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Neurogenic Dysphagia in Older Adults with Motor Disorders: Part 1

Recorded April 16th, 2020

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SpeechPathology.com Course #9229

- [Amy] And at this time, it is a pleasure to introduce Dr. Jeanna Winchester this afternoon who is presenting Neurogenic Dysphagia in Older Adults with Motor Disorders, and this is part 1 of her two-part series. Jeanna Winchester is the owner and founder of a continuing ed firm dedicated to working with global industry leaders and continuing education and professional development. Dr. Winchester is also an author, associated professor of medicine, Allied Healthcare instructor and peer-reviewed published author in clinical, cognitive, neuroscience and aging. Dr. Winchester has a bachelor's degree in psychology and biology, a PhD in brain sciences, and certification in speech-language pathology and healthcare administration. So welcome, Jeanna, thank you so much for joining us today.

- [Jeanna] Thank you so much, Amy, I'm really excited to be here and I'm just really honored to have this opportunity to speak with you today. What's really interesting about this course is that it began really with something that is within my wheelhouse, my bread and butter, which is working with older adults with various types of neurodegenerative disorders and different types of neurogenic issues. And then, of course, this coronavirus outbreak occurred. So what I have done is I have added some of that information here, on top of this course, the way that it was currently laid out, but I did add a little bit of this COVID-19 information, because as we'll see, particularly with dysphagia, speech disorders, and with the aging population, we're really gonna see some long-term effects of having such a significant acute respiratory distress occur in an aging population.

So it's nice because I have been able to take a little bit of time and add that to this presentation, so I hope that you'll find it very interesting, and hopefully helpful. I am a scientist, a clinical cognitive neuroscientist, I'm independent, and I currently don't have any disclosures. I've worked with some other speech pathology companies but

currently I'm independent as an educator and I do this full-time now. As far as the learning outcomes, I really try to develop courses that are gonna provide practical information. So I really hope that, as participants, you will be able to list the bodily systems involved in the swallow and describe their breakdown in dysphagia. I hope that you'll be able to describe the relationship of the neurological and cognitive systems in the swallow and dysphagia, and this bullet point we'll probably spend the most amount of time on, 'cause we're really gonna break it down by neurological disorder. And then finally, you should be able to describe the relationship between neurogenic dysphagia and hospital readmission rates.

And that final bullet point is really where COVID-19 is going to reshape the way we discuss this and we had already had quite a bit of a revolution occur in 2019. So there's a lot going on right now and there's a lot of information out there. What we're gonna try to do is put it together, present it to you here in a cohesive way and hopefully that'll be something that you can take. Currently if you are working in telepractice, but hopefully when our patient interactions can begin again, you can take that information into your everyday practice. It's important because dysphagia is so prevalent. It's the sequela of many chronic and complex conditions.

We see it prevalent in other comorbidities such as stroke, we're gonna talk about Parkinson's today, various types of dementia, which is really where my expertise goes from here. I look at the systems surrounding neurogenic dysphagia but then my real expertise is really looking at some of the dementia cases. We will be exploring Lewy body dementia in this hour but I wanna make sure that I emphasize, there is a cognitive impairment component to almost every case study we're gonna look at. So really, that cognitive component will be there throughout the entire part one and part two. Many, many studies have looked at the prevalence of dysphagia and the elderly community. Just being 55 years or older, there is a wear and tear that happens with the swallow and this is prevalent in the elderly. To add any sort of comorbidity on top of that, or

even just a condition, it doesn't have to be a degenerative condition, just anything, asthma, this can then predispose that patient to become more at a higher aspiration risk and more at-risk of dysphagia. Generally, estimates puts that there's a dramatic increase in community-dwelling adults that have conditions associated with dysphagia. That bullet point is now an understatement. With the COVID-19 pandemic being a respiratory condition, inherently we are talking about the junction of the GI system, the respiratory system, our vocalizations, our neurology, our cognition, all of that happens in the head and neck, and so to have such a dramatic viral outbreak occur in the respiratory system, it will have long-lasting effects on this dysphagia community.

Very likely, there is going to be an explosion of dysphagia-related cases following such a significant pandemic. And that's because what we're really talking about here is aspiration pneumonia. Again, the very thing that these patients are at risk of is exactly what we're talking about today, the contents penetrating the vocal chords, entering the respiratory tract and taking up residence in the lungs. This is what a respiratory infection is, this is what a viral infection is and they aspirated the content. You know, if they touched something of a surface that then had the virus, then they touch their mouth, well then you have to swallow that.

Perhaps they aspirated those contents, or it was from their nasal pharynx and there was a post-nasal drip of some sort. They absolutely aspirated those contents for the virus to make its way to the lobes of the lungs. So right away, we're in the ballpark of speech pathology expertise. This is the community that we need to be speaking to and we're likely to see a real large increase in aspiration pneumonia risk, aspiration risk, and then possibly chronic dysphagia-related degeneration in many patients recovering from coronavirus. In general, aspiration is a general mechanism, and again, that's why we're in this realm. And it is associated with that infection associated with inhalation. Now let's say we're not talking about specifically coronavirus, it's easy to talk about because it's so prevalent, but this could be the flu, this could be any pneumonia, this

could be reflux contents and they could be aspirating very acidic gastric contents. Aspiration itself is a general mechanism of anything penetrating that laryngeal barrier that should protect the airway. When it crosses it, it is aspiration, and we do this all the time, even in the young and healthy individuals, we aspirate our oral secretions, particularly during sleep. And we do it at various times throughout the day, although with activity and moving around, we are more likely to cough those out. We will talk about, in part two, the effects of the sedentary lifestyles, sarcopenia, and malnutrition, how lack of activity can really drive this forward. And we know that from the amount of contents aspirated really makes a difference.

So a small aspiration of oral contents, such as a little bit of saliva, may not do too much damage, but any amount of aspiration of acidic reflux coming from the stomach and now that acid will burn the lungs. So what gets aspirated is another important point, and especially when we bring it back here to COVID-19. These patients are more likely to have thrush and other microbiomes now in their oral pharyngeal and laryngeal cavities, especially if they were intubated or on any sort of artificial ventilation. So as you return to more face-to-face contact, depending on your situation, but even in the telehealth practice, and a review of oral health, especially if they have dentures, and taking that into account. Some evidence of thrush is visible even over a FaceTime or other form of video chat.

Chest wall capacity is going to be affected for sure because of what COVID-19 does. It is destroying the tissue of the lungs and the airways begin to collapse. Think of a really, really, really aggressive emphysema in an acute respiratory distress kinda scenario. So afterwards, these individuals are gonna have a really difficult time with the scar tissue, being able to expand their lungs, and there's a certain amount of holding your breath that is involved with the swallow, which we will be reviewing in our systems to swallow here in just a second. The cough reflex, again, because of the scarring and just absolute exhaustion, all pharyngeal and laryngeal sensitivity and their motor responses.

We put this in red because this is going to have a lot of correlation to our case studies today. Of the case studies that we go over, Parkinson's, Huntington's, even when we look at multiple sclerosis, Hunting, I'm sorry, ALS, sarcopenia, malnutrition, all of these case studies are going to involve patient populations that already have a difficulty with either sensitivity or the motor response itself. Now they're gonna have this additional burden, not surprisingly, upper respiratory and lower respiratory disease, the act of having it itself. In addition to possibly any other comorbidities, this population is very likely to have both acute asthma from the scarring, but possibly chronic asthma. Let's say they weren't diagnosed with COPD but they were on the path, they were already deficient, they were already starting to experience some respiratory distress and they hadn't had an official diagnosis yet.

This may trip them onto that final diagnosis, this is what put them on that path. The nutritional demands, we are going to take an entire section of in part two, with malnutrition. The elderly already have an issue with malnutrition. Dysphagia brings malnutrition, and then a viral attack on the body can have a significant loss of resources in the body, which we describe as malnutrition or electrolyte loss. Just being admitted to the SNF itself puts them at risk. We know that community-acquired infections were already a problem.

Now we have a pandemic that ravages communities, so just being in the community itself puts them at risk. And then there are other super infections that are likely to become the topics of 2020, in the fall, going into the winter of 2020, and then going into 2021. As I said, it really depends on when you listen to this. In the future, there will be many, many more topics coming out and I encourage you to continue in the next few years, just stay educated and continue to look back. How our body is as we suffer through an acute respiratory infection, we are now at risk of something else and our body is a huge microbiome. MRSA, Cdiff, SIBO, these are already issues of community-acquired infections and rampant in populations that have dysphagia,

rampant in populations that are at a high risk of aspiration already. So it's just important to write these down, keep them with you as you begin to re-enter this patient population and we begin to treat the after effects of this pandemic occurring. You are likely to see, at a minimum, issues in this list and it'll probably be a much larger list as we go forward. And that's because the bodily systems affected in dysphagia, these are the systems that I hope you'll be able to list. Now there are more. I am putting up available a copy of the publication that I have published back in 2015, where we discussed these bodily systems of dysphagia. You can write down that link and later today you'll be able to see that publication. It's also available through the ASHA Journals.

And what we discussed in the publication is that these are the bare minimum five. You can include more bodily systems, of course, but at a bare minimum. Please describe dysphagia in terms of these minimum five. Respiratory. You do have to hold your breath. I've exaggerated my swallow and I've exaggerated this breath hold to show you that you really do have to hold it for one to two seconds to complete the swallow, and when you have issues with this, it could be with breath hold, then you can aspirate in the middle of the swallow.

Neurological and cognitive are pretty intuitive, especially in this group. When I speak with the general population, or perhaps individuals, that whether you're an OPT, a PT or speech, all the rehab disciplines, even audiology, are going to have a significant neurocognitive component, so that's why it's a real pleasure to speak with this audience today because it's fairly intuitive. And the muscular component is fairly intuitive. You guys already have master's degrees and an incredibly large amount of background on this, so I don't spend a lot of time on muscular. But what we're gonna do is look at how they interact, especially with gastrointestinal. You may not have thought about this before, but the GI system begins in the pharynx, and although it is supposed to move in one direction, going from the mouth all the way out, any time that

anything from the esophagus comes back into the pharynx, it is considered reflux, that is dysphagia, that is a breakdown because that should only move in one direction. Here, it's very important to remember that because there's gonna be reflux associated with the medications, there's gonna be reflux associated with intubation, with mechanical ventilation, from being sedentary, from being in the community itself, all those risks. Now we have patients who are likely to have more GERD. If they're in the hospital, they probably will put on pantoprazole or some other form of that. But when they go home, they're gonna have a massive reflux rebound, they're respiratorily compromised, they've got neurocognitive and muscular issues, now they're refluxing and some of that acid may start to burn the lungs.

Together these systems can really snowball out of control and that is because there's an evolving and accelerating effect of dysphagia-related decline across these bodily systems, that's really what the crux of that publication is and the crux of what I've been talking about these last number of years, really trying to emphasize, and I thought that this photo describes it so well, the evolving nature of the decline, and I'm gonna take my arrow here for a second and just show you what I mean.

Up here we may have the first inclinations of dysphagia, and really, it's just, whatever it is, it's falling off the cliff, it's doing what it does. This is a photo of a waterfall that has been frozen. And we see the effects of the waterfall, even with the freezing temperatures, the water is still flowing. But what I love about this photo is the evolving effect. You really see the effect of the waterfall on the surrounding area by seeing how it's frozen, but all of this snow occurred because that water fell and the evolving nature of those effects has changed the landscape of this little area. And what I love the most about this photo is how small we are by comparison and it really puts this in perspective, that things can snowball out of control, there's an evolving and an accelerating effect, particularly now with this new respiratory-compromised population that we will be dealing with for the next number of years. We have to remember our

place but this is who we are relative to such an enormous problem. But we can also have a very significant evolving and accelerating effect by managing this dysphagia. Just to continue with the metaphor here, if you were to put a dam at the top, it would stop the waterfall. Well with your mechanical, I'm sorry, with your dietary modifications, other compensatory effects, you can be the dam and we can stop the waterfall, that evolving and accelerating effect of dysphagia. And so if you learn anything, anything in part one and part two, this is what I hope you will take away from this. The effects increase over time, the devastation increases, but you can change it just the way that we can change the power of these mighty rivers and these mighty waterfalls. So we look at COVID-19, and anyone in general, who might have any compromised respiratory component. This is COPD, emphysema, chronic bronchitis, acute asthma. Let's say they had a bad flu, they had MERS, they had SARS, they had something that wasn't COVID-19.

These are true whether you have COVID-19 or any other infection that might affect the respiratory system of dysphagia. We're gonna wanna look at the oral pharyngeal, laryngeal, but also the tracheal and bronchial and lobar effects. Have those conversations with your PTs if you're an SLP. If you're a PT, SLP or OT, you know, it might be time to start reaching out to respiratory.

Respiratory, it looks like, it's gonna have a discipline that grows quite a bit in the next few years. Have those conversations because this is a snowball effect and it can devastate many systems, and together, as an interdisciplinary team, you guys can really make a difference because it's those long-term consequences, the tissue scarring, the likely explosion of patients with dysphagia, following some of the neuromuscular and cognitive components of this disease that we are likely to see in our populations. We know it's gonna affect the neurological and cognitive systems of dysphagia at a minimum because of the fevers. There is gonna be some apathy, aggression, defiance and depression in this population that will be specific to the

elderly. It will be different than what is seen in the younger population. What has come about in the last couple of days, since I wrote this PowerPoint and sent it in to Continued, in the last couple of days to the last week, what they're starting to realize is there might be an actual encephalopathy with COVID-19 where the virus might be attacking the central nervous system itself. Some of the very first cases were misdiagnosed as Guillain-Barre. Guillain-Barre is an enigmatic neurological disorder that has inflammation and flu-like symptoms, so it makes sense why it was misdiagnosed, but it might be because there's a subset of COVID-19 patients that are actually having neurological encephalopathy.

So check back on that particular component. It may not be all patients but it may be a subset of the populations that are actually having some brain hemorrhaging occur, either secondary to the virus or it's a version of the virus and there's actually multiple versions of the virus, we haven't determined that yet. At a minimum, if any patient has a cognitive impairment and they have a high fever, the high fever and the inflammation exacerbates the cognitive impairment and the dementia. This will have an effect on long-term medical compliance.

That's the second component I hope you really take away from and apply in your everyday practice. For the next few years, medical compliance will be very difficult and that may be something that you really have to work on with your patients. Following up on them, are there telehealth ways that you can help these individuals, that are cognitively impaired, continue to adhere to their treatment without requiring being right next to them in the room? So that's some things to consider as you look to how this might be impactful in your everyday practice. And so that's why I wanted to leave some guidelines here. You can begin to make more referrals. I highly recommend, if you're working with any patients, PT, OT, speech, audiology, whoever is listening, if you're working with any patients that is over the age of 55 and has a cognitive impairment and they have the coronavirus, they survived, please make a referral, either

neuropsychiatric or physician or mental health nursing because we do know that, or it seems to be, that there is a neurological component and there is a broader availability of neuropsychiatrists over telehealth now. As of March 17th, they can see these over video and teleconferencing in their homes, and they can assess those things like apathy, aggression, depression, things that might impede medical compliance, and again, if you're gonna give your patient a neurocompensatory technique, you know, it's pretty good to check up on them to see, are they able to actually do it or do they need the help of a counselor or somebody else who might be able to help them stay consistent with the treatments that you're recommending?

Because it all comes down to defining what neurogenic dysphagia is. It all begins in the brainstem, and again, I've cited that publication 'cause I'm gonna go through this kind of quickly, but it is in that publication and you can look at a lot more of the mechanisms online. Essentially what it comes down to is that you have cranial nerves, you have a cerebellum, a spinal cord and a cortex. All of these are gonna work together in order to execute the swallow. There's no specific one side of the cortex that is gonna do this. The one side may be dominant over the other and this does have a little bit to do with handedness.

There's a temporal arrangement of all these structures, the respiratory system, the neurological, the cognitive systems, they all have to work together because the respiratory system is gonna have to hold its breath, the entire pharynx is gonna have to rock forward so the GI system can open up in the form of the upper esophageal sphincter. It's naturally closed when the pharynx rocks forward, it pulls the upper esophageal sphincter open and this allows the contents to then enter the bolus, to enter the GI system. The neurological, muscular and cognitive system should come together, hopefully, they coordinate, these are very tiny and very numerous number of muscles, in order to close the larynx, close the vocal chords, retrovert the epiglottis, cover the airway, rock the whole thing forward, open the GI tract and have that bolus

safely transit into the GI component. But then here's the tricky part. The upper esophageal sphincter has to close. The pharynx has to recuperate its original respiratory configuration so you can passively breathe again. I highlighted this in red because I want to really emphasize that that component may be difficult for anyone with this acute respiratory distress for any reason, but especially for COVID-19, scarring, and any of the case study conditions that we're gonna be talking about today. And that's because there's a lot of sensation and motor action happening. Your nervous system is constantly modifying it, you know, if it tastes bad, if it's salty, if it's hot. If you're just in a bad mood, the swallow does something differently because all of those things matter. Because taste, pressure, temperature, nociceptive, which means your touch, general somatic stimuli, meaning, you know, do you have a headache? Is the dog barking?

Are they mowing the yard outside? Is someone talking to you and you're laughing in the middle of it? You start eating? Many, many, many different things are happening at the same time and your nervous system, cognitive system, muscular, respiratory and GI must all come together through the brainstem's central pattern generator, to make this all happen. Because the brainstem is gonna act like an extension of the cortex. It's gonna modify our breath, our heart rate and all those autonomic systems, and it really helps to make sure that everything comes together so the cortex can process it.

We are much more than our brain, we are really amazing neurological system, and there are many parts to that system that work, many of them come together for the swallow. Especially the reticular formation of the brainstem, it is a multiregional, multisensory coordinated experience and this portion of the brainstem is gonna modify all those different autonomic and voluntary sensations. For example, I'm laughing, I'm hearing a good joke, and I start to realize that I'm gonna choke and I voluntarily cough. It's a very complex movement, all together, if that sensation goes well, I keep eating and I continue my experience. It's because it consists of both the act itself, the

neuromotor part, as well as our perception of the experience. And many individuals in long-term care and in the elderly have very negative experiences because of what's happening with their dysphagia when they try to eat. This negative experience might cause them to choose to isolate themselves. The isolation can exacerbate the problem, it becomes a very multiregional, multisensory, highly coordinated experience, the act of eating really affects our quality of life. And it's because that part of the brainstem actually controls a heck of a lot. The pontine pneumotaxic center is the center that controls breath rate. So the same part of the brainstem that's controlling the swallow is regulating your breathing. It's also regulating all of these cranial nerves that are involved in the swallow as well. Trigeminal, facial, glossopharyngeal, vagus, hypoglossal. And so all of this has to come together in order for the swallow to happen.

One thing that I tell my physicians, 'cause I teach a first year, I teach physicians in medical school. By the time they come around to my neurology lecture actually, there are second and third years, and they say that just because humans do it well doesn't mean it's an easy thing to do, it just means we're evolved to be really, really good at it. So our brainstem has made it so that I can coordinate everything for us in an unconscious way. The brainstem is really the unconscious component of everything. So it's gonna control those basic inspiratory and expiratory rhythms. It's also gonna control the depth.

It's gonna modify based on feedback and your levels of carbon dioxide. You know, if you're laughing too hard, your brainstem is going to adjust based on how much oxygen and carbon dioxide you have. Think about how that is artificially affected if you're on mechanical ventilation. This is one thing that I also want to point and we don't know what the effects of it will be but we're starting to see that a certain percentage of patients, not everybody, the majority of patients really need mechanical ventilation, but a small set of the population actually got worse on mechanical ventilation, it made the problem worse, small percentage, but why in that population did that happen? Could it

be that the mechanical artificial ventilation threw off their basic rhythms? Who knows, it's hard to determine but we're starting to see some of those smaller subsets of patients, and there is a chunk of patients where the ventilators weren't a good idea, they actually had a harder time because of it. And that's because our own body is controlling that and mechanical ventilation does artificially affect that, the body has to constantly adapt to the artificial levels of ventilation that are happening. And did that stress them out? What did that add to this entire model? And that is because when we really look at neurogenic dysphagia, and that is why it's so prevalent across all the rehab disciplines, why neurogenic dysphagia has such a broad sweeping effect across the population, and it is because the motor cortex comes together with the cerebellum, the brainstem, all those cranial nerves.

All of the spinal nerves of the peripheral nervous system in our cervical and phrenic plexuses, which are near our collarbones, they're right behind the collarbones. And the thoracic nerves, right at the superior portion of the sternum where the sternum meets the neck and the cervical portions of the head and neck. All of these together are going to be affected in the face, larynx, tongue, diaphragm, shoulders, neck, the muscles in primary and secondary respiration, and even our abdominal muscles.

We'll talk a little bit about that with sarcopenia and malnutrition, how not being able to breathe out, not having control of the abdominal muscles and sedentary lifestyles can really affect the ability to hold the breath long enough to complete the swallow. Some people, as I've said, can't hold their breath long enough, and so they try to breathe in the middle of the swallow and they end up aspirating. And that's because all these different systems come together. I tried to put this small graphic here where a marker has colored in the motor systems and the sensory systems, because this is the complexity of the swallow just in the neurological system alone. There are many different cognitive functions associated with this because we have executive functions, there are memory systems, there's interhemisphere coordination. We've talked a lot

about the brainstem, we haven't had as much time to talk about cerebellum in this part one and part two, but chronic alcoholism would affect the cerebellum. There are many different diagnoses that can result in neurogenic dysphagia. It can cause the dysphagia or it can be exacerbated by the dysphagia. In truth, what will likely happen is that the diagnosis may cause the dysphagia, the dysphagia will exacerbate the diagnosis and they end up in this terrible feedback loop, and that is how dysphagia and neurogenic dysphagia can spiral out of control. Which brings us to our first case study here.

Parkinson's disease is a neurological disorder, it is considered an upper motor disease because it is affecting the central nervous system, only upper means central nervous system. Lower means peripheral nervous system.

This is an issue where the substantia nigra of the subthalamic region of the thalamus, it's an area that sits in the deepest parts of the cortex, just above the brainstem, just below the cortex, it's nestled right in the middle. And the purpose of the thalamus, like Grand Central Station, is to send neuronal signals everywhere. Well this part of the body is not making enough dopamine. It could be because they had chronic cocaine or heroine abuse.

Maybe they have a genetic component, although that's only 2% of the population. Maybe they were exposed to a heavy metal, like lead or some other aluminum or something that might've poisoned their body and they ended up with Parkinson's, or they are just prone to a loss of dopamine later in life. For whatever reason, this imbalance between dopamine and acetylcholine manifests as the tremors of Parkinson's disease, that are the characteristic tremors. There are slow riding movements called bradykinesia, and if you break down that word, brady means slow, kinesia means movement. For those of you that may be more into physical therapy, you know that, but for other individuals, they may not be able to breakdown that word. But it's important to break down that word because we're gonna compare it to Huntington's. So I'm pointing that out because I want you to see, this component will

be different in Huntington's disease that we will talk about next. Parkinson's itself is associated with a form of Parkinsonian dementia. We will talk about what Lewy body dementia is and how this term kind of encompasses a number of different types of dementias. But because we are losing dopamine and we are in the cortex, there are cognitive ramifications to changing any of the neurotransmitter levels. Whether you substitute it with L-DOPA, there are consequences, cognitively, to taking L-DOPA. There are cognitive consequences to have not having enough dopamine. So Parkinson's has its own form of dementia. Dementia with Lewy body's is additive component, Lewy body dementia is a term that will encompass both of those types of dementia and that'll be the final thing we discuss today.

And talking a little bit more specifics, and relating Parkinson's back to this general topic here, I did find a case study from 2018 looking at the effects of respiratory, significant respiratory infections in general in Parkinson's patients because where we are in time, we don't have a lot of data right now to be able to specifically relate Parkinson's to the coronavirus. But there are a lot of lessons that we can learn in general for Parkinson's and significant serious respiratory infections that take them to the emergency room.

They did look at these admissions between January 2007 and December of 2013. Comparing a number of clinical features, laboratory data and various outcomes. They look at patients that have these infections and then they divided the group into those that had Parkinson's disease as well and those that did not. Of the 1200 episodes of infection, in Parkinson's patients, and the 2400 other non-Parkinson's patients, it was found that the Parkinson's patients had fewer comorbidities. And they also had a lower severity of infectious disease. We can't go into a lot about what the authors talk about, but it may be that Parkinson's patients are already cautionary, and so their behaviors are a little bit different, especially if they have a caregiver or if they're already in some sort of assisted living facility to begin with. This would change their behavior, that

changes the level of comorbidities in serious infections. However, when they did have an infection that was serious, they did stay in the hospital much longer than the control group. So while they may not have had the activity level that produced the behavior where they ran out and did a bunch of stuff, more likely to get infected. However, when they did, what happened to them was much more serious and they stayed in the hospital much longer and they battled those effects for much longer. Because the incidences of respiratory tract and urinary tract infections were higher in Parkinson's patients, the relationship of urinary tract infections to dysphagia or respiratory disease is that urinary tract infections will cause a fever.

So again, cognitive impairments, neurological effects, but it's also gonna throw off that electrolyte balance. So the UTIs are contributing to some of that malnutrition and loss of electrolytes that we will be discussing in part two, where we're just gonna zero in on that effect and I'm gonna bring every case study that we talk about, up to that point, I'm gonna bring it back and go through malnutrition in every case study again. So that'll be the end of part two.

So you can really see how we're gonna try to bring you a comprehensive two-part exploration of many case studies and we'll wrap it up at the end by bringing up this sarcopenia, malnutrition, these more general aspects. One of the more effective ways to diagnose and manage dysphagia, as well as aspiration, comes from imaging, and this is a bit intuitive. What I want to educate you on is how to make the appropriate choice, and I used some of my experience from PET and MRI and X-rays as an example. So I'm gonna give you this little bit of advice and then we're gonna talk a little bit about aspiration, pneumonia and Parkinson's with imaging and looking at dysphagia. So whether you're trying to choose the modified barium swallow versus the FEES in imaging, what I want you to know is that it really depends on what you're looking for. And I'm gonna use an X-ray versus an MRI as an example. If I broke my arm, well the bone can be seen in an X-ray and that's the equivalent of a modified

barium swallow. The modified barium swallow is an X-ray. So if it's quick and dirty and you can get something from the modified, same thing with an X-ray, quick and dirty, it's cheap, it's available, lots of people can do it. If you can get information from the X-ray, go with the X-ray. However, there are things that an X-ray can't see by the nature of X-ray, and that's what I give the relationship of FEES, I equate it to something like an MRI. If I tore a muscle, or a ligament, or I have a neurological disorder or I have an issue with, like, fluid, those things are just not capable of being seen on an X-ray. In the swallow, there is some similar correlates to reflux, some other correlates that can't be seen on an X-ray 'cause they're fluid or tissue-based. A FEES is gonna be great for that. So it's really, what are you looking for?

Do you need to see something a little more complex? Go for the FEES. If the modified gets you what you need to see, because it's actually showing something useful to you, go for the modified. Here, this particular study, there were a lot of choices between FEES versus modified barium swallow in Parkinson's. I bring that up specifically because Parkinson's disease, Huntington's, and many of these neurogenic dysphagia disorders that I'm talking about today are really gonna have a lot of applications and I really recommend using these imaging studies. Because you can see a lot of different aspects that are important here.

Chewing, transferring, aspiration, the total swallow time, and we can be certain that evaluating these measures are going to relate to something significant like mortality. When they can't chew, when they have a higher aspiration risk, when these things can be managed through imaging, you can improve measures of quality of life. This is true whether it's Parkinson's or Huntington's disease. The reason we talk about Huntington's is because it's very similar to Parkinson's but it's a different neurotransmitter. Huntington's is also a genetic disorder and it's very likely to happen in males in their mid-30s, especially if their grandfather had it and their father did not. They are very biased to have it. And it is fatal, and unfortunately, there is no treatment.

Here, GABA is throwing off the balance between dopamine and acetylcholine. So it's not dopamine directly but it's dopamine indirectly. GABA is off and all three of these chemicals have to be in balance, like a really good soup. You know, if it's too salty, if it's too acidic, if it's too sweet, if you've got too much of one ingredient or the other, it throws off the balance. Neurotransmitters are the same way, GABA is off, and so a different part of the subthalamic region is affected in Huntington's disease. But they're a little bit different from Parkinson's, they're gonna have a tremor, but here, it's gonna be a choreatic tremor, it's gonna be a wild flailing tremor. And that's why I said the bradykinesia is important distinction in Parkinson's because it's that slow-arriving, pill-moving, shuffling feet resting tremor that you're gonna see in Parkinson's. Huntington's, there may be a resting tremor but it's gonna be much more wild, and if they specifically have choreatic movements, and it's funny 'cause chorea, it's gonna be much more wild and flailing and erratic.

There is no medical treatment, unfortunately. There are some dopamine receptor blockers but that's gonna have some other issues. And then of course, Parkinson's and Huntington's are gonna have issues with dysarthria, because anything that happens to the central nervous system is gonna affect the peripheral nervous system. They will have muscles that won't respond regardless of what they want to happen. But they're also gonna have fear, anxiety and a number of other cognitive-related issues. It will not necessarily follow a one-to-one fashion.

The cognitive decline will be at a different decline than the neurological, and in fact, it's like dysphagia, it's probably gonna be circular. You will likely see the neurological, the cognitive and the swallow deteriorate like a snowball, and they will circle back and affect each other, and they will also exacerbate each other. But what we see from case studies is actually there's a lot you can do. That's why I want to make sure that I always finish up, and I'm gonna show you this as we finish up here with Lewy body dementia, that there is a lot you can do. The topic itself is poorly explored in

Huntington's disease because the population passes away very quickly, and it's harder on clinical trials in populations that know that there's nothing that can be done. But what they do see, in the very few studies that have been published, like I said, there's only 10 of 24 that have been published, there's just not a lot looking at it, but what we do see is that you can do a lot. Dysphagia should be assessed in Huntington's patients and in Parkinson's patients very, very early, especially in the presence of clinical markers and frequent reassessments are necessary.

Longitudinal studies show that OT, PT and speech, and audiology, there isn't too much here for you, I don't know how many audiologists will listen to this, but many, many audiological effects for all these neurological diseases as well, but particularly, PT, OT, and speech, your intervention in the swallow and in activity has significant quality of life improvement markers in these populations, so I want to end by making sure that I let you know there is still a lot you can do. Because although the physician and coordinating with the nurse practitioners and the other medical teams are important for the pharmacological treatment of Huntington's, the rehab team is essential in the quality of life for Huntington's, both for rehabilitation, compensation, and I would even add caregiver training. Because it all comes together, there is a high prevalence of dementia in both of those populations.

As I've already mentioned, Lewy body dementia is a term that encompasses both dementia with Lewy bodies, Lewy bodies are our protein plaque that are building up, body means like a tangle or a ball of hair or like a tumbleweed. You know, if you watched a western and the tumbleweed goes across the street, well imagine if that tumbleweed was made up of a bad protein and that plaque body was being stuck in parts of the neurons, that's literally what's happening here is that there is this abnormal gook, this protein aggregate called the Lewy body, that accumulates in the neural pathways of these patients. In addition to the Parkinson's itself, it has nothing to do with Parkinson's, you can have Lewy bodies by itself, you can have Parkinson's by

itself, and you can have both. Lewy body dementia is an over-arching term to kind of catch all of those patients. What we will see is that the protein is called alpha-synuclein, that's the name of the protein, and what it does is it accumulates on the tissue and it's gonna eat away at it. It gets stuck between the neurons and stops dopamine transmission. That's what happens is the dopamine can't jump the synapse if there's is a giant protein tumbleweed in the way, and the plaque blocks the chemical from making it to the next neuron.

Currently, there are no disease-modifying drugs, this is what everyone's working on, is just like Alzheimer's disease, which has a plaque problem of a different kind, in Parkinson's, Lewy body dementia, and in Alzheimer's, the pharmacological interventions are trying to get the plaques to leave the brain, 'cause that's what normally happens in the body, and our body is naturally doing this all the time but for some reason, with the elderly, the plaques are not leaving the body and they build up and they cause these forms of dementia. With COVID-19, there is a teeny, tiny bit of evidence, this is so preliminary but I wanted to make sure I put this in there for you.

And go to the references, because you'll see a lot of the references are pretty current. What teeny, tiny bit of evidence we know is that silent aspiration risk is gonna be huge in this population. This population especially following the tracheal penetration of intubation, the pharyngeal retention in aspiration is all gonna be affected, but they are not likely to feel it, so they're not likely to complain of swallow dysfunction. You may have to assess and really utilize your clinical skills, because this is a population that may not be able to feel it, which means they can't complain, and that's so critical 'cause your investigative skills and assessment skills as a clinician could be so important here. And all of this is going to affect hospital admission rates because as we already said, being on an altered diet, the presence of dysphagia, of being sedentary, being isolated, that risk of respiration that we've all talked about so far, and just being in the nursing home alone is gonna predispose that individual to going back to the

hospital over and over again. And half of those patients are not likely to survive that over the course of 12 months. There's a very high mortality rate over 12 months. We must now add the COVID-19 infection diagnosis to that list. If you see that in the next few years, you should put on your investigator cap, especially in this population that may not be able to feel it. AHCA has provided you with a ton of information, this same slide will be found in part two, don't worry. What I wanna highlight is [FloridaHealth.gov/COVID-19](https://www.floridahealth.gov/COVID-19). The American Healthcare Association really encourages you to go to that website because they believe that that is the most accurate and up to date, or to call the 866-779-6121 number, or COVID-19@flhealth.gov if you have more questions, and again, I'm gonna show that to you again in part two. They recommend assessing these patients, you will need to have your basic procedures as well, facemask, isolation, cautions and hand hygiene. PPE is the word of the day for everyone, but I want to make sure that if you work in a diagnostic facility where you are performing the MBS, or if you're a PT, or let's say you're an OT in home health, remember that there are appropriate respiratory collection procedures and you just need to make sure that you review your IPC practices, make sure you have it all up to date.

All of these factors are going to increase the likelihood of return-to-hospital admissions, and I want to remind you that the G-tube placement and the tracheostomy are just as biasing as that ventilator. So if you have a patient that has a trach, was on a ventilator and they have a G-tube in place, you really need to put on that investigator cap because a combination of those factors are really likely to snowball that patient out of control, and especially if they're on that G-tube and they can't even do PO trials of an altered mechanical of a puree and a puree liquid. So we wrap up today by bringing here, and we'll just see if we can take any questions, as we finish up here, but we do see that the management of dysphagia is going to typically involve looking at those cranial nerves. We want to do those voluntary swallow tests. I want you to caution with test trials of ice and water, you need to be very careful because these patients are likely

to have silent aspiration, remember that, and they're not likely to cough or complain. So you may be giving them thin liquids and they're silently aspirating. Voluntary cough may be impeded but you really need to assess it, so be careful with those test trials. Questionnaires and other form of self-report are not gonna be very effective, again, because that silent aspiration problem. How can they report it if they can't feel it? So that's why I want to remind you of those gold standards for evaluating patients. Those gold standards are imaging in the form of a modified barium swallow or perhaps the FEES. You're gonna want to look at specifically weakness, spasticity, rigidity, over or under kinesia, that bradykinesia we've been talking about, and then I wanna bring it back to ataxia and dysarthria and other forms of discoordination. I've been highlighting weakness and spasticity and rigidity so much, and even that bradykinesia, but I do wanna remind you of ataxia and dysarthria present in this population. That dietary changes that you do can be so effective, and that there are significant consequences if these measures are not taken into place.

We do have a couple of questions here, I do wanna make sure that I answer this question. I'm sorry, I think I missed one before, if you wanna put it back in the window. But before I finish up my last couple of slides, there's a question here. Have there been studies regarding aspiration of coronavirus and inhalation as a transmission source? That is an incredible question. They have not yet been published. That's exactly what I have been looking for and it really makes me feel great that you're starting to make those connections because, yes, what happens, who knows what's gonna happen. We do know, with other forms of respiratory infection, how easily it is to cross-contaminate, and some of those ventilators were getting split. Absolutely, I'm glad to see that you guys are making those connections because that could be a real issue and hopefully that'll start to become noticed soon. And here we have a question, but is the role of OTs declining in feeding and swallowing? That's an excellent question, actually, that is the very last thing that I'm gonna finish up with. So I'm gonna finish that question here because that is actually the topic I'm finishing up with. So here we have

SLPs that are the integral members, and that's why we've been talking a little bit about SLPs, that OT and PT, I am looking at you because of those followup assessments are so important and coordinating with the interdisciplinary team is incredibly important. So the last thing I'm finishing up with is what does OT and PT do?

Speech-language and cognition and swallowing have so many different neural substrates and they share that brainstem component, that unconscious autonomic component. All of that does come together. So we do have a high likelihood of patients of dysphagia exhibiting some of those symptoms in PT and OT, but what are they and how do you know what you can do? So for OT, the role of OT in feeding and swallowing has been declining. I imagine that this is about to change, I really hope this changes. You know, there's a broad need for OTs in dysphagia. There has been a higher emphasis because of a lot of CMS billing things we can't talk about today. But the role of OT is still an ideal fit because there are many components that the OTs can review during their sessions that complement what PT and speech are doing. OT can be that integral member because they're going to have that ability to relate it to the other activities of daily living.

So as we look to broaden OT and their role in dysphagia, it may be that relationship to sarcopenia, malnutrition and a couple of other things that I'm gonna talk about real heavily in part two, and again, I'll bring it back to OTs and PTs in part two as well. But we're gonna see that it's the activities of daily living and that other quality of life where OTs can really add to what PT, I'm sorry, what SLPs do in their therapy. PT is gonna add an entirely new component here that I'll talk about in just a second. So in general, OTs do have a considerable role to play and I'm gonna specifically be going into details of those as it relates to that sarcopenia and that malnutrition and those activities of daily living. There are also going to be in the homes and witnessing the patient's behaviors quite a bit more. So as a referral source, SLPs, I really hope you start talking to your OT a heck of a lot more. As a referral source, the way that they are able to

observe the patient in their regular activities of daily living is gonna give you insight that you will not see in your structured therapy session. There is a fundamental difference to the way that OT and SLPs perform therapy. What that OT observes can be so vital, and you assessing patients that maybe have silent aspiration and they're not complaining to you, but maybe that OT can see some of these other signs and provide that referral to you. PT is extremely important as well because what they shown, and this does relate to OT, but the references are older, so I'm not able to bring them, but I do wanna say to OT, everything that I'm about to say about physical therapy applies to you but the studies are older, so we can't use them here, but the same general concepts are true.

What they have found in this study and in others is that when you compare two groups, a group that received medical treatment for dysphagia plus physical therapy, specifically related to muscles of the neck, head, and the upper respiratory airway, bringing it back to those respiratory muscles, that there was a significant improvement in those patients relative to other dysphagia patients who just had speech alone. And they did this by looking at those modified and looked at those same things, oral transit time, hyoid elevation, chewing, transiting, can they hold their breath? Can they hold their bodies up?

After physical therapy, a coordinated treatment between speech and PT and OT, there were improvements across all variables in the one group compared to the other one who got speech alone. So the interdisciplinary program is not only true in theory, it is absolutely true in practice. PTs can also provide other forms, and this is the last slide that I have. What they find in stroke patients is that when PT was brought in not only to do the dysphagia support that we just discussed, but also to provide massage therapy and acupuncture, especially again, head, neck, collarbone and other components of the respiratory pathway where all the disciplines come together, the patients who received that acupuncture had dysphagia, had improvements in dysphagia, relative to

those individuals that had speech alone. It's because of the fact of those peripheral muscles of the swallow. So that's where we finish up today, which is perfect, I only went two minutes over. And I wanna answer anymore questions that you might have. In part one, what I really established here is the precedent. PT, OT, speech, there's so much you guys can do. Neurogenic dysphagia has a really broad implication, even before this global pandemic broke out, but now that it has, the next few years, we're likely to see a real burst of patients because some of the chronic effects of this are going to be severe. So what last questions can I answer before you before we finish up?

- [Amy] All right, and we will give it just a few moments to see if there are additional questions. In the meantime, thank you so much, Jeanna, this was really informative, fantastic information that you shared with us today. Obviously extremely current dealing with some of the COVID issues that we are seeing, going to continue to see, so thank you for covering that as well.

- [Jeanna] I think we're doing pretty well, and that's why I wanted to take a moment to answer those questions since I saw them, they were so point on right then and I really appreciate both of you for asking those questions, and I wanna thank you guys again for listening. I'm obviously very passionate and I love to talk about these things, but what makes me passionate is I know that I'm talking to the right audience. So thank you so much again, I look forward to speaking with you in part two, and I hope you guys have a great day.

- [Amy] Excellent. Thank you so much, Jeanna, and we will go ahead and wrap it up there. Thanks to all of our participants for joining us and we look forward to seeing and having you join us again next time. Have a great rest of the day.

- [Jeanna] Bye.

