Rewiring Movement Through Sensation Transcript

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Introduction to Neurosensory Neurorehab

Help my nervous system access that strategy. It starts with sensation and I'm trying to get into those systems as much as I can. Connect to that sensation.

Movement is a sensory story. Hello and welcome to Root to Rise. My name is Dr. Amelie Slickle, your host functional podiatrist and human movement specialist.

Today, we are going to be taking a little bit of a dive into my approach for the chronic neurological patients. And we're going be exploring the role of neurosensory stimulation in neurorehab.

Now, oftentimes when we think about neurorehab and the neuro rehab patient, we about strength, mobility, of course, reestablishing motor patterns, but I feel that there is a great disappreciation for the role of sensory stimulation in these patients.

I'm going to share a little bit about my background, some of the stories of my patients, and then how you can start to think from this neurosensory lens as far as optimizing neurorehab.

So when we think about neuros sensory, neurosensor approach to neuro rehab. We are trying to optimize the brain stimulation. We're trying access these innate senses that are going to be critical to our perception and our relationship to ourselves.

This will include the senses of sight, sound, vestibular, eye movements, skin, joints, with proprioception, mechanoception. So from a neurosensory perspective, there are going to be four main systems that I want you to think about.

Again, I've already mentioned these, but to keep it a little bit broad, we have eyes, ears, joins and skin.

The Four Sensory Systems

Eyes are going to represent your visual input. So what are you seeing? What is your peripheral vision? Are you spotting? what Are the shades of the lights and any sort of haziness?

And then you also have eye muscle movements. Eye muscle Movements have been shown to actually stimulate the basal ganglia, which is part of how we control large movements such as walking.

going upstairs, large motor movements. Your ears are going to represent the vestibular system, but also sound. So the balance of the inner ear fluid and the outer ear canals, also with training or thinking about motor development based off of a tempo.

and then our joints are going to represent proprioception and the skin, particularly palm of the hands and bottom of feet, is going represent mechanoception.

So four main sensory input systems and from a neurosensory, neurorehab perspective, I am always thinking about how many of these systems can I stimulate at one moment?

So as I have that patient doing a balance exercise, how am I accessing their feet? How am i accessing the joints? What am doing for their vestibular system, their visual system?

And I'm trying to get into those systems as much as i can. And this is called sensory stacking. So by sensory stack we are waking up that brain and we're lighting up your somatosensory cortex.

the more that we can activate that somatosensory cortex, we are going to support sensory feeding motor. And this is the way that it works. Sensory always precedes motor, sensory shapes motor so if we're trying to reestablish movement in motor patterns, what can we do to optimize neurosensery?

Now, to really understand this and to kind of hit it home as far as the power of the neurosensory system, I want to share two patient stories. Now the first story, i actually saw this patient a couple weeks ago and she was a spinal cord injury patient.

She actually was going in for a procedure. she had a stenosis of her spine c5 c6, went into surgery, woke up, paralyzed.

Sensory Stacking and the Spinal Cord Injury Case

They had injured the spinal cord when they were doing the surgery, so she woke up unable to move her body from the neck down in this hospital bed. This was two years ago that she had the injury.

She went from being bedbound to in a wheelchair to when I saw her in my office, again two year after the injuries, this was a couple weeks ago, she's now using a walker.

Now Why I want to share her story is that she was initially when she went through her initial rehab spinal cord rehab to try to get her into again from bed bound to wheelchair to in a walker.

For whatever reason, they were having her wear thick socks. She was always in shoes. They were trying to just kind of create soft, pillowed comforts on her feet and lower legs.

And then it was a couple months ago, that she was introduced to Noboso. And she introduced Nobozo from one of her neuro rehab specialists through SciFit.

So I actually do want to give a shout out to SciFIT, who we work with a lot at NoBoso, but they introduced the Nooboso products. Two years after the spinal cord injury, she had no stimulation to her feet.

Finally experienced stimulation through the Noboso products, again two years later. what happened, like she felt her mat and then she started to get this tingling up her legs.

She could start to actually wiggle her toes again. she would feel, you know, zings and electricity and just like her brain was waking up as soon as she starting to stimulate the bottom of the foot with the textural products at Noboso.

So long story short of that, that helped her really accelerate her neuro rehab and her goals to walk again. She came to see me and she had wanted to understand what are all the other neurosensory approaches that she could bring into her neural rehab.

So I want to share a little bit about what I was sharing with her. And she was actually quite strong for someone who had a C5, C6 spinal cord injury, navigating really well and really strong in her walker.

But what I had said to her is, I need you when you are doing your neuro rehab, whatever facility it is that you're going to or when were at home, is I needs you out of your shoes.

I needed you to be barefoot so you can stimulate the skin in the bottom of the foot. I need you to access the nerves that are on your hands. So we actually wrapped the neboso material around her walker, the handles around, her Walker.

I gave her nebo so sucks to put into her shoes when she's going to use that. You of course could use the insoles as well. And then I had her add in as much as she could to connect to her perception of gravity.

So we were using weighted vests, wrist weights. I had her using dry brushing and I told her husband to dry brush from the tips of the toes all the way up through her hands.

And then once she does that, we are going to to the diaphragmatic breath work and theway that the diaphram connects to your pelvic floor. so we can start to access the fascial system and the facial slings and how your body relates to gravity when you are upright.

Because at the end of the day, if her goal is to learn to walk again, to go from that walker to a single cane to no modality at all and to be fully walking, I told her that you need to feel your body in gravity and you have to be able to stand on one leg.

That is critical. It's a critical component to walking. And the last part that I wanted to share of what I added in with her was visualization. So I told her the way that I want you to do this is you are going to either dry brush or you're going do the Nero stick, have your husband help you if you need and we're gonna stimulate all of the thousands of nerves in your skin and your superficial fascia and then we are gonna lay there, lay in bed so you feel safe and comfortable and you were going visualize, you gonna visualize yourself sitting in you bed turning and standing up feeling nice and strong And I just want you to walk to your bathroom and then you're going to picture yourself again, lying in bed, sitting up, turning, standing up nice and strong, and you are walking to the bathroom.

And as I want to do this over and over, because what happens is that when you visualize your body doing something, research has shown that visualizing an action, a motor action actually stimulates motor neurons.

So we're starting to lay down the foundation of the activation and the development of these motor pathways to get her into her goal of again sitting up and walking without a walker or a cane.

Now if I were to add this in even more, I would probably say as you were doing that visualization, i want you to have the neboso neuro balls in your hands.

And you just dry brush and you did the neuro stick and now you're going to lie on your back and, you are going hold the neural balls on you hands and your going visualize doing this.

So that we are accessing as much as we can about the neurosensory system.

Body Schema and the TBI Case

A second patient that I saw, similar to this as far as how the thought process in my mind of maximizing neurosensory stimulation from doing a rehab, is a patient I that saw when I was in Singapore.

She was in a very, very bad car accident. And from that, she had a concussion. So this is a TBI or concusion patient who was young, otherwise healthy, and was having a lot of movement inaccuracies, clumsiness.

And that clumsiness was just a sequelae or a remnant of the TBI and the concussion. So what my mind, from a neurosensory perspective, was thinking is I need to start as a baseline.

And the foundation of her approach every day has to be establishing body schema. I need her to see her body in her mind's eye because movement accuracy is based off of our subconscious, our brain subconsciously knowing where that limb or that structure is moving in space.

When we are reaching for something without even looking, can I reach for my cell phone and know exactly where it is? I know where my hand is, right? And I'm not even look, but I can feel and see where that is moving.

That is part of that body schema and the subconscious accuracy of knowing where your body and limbs are in space in relation to external objects. So for her, kind of similar to the spinal cord injury patient, I needed her to start to strengthen her schema.

Now, the schema, which is your mind's mental map of your body and space, is an interplay between what you feel and what your see. What you fell, I need you to feel the size of you head.

Just sitting here, can you the feel size your head? Can you see the side of head your? Now when someone has a chronic neurological injury, a spinal cord, they had a stroke, it is hard for them to access that mind-body connection.

So from a neurosensory perspective, you want to essentially turn the volume up to the perception, to this senses so that they can feel it slash hear it.

So I go back here to the neuro stick to dry brushing to something. Can we dry brush every inch of the body again? And then we're going to sit there and we are going feel slash see our body in space.

We see the head, the neck, shoulders, work down our torso to our hips, to legs, knees, feet. And we feel it, we see it. Do you want to add in some compression, compression apparel?

Do want add-in weights? And maybe have someone do this under a weighted blanket or with weighted apparel on. But we are going to start by establishing that body schema.

And then for her, what I progressed, as I said, when you do your Pilates practice, you're doing something. You're on a reformer so you are safe and fixed.

As you are doing that exercise, that repetitive exercise. I want you to shut your eyes and then you're going to see your arms as they move forward in the movement.

And if you have a hard time seeing the arm as it's moving with your eye shut, we have to put some weighted apparel on, I have put a compressive sleeve on.

I'm going to wrist weights on you. Whatever it is so that we are again crossing this form of a visualization, but it's really more strengthening the mind, body, the minds eye to seeing where that body is moving in space.

So that's again another way Same thing in her. Always be barefoot. Stimulate the feet before you do any exercises. Release the bottom of the feets. Get on a vibration platform.

We always want something in our hands. we're going to access and understand how to stimulate the visual. If you are stimulating the hands and you look at the hand when they're being stimulated that actually stacks both somatosensory cortex 1 with somato sensory cortex 2 and it's all about just waking up the brain as much as we can.

hen. We have these senses that are so easily tapped into, we just always want to look at every exercise and see or ask ourselves, what can I add in sensorally to help this individual win at the exercise?

Now I didn't mention it for these two patients, but I could have easily added in that we're going to do movements at a certain tempo. We're gonna do something to the beat of a rhythm.

Have a song, and every time you hear a beat, I want your foot to step onto the step. As you step up, there's a neboso mat on the steps. I wanna you to feel the texture as you here the beats of the music, or using a metronome.

We can incorporate again that visual that we are thinking about when you feel the texture in the hand, you're going to look at the text from the hands.

I love using mirrors for these individuals. So those are just two examples of how I like to neuro sensory perspective. And that was essentially the prescription that I gave to those patients to add in a neuro-sensory layer to what they're doing.

Then all the other neuro rehab, the gait training and the actual strength and mobility and body work, all of that gets added on to it. But we're just always thinking of this layer of neuro sensor stimulation that we can add.

Oftentimes I will tell people, I provide the glitter or the sprinkles and you keep doing exactly everything else that you're doing, but we're just going to add a little bit of sprinkle of sensory to everything that your doing.

So you are not changing, we are just adding and enhancing and that is going wake up the brain. So, I want to give a few additional takeaways on how we can play with these different systems, remembering that there are four main systems.

Visual and Vestibular Stimulation

And what I'm sharing as far as this neurosensory approach is not just for the neurorehab client or patient. This is for everyone. This is for otherwise healthy adults, this is just for movement optimization.

This for high level performing athletes. And then this for individuals who are over 65 plus, that active ager, who is trying to really support movement longevity.

Movement is a sensory story. So how do we bring it in? The first one that I want to speak about is going to be visual. Now, visual stimulation, your eyes.

Remember, this is the actual visual input of what you're seeing. The more that we look around, it actually throws off our balance. If you spot the way that a dancer spots when they're doing different turns or pirouettes, I think very similar, using and accessing your visual system can improve stability.

playing with the eyes and eye movements can throw off someone's balance, creating a conflict, which creating conflict could be a mechanism to create better stability.

So can you find a balanced strategy when I have you move your eyes? Are you able to access vestibular proprioceptive, mechanoceptiv and maintain your stability?

Now I mentioned this already but I do want to emphasize it that eye movements not only throw off your balance but they're stimulating the basal ganglia and there was a research study that was done and it was an eye movement exercise study specifically for MS and they had these MS patients do eye-movements and one of the best eye moments to stimulate the Basal Ganglia and to improve balance are saccades.

A saccade is when you do this ping-pong, ping pong ball movement of your eyes where you look right, left, right left right right and you go back and forth.

That is a sacade The studies have shown that a saccade specifically as far as the eye movement exercise is very basal ganglia brain stimulating. In fact, there were some hockey teams that would do saccades before they got on the ice because it actually primed the brain and got them ready for when they were playing hockey.

So very, very powerful way that you can play with the visual system. Now one other way that I want to share with this is you can play with the peripheral.

And one of my favorite ways to do this, is, you could be in a distance. So imagine you are standing and you're looking about 100 yards away, and your looking and spotting something.

As you look far, far into the distance and stay spotted on one point, You want start to notice What is in your peripherals? Just what do you notice, right?

I see the door over here, I some chairs over there, but you're keeping your eyes really focused on one point. The ability to access visual acuity with good peripheral awareness is very important when it comes to movement accuracy and movement longevity.

So those are some of my favorite ways to bring in some neurosensory stimulation through the visual system. Next, or second, we're going to talk about vestibular.

Now, vestiblular is your inner ear fluid, and we can also talk here a little bit about rhythm and sound in music. Of course, you can do that. But when we stimulate the vestigular system, one of my favorite is to keep your eyes fixated and then you're going to shake your head no so think of it just like a cup of water we're just trying to create little waves in the cup or you could shake your head yes.

Now when I have patients do this to access and maintain your stability while doing this, so this shaking the head no or nodding the heads yes, you're creating a conflict, right?

We're challenging the vestibular system and when you throw off the the system by moving your or shaking your That's a conflict. You're essentially telling the nervous system, as I perturb you, can you upregulate visual proprioceptive and mechanoceptiv to maintain your stability?

And that's our goal. Through a complex, create a strategy. So what's happening as when we're doing the no and the yes, what I want you to do is to focus on the visual.

So imagine you're standing on one leg balancing, eyes are fixated and you shake your head no. I want you to be telling yourself in your I see the numbers.

I'm trying to bring a conscious cue to the visual to help my nervous system access that strategy. Very, very important when you're doing this with someone who has a true chronic neurological injury, spinal cord injury etc.

That's a really good vestibular perturbation. Another one that I like to do is anything inverted.

Proprioception, Mechanoception, and Closing Takeaways

So something that is changing your position, your orientation. A lot of us are just so accustomed to the orientation of feet on floor, head up. And that's our relationship to gravity.

to really challenge the nervous system and drive neuroplasticity and create high body schema and high movement accuracy and perception, we need to be turning.

We need be head down, something like a down dog, right, if we can tolerate it. So how can we start to tease into that vestibular system by getting in different positions that help your body's orientation?

That's another one of my favorite. When it comes to paropreoceptives, of course, anything that is unstable, wobble boards, bosews, dyna-dis, the kinesis board, any of that wobbl-wobble is stretching the joints, which is creating a paro-prioceptive challenge.

Those are great, right? We incorporate that all the time with ankle sprains. We go on unstable surfaces. Now here's where I want you to think about a little bit different when it comes to the neuro rehab patient is the way that I actually want to access proprioceptive, I'm not trying to challenge it right now because we've got a lot of challenges going on, is that i want help the brain feel the joint easier.

Using a brace, an ASO brace and elbow brace a knee brace an ankle brace something that is talking to all of the nerves that are surrounding that joint capsule.

Kinesiology tape is great so using kinesiology tape, is going to access the superficial fascia and how it weaves into these joint capsules in the spider web of connective tissue which is, going, to talk to the brain.

using weight. I love to give the example of holding light weights and I challenge you to do this and when I do workshops I always give this example. So if you were to stand and stand nice and tall and your eyes are shut and you're arms are hanging by your side and i want you just feel and connect your arms as they're hanging your by

side.

And as you stand there focusing on the arms and the weight of the arm, could you actually feel the subtlety of gravity pulling your arms down? Do you feel pulling of your arm at your shoulder joint?

Feel the pulling at the elbow? At your wrist? And just connect to that sensation. Hold that sensation. Think about how your left arm compares to your right arm.

And now let's add the power of weight. Slight weight, the weight of your cell phone. So what I'm gonna have you do is a reach down and you're going to grab your cellphone, find it wherever it is, and let' put it in our right hand.

We're all kind of on the same side here. You're gonna hold your phone on your the right. Left arm is by the side. Both arms are still completely relaxed.

You're standing up, eyes are shut, and I want you to focus again. Do you notice the difference on the side that is holding your cell phone? Does it seem to talk to your brain a little bit easier?

Do you see that arm a bit a easier, something so subtle yet so powerful? And if you can appreciate what I'm trying to demonstrate here, I want you to take home that that is the power of proprioception.

So when it comes to a neurosensory approach to neurorehab, i am always having these patients something in the hand and if you can have a little weight to it honestly this is why we developed the sensory sticks at Noboso is because I wanted to get that texture with weight they are two pounds each and just holding those in the arms while you're doing your neuro rehab you are waking up the brain you were lighting up that somatosensory cortex so that is one of my favorite ways to access proprioceptive And then finally, we got our Meccanoceptive, one of my favorite.

This is of course the skin in the bottom of the feet, the palm of hand. Get some texture in hands, get on a vibration platform. You definitely want to get out of your shoes, you want get off of cushioned mats.

When I work with a neurorehab patient, I am getting them as connected to their feet and the skin in the feet, and skin of their hands as I can. I'm never leaving those hands bare.

There is never going to be an exercise that nothing is in hands. Your hands are way more sensitive than your feet. And I love to talk about the feets.

But as far as the number of mechanoceptors, Here, we have a few hundred mechanoceptors in our feet. We have over 20,000 in hands, so that is just a demonstration of the difference between the sensitivity and why we need to be able to access our hands.

If you've ever heard of The Homunculus, The homunculus is essentially this representation of our somatosensory cortex, and what it is, is And if you Google homunculus, a homonculus is like this little man or woman, and it has big, big big hands and a big mouth and big feet.

And it's essentially saying that the parts of this homiculus that are the biggest are, the most sensory sensitive. It's what lights up the brain the Most.

So if those parts are The most Sensory sensitive, I, from a neurosensory approach, am going to be stimulating those. And actually, I've been having some really exciting conversations as far as the mouth and chewing and having something in the mouse to create stability.

So maybe you want to start exploring up there as well. What we want be thinking about, again, as we wrap this up, is when you are trying to optimize your movement, remember, sensory shapes motor.

It is always afferent in, efferant out. Afferents is the sensory stimulation coming up into the brain, which is going to

shape the efferenc or the motor movement out This is the formula of how your nervous system works.

So when we are trying to optimize and rehab and relearn how to walk for many of these patients, you are try to maximize that sensory stimulation. And I want to leave you my friends with one of my favorite quotes again is going to be recovery is not just about muscles and movement.

It starts with sensation. When we wake up the nervous system, we create the foundation for healing, hope and lasting progress. If you are curious to learn more about the Noboso products and all of our textured sensorally-stimulated products, definitely check out nobosso.com.

And if you're a health provider or you just trying to take ownership of your own body, through my education company, we actually have a certification called the NeuroSensory Specialist.

We'll teach you how to access all these sensory input systems. I will go into in that certification how does sensorially stack. how to create sensory conflicts, how do really optimize sensory orientation.

It is a really powerful course and you can learn information about that both on the Noboso website as well as on ebfaglobal.com. I hope you enjoyed and I'll see you on another episode.