

## **Episode 26 – Understanding the Polyvagal Theory and How it Relates to SM**

Hello and welcome to the Selective Mutism HELP, Home Educational Learning Program, Podcast, my name is Kelly, and I will be your host. This podcast aims to give you the help you need to support the person in your life affected by Selective Mutism. In this episode I'll be discussing what the Vagus Nerve does and how the Polyvagal Theory could be the missing piece we've been looking for in the puzzle that is SM. Let's get started.

Welcome to episode 26 of the Selective Mutism HELP Home Educational Learning Program podcast. My name is Kelly, and I am a parent of a child with Selective Mutism. Being that I am a parent and not a medical professional, this podcast is for informational purposes only. My background is in biology, I've always been interested in how the body works. My husband says I should have used that degree to become a doctor, but instead I used it to become a Zookeeper. Although I didn't use the knowledge I learned about anatomy and physiology much as a zoo keeper, I can now appreciate that knowledge and use it to help better understand my daughter and her anxiety.

I want to start by talking about cranial nerve #10 or better known as the Vagus nerve. The Vagus nerve is the longest nerve in our body. It starts from our cranium and goes all the way through our trunk and ends at our reproductive organs. Vagus means wanderer and this name fits this nerve because it wanders throughout a large portion of our body and innervates pretty much every organ along the way. Because of the numerous organs it comes in contact with, it does a lot with regulating our system. It is responsible for the parasympathetic autonomic nervous system and the sympathetic autonomic nervous system. The parasympathetic part is our rest and digest state. This keeps our heart rate normal, keeps our digestion going, and it controls all of our smooth muscles. Smooth muscles are the muscles that we can't control cognitively like our heart, our glands, our digestion, etc. So it is very important that our vagus nerve is working appropriately to keep our body working to the best of its ability.

I'll take you on a little journey along the Vagus nerve and talk about the parts of the body it interacts with. We'll start with our ears. The vagus nerve runs closely along our auricular area which allows the brain to decipher the frequencies we are hearing. Based on how well our Vagus Nerve is working, it will help our brain have a better idea of what we are hearing and if we need to prepare to run away, fight, shut down, or if we are ok. Next, it travels down into our pharynx. Our pharynx is our throat which has the organs that help with getting air, food, and fluid down from our nose and mouth. What I find interesting about this, is I commonly hear from parents during coaching sessions talk about how their child isn't able to eat or drink at school. I've never found a definitive answer on why this is. But, now that I'm understanding the Vagus Nerve more, what if this could be a cause to the issue of not eating or drinking. Let's look closer at the organs associated with the act of swallowing. We have our esophagus which sits right alongside our trachea. On the top of these two organs is our soft palate which acts like a flap to close off our trachea so that when we swallow, food goes down our esophagus and into our stomach instead of going down our trachea and into our lungs. If the Vagus nerve is not being stimulated to do allow the pharynx to work properly, could it be that now there's some sort of irritation or inability to swallow properly? Could this increase an aversive feeling in the throat or increase the risk of choking? If every time I ate in a certain place and I felt like I was

going to choke, or my throat hurt when I swallowed, I may not want to eat in that location anymore. If I ate in another place and never felt that way, I would probably just wait to eat where I felt the best – could this be true for those kids that don't eat at school? Maybe?

Let's continue down the Vagus Nerve to the larynx. The larynx is also called our voice box, so this is where our vocal cords are. Whenever I'm working with a child with SM and we are talking about what it feels like when they are in a situation where they can't speak, every single one of them has told me that their throat feels tight and they can't get sound out. If the Vagus Nerve is not being stimulated to do its job, it may be affecting the function of our vocal chords. If our vocal chords aren't relaxed enough to allow air to go through them to vibrate, we aren't going to be able to make a sound. There was a really cool study done by Dr. Cesar Ruiz a few years ago where he took an external measuring device, placed it where the larynx is and measured laryngeal tension on kids with selective mutism. He found that right before a child with SM was expected to speak their laryngeal tension skyrocketed and the child was unable to speak. What they did in this study, was worked with these kids to hum right before speaking. If someone asked them their name, they would say mmmmmmy name is so and so and the laryngeal tension went away and they could keep speaking. The humming could be enough to stimulate the vagus nerve which then relaxes the vocal folds allowing them to flap when air passes through and sound is produced. Makes sense!

The Vagus nerves continues to travel down, goes around the heart, goes to the stomach, through the liver and spleen, through the digestive system, and to the reproductive organs. So you can see, it touches all the vital organs which is important to understand. This brings me to the topic of the Polyvagal Theory which is a way to describe the Autonomic nervous system as having three subdivisions, or three zones, that relate to social connection and behavior. The first zone, or the green zone, is the ventral vagal social engagement zone. This is where we want to be. This is when we feel happy, we're grounded, we're calm. We feel safe, we feel connected, we're able to make eye contact with people, we're engaged in our surroundings, we feel good! This is our rest and digest stage. The vagus nerve is keeping us grounded, it's keeping us happy, we have increased digestion, we are more resistant to infections, we typically sleep better, we have a better immunity to fight off pathogens and germs, we have better circulation, we have better control and movement of our eyes and our head. Who doesn't wish they can feel in that zone more? I know I want to!

The next zone is the yellow zone, or the zone in which the sympathetic autonomic nervous system is activated. You have probably heard the term fight or flight or hyper arousal – this is what happens with the sympathetic autonomic nervous system is activated. Think about when your fight response is activated - we feel angry, we're revved up, we have some rage, our adrenaline is pumping, we're feeling like we're ready to take somebody down. Now think about when the flight response is activated – we feel anxious, we feel stressed, maybe overwhelmed, feel out of control, out of sorts, we just don't know what's happening and we're just trying to keep everything together. During either the flight or flight response our heart rate increases, our blood pressure increases, our adrenaline increases we're trying to do what we can to make sure we have what we need to run away or to fight. Our digestion slows, we have decreased immunity, we have decreased salivation so we get a dry mouth – which again can interfere with the ability to eat or want to eat. And we don't relate very well to others when we are in this

yellow zone. A recent example of this was one morning before school, I calmly mentioned to my daughter that she was going to need to do all of her homework that night because it was all due the next day and she hadn't worked on it at all during previous days. She didn't like that reminder and her sympathetic nervous system sent her into the fight zone. She rushed over to where I was standing and started yelling "no I'm going do it now!" I remained calm and said "I get that you want to do it now, but we have to go to school, so now isn't a good time." She just kept yelling that she was going to do it at that moment. Since her sympathetic nervous system was running the show, she wasn't able to have the ability to relate to what I was saying, she wasn't able to understand my tone of voice, the words I was using, to logically think about and comprehend what I was saying. One final note on this stage, is that it causes the pupils to dilate. Your body is trying to bring in as much light and as much information as possible when you are hyper aroused. I remember when my daughter was at the height of her SM that her pupils were always huge and it was because she was constantly in this anxious zone and trying to gather all the information all the time.

Now, if we are in this yellow, sympathetic state for a prolonged period of time, our body cannot sustain this. You can't sustain a high heart rate all the time, you can't sustain a high blood pressure all the time, your body is going to give out. Since our body is designed to protect us and wants us to survive as long as possible, it switches out of the sympathetic stage and goes into the red, dorsal vagal shutdown stage. The brain puts a cap on the organs to calm them down and to take a break before it explodes. In this zone, the body is now decreasing the heart rate, it's decreasing blood pressure, it's decreasing the core temperature, it's changing the way the brain picks up sound. Going back to the vagus nerve and how it affects our hearing, if the vagus nerve isn't being stimulated to activate, it isn't allowing us to understand different tones of voice. When you're happy typically your voice is a little higher and it makes others around you feel good and happy and relaxed. But when you're in the dorsal shut down stage, your brain doesn't focus on those pleasant tones. The brain is focusing on low frequency sounds. Since these structures are hundreds and hundreds of million years old, their primal role is to protect us from danger. Generally danger comes in the forms of low growls from predators. If we are in tune to those sounds, we have less chance of getting eaten. Well, we don't run the risk of getting eaten anymore, but those primal responses are still there. So when a person is in this shut down, low frequency sounds like a loud car going by or the rattling of a heat vent sends the body into a shut down response. Think about high frequency sounds. Our primal response when we hear a high shrill sound is that someone is screaming and they are in danger. We are herd animals, so if we hear someone in our herd is calling out using a high pitched scream, we need to hear it so we can get away from the threat. This is why some people need to use noise cancelling headphones when they're feeling anxious, to prevent their brain from picking up on the high and low frequency sounds and sending them into dorsal vagal shut down. Another thing that changes when we are in shut down is the perception of eye contact. Think about our kids with SM and how they avoid eye contact when they are spoken to. Let's say a teacher is coming up to your child and says good morning what did you do this weekend and is looking right at them, they tend to freeze and look away. Why? Well, number one they may not be able to hear what the teacher is saying because their brain is focusing on high and low frequency sounds and is blocking out other frequencies, like the frequency of a calm voice. Number two, this eye contact is now a threat. They see this teacher staring right at them and their brain is on high alert. They are reading the eye contact as if they are under attack and

they must freeze and stop immediately until the danger passes. Think of a deer in headlights or an opossum playing dead. The vagus nerve, which, again, innervates closing with the facial muscles, is not being activated, so they can't respond with any facial expressions either. I'm sure you can picture the face your child makes when they are in situations like this.

What's also very interesting about this dorsal vagal shut down is it increases the pain threshold. There are more endorphins running throughout the body to help numb pain. I've heard so many stories about a child that falls at school hits their head doesn't cry or they have a really high fever, but they don't appear to be in any discomfort. But as soon as they're with mom or dad in the car they start crying because they have shifted from dorsal shut down to either sympathetic or ventral vagal so the pain receptors can be accessed again and they can feel the pain or ailment that their body was masking to protect themselves. Think about it from a survival standpoint. If you are the only one in a herd that is showing signs of pain or illness, you are going to be the one eaten first. Your body needs to focus on survival and not on the current pain.

Unfortunately, some kids stay in this dorsal vagal shutdown for years and years and years. They become depressed, they become hopeless, helpless, they feel shame, they feel trapped within themselves. Their brain is trying to protect them and they don't have the vagal stimulation to get back into that social engagement zone. This understanding helps when wondering why our kids can't think logically about different situations. During the shut down, the heart rate and blood pressure lowers. If you have a lower heart rate and a lower blood pressure that means there's less blood getting pumped through your body and less blood being pumped to your brain. If you don't have as much blood being pumped to your brain it's not going to work as effectively as it should and so it doesn't have the power to connect to that prefrontal cortex or the logical, thinking part of our brain. Our daughter was doing cognitive behavioral therapy a couple years ago. She knew everything they taught her and could recall it when she wasn't anxious. She could go through all the steps of coping and she knew it all off the top of her head and with no hesitation she could verbalize what needed to happen. But, the moment she got into an anxiety provoking situation she could not access that information. Her prefrontal cortex was not available to her so no matter what we did it seemed like she couldn't get to this place of using all the parts of her brain because she's now shut down.

As a parent this helps me understand why in certain situations our daughter wasn't able to do anything. Thinking back to when I would tell her to say hi to grandma, or tell her to give an aunt a hug, or tell her to say sorry if she accidentally hurt her brother, she couldn't respond because she was shut down, just trying to survive. And my intense eye contact and frequencies of my voice was not helping her at all.

So what do we do with this information? For me, I have a better understanding of recognizing when I'm in the three different zones. I understand when that when I'm feeling joyful, content, grounded, or happy that I'm in the green, ventral vagal social engagement stage. Then, when I'm feeling anxious, stressed, irritable, out of control, I'm in the yellow, sympathetic stage, and if I don't change what I'm doing, then I have the potential of getting into dorsal vagal shutdown. When I'm in shut down, I feel numb, I don't want to be around people, I don't have many facial expressions or changes in my intonation, I have a flat affect. Being able to recognize this, I can

make changes to make sure that I'm in a place where I'm not headed towards a shutdown. I'm recognizing my sympathetic nervous system firing up and I can take steps to get back into social engagement before shut down happens. I had an opportunity to put all of this into play and understand its effects on me. I typically have a lot going on. I have a lot of ideas and a lot of little projects that I'm always working on. Because of this, I tend to feel overwhelmed and stressed which means I'm in the sympathetic, yellow zone, quite often. One day, my husband sent me a text and said hey I'm going to Taco Bell, which is my guilty pleasure, do you want anything? and I thought to myself, no I can't even think about food, I want no part of any food right now. After I text him back, no thank you, I paused and I thought to myself I should be hungry it's been six or seven hours since I've eaten anything and I love Taco Bell. I realized I was in sympathetic and my body got out of the rest and digest state so I couldn't feel that I was hungry. I learned some easy techniques to help get out of the sympathetic zone and go back towards that social engagement zone, back to the rest and digest. I got up from my desk and sat on the floor. I put my right hand on top of my head and gently tilted my right ear to my right shoulder and looked up to the left. I learned you want to hold this position for at least 30 seconds while breathing deeply and wait until you feel a shift in your breathing. When I do this, I feel a sensation, like an opening along the outside of my neck, where the pharynx and larynx are, which I believe is the feeling of vagus nerve being stimulated. After one side, you do the same for the other side. The second part of it is you do something similar, but you take your hand and pull in your rib cage so now you're in a C shape for at least 30 seconds on each side. The reason for the two different areas is because our vagus nerve is so long we first focus on our neck and then we focus on our trunk so that we're stimulating that vagus nerve from the first half to the second. After I do this, I feel like I can take a bigger breath, I can feel things relaxing. I remember after doing this on the day my husband asked if I wanted lunch, I stood up and the first thing I said without even thinking, was, "oh I'm really hungry." This was a huge ah-ha moment for me. I was able to shift my nervous system into the rest/digest zone and my brain was able to receive a signal from my stomach that I was hungry. I checked my phone and my husband responded back, well too bad I got you food anyways. Yes!

After I learned about the polyvagal theory, I wanted to know if there were any treatment modalities that went along with this. I was excited to find out that there is! It is called the Safe and Sound Protocol developed by Stephen Porges who is the one who has worked through this understanding of the polyvagal theory. The Safe and Sound Protocol uses specific sound frequencies to retune the nervous system to focus in on those frequencies that connect us to others, to help us stay for a longer period of time and get back to the social engagement zone. They take everyday songs and remove the high and low frequencies systematically to help calm our nervous system and promote the social engagement ventral vagal zone. The science behind it makes total sense to me and recently I became a certified practitioner for this program. I started the SSP with my kids – ages 9 and 7. We've been doing 10 minutes a day 5 days a week. The protocol contains 5 hours of music and you can choose between three different music playlists – adult, child, and just announced, a classical playlist. We are 2 hours into the 5 hour program and my husband and I have noticed a new sense of calm among the kids. It hasn't been a night and day difference yet, but there has been a difference and that is more than I could ask for at this point. I started this program on myself as well. A couple weeks prior to starting it, I was in a shut down stage. It was a really difficult time and since starting this program, I have not been back into shut down. I feel more regulated, I have been able to think

more clearly which has allowed me to achieve more on a professional level and feel more connected with those around me. If you have questions about the SSP or are interested in starting this program to retune your own nervous system, I'd love to talk with you! You can email me at [smhelp2020@gmail.com](mailto:smhelp2020@gmail.com). There is a sense of calm available to us all, we just need to take the first step into finding it. I also wanted to invite you all to the 2<sup>nd</sup> Annual Selective Mutism Foundation Conference which will be taking place in the Tampa area of Florida February 17-19<sup>th</sup>. This conference is led by parents of children with SM who have taken their journey and vowed to help other's on their own SM journey. The topics of discussion are similar this podcast episode. The topics give registrants a way to support their child, the student in their class, their client, in a way that involves the whole person. It is unlike any SM conference done before and I hope you can attend either in-person or virtually. For more information visit [www.smhelp.org/smf-conference](http://www.smhelp.org/smf-conference). Take care.