

## wHolistic!™ - Swallow Dysfunction in Parkinson's Disease - Nicole Herndon

Rebecca Korduner: A much better introduction of our speaker today, so Dr. Subramanian, why don't you take it away?

Dr. Subramanian: Thanks, sorry it's a fun morning on Zoom today, so hopefully this won't keep giving us challenges, but welcome everyone! Great to see everyone. Thank you for joining us and battling all the Zoom challenges I think the nation is joining school all of a sudden today. I have two children who are just online in grades seven and eleven, so the new normal I guess, but we continue to be physically distanced but socially connecting here through this Zoom technology and thanks to PMD Alliance for hosting. I was speaking to Dr. Oaken, who is the biggest cheerleader of his entire team there, and we were talking about important offerings to bring you for our patients across the world, and he mentioned Nicole. And they just wrote a paper together which has been a really cool paper. I just reviewed it over the weekend, and just a great number of practical tips for our patients. Nicole Herndon is a speech language pathologist at the University of Florida Health Rehab Center, and she earned her Master of Science degree at the same place where she did her undergrad, which is in speech language pathology in Purdue. We're excited to have her. She can talk about a host of topics, and today we're going to be focusing on swallowing dysfunction, but she also knows a lot about speech. We may have her or somebody from their team come back and speak to us about speech but maybe for the question and answer session. Just in general we'll focus just on the swallowing dysfunction aspects of things because I think it's really important and poses an important safety issue for our patients, and it's something that I think Nicole has a lot of practical tips to share with us. So without further ado, I will pass on the floor to Nicole. Maybe you can tell us a little bit about why you got interested in speech and language pathology in the first place, and then why you like working with Parkinson's patients.

Nicole Herndon: All right so my name is Nicole Herndon. I'm a speech language pathologist at the UF Center for Rehab in Gainesville, Florida. I think I saw someone else was from Florida and a few other people on. But thank you for having me come and talk about this. Near and dear to my heart, so I can talk about it all day long. I only have about 20 to 30 minutes, so I'll try and limit it. I got into speech language pathology because my grandfather suffered a traumatic brain injury. He had a fall, and that kind of opened up the door to what all a speech language pathologist could do. I still come across this when I meet with other people as well, but they think oh you're a speech pathologist you work in schools-- you teach kids how to talk, but there's so much more and that's what I came to learn after hearing about what his speech language pathologist was doing. They were working on swallowing, they were working on cognition, getting him back to speaking and finding the words that he wanted to use, and I just found that so so interesting. In high school, I was really fortunate. I went to school in Indiana and my high school offered an internship class, so I was able to intern as a high school student with multiple speech pathologists so I could really figure out what I wanted to do, and then I pursued that through grad school. And then while in undergrad and grad school, I continued doing some research with Dr. Jessica Huber at Purdue University with patients with Parkinson's disease. So that's kind of how I got introduced to it, and then I kind of went off a little bit, worked in pediatrics when I first got out of grad school, but wanted to find my way back in. Jessica and one of my colleagues here had met at our national convention and mentioned that I was looking for a job and that's how I came to Gainesville, Florida. So that's a long-winded kind of talk about how I found my way, but I've been here for almost two and a half years, and I enjoy every day.

Dr. Subramanian: That's amazing. Well Mike speaks highly of you, and you guys have a great multidisciplinary team, and I think if nothing less we teach people how all of us can work

together to help the day-to-day struggles of our Parkinson's patients and the people that care about them. So welcome. I know you put together some slides, and you did this amazing paper as well that was great. And maybe you could teach us through the slides, and then we'll come up with some questions and get into a discussion in about 20-25 minutes.

Nicole Herndon: Sure yeah, all right, so let me share my screen. All righty, so yes I work with a multi-disciplinary team, so this is just one little piece of what we do here and I allude to a little bit of what you can do as well, so I'll point out where they can be helpful in terms of swallowing and feeding because it definitely is a team approach. We're just going to go over basic swallowing function-- what is normal, what happens during the swallow. And then I thought, I have a lot of patients that come to me, and we review these videos together, but then I send out this report. And I am realizing that a lot of the lingo that I use is maybe not something that they can kind of understand for themselves to know how they can interpret it and how they can share it then with their other doctors. I kind of wanted to go a little bit into that as well. We'll go through evaluation swallowing and Parkinson's disease-- which is also very similar to those with atypical Parkinsonism as well-- treatment options that we may give in clinic, and then just some concluding remarks. The first thing, swallowing. It involves more than 30 pairs of muscles bilaterally, and it's controlled by both the brain and subcortical structures. Subcortical meaning the brain stem and below. Voluntary meaning you are in control of it, involuntary meaning, at a certain point, it just happens. So if you ever chew something, you push it back with your tongue, at a certain point, you can't stop your swallow. That's what I mean by involuntary. And it includes three phases: oral so that the food or liquid is in your mouth, pharyngeal when it's in your throat, and esophageal when it's going down your esophagus until it meets your stomach. I just wanted to go through a few structures that you might see on a certain type of evaluation, and really this was just supposed to give an idea of how I can better explain what happens during swallowing. The first thing I want you to pay attention to is what we call the tongue base or base of tongue. It's just this bottom part of the tongue that finds its way into the throat, but it serves a really important purpose for both safety and efficiency of your swallow. And then right here is your epiglottis-- so I outlined it right there. It's a piece of cartilage that at rest you can see it's nice and curved, and then as you swallow it actually inverts, because it helps to close off the entrance to your airway. While it doesn't move on its own, some of the other structures move and push it down, and if it's impaired, it could impair swallow safety. And on top of it, you see it kind of cups a lighter airfield space, and that's called the vallecula. We're seeing a two-dimensional view. There's one on each side, so we're only seeing one because of our view here. And then up here is a soft palate. Obviously, we've all had that instance where we laugh while swallowing a liquid and it comes out our nose. Our soft palate serves an important purpose of trying to prevent liquid from coming up your nose often. We don't typically see anything like nasal regurgitation with Parkinson's disease or Parkinsonism, but it can happen just in their swallowing coordination. Or the whole system is a pressure generation, so if it pushes pressure one way or the other, it could move things up into the nasal cavity. Right here is an important structure to remember--we'll come back to it later on-- are the vocal folds. They're that little bit of a darker space, and it's leading into your trachea, which is down below. And then up top where I just shaded, we call it your laryngeal vestibule. This is just an area-- I call it the entrance to your airway-- which sometimes if we see material go into it we might be thinking, okay well maybe we need to do a strategy something like that. I tend to be a bit more liberal in my recommendations, so some people consider penetration normal. We know that as you get older, the likelihood that you have penetration also increases. There's normal variation among all of us. And then once again down below is that trachea. Leading down to your lungs, this back wall here is the posterior pharyngeal wall. That meets with your tongue base, and they push together to kind of push whatever you're swallowing down. So if you have any sort of weakness or mis-timing there it could leave some residue in your throat. And then lastly the upper esophageal sphincter which is the entrance to your airway. What's important to note on

this image is your airway is in front and your esophagus is in the back. You also see that your airway is closed at rest. We don't want stuff coming back up during the day while we're just sitting there, so what happens during the swallow is the structures kind of pull up and forward, and that helps open up that esophagus to allow the food and liquid to move down. On the next one you'll see a schematic. Let's pretend that this person is swallowing peas-- I don't know what else they could have that's green. They chewed it up, and then they form it into this ball called a bolus-- you'll see on the image they call it bolus-- of food and their tongue is going to push that back into their throat. On number two you'll see the epiglottis has now inverted. It's closing off the airway because it wants to prevent any of the peas from going into the airway but then funnel it down into the esophagus. That's what we're seeing in number two there. You'll also notice that the soft palate is now up against the back wall to prevent anything from going up through it. And then lastly number three after the swallow what happens is it goes down the esophagus, your airway opens back up. We have a brief apnea period when we're swallowing that you can just think about how important it is that that airway closes off when you're swallowing. The talk today is focusing on swallowing dysfunction or dysphagia. These can be problems in the oral (mouth), pharyngeal (throat), or esophageal stages of the swallow. And it can affect any or all of these stages. Just because you have one doesn't mean you have the other, but just because you have one doesn't mean you can't have the other. And up to 80 percent of patients with Parkinson's disease will develop dysphagia during the course of their disease. And there's a mismatch between the symptoms that patients report and the deficits that we see on instrumentals following evaluation, so it's really critical that you talk with your doctor about any coughing that you're experiencing, any sensation of food or liquid sticking in your throat, but also it's worth sometimes just getting the evaluation to make sure that there isn't something that's missed. We also know that patients with Parkinson's disease in particular have a reduced urge to cough or reduced cough response when things enter the airway. For us, just because someone doesn't cough or have that noticeable increase in frequency of coughing during meals doesn't mean that they're not having something. It also doesn't mean that they do have something, but we need to check it out. I always tell my patients I don't have X-ray vision. I can't just make an assumption based off what you're telling me. I need to see for myself. We also know the negative impacts that dysphagia can have. It can result in reduced quality of life, reduce social participation. I'll have patients tell me that they don't want to go out to eat because it's embarrassing for them to go there. They start coughing or they feel like food spills out of their mouth. Dehydration or malnutrition, which can lead to unintentional weight loss. And another big thing is aspiration pneumonia. We know that there's a high risk of aspiration pneumonia in Parkinson's disease is what the research shows. It's the leading cause of PD-related deaths, so what we're trying to do is catch it early on and prevent any of these things from happening and once again that help happens with a multidisciplinary team. We often work with our dietitians to help prevent dehydration and malnutrition and unintentional weight loss. We work with PT/OT. We have social workers that can help find different activities that we can increase socialization. If that's harder, bring people into their house-- I know that that's a big thing with COVID but we can do it via FaceTime, Zoom. There's many different ways that we can adapt and increase quality of life. Some of the definitions-- and this is going to go back to that image I showed earlier, the x-ray image-- is penetration and aspiration. It's likely that you've heard these before but maybe not know what exactly they mean. Penetration occurs when material enters the airway and stays either above the level of the vocal folds or reaches the level of the vocal fold. If you remember me talking about that shaded space called the laryngeal vestibule-- so if something goes in there and kind of stays in that area, we call it penetration. And then aspiration is when it goes down below the level of the vocal folds into that trachea or further down into the lungs. So those are the two things we're kind of watching in terms of swallow safety. And then in terms of swallow efficiency we're looking at residue. Is there some remaining in the mouth or the throat after the swallow? Does it appear that there might be some

sticking in the esophagus, and we need to refer to GI or ENT? These are the sorts of things that we're really analyzing during the swallow study and we'll report to you afterwards. I just wanted to show a quick image of what a normal swallow looks like, so I'll play the video in a second. But what I want you to pay attention to is--this is actually knees falling-- but as I swallow you see how quickly things have to happen. These structures have to move and coordinate in a way that's controlled by our brainstem and cortex, and it happens in less than a second. So you can just see how complex this is and how quickly it has to occur. This is me swallowing thin liquid, like water. This is me swallowing a little bit thicker, some nectar thick consistency. Here's some pudding, and then lastly, I choose some cookies and swallow those. And I will say I probably swallow a little bit faster and chew a little bit faster than most people. I was in front of the crowd swallowing. Overall though you can just see how quickly that airway has to close off to protect it, and you can see kind of how the muscles squeeze to make sure there is no residue after the swallow and push all in through the esophagus. Now I'll just show you an example of penetration. Remember this is when material enters the larger vestibular-- enters the entrance of the airway but stays above the level of those vocal folds. And you'll see them, they're a little bit darker. The first video that I play is fast, and then the next one is a little bit slower. And what you're watching for is there's like this half rainbow of material that appears to go in just below the esophagus there, so I'll play it. Here's a little bit slower just to show you. There's that rainbow, and then most of it kind of gets squeezed back out as those structures close and get closer together. So that's what penetration is. Once again, I said I'm not super worried about that. If I saw it consistently happen maybe the residue stays and finds its way further and further down, then I'm going to be more conservative. If I'm seeing it worsen over time-- so maybe you start there and it gets worse and worse and worse-- then I'm going to obviously have to make some changes. But we document and then we track you over time. That's kind of the important piece of the disease-- as it progresses what's changing. We can't predict everything when it comes to swallowing. And this is an example of aspiration. I'm sure this is more of the common term that you guys have heard-- it's when it goes below the level of the vocal folds into that trachea. Once again, I'll play it at a normal pace and then I'll play it a little bit faster. It's a little faint on the screen, so here's it a little bit slower. As I swallow it kind of just finds its way in and then trickles down into that airway. Another thing to note there, too, the patient didn't cough immediately after. We would assume that if you had a normal sensory system, there would be an immediate cough response to try and eject it out of the airway, but we know, like I said earlier, that with Parkinson's disease it can be suppressed or absent, and this patient had an absent cough response. And I also think it's important to note that all of us aspirate. What we're looking for is, is it increasing the frequency? Is it resulting in infection? Something like that. We've all had the moment where we're coughing, something goes down the wrong way, but once again if it's increasing the frequency, if it's causing a reduction in quality of life, social participation, that's when it starts off a functional impact, that's when we need to start targeting it. And then this is the last video that I'll show. This is just some residue that ends up in the vallecula, which is that pocket right in front of the epiglottis. There you can just see it's a little less efficient. All right so let's go into swallowing evaluation. What are the types of evaluations that can be done, when should you have one, and why, and then what can it tell us? The goal of this following evaluation is to assess the safety and efficiency of the oral pharyngeal swallow-- so oral in the mouth, pharyngeal in the throat. There's two main types, each one with its own benefits and limitations. The first one is the clinical bedside swallowing evaluation, and then the next type is an instrumental evaluation. There's a few names for this one-- the MBSS, the VFSS. A normal barium swallow study is looking more at the esophagus, whereas a modified barium swallow study is looking at the mouth and the throat. And then FEES is where they're going to be kind of looking from above, looking at swallowing function. The goal of the clinical bedside swallow is to identify those that require additional testing and to determine who is appropriate for an instrumental evaluation, so if someone's falling asleep, something like that,

they're not going to be appropriate for it. It may include a review of the medical history, cranial nerve exam, so looking at the muscles that we use for speech and swallowing, make sure they have good range of motion, strength, something like that. We can always screen for cognition-- are you able to follow directions, do you seem alert, are you oriented? And then it will include trials of ice, solids, and liquids to screen for signs and symptoms of dysphagia or aspiration. Some of that may include coughing, throat clearing, a wet vocal quality. But once again just watching somebody eat and drink, we can make assumptions about it, but we don't really know what is happening in the moment. Like I said we're concerned about silent aspiration, which is when it goes down the wrong way and there's no cough, so how do we know that there isn't something going on? That's where the imaging swallow studies can be helpful. Modified barium swallow studies-- the top images are [C arm?] at our center. We just started running those at our center. They were previously at another building about a month ago, so we're really excited about that. But you can see here you just sit in a chair. It's open air, so if you have classroom phobia it's nothing to worry about. We take an x-ray video while you swallow different consistencies of contrast, so it could be a thin liquid which is a water consistency. It could be thicker liquids if we feel like you need-- it a pudding consistency, some cookies. We can even try the tablet if pills tend to stick for you or pose a problem. What we tend to use is barium sulfate. On the image at the bottom we use the VARIBAR © products-- it's an FDA approved one for the modified barium swallow studies-- and it comes pre-prepared, so we're consistent across swallow studies, which is also important when we're using it for comparison across time. And just like the FEES as well, you review the images afterwards with your speech language pathologist or whoever completes your exam and discuss the results and recommendations. So it's always important to look at the videos afterwards and discuss what you should be doing is speech therapy--recommended-- do you need to change your diet, is there a strategy that you need to use? Something like that so that you don't leave there with nothing. Here's just more information about the FEES evaluation of swallowing. There's an endoscope, a camera passed through your nose, and it has this view in the image here looking down at your voice box. At the top where it says age, that's roughly where your esophagus is. It's just closed at rest so we can't see it. You'll swallow real food, liquid, pills, things like that, so you don't have to use contrast. There's no radiation involved. And once again you review the videos and the images and discuss results and recommendations with the speech language pathologist or even ENT can do this after. What does the evaluation tell us? It tells us what strategies are helpful for you. So if we saw a little bit of residue, if we saw something going down the wrong way, what is going to make it the safest but least restrictive that we can possibly make in terms of diet? And what sorts of exercises may be helpful? What do we see on the exam? Or what sorts of exercises can target that based off of the evidence that we have? So let's focus on some swallowing changes in Parkinson's disease. Like I alluded to earlier, atypical Parkinsonism have similar difficulties, but it just is more quickly going to be more severe, so it's probably coughing earlier on, maybe dysphagia shows up within the first few years, versus in Parkinson sometimes it doesn't show up for decades even. Common complaints. These are complaints that I get from patients. We always discuss: have you noticed any changes in your swallowing? Are you coughing while eating and drinking? Do you feel like food or pills stick in your mouth or your throat? These are common things that we hear from patients. We know that a loss or a reduction in sense of smell is a common thing, and it can also change appetite, which could result in eating less or taking more time during meal times if you have a tremor, so that's where OT is really really helpful. When you are spilling food, it just takes so so long because of bradykinesia even to get it to your mouth. Trouble chewing-- if you feel like you have some jaw dystonia. Maybe you have a delay in starting the swallow, whether that's pushing it back in your mouth. Sometimes there's a little bit of tongue pumping to push it back-- it's on a smooth movement. Or maybe it spills back like the aspiration video we saw and then it triggers the swallow, so it's just a little delay causing that mistiming of the swallow, coughing, or choking.

Choking is always one that you need the Heimlich maneuver for-- you can't get air through-- whereas coughing is just something kind of tickles your throat, you feel like something went down the wrong way. Once again, if someone's reporting weight loss for an unknown reason, then we're kind of suspicious of, is there an underlying swallowing difficulty. And then this is from the paper that we just published, but I just thought it was a nice table to kind of look at the three stages of swallowing-- the oral, the pharyngeal, and esophageal, and some of the impairments that research has found. It's a pretty extensive list, and that doesn't mean that all of these things are found across all patients. You can have one thing. There's also some normal variation among all of these. We know that as you get older there's age-related changes. We call it presbyphagia. Trying to figure out where kind of that normal is and where the disorder is. I always stress, does it have a functional impact. Just because I see something-- maybe there's a delay in the swallow-- but if it doesn't have a functional impact then maybe it's normal for the patient. Maybe I didn't test their swallow five years ago. I need to kind of be cognizant of making sure I'm not just making these huge changes for the patient that is going to impact quality of life or they're going to feel like it doesn't help them so they don't do it. The esophageal stage-- that's going to be gastroenterology, so if you feel like you present with those symptoms or you feel like that's something that you have difficulty with, I would definitely recommend a gastroenterologist to assess. So what are some treatment options? How do we treat it and what do we know to treat? What are some examples of things that we can treat? Compensatory strategy-- we determine this based off of the findings of your instrumental evaluation. Like I said, we don't like making assumptions. We want to make sure that we are giving you the biggest thing for your buck and that we are treating what we see and not just giving you a whole list on a handout because we feel like that's just easier. Some examples may include single sips, smaller or larger sips, second swallows, swallowing your saliva a second time, alternating liquids and solids, sometimes a chin tuck maneuver. We always say unless we test it on the instrumental evaluation, we don't know if it's helpful or not, so the chin tuck is a great example. Some of our patients, maybe we do recommend that they swallow with their chin down, and others we try it and it makes their swallow worse, so we really don't want to just blindly give these recommendations without seeing how it impacts that patient in particular, so individualized care. We always recommend the following: eating and drinking in the upright position. I've had patients say well in the middle, and I have to take my medications. I'm just laying down in bed, and I take my pills with some water, and that's when I have this coughing. I understand that it's hard to sit up, but it's really important because gravity changes the flow of water, so we have to be cognizant of that. Limiting distractions in the meal environment-- dual tasking is also another thing. I think you guys had a speaker on that not too long ago. There's been at least one paper published by Emily Plowman that looks at dual tasking during an instrumental evaluation to see how that changes the swallow. So if you're finding that you're coughing while talking during a meal or while watching TV, maybe try to limit those distractions and see if it gives you any relief. And then frequent oral care-- I'll go over this in a little bit because I'm a huge advocate for oral care. Exercises-- once again, based off of the deficits that we see during the evaluation, some examples include the following, but these are going to be prescribed by your speech language pathologist based off of their findings. I don't want to go into the details of these, but it's something that your speech pathologist can talk you through if they feel like you would benefit from it. Another thing that we really like here and is actually developed at UF is expiratory muscle strength training or EMST, and this is with the pressure threshold device. There's a spring in there that as you turn the dial it increases the pressure resistance, and as you blow into it you have to kind of break the seal or open up the valve for a successful repetition. We train our patients-- the research has shown that if you train at 75% of your maximum ability to do the task it can help improve cough and swallow function. We're a huge proponent of this, lots of evidence behind it, even among our atypical Parkinsonism. Sometimes we'll get our Huntington's patients doing it. There's a lot of our patients that we can use for this. Diet-- once

again based on the instrumental evaluation. Nectar-thick isn't always better. Just because it reduces coughing, doesn't mean that it's not increasing residue. We know as things get thicker, they coat more. This is something that I stress all the time with our patients. What I worry about is there's been more and more research on thickening liquids and what that actually means if it goes down the wrong way. We're adding chemicals to it, so how does that impact the lungs if it's aspirated? Oftentimes too, our patients have a weaker cough, so when you thicken something, if it goes down the wrong way, it's harder to clear with that cough. So unless you see it on an instrumental evaluation-- if someone's recommending that you thicken your liquid, I would request an instrumental evaluation to really see if it helps you. Sometimes there isn't a difference. At the end of the day, we give our recommendations and the patient and their caregivers and their family make the best decision that they can. Thicken liquids have been found to reduce quality of life. A lot of patients don't tend to follow the recommendations because of that. It can increase dehydration, and we know UTIs is a whole other problem. Trying to see kind of the whole picture of the patient and making the best decision, your speech pathologist should go over the pros and cons of it. And if you really really want thin liquids there's a few other options-- Frazier free water protocol is a good one-- but talk with your speech pathologist about that. If your diet gets changed, if you have to do a strategy for your swallow, I always recommend speech therapy-- we call it swallow therapy, but it's done by speech language pathologists-- to help improve your swallow function. We don't want you to stay on that diet forever, we don't want you to have to do that strategy forever. If we can improve it, let's do that. Or maybe we just want to maintain function, make sure it doesn't get worse. We know that Parkinson's, atypical Parkinsonism, many of these diseases are progressive, so let's try and slow the progression or halt the progression by doing some speech or swallow therapy, Oral care, coming back to this. Many patients are at an increased risk for reduced oral health even when I talk with my OT colleagues, just simply brushing is harder because of motor symptoms, dry mouth or xerostomia, sialorrhea-- excess saliva, or drooling some dysphagia, can increase the likelihood that you have poor oral health. I always recommend it at least twice a day with routine dental appointments at least every six months because if you have poor oral care, the research has shown that it could increase your chances of getting aspiration pneumonia. When you have poor oral care, you have a lot of bacteria built up in your mouth, and when you swallow, if something were to go down the wrong way, more bacteria is attached with your poor oral care, so if we can reduce the bacteria that goes down, we can reduce the chances of an infection, so why not be proactive in trying to reduce your risk then be reactive to it. This is something I talk a lot about with my patients. Even if they have a good oral care routine, I tell them to continue doing it, and if it becomes harder, to talk with their OTs, if it's harder to do the motor movement or find a way. Even if someone has a hard time swallowing-- let's say they need suction something like that, which is rare, but there's suction toothbrushes-- there's always a way to kind of get that oral care in, and it's also important to know you need that friction from a toothbrush, even if you don't have teeth-- get those gums, get the tongue. You need that friction to get that bacteria off. I kind of alluded to these on the last slide. Sialorrhea, excess saliva, which can result in drooling, is due to swallowing your saliva less frequently. It's actually not a hyper production of saliva, it's just that you're clearing it less frequently. Little tricks-- wiping your mouth with the cloth, upright posture-- if you're bent over gravity can pull it out of your mouth-- increase in frequency of swallowing or frequent sips of water. Then there's some pharmacological options, should you want to seek that you can always talk to your doctor if the other tricks don't manage it. And then xerostomia-- dry mouth-- is often due to medication side effects or autonomic dysfunction. The treatment is fairly similar to that of sialorrhea-- so frequent sips of water, lozenges, products for dry mouth, or some synthetic saliva. I always tell people make sure your lozenges aren't minty. When you breathe in with something minty, it's going to create more of a drying effect, so maybe something that's a more fruity flavor. Sugar-free is probably better if you want to keep that oral care up as well. Just some concluding

remarks. Early detection and management of dysphagia and those with PD, and I'll add atypical Parkinsonism and really any movement disorder by multidisciplinary team to reduce the negative impacts is really really important. I'm very fortunate to work with such an awesome team. We have many many disciplines here, and they're constantly teaching me things, and I think the patients are treated so well with that kind of-- we always say you have the patient in the middle and you kind of form a sun around it. That's kind of how they get their patient-centered care, which really helps with the identification of these patients. They'll get referred to me-- and I've never seen them before-- but for possible dysphagia. Reported symptoms of dysphagia do not match those findings on instrumental evaluations. We know that it's underreported or not identified based off of report, but the instrumental evaluation findings may find some deficits. We always recommend a baseline instrumental evaluation. After you're diagnosed, even if you feel like you don't have any deficits, it's always good to get a baseline. And like I said we can compare every 1-2 years after, depending upon your results. If you have a severe swallow, we might want to see you at six months, something like that, just to make sure that we're doing more good than harm. Dysphagia can increase the risk of developing aspiration pneumonia; however, other risk factors have to be present-- this could be your immunocompromised, it could be that you have a poor respiratory status, that you're not mobile, you're acutely ill, that you smoke, so there's certain things that can increase your chances as well. Speech therapy can help improve swallow function with exercise strategies and diet changes, and then once again frequent oral care can reduce the risk of developing aspiration pneumonia, so I always like to hit home on that one. All right so that is the end. I just have some references here, and then anybody can email me if you have questions, but hopefully I can answer a few now so, we should do that.

Indu Subramanian: Well thank you so much. That was so clear. I think I learned a lot actually, and I went to medical school for four years, and I've been a neurology resident four years after that, and then 20 years later it's like I'm learning every day from these lectures. It's awesome! So there's a bunch of questions in the chat. A bunch of people on the non-video participant scene as well, a lot of people probably will be watching this video after and would love to get your slides if you are comfortable with sharing them, because I think they were very clear, really nice resource about how to interpret the swallow study because I think that gets very confusing to people and lots of words nobody knows where these structures are, I've forgotten where they are myself so great. So just going to start taking some questions from the chat. I think you've covered some of these. But one is about swallowing with feeling that there's food remaining between gum and cheeks, what to do to reduce that.

Nicole Herndon: Yeah so that could just mean that when you're chewing, you don't form that nice, we call it a "cohesive bolus," so you're not having that nice ball sometimes, there's reduced kind of range of motion, but if you just kind of take your tongue and move it around your gums, you can see what your range of motion is. I have some patients who just can't do that movement. I don't know if it's rigidity in the tongue. I know that rigidity and bradykinesia can impact the swallow system, so if you can't do that I always recommend just making sure you do good oral care after a meal, but if you can use your tongue to get it-- I mean obviously you can use your finger if they're nice and clean- to get it out, but try and use your tongue and just make sure that food is trying to form into a ball before you push it back.

Dr. Subramanian: Okay that's great. Somebody writes here: "I constantly feel there's a lump in my throat that I can't clear, although I have no problems eating or drinking. Is there something that you can recommend for that?"

Nicole Herndon: Yeah so I would probably recommend that evaluation that I called FEES, that camera that kind of goes through your nose. So the problem with the x-ray video is that it doesn't really show anything beyond the tissues and the contrast, so we can't see saliva. Some people will feel like it's just increased saliva. It's not during mealtimes in particular, it's just the sensation throughout the day. ENT could probably do the best evaluation for that, just to make

sure that there isn't anything, and then they can always just change over the exam and do a FEES. They can do just looking at the structures and then start to give you some trials. It's going to kind of put two maybe appointments together, and I know a lot of people have lots and lots of appointments, so trying to take that into consideration. And then you can always get a modified barium swallow study, should you just want to get it checked out, but I would say the ENT would probably be most appropriate for that just to rule out anything.

Dr. Subramanian: Absolutely, and you mentioned sort of there's some ENT sometimes that you work with and then if there's lower issues in the esophagus that you're fighting, then maybe a gastroenterologist would be the right thing, but if it's more in the upper area maybe working with an ENT. Is the ENT the person that does that FEES procedure, or do you guys do it?

Nicole Herndon: We don't do it at our clinic. Outpatient is a little hard with trying to clean it. Acute care our SLPs do FEES, and they can take it to the patient's bedside and do it, so that's what makes it so nice, is that it's you can really take it anywhere, any patient positioning. And then our ENTs also do it. I don't know if it's an additional training that they do, but it's always something to [inaudible] something that you're interested in getting and making sure you call the ENT's office to make sure that's something that they offer, but it's the same evaluation completed by either ENT or speech.

Dr. Subramanian: Sounds great. Then somebody asked, what about the liquids that are swallowed and go up the back and out the nose? What kind of things could help that and that seen in Parkinson's? Are you seeing that much in Parkinson's?

Nicole Herndon: So occasionally I see it. I can see it in other diseases or disorders as well. It just means that that soft palate isn't coming up against that back wall to prevent things from going up that way. It could be due to a weakness or it could be due to a mistiming. Like I mentioned, it's a pressure generation, so everything closes and that tongue and that back wall kind of squeeze together and push everything down, but if it's a little off-- maybe your entrance to the esophagus doesn't open in time-- it's going to have to push the pressure back up. It could be that. There is EMST. I don't know if this has been published, but I have seen it when someone did a modified barium swallow x-ray video and did that EMST, and it helped push up the palette. I think ENT would be best to rule out any sort of structural issue. If it's more of a weakness issue or a timing issue, I think speech would be most appropriate, but I would say you want to make sure that it's not just an underlying like VPI or something like that.

Dr. Subramanian: Okay, then there's a question about getting a lot of mucus in my throat and can't seem to cough it up or swallow it. Is there something that I can do to clear it?

Nicole Herndon: Firstly, make sure you're hydrated. If you're dehydrated, it's going to thicken saliva. I'll often have patients tell me that they clear their throat, and when you clear your throat it actually just irritates your voice box. When it's irritated, it's going to kind of increase kind of the coating to protect it and then it causes you to clear your throat, so it's this perpetual cycle of clearing your throat, irritation, clearing your throat. It could be that, it could be dehydration. I hear it a lot from patients, and I think it could also deal with that sialorrhea, so that excess saliva, that swallowing less frequently, and it builds up and maybe it just spills back. I'm a big fan of the sniff and the swallow, so you sniff, create pressure, and then swallow it down, and sometimes that can create enough pressure to clear that. Sips of water as well versus clearing your throat. If you wanted a view of the secretions or the saliva, you would have to do the FEES, because the modified barium swallow study you can't see the secretions unless they get coated during the swallow study, so that would be where you want to kind of choose one versus the other.

Dr. Subramanian: Okay. There's also a question here about, "I've heard that many physicians are recommending carbonated liquids versus thickening due to residue and less interest in fluid intake when thickened." Do you have any ideas or opinions on that?

Nicole Herndon: So I haven't heard that. I do know that carbonated liquids could increase sensation, so it could result in like a faster swallow trigger, just like maybe something sour

could. But I always-- I mean I think you got it on the talk-- I always stress test it on imaging to see if it actually makes a difference, because we also know that then too much carbonation can also impact reflux and things like that and that can also wreak havoc as well on the patient's quality of life.

Dr. Subramanian: How about people who have pills issues, gagging on pills? Do you have recommendations for people who have issues with choking on their pills?

Nicole Herndon: So I always-- if someone has that issue-- I test it during the modified barium swallow study. We have some larger ones, but I can always break them in half. We can't use your own medication because we wouldn't be able to see, it's not contrasted. But there's a few tricks that you can do, some that I can give you without seeing it on imaging. It's just making sure you place it further back on your tongue more purposefully instead of dumping it in the front of your mouth. You then have less room that you have to kind of generate that pressure and move it on back. And then also if you have dry mouth, the moment you put the pill in your mouth it's going to want to stick to your tongue, so just making sure you take a sip of water or two beforehand just to kind of get it nice and moist and then take your pills. And also I have a few patients that will tell me that they have difficulty swallowing pills, but it's because they don't take their pills with water. So if that's the case just take your pills with water.

Dr. Subramanian: [laughter] You've clearly done this a while, all the reasons, and then sometimes I guess applesauce and things like that may be helpful.

Nicole Herndon: Yeah so putting it in something thicker-- applesauce sometimes it can be a little bit more runny than like pudding, yogurt, even ice cream-- some of our patients really like when I say that-- can help, if you can hide it in there. The problem that some of my patients have is when they go to move it back they have this tongue pumping and so it separates the pill from whatever the food is, so you might have to play around with the thickness at all, but that can also be really helpful. Especially if you're just not one that can swallow pills, it's always been difficult for you, you can do that. You can always talk with your doctor or your pharmacist too. Certain medications can be cut or crushed, certain ones can't. That's important-- you can't just make an assumption that you can cut them up and swallow them.

Dr. Subramanian: So okay and there's also some questions about sputum and coughing a lot with sputum at night. I think one of the issues sometimes can also be that sometimes people get a bit of post nasal drip kind of situations as well so sometimes we give allergy sprays, but do you have any thoughts on that?

Nicole Herndon: Yeah sometimes too I think it could be reflux-related, so I would say first thing make sure you're not laying down right after you eat and drink, but secondly can be silent. Think about how when you lay down, your esophagus is more or horizontal, so it's more likely to maybe run up and cause some of that, it can also increase the thickness of your saliva, can give you bad breath in the morning, something like that. So sometimes sleeping on an incline can help if it is reflux-related. I always tell people not just pillows-- that's just going to kink your neck-- you have to actually elevate your esophagus, so that kind of chest and abdomen. Maybe check in-- even ENT can diagnose reflux if they see it when they pass an endoscope and look at your voice box. Sometimes they'll do it as a preventative measure if it sounds like that's what it is. Gastroenterology as well, looking at that esophagus, making sure that there's not an underlying structural issue that could be causing the reflux.

Dr. Subramanian: Okay there's a question about drooling and whether gum might help it.

Nicole Herndon: Yeah so yeah I really like gum for it. Chewing causes you to swallow more frequently. It also can add some flavor to it to increase that sensory response to cause you to swallow more frequently. A lot of my patients really like chewing gum, so I recommend that if it works for you.

Dr. Subramanian: Perfect, just important to take it out before you fall asleep or something, so we don't want to get it lodged--

Nicole Herndon: Yes, yes absolutely.

Dr. Subramanian: There's also been some questions about swallowing water and having a delay in the swallow or having just issues with water in general. Any thoughts on--? It says long hesitancy swallowing water and other people who have issues with just water in general. They have some sort of water phobia, looks like in some of these.

Nicole Herndon: Yeah so it could be that it's being held in the mouth. So sometimes that's that slowness with the tongue, that tongue pumping, or just that difficulty initiating. I also think water is pretty neutral in terms of taste, things like that, so I think sometimes that makes it a little bit harder to initiate the swallow. I haven't seen anything that would support it being specific to a certain kind of liquid, but I would say it would maybe make sense because it's so neutral. If you feel like you need something to help trigger the swallow, like I said there's some evidence out there for sour boluses or something that's cold to help increase it. But I always recommend testing it on an instrumental evaluation just to make sure that it's safe.

Dr. Subramanian: Perfect. There's also a question about spitting velocity, can't spit with any velocity when you need to get the throat cleared.

Nicole Herndon: It's spitting with any-- so like maybe not clearing

Dr. Subramanian: It might just be another question about generating enough maybe cough together. I don't know about the spitting. Maybe if you're off enough, maybe you couldn't actually spit this stuff out

Nicole Herndon: So I have had some patients tell me that they can't really spit it out, but usually it's more as the disease progresses and maybe there's some like dementia or some apraxia involved. If you can't do like a strong cough-- maybe that's what it is-- if you can't generate a strong cough, clear it, once again try to sniff and the swallow to try and get it down, versus coughing, clearing your throat, sips of water, once again making sure you're hydrated. And then if you want to work on cough, if that's what they were alluding to in that comment, I highly recommend EMST, just the evidence behind it makes me really support that.

Dr. Subramanian: So the EMST, that's that thing where you're talking about that sort of forced kind of breathing thing, so could you tell us a little bit more about that, and is that standard of care across the world or across the country now? And maybe people could get a bit more resources on that because I'm pretty new to that myself.

Nicole Herndon: Yeah so that is something that is used across many patient populations, so different diseases, and I would say it's pretty well known at least in the US, from what I've heard from people. You can get it online if you just type in EMST 150, it's sold by [as?] buyer products. Occasionally you can find it on Amazon. I would just be careful that it's not just the mouthpiece or something like that, but you definitely need to set it up with a speech pathologist because our concern is that you're going to train too high and cause fatigue. It shouldn't be so high that it causes fatigue. It should be high enough that it creates that strengthening component, so I think that's really important. I do sometimes have patients who are really gung-ho to get going on that, but I want to make sure that we're not going to create fatigue. You don't want to do it right before a meal in case it does fatigue or right before a big speech. I always tell patients if you do get it set up with your speech pathologist, just make sure you get it in your routine, set it on the table and do it during commercial breaks. It's a pretty quick exercise and many of my patients even with dementia, even with big motor issues, bradykinesia, tremor, are still able to find a way to do it. Sometimes the caregiver does have to help, but we'll include the caregiver in our sessions to work through kind of the kinks and things like that, but once you get it up and going you can do it at home on your own, we just kind of need that initial setup to make sure that it's appropriate and safe. And there's a few contraindications for it as well too

Dr. Subramanian: So okay and that's what you were talking about in terms of preventative of the Parkinson's progressive disease, maybe you could kind of start doing that.

Nicole Herndon: Yeah let me grab it really quick, I have an example one over here so let me just grab it.

Dr. Subramanian: Cool!

Nicole Herndon: All right, in my office. So it comes in a box like this-- and on there you can see the guy doing it-- but so you can see here he's holding his cheek because when you blow into you don't want to lose some pressure in your cheeks and then have to generate extra pressure to overcome it-- trying to prevent that fatigue, more that strengthening component. So there's a few ones like this on the market. If someone's a little bit weaker but still want to get practice with it, there's some ones from Phillip's that are a little bit lower level that you can do. It looks like this, and usually there's a mouthpiece on it. And it comes with two, so you can kind of choose which one works best. And then you just simply turn the dial, and then there's a spring in here that it tightens to increase that resistive load. So our goal is that as you get better, we can continue to turn it up and kind of push you further and further along, but once again if we can't get that, we at least want to maintain function for as long as you can. We know how important cough is for swallow safety as well. If something goes down the wrong way, you need that power to eject whatever it is that went down out of the airway.

Dr. Subramanian: So you blow you into it??

Nicole Herndon: You go [mimics blowing] yep and you blow into it

Dr. Subramanian: And try not to let this-- okay that's helpful cool

Nicole Herndon: Yeah I think they have videos on their website to show you how to do it, and if you're interested, and your speech language pathologist isn't familiar with it, I can always chat with them or something like that, I'd be more than happy to do that. So they also have some webinars occasionally, so your speech pathologist could do that.

Dr. Subramanian: Okay well this has been so helpful, Nicole, so much information and so much practical stuff. You've already been asked to come back in the chat, and everyone wants to know about ice cream, so you've already made them-- they're like, is ice cream considered a thickened liquid or whatever, or not--

Nicole Herndon: It's considered a thin liquid actually because it melts down, but if you need it for your meds or for quality of life, I'll give it to you

Dr. Subramanian: We'll give it to you today, go have some ice cream everyone.

Nicole Herndon: For good oral care

Dr. Subramanian: Doctor's order-- doctor and speech pathologist order for today because it's hot and we deserve it. [laughter]. This is awesome! So we will have you back to hopefully talk about voice stuff because there's a lot of questions about voice, and we didn't get to it, but you think that would be kind of the sort of second installment, right?

Nicole Herndon: I mean there's just so much that we can do, but I know symptoms vary. What is difficult for each patient varies and what they find is something that they want to work on. We always talk about how something needs to be functional, individualized care so I think that this just stresses the point that swallow is one of the things that we can cover.

Dr. Subramanian: Well I'm sad that your granddad had a TBI, but I'm so happy that he inspired you to go into this field.

Nicole Herndon: He's doing very well though.

Dr. Subramanian: Oh really still? that's amazing. Well I'm so happy that he inspired you to go into this field because you've taught us so much today, and we will have you back hopefully in the next couple months to talk more about the more vocal and speech part, if you don't mind sharing with us.

Nicole Herndon: Not at all, I'd be happy.

Dr. Subramanian: And I hope you don't get inundated with emails, but you've been so generous with your time and your offer to help our sweet patients out there, so I'll give you a last minute to say a message of hope to our group here and then we'll hand it back to the Cambia line.

Nicole Herndon: Sure yeah so like I said I've been doing this for two and a half years so, so many of my patients are just inspiring to hear their stories and hear kind of their experiences and how hard it is every day to go through Parkinson's, atypical Parkinsonism, any movement disorder. And the caregivers and family members that support them-- you got to stay healthy,

stay motivated. Sometimes I know it's hard, but at the end of the day we want something that's going to impact you day to day, so find the ways to incorporate what your therapist recommends in fun tasks-- sing, eat ice cream, that is recommended, so at the end of the day quality of life is super important. If you ever feel like your therapist isn't focusing on your goals, advocate for yourself. I tell a lot of my patients-- because we have a lot of patients that come from further away so we're often referring them back-- and so we talk a lot about functional goals and making sure you talk with your therapist about the goals to make sure they're working on what you want to work on, so that's what I would say. And then yeah, just continue to work hard every day and fight Parkinson's!

Dr. Subramanian: Fight Parkinson's and have an ice cream. All right well thank you so much so we'll hand it back to you guys Rebecca, at Cambia Life. I'm glad the Zoom didn't crash [laughter]  
Rebecca Korduner: Yes, we made it!

Dr. Subramanian: Yes, so we all deserve to celebrate. So anyway thanks for hosting and thank you, Nicole, again for coming on. Mike was right, you deserve a round of applause from all of us. And we'll give you our goodbye wave as well.

Nicole Herndon: All right, thank you.

Rebecca Korduner: Yes, thank you so much. This was wonderful. I saw so many comments in the chat just about how excellent this was. I don't even think that does it justice. This is great, so if we could all turn our cameras on, we are going to give our goodbye wave. Love to see you. It's been so great, and we will see you guys soon [laughter] Thank you so much everyone, bye.