Enhance Your Function: Power Of Neuroplasticity Transcript

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Introduction and Garrett Salpeteru2019s Background

Welcome to the MS and Neuroimmune Summit. now I'm here with my good friend Garrett Salpeter he is known as "The Health Engineer," Garrett has been, taking his training in engineering and neuroscience and use it to create the NeuFit and patented NEUBIE device.

He trains physicians, therapists, and professional sports teams and universities how to apply NeuFit with their patients and their athletes, helping them recover faster from injury and optimize performance.

He's the bestselling author of the book The NeuFit Method and the host of The Undercurrent Podcast Garrett and I have known each other for years, and I've been using the NEUBIE for years.

as many of you know, electrical simulation was a big part of my rehabilitation. And I still do electrical stimulation, quite often, an hour a day. it's I love electricity.

It is really wonderful stuff. So welcome. Garrett. Did I miss anything? I think you touched on the high points, Dr. Wahls. Thank you so much for having me. It's. It's great to be here.

And I'm excited to to dive in and talk about this power of electricity there. And specifically how we can use it to help people harness the the power of neuroplasticity.

So let's talk about neuroplasticity, what it is and why it's so important for people with multiple sclerosis and other neuroimmune conditions.

What Neuroplasticity Means in MS

That's it's an awesome topic and I think it's worth just defining it. So we're all on the same page when we talk about neuroplasticity. You know, it's interesting that for for decades, you know, for for medical history, most of medical history, we thought that the brain and nervous system were fixed.

And when there was damage, it couldn't necessarily be repaired. And we were people were sort of stuck that way. And only in the last few decades have we discovered as a scientific community, this concept of neuroplasticity.

So we'll we'll define that as the ability of the human nervous system to adapt in response to environmental inputs. So one example of neuroplasticity is adaptation that we experience as children.

You know, if you grow up in a house here in in you know, I'm in Texas, if you grow up here, you're going to grow up learning English, possibly also Spanish, because you're hearing that in your environment and you're going to get very good at recognizing the intonations, the dialect, the words, etc.

whereas if you grew up in China, your brain is going to adapt to hearing the sounds and intonations of of Mandarin Chinese, for example. And so you're going to grow up, you know, speaking and hearing differently depending on those environmental inputs.

You're going to adapt to that. And the cool part about this, the relevant part about this concept of neuroplasticity is now we know that that even after childhood, even as adults, we still have some capacity to adapt and change, even after a neurological injury or a neurological damage from a degenerative condition like Multiple Sclerosis or other autoimmune disease.

So, so then if you know, if we're talking about someone who has experienced MS. and a decline in function, you know, hopefully they're doing the protocol and doing everything they can to stop the progression of the disease.

But now the question becomes, you know, once I've done that, the question becomes, how can we restore the function that's been lost? And so neuroplasticity helps describe the possibility to regain that function.

So there can be essentially two two parts to it. One is structural rebuilding. So if myelin has been degraded or broken down for example, it would literally be remodeling it and rebuilding that myelin sheath.

And then there's also the functional reorganization side where if one pathway is damaged neurologically, building a detour and using another pathway to fulfill that same require that same communication pathway or that same process or that same activity.

So there's there's two parts to it. And ultimately we all have some capacity for neuroplasticity. That's the exciting part. The question is how much capacity do we have.

And and what can we do to maximize and tap into it. And so that's, you know, if we're working with someone who has a mess and is trying to restore function, that's what we'll tell them is, look, we all have this capacity.

We don't necessarily know whether you have the capacity to make this much improvement or make this much improvement. But as we go through the process, we'll start to see how you're adapting and get a sense of the trajectory and and see, you know, how far we can go.

And then, of course, for everyone who's listening, I want you to know, we can also have neuroplasticity in a negative way. I look at all the people looking at their smartphone, hunched over, looking down, down, down.

And we are we we're not using our, skeleton and my neck in a normal fashion. So it's getting we're getting contractures. So neuroplasticity can help and can harm depending on your daily choices.

100%. And if I may just add a little bit to that too, there is a dark side to neuroplasticity. I'm so glad you mentioned that. And some of it also has to do with I mean, yes, you know, negative structural changes if we're hunched over is a is a fabulous example.

There's also this concept of use it or lose it. So all of us, even without any neurodegenerative conditions, have this this requirement for movement. It's like, you know, we have a requirement to brush our teeth twice a day.

You can't just brush your teeth once and you're good for the next month or a year, right? We have to you know, we have the same thing with movement requirements.

Movement is like nutrition. And so if we don't move our bodies we actually are sending the signal. So structural yes. Tissues you know will will stiffen and we'll lose range of motion that way neurologically, energetically we're also sending a signal hey we're not using these pathways.

And guess what? It takes energy and resources for the body to to maintain neurological pathways and maintain muscle mass, a lot of metabolic energy to do that.

And so if we're not using those, the signal is, hey, you know what? We don't really need this. And our brains are oriented towards survival and protection.

Our brains evolved in a time where there could be a famine tomorrow. So if we're not using neurological pathways or muscles or tissues of the body, the brain says, hey, we can we can stop doing that.

We can conserve energy and we can shut that down. So when you have a neurological, neurodegenerative condition, it's even more dramatic. But we're all subject to that dark side of neuroplasticity.

So I'm so glad you mentioned it. The big lesson I want everyone to hear us.

The Dark Side of Neuroplasticity

There's, it's important for us to pay attention to the fact that our brains are continually deciding what part of the brain we're going to keep up, and what part of the brain we're going to let go of, and what part of our bones we're going to keep, and what we'll let go of, what part of our muscles we're going to keep, and what we'll let go of.

and so when you're working with your patients, how do you help them use the positive parts of neuroplasticity? So we are best known for the NEUBIE device, which if people are watching can see, see one of those behind me at my home unit there?

we're best known for using the NEUBIE device and the direct current here. So it's direct current as opposed to alternating current. And this allows us to communicate with the nervous system in a much more powerful and precise way, so that we can actually stimulate as much of this neuro plastic adaptation process as possible.

And so just to understand some of the backstory here, it's worth delving into some of the history. There's these benefits of direct current that were known back in the 1960s and 1970s, but there was always a problem where a direct current would sting and burn the skin, and it was in a case of the baby being thrown out with the bathwater, where as a field, you know, electrical modalities, electrical technology essentially cast aside direct current.

And in its place came alternating current. And so that the tens units, the Russian stem, the inter pharyngeal, all these things that that people may be familiar with are, and what you used in the early 2000s, you know, when you, when you had your experience know helping yourself recover from, from the depths of your arms, challenges there.

You know, those are alternating current. I know we've talked about how you had to use those for hours and hours a day, whereas the NEUBIE, you know, you can get similar benefits, for example, in one hour.

So so some of the differences and why that matters, why we'd want to use direct current instead of alternating current. there's two main two main reasons.

One is this ability to send a lot more sensory input into the nervous system with with alternating current. As that signal volleys back and forth, you get these muscle contractions, a little bit of a stress response also because alternating current is foreign to the body.

How the NEUBIE Uses Direct Current

direct current is what we run. Our nervous systems run on direct current, so there's no protective reaction against it. And we can bypass a lot of the contractions to get more sensory input into the nervous system.

So that means input. You know, we talked about environmental inputs are what drive neuroplasticity. So it allows us to accumulate a lot of input so we can help reach help people reach the threshold of stimulation that's necessary in order to drive these neuro plastic changes.

There's enough input where their brains are going to to make this calculation that we talked about, and they're going to say instead of, oh, we don't need that pathway, we're going to shut down to save energy.

It's going to say, oh, hey, we're using this pathway a lot. So gosh darn it, it is worth investing the energy and resources to upregulate that pathway and to maintain it over time.

So it's about getting enough of that input in there. So direct current allows us to have this functional effect on the nervous system. It's very powerful.

And there's a separate a second category of benefit which is the effect on structure or remodeling. And the best way to think about it is think of think of an electric field, sort of like a hill.

You know, if you have a hill, there's an incline. If you put a ball at the top of the hill, it's going to roll down hill because of gravity. Same thing inside of an electric field.

Charges are going to move a positive towards the negative and vice versa. They're going to move and it's going to cause cell migration. It's going to influence the healing process.

And why does that matter? Well, I'll give you one example. We completed a study with 150 diabetic neuropathy patients. So a different population from EMS.

But very relevant in terms of, you know, some of the histology or some of some of the effect, the damage to the individuals because there is the myelination in these patients as well.

And so we actually we were able to take 150 patients and divide them into two groups where one group got traditional alternating current electrical stimulation like a typical Tens unit.

And in that group we saw what, you know, people generally expected with diabetic group, with the patients in their 70s, which is little to no progress, not much happening.

However, the other half that got the NEUBIE got the direct current treatment of the NEUBIE device saw profound changes. You know, subjectively they were seeing improvements in sensation, reductions in pain, better balance, better ability to go about their activities of daily living.

And objectively, it was fascinating. So we used EMG and nerve conduction velocity testing. So I actually like putting needles into the nerves to measure the amount of electrical activity in the speed of which it's going.

There. And we saw objective improvements in the nerves in just, just six weeks of treatment. So we're seeing the direct current. So one of them was nerve conduction velocity, which just to close the loop there does mean there is a change in myelination.

There's re some sort of re myelination happening some degree of re myelination. If you're seeing an increase in nerve conduction velocity also increase in EMG amplitude.

So some improvement in axons as well. But the the takeaway there is that we are seeing some of these benefits of direct current here on tissue healing and regeneration in humans.

A lot of the previous research was in animal models. To our knowledge, this work with the NEUBIE is actually some of the first showing these effects in humans, and we're very excited it may be published even by the time this is really your process right now.

You know, people have said reimagination is not possible. Reimagination is possible. We do have the, the, the instructions in our DNA that can supervisory myelination.

We have to provide the correct inputs and the correct nutrition. and, part of what I think I'm hearing you tell me is electricity is part of the nutrition that you're providing, to the nerves that. Would that be correct?

Yes. No. You know, I sort of talk about the movement generally and, you know, especially this amplified form of movement when you're using the NEUBIE as a metaphorical nutrition for the body.

I think that I think that it's useful to sort of break this up into two categories to talk about how we need the the stimulation of the, you know, of something like the NEUBIE or a significant amount of high quality exercise and movement.

This is just a way to get that input faster and more efficiently, and usually more safely. we need that and then we need the raw materials and the support.

So we need the nutrition. we need, you know, we we certainly encourage the wireless protocol. definitely sleep as well. Where the, you know, we need to have the raw material.

We need to have proteins to rebuild all the structural tissues of the body. We need to have enough fat to rebuild myelin tissue. and then sleep is a lot of when that happens.

Deep sleep, of course, when the body rebuilds tissue. REM sleep is when we we integrate memories and learnings from the day and make changes and neurological connections, rebuild, you know, neurons and the connections in between them.

So, that's vitally important too. So I sort of make the distinction between the stimulation and then the, the physiological support for that. And we need it.

those are the main areas to focus and not both. You know, one of the things that I saw as I was looking at the research is the impact on nerve growth factors.

Brain drive, neurotrophic factors, which is a signature molecule in our in our brains that helps guide, the, connections of synapses, the repair of the, myelin, the maintenance of the axons.

Research on Nerve Healing and Remyelination

And when you exercise, you make more than enough. If you add electrical stimulation plus the exercise you make even more enough. and so, yeah, I think that's why, you know, early on the first several years that I was doing the electrical stimulation, man, I could tell that, my brain really liked, the electricity.

I don't know, but I'm assuming that that was in response to making more Bdnf. I totally think you're. You're on to something there. we, you know, there is there is great research on Bdnf production with exercise and that's, you know, we don't have any studies specifically with the NEUBIE, but that's our our understanding is that it's amplifying those same effects, those same known pathways, just amplifying them even further.

And anecdotally, we see, you know, there's a lot of there's a lot of known benefits of exercise on on mood psychology, you know, cognition. And we we certainly hear people report those benefits.

And again, it just speaks to the benefits of exercise on brain function overall. So just just to kind of underscore and amplify what you're saying. Yes.

I'm asked again and again, is it this just like Attenzione unit, could I just use a Tens unit. So I'm going to have you address, because there are over-the-counter Tens units that are very cheap and expensive and people are messaging me all the time.

They just want to use their those tens units. But what's different between those units? in the NEUBIE. It's a good question. And, you know, if people look at it and they see electrodes on the skin and, you know, these electrical signals, you know, I certainly can understand why people would would think that or that's sort of the frame of reference.

And the difference I would describe it is that they're they're both in this world of electricity. And so there is some overlap just the same as if you have a rotary telephone from 20 or 30 years ago and you have an iPhone from today.

They're both phones. And so there is some overlap in what they can do. But with the iPhone there's just so many more things you can do. There's more apps you can text, you can access the internet.

It's like having a computer in your phone, whereas they both can make calls or just more you can do there. So you, the NEUBIE, is like the iPhone. There's just a lot more that you can do with it.

Still some value even in those alternating current units. But it's going to be limited. It's going to be limited because you're using alternating current, so you're not going to get as much input into the nervous system.

You're not going to get that effect on tissue healing that you do with direct current. And part of the the you know, what makes this special here is that, we talked about those benefits of direct current, and we talked about how historically that that kind of category got thrown out because of the issues, was stinging and burning the skin.

So that's part of what makes this special, is we actually have multiple waveforms and a very sophisticated the sophisticated engineering in terms of the signal to be able to get direct current into the body to harness those physiological benefits, but to still have the comfort of alternating current to bypass any of the stinging and burning.

And so it's, it allows us to and allows us to get those, those functional benefits, those structural healing benefits and so we've seen just incredible results.

we have a case series published looking at using the NEUBIE with patients for Functional recovery in MS. and that I could share the link of course, for this year.

and then, you know, we have hundreds of, providers, physical therapists, chiropractors and related professionals using this around the country. We have, you know, dozens of Ms..

Patients who have come to see us in Austin. And, you know, I can't tell you how many dozens or hundreds of times people tell us, like, oh, yeah, I've tried that tens unit or I tried other stuff at my physical therapist or chiropractor and I just get so much more out of this.

So, you know, we hear that time and time again and there's some explanations as to why. But, you know, sometimes I think it's one of those things that people have to experience for themselves as well.

Exercise, BDNF, and Electrical Stimulation

on that note. So. Yeah. Sorry. Go ahead. So how about you tell us, an example of a case study. Someone who came in significant disability that was able to achieve remarkable improvement in function.

There are there are many of those. I mean, we, we host, at least quarterly in our office in Austin, these, Ms.. Boot camps where people come in often from out of state or sometimes even out of the country, come in for a weekend intensive where they're doing two treatments a day and, often a group activity or learning or something together over lunch.

We serve all those compliant meals, by the way. And, at this so I, I, I think every single time I've been able to go and have lunch with the attendees.

And so. Hi, Tim, it's Friday, Saturday, Sunday, I typically go on Saturday and, I get to get to sit down and have lunch and get to know the people there.

And every single time, you know, at least two. If not, you know, all 8 or 10 attendees will tell me that just in the first day and a half, they're noticing they're noticing something like either their drop foot is improving, so their gaits a little bit smoother.

They're able to lift their leg up and cross their leg in a seated position for the first time in weeks or months or years. They slept better the night before for the first time in a while, because of this autonomic nervous system reset that we did.

So there's these faster changes that we see. And then that's great because it tells us that people are tapping into this dormant potential that's already there.

But then we also want to work on longer term. So so some people will will go and work with a provider, you know, back local in their own community and then some, we'll get a device to use a at home, either rent or purchase and work with our team remotely.

And so, you know, we hear these stories, you know, oftentimes, you know, a month or 2 or 3 later, people will be sending in videos. So, you know, I saw this video of a woman who had come to boot camp.

And then, we had a video of her gait and she, you know, is leaning very heavily on a walker and two months later we see her walking, walking with a cane down her street to the mailbox and back and actually lifting up her cane, taking a few steps without it, you know, night and day, night and day difference.

we got another video of a woman who had been a very accomplished pianist piano player and had Ms.. In her early 20s, which which, you know, derailed her career as an aspiring professional musician.

And now in her early 40s, she came in and she was working with us at the boot camp, and he was doing a lot of hand dexterity work with the NEUBIE connected to her hands through these electric gloves that we use.

NEUBIE vs. TENS Units

And about 7 or 8 weeks after the bootcamp, she sent us a video of her doing her exercises with the with the NEUBIE on and then playing scales on her piano.

And it was just so moving and so beautiful. And, you know, I'm just I'm getting chills thinking about it again right now. I know. It for many, you know, loss of hand function profoundly disabling because then it becomes difficult to write your name becomes difficult to feed yourself, and it's hard to do electrical stimulation, to the hand muscles, because the hand muscles are so small, so remarkably, exciting stuff.

what about the pain? Is past history big problems for the Ms. patients. The longer we have our illness, the more likely we are to have, spasticity. And also the more like we are to have issues with pain.

so both very interesting. And I think it's, it's worth sort of drilling down what on what's happening neurologically in both these cases. So let's talk first about spasticity.

We know that when you have a muscle there's basically two sets of signals. The nervous system controls the muscles right. Sends the signals that controls muscles.

And those signals tell muscles either to contract or to relax. So if you have spasticity, you essentially have an excess of contract signals and a deficit of relaxed signals.

And so there's an interesting little aside here that that is worth mentioning. So I want to ask the audience a pop quiz here, which is what do you think takes more energy?

Does it take more energy to contract muscles or to relax muscles? Most people are going to say contract muscles, but it's actually the opposite. And we know this because of what happens.

sorry, it's a little gruesome, but think about what happens to a corpse after death. The body goes into rigor mortis, right? So it actually takes energy to break bonds between muscles, between contractions, to maintain a longer, looser, more relaxed state.

The lower energy state is actually one of contraction. That's why a corpse goes, stiffens and goes into rigor mortis. and so the, the there's a couple of things going on there.

One is contraction is sort of the, the default state. It actually takes energy and neurological signal to send that signal to relax, to change from that default state.

It's like a system is going to go towards greater entropy unless you inject energy, a system is going to go towards the body is going to go towards greater tension and contraction unless you you give it cause to relax.

So sometimes it's a matter of, you know, raising the energy of the body is metabolic things that you can do in the

walls. Protocol is super relevant for that. A lot of times.

It also is very important that that you, you find where there's deficits neurologically in the body. And what I mean by that is if the brain can't see an area of the body clearly enough.

So this is proprioception, like if I, if I'm walking around my room here with my eyes open and there's obstacles on the floor, I can navigate around them easily.

But if my eyes are closed, I'm going to be walking a lot more slowly. I'm gonna be a lot more protected and a lot more, concerned that I might run into something because I don't have that proprioception input.

I can't see where my body is going in space. And so the brain sees, you know, sees in air quotes are limbs in the same way. And if the brain can't see the parts of the body as clearly, it doesn't know what's going on, it doesn't know where to send that signal to relax.

MS Case Studies and Functional Recovery

And so restoring that neurological communication, like we do with the direct current and going through this mapping process and identifying where any of these neurological deficits are going through that process, allows us to restore the communication in a way that restores the body's ability to send those signals to relax and can oftentimes help with spasticity.

So the NEUBIE, for example, is even FDA cleared for reducing spasticity. That's a little bit of the underlying neurological reason as to why, and then pain.

Pain is also interesting when you look at it neurologically. A lot of times we, we think like there must be pain sensors in the body, and if we touch something, it's like, oh, that pained me.

But in reality, the there's, there's, receptors in the body that report threat and the brain creates a signal of pain. So if you're if someone tells you, you know, your pain is all in your head, you can say, yes, it is.

And so is it true for anyone who experiences pain? Pain is created by the brain. It's the brain's way of saying, pay attention to that or stop. Don't do that, or trying to get us to change our behavior.

And so what we want to do with pain is literally go through this same type of mapping of the nervous system process to find where there is an elevated perception of threat or hypersensitivity, and then stimulate those areas and teach the brain to recalibrate, to teach the brain that it can actually, it can actually allow that area to function.

It doesn't have to protect quite so much. And so, reeducate the nervous system, neuromuscular education. But being able to, to, to find where that hypersensitivity is and then give the brain a chance to see that so we can say, oh, okay, I get it that we don't that actually isn't that actually isn't, you know, something we need to react to.

And I love that love this metaphor of like, you know, so if I'm in my office here and a venomous snake comes in the room, you know, it's appropriate for me to to have a reaction and kind of jump to it and come to attention, have an adrenaline rush, because I might need to run away or I might need to defend myself right.

But if I if I react the same way when my my eight year old daughter throws a toy rubber snake there, I react in the same way. I'm, It's excessive, right?

I'm wasting energy. I'm I'm I'm getting the troops ready for battle when there's no battle to fight. And that's going to be wasteful. That's going to just, you know, be harmful and damaging to the system.

If you're in that state too often. So it's essentially teaching the nervous system of the brain to recalibrate its response. Pain can be appropriate, you know, when there's damage.

But oftentimes pain happens, because there's an excessive reaction in the nervous system and it can be recalibrated. Okay. So I also don't want to summarize, some of the benefits, certainly that we're seeing, for people who have spasticity, a very difficult problem for people with MS.

that the NEUBIE has been a very helpful tool, to reduce that spasticity, pain is very, very common, for people with MS. That the NEUBIE has been helpful, for reducing, pain as well for, muscle weakness.

whether it's in your hands, your legs, your butt, your belly been very helpful for that. I'm thinking about drop foot, a very, very, very, very common problem for people with, MS.

is this helpful for recalibrating, the drop foot so people are stumbling and tripping over their toes? We've seen seen a lot of benefit there. Sometimes it's it's comes online more quickly.

Spasticity, Pain, and Drop Foot

Sometimes it takes longer. but we, we often see benefit there. So if someone's experiencing that, this is definitely worth trying. Yes. Okay. So, so we have, I know many, many people listening who are now intrigued or thinking like, well, I'd like to try, the NEUBIE the NeuFit.

What are the ways that they could, have a trial? How does that how could that help? So the best thing to do would probably be to go to our website. there's a special landing page at www.neu.fit/wahls that's neu.fit/wahls. And, on the website there we have, you know, opportunity for you to reach out to our team.

There's a directory of, of providers, physical therapy, chiropractic and other professional clinics that have this. You know, in the US, there's several hundred at the time of this recording.

and then we have some coming, coming online in other countries as well, in Canada, in Australia, a couple in Europe. So there's, there's clinics where people can experience this locally.

if for some reason it's better to work directly with our team, we have these quarterly MS Boot camps in Austin. we also have, you know, dozens or perhaps hundreds of people who who get a device at home because it makes more sense rather than going to a clinic every day, you know, having something or four days a week, you know, having a device at home where you can use it, like you said, Dr. Wahls you know, you like to do this an hour a day.

There's, you know, customized programs where people can do, you know, 10 to 30 minutes of more intense work and then some more, you know, before bed relaxation work to activate the vagus nerve and prepare for sleep, or use some mobility work in one part of the day, and strength work and another segment of the workout.

You know, it can be tailored to, to people's goals. but generally speaking, you know, people can work with local providers. We certainly encourage that.

and then our team is available, you know, in case that makes sense as well. Well, Garrett, always love chatting with you. and, I also love my NEUBIE. it's a, wonderful, wonderful device.

again, tell people your website, and your Instagram. website. Is www.neu.fit. And then Instagram is @neufitrfp for rehab fitness and performance and just started this year.

How to Try NeuFit and Contact Information

A personal Instagram is my first name. first and last. Garrett. Salpeter doing some content on there. Would love to interact with people both on our business and my personal Instagram pages.

And, yeah, if anyone is, interested in this, please reach out. Our team is, you know, monitoring our social and, website inquiry channels and all that.

this has been wonderful. Thank you so much, Garrett, for, chat with me today. Thank you. Dr. Wahls has been a pleasure.