to do to have a Memory test working?

And the questions are really simple. There's no language dependency. You know, and some people have better language skills than others. So that makes it a much more objective thing.

How BrainGauge assessments work

Let me show you what a little report looks like. And this is what each, in this case, this was tracking concussion recovery. This is day one after concussions.

We tried to make it, we, This has been a research tool for well over 20 years, but we made it very user friendly. And by that, I mean, red is bad, green is good, short is, bad and long is.

So on these bar charts, you just look at it and say, Oh, okay. Here's, here's what these different measures look like. And you can see from day one to day six, today, 14, there's a significant improvement.

This is all just tracking recovery of concussion. There were no interventions done here. But what we generally, what most people do to make it even simpler is they just track the plot.

They say, well, bottom left, you see this little graph, and you'll see that the overall cortical metric, the combination of all the measures shows that, this the over all corticometric is improving.

And that's just by combining all these measures together, You get a composite score. So that's basically what it looks like. And all the scores have different things.

Like I mentioned before, what has the brain gauge been used for? Things like trauma, neurodegenerative disorders, developmental disorders pain, even pharmacological insult, things like alcohol.

What does that have an impact on? even mold, stress, anxiety, depression. We've got papers on all of these things, but what I want you to really think about is that the whole motivation for coming up with these measures was to determine if you could improve your scores.

Okay. And so like with concussion recovery, yeah, you bump your head in a sport and you do recover, and then you want to track and see, because the time course of that recovery is different for everybody.

But then we came up with a way to train for, for taking people to a gym for their brain and the motivation for training is exactly the same. We want to make sure and see if that improves.

And so what I want show you just one more graph, but you know, what's the goal of using the brain gauge gym? And you. This is something where this is just a typical plot.

And if you see the red dotted line, this is dementia level performance. And that's what you get with stroke and brain injury and, or actually a lot of different neurological issues.

But this person, you know, in this case, they're about to take his car keys away, but he started training and as he trained, he got better and better, better until pretty soon he was closing in on elite performance that guy was 80 years old.

Talk a little bit about like the training. What does somebody do? So you get a metrics that shows you where they are, regardless of what the actual subject matter is.

But what does training look like? Okay. So can you still see my screen? Yep. I sure can. It says therapeutic. So like what I've got here is this is the brain gauge gym and there are 20 different levels.

And what? I mean is we have level one here. That's the easiest level two, three, four and five. Now, generally when you start, everything's great out.

Basically, that's the therapeutic level. There's also basic, basic plus, and elite. Most people can get to the basics level, but those 20 different levels start easy.

What I want you to imagine is going to gym. Here's your weight bench over here at speed. Here's your pull-up bar with weights on it. Here is your leg lift, etc.

These are all different exercises. And so with this exercise, what I'm going to do is I want to click on, you know, let's click, on number four because it's gray.

I've never used it, but you can click. On any of these at any time, again, just like going, to the gym, Just like, going and working out. but you say, okay, I'm gonna click here and it's gonna see, say click, give me instructions.

It says click each time I feel a tap on my middle finger. And that's what I am doing. I feeling a tab on the middle of my finger and each I fill the tab I gonna respond.

Basically, you know, if I don't respond fast enough I'll get an X. But right now, therapeutic drill is really hard to fail. We want to build confidence, so that's good.

You do. Therapeutic drill, the therapeutic side is for building confidence. And I just got off the phone with one of the trainers at one the schools where he's working with, one other kids, and they said, well, they got all the way through therapeutic levels one through five.

And then they went to basics and they said, well, I'm having trouble with basics. And I say, okay, so here's what happens on basics if you don't respond fast enough.

BrainGauge gym training and exercise levels

Okay. So I responded and I'll not going to respond on purpose this time. They said this level is not working. It's like, no, it's working there. Just not fast.

If you respond quick enough, then you need to back off. In other words, it's like saying that 200 pound weight did not work because I couldn't lift it.

So that's the way it works. And so each of these is a little bit different. That is the speed drill. Let's look at plasticity. Okay, the plasticity. This is a exercise for plastic city.

Yes. And let's go back to therapeutic. I have trouble talking and thinking at the same time. But what I'll do is I click here. Okay. It's going to just, I'm going get two vibrations at same.

Time. Oh, it's good to ask me, you know, which one is larger. And what's happening is I'm activating two places in my brain that are fighting for attention.

And basically it's competing. It's this contrast enhancement. Let's describe that because I don't know if everybody will get that. So you have two different vibrations and it's asking you, you got your fingers on it and asking to identify which one is more intense.

Correct. The light touch and the deeper touch is being registered in two parts of the brain. Correct. So everything, everything is done. Is all done with the brain gauge.

With the touch. You know, and audience, you've heard me talk about this before. One of my favorite places or one of favorite diagrams is the homunculus.

And that sketch is even being expanded to include how it influences circuits in the brain. And so if you pull up a picture of a homunculus and you spell it just like it sounds, H-O-M-U-N-C-L-E-S, and sometimes it's C- L- O- U- S, but you'll see the sensory motor cortex and the hands are the biggest parts on there.

The face is another big part. And then the legs are in the middle and. picture of the homunculus represents how much influence those body parts have. So creating this instrument with the hands, I think that's fantastic.

You started to tell me about the individual that had the stroke with a clenched hand. I'd love for you to share that one with my audience. Sure. So all exercises that we do are exercises of connectivity.

All the measures that do our measures of conductivity. And for most people, they don't really know what connectivity is. But way back in the 1970s, I started looking at things that I didn't even realize had to do with connectivity because I was interested in exercise physiology of the muscle.

And it turned out I found some papers in it and said, Oh, if you, you break your arm and it's in a cast, everybody knows. Oh it. Muscles in there are going to get weaker.

However, If you work out with the arm, that's not got the cast on it, your arm in the cast won't atrophy as much. And so those studies were done in 1970s.

Then later on, we studied this in brain. We studied it by, you know, looking at where do you get activity in your brain? And, most people just always just said the mantra, right hand, left side of the brain, and they don't ever talk to each other.

That's not true. If you look close, not at all. And so we actually found the connections at the lowest level of the entry level somatosensory cortex and study those interactions.

Then we studied basically with the first brain gauges, we did measures of connectivity between the two hands. Later on, You know, we've got a lot of clinicians using the brain training that I just showed you.

They're using that brain gauge gym to help people work out. And I got, a lotta people asked me, well, you know what do I do with my patient who had a stroke and they don't have the use of their right hand and the right handed.

I said, Well, have them use the left hand. You today, one of the recent stroke victims had spastic fist. couldn't use it and that he was in that condition for three years and he started using the brain gauge with his left hand.

Well, he's also was using a walker 30 days after he. Using the brand gauge, she got rid of his Walker and. And he also, he wasn't talking very well. And keep in mind, you think about that homunculus again, since you like the monculus is a good talk.

Stroke recovery and case study examples

So he was having trouble speaking, but in the homuculus, the hand is right next to the face. His speech got better. a week, another week later. And another weak later, he started being able to use his right hand.

So that was kind of fascinating to me. I was like, well, I'm starting to tell you before we were recording, you know, recently lost my mom, which is just such a hard thing.

But then when I come across somebody like you, who has this kind of a tool and if I had met you a year ago, there wouldn't have even have been a question.

I would have gotten it and I could have taken it to the nursing home and i could've used it with my mom. She had a clenched fist and you know, I hope nobody ever has to go into a nursing.

Home, i would fight that tooth and nail. Because they just don't get the care that they need and nobody is exploring anything and they look at somebody like my mom and They just She's gonna be like that forever and I give up and i'm listening to you and if I had tried that with my Mom because it was her left hand and she's right dominant I can't even imagine what we would have been able to have accomplished.

I'm so excited to hear about your work. So one of the questions that I had asked you, is this only available to people that go to a provider? Is this something that somebody can do for themselves?

do an assessment on themselves and then do the games. Is this available like that? Yeah, and we basically have units, home units for people with, you know, it's slightly different software for the people that are doing it at home.

It's for their whole family. And then we have professional units. Some people can get it from a provider and some people, if they don't want to go to a clinic to get one, they can one directly from us.

And we do training, we have YouTube videos on how to use it. And. We have a lot of information and we had workshops for people to come through and get trained on, how do you use.

Oh, that's great. So we'd have at our workshops. individuals that are just doing it for themselves and people who, uh, and practitioners. who are implementing it in their clinic.

But then they'll see their patient once or twice a week, but then, they also get home units for their patients to take home. So anyway, and then the home units that they get from the clinic are tied to the professional units.

Oh, that's good. So the professionals can actually monitor. A professional can monitor their activity and see what the results are. Now, on your website, can people find maybe a provider that might be close to where they live?

They could just reach out to me because it's been a while. And quite frankly, the cost of the brain gauge is so it made, we really were dedicated to keeping the distribution costs low.

The Office of Labor Research sponsored us so we don't have investors. You know, this is not a real expensive device. That's wonderful. Okay, so let's look at a couple scenarios because I can imagine people listening to this going, okay, I'd love for you to kind of Give an example in the following areas of what you've seen or maybe your research showed, primarily looking at maybe like how long did it take before you started to see some changes and what kind of changes did you see?

Let's one, Attention is always such a big area. So let's have an attention example, an autistic example and a dementia. I'm going to share my screen again.

Okay, go ahead. And we're just going go through these case studies. Oh, great. That would be perfect. What we'll do. Okay, so here's a case study. Ignore everything to the left right now, but what you see is this is, we have different ways to display data.

But this person, she had a stroke in December of 2025. Okay. And, you know, then she tried a few things. Nothing

seemed to work. Then she started doing the brain gauge gem.

Three weeks later, her scores look like this. Again, it's somewhat intuitive. This is bad, this is good, but much better. And she also wasn't really walking, walking upstairs, not speaking very well.

This took two and a half weeks, two-and-a-half to three weeks to get to here. Now compare this, because her son had a medical practice in 2017 with a brain gauge, he had her scores on file.

So this was even slightly better than that. She continued to train. And this is her pose. This is what it looked like over here, but her post recovery progress looks like this.

And she scored extremely well now. She's doing very, very well. Her son says, well, you know, she's 81. And she's an executive for TurboTax. She's back at work, working full time.

So that's FK study. But again, right after a stroke, that the best time to do this. Yes, absolutely. I heard this 75 year old male who I mentioned earlier, and it takes him a little longer.

Now we don't have data on him before this because He was just doing the training that what I showed you when I should do that therapeutic brain gauge gym.

He did all of level one and then took it. It took about 20 minutes and took a two hour nap. So we don't have a data point for him, but that data pointed way down here.

But you know, he quit using his Walker here, his speech became intelligible here full use of right hand here so it takes a little bit longer. Here's another stroke victim.

He had a stroke 14 years ago. Wow. A lot of trouble with communication and handling the brain gauge. The clinician actually had to hold his hand on the brand gauge and give him some help at the beginning.

Each of these tick marks is when he was using the BrainGage and doing a training for it.

Home use, providers, and monitoring progress

Over here, this is, when the clinician asked him a question and normally, you know, the white, his wife was standing was there and to interpret because he could only make you know, monosyllabic sounds and he was, had very unintelligible speech.

He responded in a full paragraph and his wife fell out of her chair. I mean, she was blown away. So. Here's another case study, there's dementia and early decline.

And so we recommend, you know, if you have effective interventions and by all means do those interventions as well as the brain training. She was being treated a couple of times with transcranial laser therapy, but then she also, each tick mark, she was performing daily.

and I asked the clinician, well, how's she doing? Now I said, Well, your scores are clearly good. He goes, Oh my gosh. You know, she's doing fantastic.

He said what I, what he didn't understand was why did she all of a sudden get better right after three weeks? And I said, well, training doesn't happen overnight.

It's just like going to the gym. Again, the physical analog, but we know about muscles is like, if you could start training, it's going take two to three.

Now, a few of atrophied a lot, is going. Sure. Here's a couple of more. These are people using both isis and the brain gauge shim. Over here, they were doing just microcurrent nerve feedback before the dotted line.

After that dotted, line they're doing the micro current nerve, feedback plus the bring gauge gym. They look very similar and they are different. Here is the 80 year old with dementia.

He was doing hyperbaric dives. And then when he started doing, hyper baric, dimes plus spring age gym, also needs getting much better. This is the part that I, like I do a lot of speaking and I one of the things that, I constantly try to get providers and, and people involved in healthcare to understand if you don't include the brain, it's going to go much slower.

Yes, it is. You have to put the brain into the equation. Yes. Well, this is really great and if you have anything that you can share with us, we'll put it in the show notes because I'd really love for people to See this especially right now if you're in the car and and you just listening and your going I'm not really sure what they're doing right.

Now. We're showing the different reports the the changes that people actually went through and I would love to be able to share that with the audience But what about like how do people find you?

What is your how to people finds your website? How do they get in touch with you Type in brain gauge, B-A-R, brain, like brain. And then gauge not gauge, G- A-U-G-E.

At our website. Why don't you clarify that? That's great. And when you ask about a couple of things, so I'm skipping through the case study. We have a lot of case studies.

I just, we've got some interesting one. This was a very interesting. One, this 33 year old individual with autism. He was doing, you know, he got lots and lots of different treatments at this dotted line.

Is when he started using the brain gauge treat gym half weeks after he start using it. I got a call from the, uh, director of the wellness center where he was.

And she said, Oh, this guy's mother's in here in tears. Oh gosh, what'd I do wrong? She goes, no, he's she's overwhelmed with how well he is doing. She's a little scared because he wants to drive.

Now, because now he also knew he was doing it.

Autism, ADHD, and broader applications

You know, autism is kind of the poster child for disconnectivity. Remember I said, these are all exercises of connectivity that we have them do. Connectivity is a functional building block.

These are not playing games on a phone. They are doing exercises. This is going to the gym and being serious about doing some interval work and cross training.

with your brain. So we've, we'd seen similar success with ADHD and, and autism. Let me see. ADHD all by itself or brain training all, by its self, you know, after a few weeks.

A lot of these kids, a lot people are using this in their clinics to try to get adolescents off meds or just try to improve their attention without med.

And so that's been pretty successful and you can see some of the times this is pretty, pretty fast. I mean, relatively talk about a kid who's had attention issues their whole life and all of a sudden they're, they are doing much, much better.

We're going to wrap it up for today. I really would love any information that we could put in with the show notes to kind of show it and then tell them again how they can get in touch with you.

Sure. They can email me. Well, I'll just put it in the show because my name's too long, but you can mark.tommerdahl at gmail or mark at corticalmetrics.com.

Either one works. Okay, great. Last question. This is kind of like my wrap up. If there's one thing that you really want people to know about brain gauge, what is it?

The whole point of braingauge is to make sure you can keep your brain healthy. Number one, I don't care how you keep it healthy, but at least measure it, track it.

And, you know, two parents with Alzheimer's. I mean, it just that's, and it could have been largely we're seeing people turn that kind of thing around memory loss around by just paying attention and.

You know, it's not a mystery. The brain is not as big a mistery as people like to, oh, there's nothing we can do.

Why brain tracking matters and closing remarks

That's bull. There is a lot we do to fix your brain, but just get some tools and do it. And don't just say, Oh, time to go to the nursing home. No, no out of the fricking nursing.

It's. And you can do it by doing exercises and you know, a few other things, but monitoring your brain function can really, really help. Well said, I'm so glad that we got to have this conversation.

You are like a brother from another mother. I love it. Well, everybody, thanks so much for tuning in. If this inspired you or you go, gosh, if this could help so-and-so share the podcast, let people know.

That's why I do this. I like to bring really exciting people like Mark to the platform so that other people can hear all this information. And just like he said, there is so much we can do for our brain.

and we're trying to give you the tools to do it. So thanks for tuning in and as always, be blessed. Thanks for listening. I hope today's lesson will help you or someone you love.

Do you have a question or just really want to talk to somebody about brains? Connect with me over on Facebook or Instagram at Connect My Brain. Looking to understand and optimize your particular brain?

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