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Back to Basics: Applying Clinical Reasoning to the Clinical Swallow Assessment

Recorded October 1, 2019

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SpeechPathology.com Course #9047

-- [Narrator] Once again, welcome to our webinar today. Back to Basics: Bedside and Clinical Assessment. Our presenter today is Angela Mansolillo, she is a speech language pathologist and board certified specialist in swallowing disorders, with over 30 years of experience. She is currently a senior speech language pathologist at Cooley Dickinson Hospital in Massachusetts where she provides evaluation and treatments services for adults and children with dysphagia. And is involved with program planning and development for inpatient and outpatient programming, including, quality improvement initiatives, patient education, and clinical policies and protocols. In addition, she is an adjunct faculty member at Elms College Department of Communications, Sciences, and Disorders, and she's provided numerous regional and national presentations, and lectured at several colleges and universities throughout Massachusetts. So Angela, it's great to have you back to talk to us about the clinical swallowing eval. I'll turn over the floor to you.

- [Angela] Thank you Amy. It is lovely to be back. I always enjoy being here on speech pathology.com, and I am really thrilled to be talking about clinical assessment 'cause this is one of my favorite topics. I am a big fan of the clinical assessment as you will see. And today we're going to help you all to apply some actual clinical reasoning to the clinical assessment process. First, let's go through the learning outcomes for today. You can see them there, on the slide we have three learning outcomes for today. Participants will be able to describe three components of a clinical swallow evaluation, as well as the evidence that supports them, participants will be able to identify risk factors for aspiration in various patient populations, and will be able to identify appropriate interventions based on the results of your clinical assessment. So why clinical assessment? I started this out by saying that I'm a big fan of the clinical assessment, of the bedside swallow assessment, and that's not always a popular view in the field of speech pathology. I understand that the clinical assessment sometimes gets a bad rap in the field of speech pathology, and I understand its limitations. And we

will talk about some of those today. And I also understand that there are things that clinical assessment does for us, that instrumental assessment simply doesn't do. Yes, I know, I can't definitively identify aspiration at the bedside. And I certainly can't tell you anything about pharyngeal swallow physiology, but clinical assessment allows us to gather information as we go forward, that's critical to our overall diagnosis. And also information that allows us to then do a more efficient instrumental assessment. It also engages patients in a way that instrumental assessments simply doesn't. It's a real life functional eating and it allows for a much more natural sort of environment and natural sort of interaction in my view. There are certainly some questions that I feel can really be best answered by a clinical assessment. Questions that instrumental assessment really doesn't answer well at all. And these are questions about function, cognitive assessment. And we're gonna talk a little bit about what aspects of cognition we can assess as part of our bedside evaluation.

We can look at positioning, self feeding, we can look at a number of different utensil types, we can look at a number of different bolus types. We don't have the same kinds of time constraints that we do with an instrumental assessment. We can look for fluctuations in performance and look at the effects of fatigue and endurance. If you are going to get an instrumental assessment at my hospital, it's going to happen at nine, 9:30, 10 or 10:30 in the morning. Those are our modified barium swallow slots. But I can do my clinical assessment on patients in the hospital at any time if I wanna look at them a little bit later in the day to see is fatigue having an affect? Do they really have poor endurance that's going to impact their swallow function? Again, those are questions that I can best answer with my clinical assessment. I also have no time limitation so I can look at what happens over the course of the entire meal time to see, are there changes from the beginning of the meal to the end of the meal? And certainly, this is the way that we simulate real-life eating. This is the way that we assess functional eating, in a way that instrumental assessments simply doesn't allow. Now we are looking for signs and symptoms of aspiration, and we'll be talking about that as

we go through the webinar today of course. But that's not the only thing that we're doing when we do that clinical assessment. So we start our clinical assessment where we start every assessment, with a review of the available information. And one of the things that's often pertinent as we're getting ready to do a bedside or clinical swallow evaluation is the chest x-ray. Particularly if you're in a skilled nursing setting or certainly in an acute care setting. There probably is a fairly recent chest x-ray that you will have access to. Now we're not the people who are interpreting those chest-x-rays certainly. They do think it's helpful to have an understanding of what some of the terminology means. So if you see terms like density, opacity, consolidation, or infiltrate, although radiologists in my hospital tell me infiltrate is not being used very commonly anymore. It's being replaced by opacity. It's going out of vogue apparently.

But if you see any of those terms, the radiologist is telling you there's something in the air spaces. The lungs are not gonna function optimally because the air spaces are filled with something. Can't always tell what it is. Could be fluid, could be bacteria, but if you see one of those terms, then that certainly could be associated with pneumonia. You might see the term atelectasis, the radiologist is telling you that some of the alveolar spaces have collapsed and so there's subsequent loss in lung volume.

That too may be associated with pneumonia, but you also have to ask yourself what kind of chest x-ray was it? Because if it was a portable chest x-ray that was done while the patient was in bed, and the atelectasis is basilar, it may just mean that they weren't able to expand their lungs sufficiently for the x-ray itself. You might see terms like edema or effusion on the report. The radiologist is telling you that there's some fluid. That is typically not associated with pneumonia. Fluid in the lungs is more likely to be associated with CHF, but also potentially with pulmonary embolism or cancer. So typically not associated with pneumonia. Another important part of the medical record that sometimes doesn't get as much attention from us as perhaps it should, are the lab values. There's a lot of lab work that's there available to us. Now again, we're not

physicians, we're nurse practitioners. I'm not suggesting we would be the ones who would be interpreting these labs. There are lots of things that abnormal lab results can mean. But I think that we can, we should at least have a basic understanding of what these labs are looking for so that we can ask better questions of the other members of our treatment team and have more informed conversations. Also, be armed with a little bit more information before we go into that room and start that bedside swallow evaluation. So one of the things that you might see in the medical record is a complete blood count or a CBC. There are a number of different measures that might be part of that CBC. One of those is likely to be a white blood cell count. So if the white blood cells are high, that alerts us to the presence of infection. It doesn't tell us there's pneumonia, could be any kind of infection, could be anywhere, but does alert us to the fact that this is someone whose immune system is currently fighting an infection somewhere.

You might also see a white cell differential. This gives us the number of white blood cells within each category of white blood cells. And as you can see, there's several different types of white blood cells and they each have a slightly different role to play in terms of immune system function. So these measures help the physician to kind of zero in on what kind of infection. Is this a viral infection? Is it bacterial? Is this some sort of allergic response? So these measures help the physician start to be able to figure that out. You might see some red blood cell measures in the labs. The red blood cell count, a hematocrit, a hemoglobin, these give us some information in terms of what, what's going on in terms of the red blood cells, as you recall perhaps, from your anatomy and physiology, that red blood cells attach themselves to the oxygen molecules and transport that oxygen everywhere it needs to go in your body. So lower red blood cell counts mean that there's less potential for that oxygenation, that oxygen transport. They also give us some indication into hydration status as you can see. Now there are a number of things that elevated measures could mean in an individual patient, but certainly one of those things is dehydration and might be something to,

again, talk with a nurse practitioner or the physician about if you're seeing these measures. It's good to have a conversation about hydration. You might see some corpuscular values in the medical records. These give the physician some insight into the presence of anemia, that would be important for us to understand because of the fatigue and weakness that goes along with anemia. You might see a platelet count in the medical record. Platelets tend to go down when there's an infection, including pneumonia, but really, any other infection on board.

So again, that could alert us to the fact that this particular patient is fighting an infection at this point and their immune system is likely to be compromised. You might see BUN and creatinine measures in the medical record. These give us some insight into protein metabolism, but also, again, give us some insight into hydration as you can see. High BUN could often be an indicator of dehydration, but also gives the physician insight into what's going on in terms of renal function. So again, not that we would be making diagnoses here, but that we would want to have some conversations with the members of the team. You might see a BMI, body mass index in the medical record. You can see the measures here in terms of getting some insight into whether the person is overweight or underweight.

Why do we care about that? Well it gives us some insight into potential compromise, nutritional compromise. And again, therefore some insight into potential for immune system function if the nutritional system is compromised. This is a patient who's less likely to be able to mount a good, robust, immune response. You might see a glucose level in the medical record. Certainly high glucose levels are associated with diabetes. A very low glucose level could be the. We sometimes see those in patients who have kind of messed up their insulin levels, but might also be an indicator of nutritional compromise. And so again, there's some additional information there for us in that regard. Albumin and pre-albumin used to be used quite a bit as nutritional markers, but we're seeing a real movement away from using these as nutritional markers.

Particularly in acute care patients. A low albumin level in an acute care patient may just mean that they're an acute care patient. When an individual's in the midst of some sort of inflammatory response, albumin production often goes down. And it's no longer really a nutritional marker at that point. So I'd be careful about not over interpreting these measures and it would be important to have conversation with the dietitian on your team about what specific markers they're using as nutritional markers. You might see a sodium level, a potassium level in the medical record, again, these can give us some insight into potential for dehydration. Before we move on and talk about homeostasis, I just did wanna say, I know that there are probably some questions about what's a normal white blood cell, what's count, what's a normal red blood cell count, and I haven't given you any measures because there's a lot of variability from lab to lab, but also among patient populations.

And so when you start looking at lab work, if you're not used to looking at it, what you'll see is your patients results and then that will be compared to the normal range. And so you'll be in the system. You would be alerted to whether or not this was outside of the realm of normal for that patient, for that age group, for that lab. So lets talk a little bit about homeostasis. This is an important function of the respiratory system. If you've heard some of my other webinars, you may have heard me talk about this before as it relates to potential for pulmonary clearance.

The respiratory system has a number of functions and one of those is its contribution to homeostasis. In order for our bodies to do all the things they need to do, acids and bases throughout and across systems need to be well-balanced. There are a number of organ systems that contribute to that balance as you would imagine. The respiratory system and the renal system have the primary responsibility for maintaining that balance. They work very closely together. We don't think about lungs and kidneys as being related, but they're actually working very closely together to maintain that balance. To maintain that homeostasis. So think about what happens then if one of

those system's goes down. Right? Let's say the renal system goes down. This is a patient who has renal failure or urinary sepsis, or chronic UTIs. For whatever reason, the renal system's not working optimally. Well that puts a lot of pressure on the respiratory system. That's important for us to understand, right, before we go in and work with that patient. If this is a patient whose balance is off, right, whose respiratory system is likely to be compromised because their renal system's down, well this is someone who's not gonna have the good tolerance respiration. Not gonna be able to do good pulmonary clearance and this may also be someone in whom we would expect to see some breathing swallow discoordination. So again, gathering information about what's going on with this patient before we go into that room. If you are in a critical care setting, you might see arterial blood gas draws.

You might see those measures. They're done only in critical care settings typically, certainly not in outpatient settings, not in med-surg units even. 'Cause this is a fairly invasive procedure, but it gives the insight, the physician insight into this acid-base balance. And so you might see, you might be looking at some of the results of an arterial blood gas draw. The PaCo₂ gives the physician insight into respiratory function, the HCO₃ gives the physician insight into the renal function. So the physician can get a better sense of why is the balance off? Is the renal system down? Is the respiratory system down? You might also see a saturation measure that comes from an arterial blood gas draw.

This is a highly accurate number as compared to pulse oximetry. Pulse oximetry, doesn't, there are a lot of things that could potentially interfere with the accuracy of the saturation measures we get from pulse oximetry. But an ABG gives us a highly accurate number. The problem is, it's not a real time number. It tells us what the sat was when the blood was drawn, which could've been minutes, or hours, or days ago. So from our perspective it's not very helpful. Pulse oximetry is a real-time number and gives us more timely information, but may not be quite as accurate. And we're gonna

talk a little bit about those measures in a little bit when we start to talk about some specific parameters to look at as we do our clinical assessment. So again, not looking to make medical diagnosis by reading these chest x-rays or looking at the labs, but we're looking for some information before we go into that room. And the lab values can give us some insight into respiratory status, into potential for nutritional compromise, into hydration status, presence of infection, and potential immune system compromise. So that we can go in armed with as much information as possible. It's also important to have a good understanding of what this patient's oxygen requirements might be. If they're receiving oxygen, at what flow rate they are receiving oxygen. So in the medical record you might see a number, a couple of different measures. You might see the oxygen flow rate, that's the volume that's delivered per minute. It's generally represented in liters per minute.

So with a traditional nasal canula you might see someone who's getting one or two or perhaps three liters per minute. But a high flow nasal canula could be even higher than that. You might see the FiO_2 measure, which is the percentage of oxygen in the total gas that the patient is getting. So obviously air, there's oxygen in air, but it's not 100% oxygen. So room air is 21% FiO_2 , and you'll wanna take a look to see patients who have some respiratory compromise get a higher percentage of oxygen in their total gas. That's independent of the flow rate.

Those two things are just did independently. Now you might have some patients who are receiving non-invasive positive pressure ventilation. These non-invasive ventilatory methods represent a significant step forward, in terms of management of patients in respiratory distress. It allows patients access to a ventilator without the intubation. So they're able to get access to the ventilator via specially-designed facial mask. They get CPAP or BPAP support. So this is great for the patient, right? They don't need to be intubated in order to have access to the vent. This complicated it for us because they're not intubated, they're often awake and alert, and everybody wants to feed

them. And so we are often asked to do swallow evals. Clinical swallow evals on these folks who are getting these non-invasive ventilatory supports. This is not an area where we have a lot of information yet. It is not a well-studied relationship at all. There is often the suggestion we'll just move the mask to take a sip or take a bite of whatever you're eating or drinking while you do the evaluation. We don't have data. So we're gonna come back to this a little bit later in the webinar when we talk about some of the respiratory parameters that we would be paying attention to across populations.

And I think we would treat these patients the same way we would treat any other patient with potential respiratory compromise. We would want to look at those same respiratory indicators, and we'll be discussing those respiratory indicators in more detail in just a few minutes. So in the absence of data specific to these populations, I think we have to treat these folks like any other patient with significant respiratory compromise. You may also have some patients who are receiving oxygen via high flow nasal cannula. I mentioned this a moment ago.

So these are special cannulas that allow patients to get higher flow oxygen through a nasal cannula. The traditional nasal cannulas limits folks to 12 to 15 liters per minute. But with a high flow nasal cannula, patients can get as many as 60 liters per minute through this specialized cannula. But that's a lot of oxygen, right? So if someone needs 60 liters per minute, this is not a respiratory system that's well-functioning, right? But again, there is this sense that these folks are perhaps not as impaired because they're not on the vent, because it is a nasal cannula. And again, not a lot of data here. So again, I would suggest that we treat these patients like any other patient with respiratory compromise and we'll be talking about those respiratory indicators in a moment. Things like respiratory rate, oxygen saturation, breathing, swallow coordination, and as I said, we'll be talking about those in a moment. There is this, I think sometimes exaggerated sense of safety with these folks. Again, because they're not intubated, because they don't have an oxygen mask, because they're awake and

alert, there's the sense that, sure, you know, you should go ahead and do that swallow eval and go ahead and feed her. But I think we have to be very cautious about these folks and really pay attention to our respiratory indicators. And of course, before you actually start your swallow trials, there are other things that you're going to wanna pay attention to. Certainly want to know about any imaging that's been done, previous swallow studies certainly, but also brain MRIs or brain CTs. What's the concern, what's the patient complaining about, what are the nurses observing, what has the family noticed, is the patient dependent for feeding, what are some of the other, has there been other nutritional concerns, has there been a recent weight loss, some voice or speech changes? You wanna try to get a sense of the level of dependency, the degree of disability, the level of alertness before we go in and actually start our swallow trials. As you go on into the room, your evaluation starts, right? You wanna think about what your initial impressions of this patient might be.

Are they awake, alert, greeting you, are they well positioned upright or sort of curled up in a ball, slumped down in the bed, are they able to readjust themselves, reposition themselves, are they dependent for those changes in positioning, are there any obvious neurological deficits? Hemiparesis, facial palsy, facial weakness, et cetera. What else is going on? Is there oxygen in place? Are there IV's in place? Is there some sort of feeding tube that's been in place? What are the other things that are going on with this individual, and what's the communication like, right? Did they greet you? Are they able to answer your questions? Can they interact with you? Or does there seem to be some cognitive impairment or perhaps some language impairment here? Also, listen to their speech. This is what you're looking at here is a review that was published last year, and they looked at all of the available evidence around a connection between dysarthria and dysphagia. And you can see the data there on the screen of the patients with dysphagia, the vast majority of them, anywhere from three quarters of them to 90% of them depending on the study that you looked at had dysarthria as well. So if you go in that room and you begin to communicate with that individual and their

speech is dysarthric, we're gonna be much more suspicious about the presence of dysphagia. And we wanna ask the patient what's going on, what are their complaints? Are they aware that they're having trouble swallowing? What do those swallow problems look like? What's troubling them? When did it start? Has it been going on for a long time? Has it been getting progressively worse? Did it just start? Do they have trouble swallowing all the time or is it just something that happens intermittently? Do they have any pain with swallowing? Where is that pain? And then probe that a little bit to see, is it just with liquids, is it just with solids, is it across the board? What modifications have you made?

You know, sometimes you'll be talking to patients and they'll say, oh they're not really having much swallow difficulty and then you talk about what they eat and they've sort of self-selected out of foods that were difficult for them or liquids that are difficult for them. And so that's important information certainly for us to pay attention to. Certainly we want patients well-positioned for our clinical evaluation. Certainly before we begin our swallow trials. As a general rule, we want folks to be as comfortable as possible for eating and as upright as possible. And positioned in such a way that they can self-feed to whatever extent that's going to be possible for them.

I'm sure that you're familiar with some of Susan Langmoore's work that demonstrated to us quite a few years ago now, that dependence for feeding was an important risk factor in terms of development of aspiration pneumonia, and so we want to get a sense of whether or not this individual is dependent for feeding, but also are there some things that we can do to improve their ability to self-feed and be less dependent. And positioning is certainly going to be a piece of that. They're well-positioned, they can access their utensils, they can access the plate. We want them to be as independent as possible. Some of you may be familiar with some of Mary Massery's work. It goes back to the sort of early to mid-90s. She did some interesting work. She's a physical therapist who did a lot of interesting work around positioning as it relates to

respiratory function, that I think has some real relevance for us in the work that we do around feeding and swallowing and breathing and swallow coordination. And so she has published some suggestions around positioning strategies that can help to improve respiration. And certainly, whatever we can do to improve respiratory function is going to have an impact on breathing, swallow, patterning and coordination. So we wanna keep from sort of cranking the patients head forward. A lot of times in hospital beds, patients, family members will put pillows behind their head, but it actually kind of pushes their head forward and doesn't really help with respiration. In fact, it may actually be impeding upper chest wall movement. So you wanna sort of decrease the pillows behind the patients head.

You wanna make sure that their shoulders are in a neutral position and open. We want them to be able to keep that chest and abdominal area as open as possible. She also suggests sort of a towel roll lengthwise along the spine, which can also help to, again, kind of open that abdominal and chest area. That's gonna be really important for respiration. Also helps with GI function too by the way. This is some work that Dr. Leder and his group did at Yale New Haven Hospital about 10 years ago now. They did a cognitive screen followed by instrumental assessment. They did FEES, endoscopic studies there. So they checked orientation and the patients ability to follow directions. And then follow that up with their instrumental assessment. And you can see the N there, it's over 4,000 people, right?

So pretty impressive study. They found that when patients were disoriented, and when patients were unable to follow directions they were more likely to be aspirating. So this is not causation, right? No one is suggesting that cognitive impairment makes people aspirate. But we do know that patients who have cognitive impairment are going to be less vigilant about their eating, they perhaps might be more impulsive about their eating, and they're certainly less likely to be able to use strategies, to recall strategies, to understand strategies, to carry through with those strategies, right? So that

cognitive assessment, informal as it may be, that you do as part of your clinical bedside swallow evaluation, it has a great deal of validity as you can see. In terms of helping us to really get a better sense of what's going on with these patients and predicting aspiration. Many have heard this term, or may or may not have heard this term, cognitive dysphagia. This was suggested in a paper a few years ago. This idea that swallowing impairment in elderly individuals is often a functional disorder. And I'm sure that you've seen this in your practice, right? The swallow impairment, the actual physiological swallow impairment, may not be that significant, but as we're working with an elderly population, may be less able to adapt their behavior, less able to pay attention to cues, maybe less aware of their own swallow impairment, less able to compensate, certainly less vigilant about their eating.

And so all of these things can contribute to dysphagia in elderly patients and exacerbate any existing dysphagia certainly as patients start to get older and perhaps have more of these cognitive impairments. So again, some sort of cognitive assessment. Informal, naturally, needs to be part of your clinical bedside swallow assessment. What about cough? Well, cough is a hot topic in the literature these days. It is hugely variable. The central pattern generator for cough is there in the brainstem, interacting with a central pattern generator for swallowing and interacting with the central pattern generator for respiration. But within that cough center there is actually a great deal of variation.

There are a number of different neurological patterns. So what that means is, the cough you cough, if I ask you to cough, your voluntary cough, is a different neurological pattern than the cough you cough if you inhale something irritating. And that's different from the cough you cough if you're coughing in response to aspiration. And that's different from the cough you cough if you're trying to cough something up and out of your lungs and on and on, right? There's overlap in these patterns for sure, but they are not exactly the same. That's good news for us as human beings. What

that means is, we are less likely to completely lose our ability to cough and protect our airway across situations. It's not good news for us as therapists, as we sit across from clients who are coughing. 'Cause it makes it very difficult to know what that was. I mean, what triggered that cough? Did the cough do what it was supposed to do? Where did the cough trigger, right? We're coming up on flu season here in New England certainly, and we end up, at my hospital, we end up getting a lot of referrals for swallow assessments for patients who've been admitted with flu, because they're coughing when they're eating. Well, yeah, they're coughing when they're eating, they're also coughing all the time, right? So it's very difficult as a speech pathologist to figure out, is this really a dysphagia that has perhaps been exacerbated by this flu, the weakness, and debilitation. Or, is this someone who is coughing, whose cough is specific to their flu symptoms. From the bedside, with our clinical assessment, it's impossible to know that. There's no way to know for sure.

This is one of the areas where we really do need instrumental assessment to be sure about that. I mentioned that cough is really, there's a lot of research going on in terms of cough right now. And as you look at this information on the slide, I would not consider this a hard and fast rule by any means. But it is certainly something to keep in mind when patients are coughing. And that is, if we're coughing to keep something out of our airway, in other words, in the face of potential aspiration, there tends to be little to no inspiratory portion to the cough. That makes sense right? You're not gonna take a deep breath in and pull in the very thing you're trying to keep out of your airway. In fact, in some of the cough literature now we see the term expiratory response, which is what we do in response to aspiration. Whereas a true cough has both an inspiratory and an expiratory portion. If, however, your patient is trying to cough and clear their lungs, let's say this is a patient who's recovering from pneumonia, or has COPD, right. We're gonna tend to see a longer than typical inspiratory portion because the individual has to take a breath in and pull that air in as deep into the lungs as possible to get it underneath the irritant to help to clear the lungs. Now again, not a hard and fast rule by

an means because cough is hugely variable. But something to kind of keep in mind as you're sitting across from the patient who's coughing and you're thinking, ha, what is that cough about? So, as I mentioned, we really, with our clinical assessment alone, we can't determine what triggered the cough, where it triggered, and whether the cough was effective. But what we can and should be doing as part of our clinical assessment is evaluating our patients for their potential for clearing cough. Do you have the potential to use cough to clear your airway? And how do we do that? Well, what your observations about the patients positioning, respiratory muscle strength core stability. If this is someone who has good core stability, doesn't have a lot of respiratory muscle weakness, is ambulatory, has good sitting balance, well their potential for cough is going to be significantly better than that patient who has a lot of weakness in the core, weakness in the respiratory muscles, positioning difficulties, can't maintain an upright posture without support.

Also ask yourselves, what do you know about this patients respiratory capacity? If this is someone who has healthy lungs, no history of lung disease, no current pneumonia, well their potential for good clearing cough is gonna be much higher than the person who perhaps is currently struggling with pneumonia or has COPD or emphysema. Ask yourself what you know about the integrity of the cilia. You remember now that the cilia, there's hair-like structures in the lungs. They line the bronchi and the bronchioles and they move in waves in the lung fluid. They have an important role to play in terms of pulmonary clearance.

And if that's the movement of the cilia that brushes the foreign matter up and out of the lungs, high enough into the lungs so that we could then cough it out. So someone who has intact cilia function is a much better potential for cough than someone who does not. Okay. So how do you find out about cilia integrity? It's not like we're gonna go around doing bronchoscopy on all of our clients as part of their swallow eval to check their cilia integrity. No, of course not. But what's in the medical history? If this is

someone who has COPD, or has emphysema, they have impaired cilia integrity. If this is someone who has a long history of cigarette smoking, they have impaired cilia integrity. If this is someone who is dehydrated, their cilia are not working very well. Dehydration doesn't damage cilia. Remember the cilia move in the lung fluid. So during that period of time while you are dehydrated, your cilia are not gonna move very well. So that patient who is dehydrated is going to have decreased cilia movement. And therefore decreased potential for cough. It's not damage, once we rehydrate that individual, the cilia will begin to move again. But during that period of dehydration, their ability to mount an effective clearing cough is likely to be diminished. And then finally, what do you know about vocal fold function? Is there some known laryngeal pathology? Is this someone who had laryngeal trauma from intubation? Is this someone who has a paralyzed vocal fold? And what are you hearing? Are you hearing hoarseness or a breathiness? Something that may alert us to the idea that his vocal fold function, this laryngeal function, may not be what it should be.

And so again, doesn't allow us to determine whether or not that cough was effective, but all these things together have helped to form our overall impression of whether or not this individual has the potential to mount a good clearing cough. There's been some interesting research recently around urge to cough. We tend to think about cough as being present or not, right? People are silent aspirators or they cough and clear. And the fact of the matter is that urge to cough, that laryngeal sensation, in other words, is sort of a continuum, right? So there are individuals who have a strong urge to cough in response to aspiration. And there are others who may not have a complete absence of laryngeal sensation, but certainly have diminished laryngeal sensation and therefore diminished urge to cough. And what we know is that in individuals who can think about it, who can estimate their urge to cough, who can feel that urge to cough, they're more likely to cough, they have more voluntary control over the cough. So one of the things that I've started asking people about is do you ever feel like you need to cough? And there's a population of folks, and you see this not uncommonly in patients with

Parkinson's disease actually, who will say, "Yeah, I feel this tickle in my throat, "often when I'm eating." But they're not actually coughing. So if they have some degree of sensation there, then perhaps we can help them to build some voluntary control. Okay, so when you feel that, you should make yourself cough. Tap into that voluntary cough. So I think it's helpful as part of our clinical assessment to start talking to people about that and helping them to tap into perhaps some voluntary control over that reflexive cough whenever that's feasible. Those of you who work with adult and elderly clients I'm sure have clients who are taking ACE inhibitors. This is a group of medications that are used to treat hypertension, used to treat heart disease and CHF. Very commonly prescribed medications.

And often, patients who are taking ACE inhibitors complain about cough sensitivity. They feel like they always have this tickle in their throat, they feel like they're coughing all the time. And we know that these medications do have the potential to increase cough sensitivity. So a few years ago, that's that Marik 2003 study you can see at the bottom of the slide. Researchers thought, "Huh, I wonder if there's "anything protective in that "in our patients with dysphagia?" And so it was a retrospective study, they went back and looked at medical records for a number of individuals who had dysphagia and they divided them into two groups. The group that was getting ACE inhibitors to control their blood pressure or their heart disease, and the people who were not.

And they calculated pneumonia rates in the two groups and they found that the pneumonia rate in the group of individuals with dysphagia who'd been getting ACE inhibitors was much lower than the pneumonia rate in the patients with dysphagia who had not been getting the ACE inhibitors. So then there was some interest in maybe prescribing ACE inhibitors as a way of helping to decrease pneumonia risk in people who were known to be aspirating. That hasn't really panned out very well. It seems to be there seem to be a lot of differences in different patient populations and the research is still sort of equivocal in terms of who really would benefit from the Ace

inhibitor medication and who would not. The issue is actually substance P. ACE inhibitors bring substance P levels up and substance P is a neurotransmitter that facilitates cough. So that's something we're all likely to be hearing some more about I think as this cough research continues. What about voluntary cough? We often ask patients to cough and listen to the strength of their voluntary cough. That certainly gives us some insight into respiratory muscle function. It doesn't really give us all of that much information though about their potential for reflexive cough. There's a little bit of research here as you can see on the slide that suggests that perhaps there's somewhat of a relationship between voluntary cough and reflexive cough. We've got research in Parkinson's patients and research in ALS patients. But certainly nothing to suggest a one to one relationship between voluntary cough, and potential for reflexive cough. We also have to look very carefully at respiration, 'cause one of the things we know is that as breathing changes, so does swallowing. These two systems, respiration and swallowing are very much intertwined. And swallowing puts demands on the respiratory system.

Swallowing means breathing cessation, and repeated swallowing means repeated breathing cessation. So swallowing does place demands on the respiratory system. That for most of us who are healthy, we don't think about much, but certainly if you're working with patients with any sort of compromise in either system, there's likely to be some breakdown in terms of the coordination between the two systems. So one of the things, excuse me. One of the things that we want to pay attention to in our clients as we do our assessment is the work of breathing. How hard is this individual working to maintain oxygenation? And when we use this term "work of breathing," we're talking about the work that's required to do two things. One, move air through some pretty narrow airways. And two, expand the lungs against the natural recoil of the ribcage and the musculature. And for most of us most of the time the work of breathing is insignificant. But we know that for a lot of our clients that's not the case. For a lot of our clients the work of breathing really is significant. So what are we wanting to pay

attention to as we're sitting across from our clients doing our clinical swallow evaluation? Well one of those things is respiratory rate. How many breaths per minute does it take this individual to maintain good oxygenation throughout their system? And resting respiratory rate is certainly variable, but the norm for adults is somewhere between 10 and 15 breaths per minute. If you're seeing a resting respiratory rate that's creeping up, particularly if it's upwards of 23, 25 breaths per minute, there is going to be some impact on breathing swallow coordination, for sure. So we want to get a sense of what the respiratory rate is before we start our swallow trials, and then what happens to it as we complete our swallow trials and impose these demands on the respiratory system. Impose this repeated breathing cessation.

You also wanna get a sense of the depth of the respiration. Is this someone who can expand their lungs sufficiently? We know that in order to maintain good oxygenation, in order to maintain good respiratory swallow patterning, patients have to get at least to the middle part of the lung-range. So we need to make sure that patients can expand their lungs. They don't have to be able to expand their lungs to full capacity to swallow safely, they do need to be able to get at least to the middle part of the lung range. So that patient, who either because of their positioning or because of pain, or because respiratory muscle weakness is breathing in more quickly and more shallowly, that patient is likely to have some deterioration in terms of breathing swallow coordination.

And we wanna be sure we're looking at that coordination. We wanna look at the post-swallow pattern. The typical breathing swallow coordination pattern is exhale, swallow, exhale some more. So for most of us, most of the time, the swallow interrupts the exhalation usually early in the exhalatory part of the process. That post-swallow exhalation has a lot of important roles to play in terms of clearing residue and facilitating esophageal clearance and facilitating laryngeal valve closure. So that post-swallow exhalation is important to swallow safety. We need to look for it. Are we seeing it? Are we seeing a post-swallow inhalation? If we're seeing a post-swallow

inhalation, the disordered pattern, when are we seeing it? Are we seeing it all the time? Are we seeing it only at the end of the meal when he's tired? Are we seeing it with certain utensils or certain bolus types? Are we seeing it only with repeated swallows? We wanna get a sense of that post-swallow pattern as it fluctuates because that will give us quite a bit of insight into breathing swallow coordination. But I also wanna listen to the respiration. Are you hearing stridor that tells you there's some sort of obstruction? And depending on when you're hearing the stridor, that gives us some insight into where the obstruction likely is. If the stridor is inspiratory, that tells us there's likely some obstruction above the glottis. If it's expiratory, then the obstruction is likely tracheal. If you're hearing it both on inspiration and expiration, then the obstruction may be sort of at the level of the glottis. We also wanna get some information around respiratory muscle functioning. Again, your observations around positioning. Patients trunk control, positional stability, your observations are on work of breathing will give us some insight into respiratory muscle function.

But you may also have some objective information available to you if this is a patient who's undergone pulmonary function tests, you may have come across those in your chart review. That information gives us some insight into respiratory muscle functioning. And for those of you who are using expiratory muscle strength training as a therapeutic technique, you know that that device allows us to get a baseline measure and so that can give us some insights into respiratory muscle functioning as well. Talked little bit about oxygen saturation when we were talking about the labs and looking at arterial blood gas draws around homeostasis. Most of the time though, we're getting oxygen saturation measures, we're getting them via pulse oximetry. And we know that at the normal range for adults is generally 95, 96% or higher. But COPD patients tend to run much lower than that at baseline and so we're working with patients with COPD, it's gonna be important to get some patient specific parameters from the physician or the respiratory therapist. Because these patients obviously run lower and so we wanna get a sense of what is sort of typical for this patient, and also,

some parameters around the lowest that they can tolerate so we know when they might be getting into some trouble with the swallow trials. Oxygen saturation, just to kind of go back for a second is the measure of the number of red blood cells that are carrying oxygen in oxygen in that moment. And so it gives us some insight into overall oxygenation. It is measured via pulse oximetry. The pulse oximeter sends a beam of light through the bloodstream. Red blood cells that are carrying that oxygen reflect that light differently than red blood cells that are not. And so that's where that percentage comes from. There have been a lot of studies.

A dozen, at least I think, that try to find a relationship between a drop in oxygen saturation on the pulse oximetry and an aspiration of vent. Which would have been awesome if anybody had been able to find that. But, there was no reliable correlation. There were of plenty of people who were aspirating and didn't have a drop in their oxygen saturation, and plenty of patients who had precipitous drops in their oxygen saturation, but had not in fact aspirated. So there's no one to one relationship there fortunately. What that oxygen saturation measure does tell us however, is it gives us some insight into the work of breathing for this individual. How hard are they working to maintain their oxygenation as we impose the demands on the respiratory system that swallowing imposes?

That repeated breath holding in other words. So if have a patient who is being monitored, whose oxygen saturation is being monitored and you're doing swallow trials, then you're seeing that oxygen saturation drop and drop and drop and drop over the course of your swallow trials or your swallow exercises, can you say they've aspirated? No, we can't say that. But what we do know that this is someone who is not really responding very well to the demands that the respiratory system is placing. Sorry, to the demands that repeated swallowing is placing on that respiratory system. As that oxygen saturation measure drops we know they're getting into some trouble from a respiratory perspective. We can't necessarily say that they're aspirating, but we do

know that the repeated breath holding is having an impact on the respiratory system. There's also some research to suggest that what's important to pay attention to is the pre-swallow oxygen saturation measure. So if you have someone who's starting out, before you begin swallow trials, who's starting out at 94% or lower, that may actually be predictive of aspiration when we begin swallow trials. And that makes sense right? Because that's a fairly low baseline, so that tells us this is someone who doesn't have any respiratory reserve, then we start to do swallow trials and impose that repeated breath holding that is associated with swallowing. And so these folks really have nowhere to go but down. They have no reserve. And so very likely that we would see some impairment in terms of respiratory swallow patterning and subsequent aspiration. So the important number to pay attention to it turns out is the baseline.

And if that's 94% or lower, then the likelihood of aspiration with swallow trials increases. So that's certainly important to pay attention to. We wanna look for dyspnea signs and symptoms of increased work of breathing, air hunger. Dyspnea is one of those kind of umbrella terms that encompasses all of the various signs and symptoms of breathing discomfort. And it manifests itself during both speech and swallowing tasks because both speech and swallowing are breath support dependent. And so we can get a sense of the patients dyspnea during our speech assessment, during our swallow assessment. What are we looking for?

Well we're looking at respiratory rate. What's the baseline respiratory rate and then what happens to it when we impose the demands of the task? Whether it's a speech task or a swallow task. In terms of speech and voice, we're looking for low volume more, a patient who needs to stop looking for frequently for air while they're talking. We're looking for activation of the accessory muscles. In terms of swallowing tasks, again, we would be looking for increases in respiratory rate, we'd be looking for that activation of the accessory muscles. We'd also be looking at someone who's kind of slowing themselves down, needing to pause more frequently between swallows,

between sips, between bites for extra breaths. And also look all bolus holding, right? So you might have someone who maybe took that sip of water, chewed up that roast beef sandwich, and then there's this pause before they actually swallow. Yeah, because their respiratory system is saying "Nope, can't swallow right now. "Got to breathe." Remember, swallowing requires breathing cessation. And so we'll sometimes see these patients with underlying respiratory compromise who are sort of holding the food or the liquid in their mouths for an extra few seconds before they swallow because they needed that extra few seconds to breathe. Certainly we're going to do an oral mechanism examination as part of our clinical swallow evaluation.

I don't need to teach you how to do that. We're looking at lips, tongue, jaw, soft palate, we're looking at range of motion, speed and strength. I would also encourage you to look at the oral health. The condition of the oral cavity. The condition of the teeth. This is some work that Dr. Leder and his group at Yale did. This time, similar to that cognitive study we were looking at a few minutes ago, this time they did oral mechanism examination followed by instrumental assessment. Again, it was endoscopic swallow study. Wide variety of diagnosis and ages as you can see, to see whether certain components of the oral mechanism examination that had higher predictability when it came to aspiration. And there were two.

Impaired lingual range of motion and facial asymmetry were the two components of the oral mechanism examination that have the most predictive ability in terms of identifying patients who were at risk for aspiration. Again, I'm not talking about a one to one relationship here, but certainly as you do your oral mechanism examination, if you see one or both of those impairments, we're gonna be more suspicious about the presence of aspiration. If you don't already have a couple of questions on your clinical evaluation protocol that allow you to assess oral health, I would certainly encourage you to do that. If you've ever heard me speak anywhere before, you know how passionate I am about oral care. And the first step to a better oral care program is an assessment. And

so we need to get in the habit of assessing oral health. Assessing the condition of the oral cavity, assessing the dryness of the oral cavity, assessing the condition of the dentition. And there are a number of tools here. These are downloadable in the public domain that you might think about using. Some of them are a little on the long side. The "Assessment of Current Oral Hygiene Care" is kind of long, but you may just wanna take certain components of one or more of these tools and incorporate them into your clinical swallow evaluation protocol. We also know that dependence for oral care is a predictive factor in terms of aspiration pneumonia. So again, this has to be a part of our assessment process. To what extent can this individual be independent with their oral care? That assessment is best done by us, perhaps by OT as well. And so needs to be part and part of our clinical swallow assessment. That means looking at cognition, attention to task, level of alertness. It means looking for any visual or perceptual deficits that might be getting in the way.

Looking for any fine motor manual dexterity impairments that might be getting in the way. And also, you know, using our assessment process to try to identify how we can improve independence. Are there some strategies we could put into place that would allow this individual to be more independent with their oral care? Also to be more independent with their self-feeding because we know when we decrease that dependence, we also decrease their risk of aspiration pneumonia. The next piece of the clinical assessment, you'll notice we haven't even gotten to swallow trials yet. We're getting there. But the next piece of the clinical assessment is some assessment of laryngeal function. We wanna get some insight into how well that airway is working. And one of the ways we do that is through cough. And we talked a little bit about cough assessment earlier. But another way to do that is to listen to vocal quality. There are a number of studies that have demonstrated that a change in vocal quality, particularly a wet vocal quality, does in some cases predict aspiration. The problem is we don't have good inter-rater reliability around what wet is. What you think is wet your colleague may not think is wet and that's where the lack of reliability seems to come in

here. Here's some work that was done with pitch elevation and maximum phonation time using these tools as strategies to get some additional insight into laryngeal function. In those top two studies they had patients elevate their pitch to the highest part of their range and they found that in both of those studies the patients who could not get to the high part of the pitch range were actually more likely to be aspirating, particularly aspirating liquids. And so that's something you might think about incorporating as a way to get some additional insight into laryngeal functioning. That study at the bottom looked at maximum phonation time so these are patients with Parkinson's disease. They had them hold there "ah" for as long as they could and they did find correlations with reductions in the laryngeal elevations but not a direct relationship to aspiration. So maximum phonation time may give us some insight into laryngeal function, but doesn't look like it allows us to make predictions about aspiration.

Okay, so now let's actually start the swallow part of the swallow evaluation. We're gonna go forward with our swallow trials here at this point. We know that there's a huge amount of variability in terms of normal quote unquote, "normal swallow function." There are a number of aspects of the swallow response that vary. And vary in different populations but also vary with the bolus. So that means as part of our swallow assessment, we need to be fairly thorough. We need to look at a wide variety of bolus types, we need to look at a wide variety of bolus sizes.

We need to look at a wide variety of utensils, we need to include single sips and serial swallows, and you want to be sure that not all of the swallows are cued. That you include at least some non-cued swallows. Again, the value of the clinical swallow assessment is that it allows us to look at real life functional eating and so we want make sure that we're not controlling every aspect of the swallow trials. What do we know about swallow trials? Well certainly there's some research to suggest that we need to include serial swallowing as part of our bedside swallow assessment. This

study demonstrated that there were a number of individuals who did not aspirate on single boluses, but did then go on to aspirate on serial swallows. In other words, repeated swallows, swallow, swallow, swallow, swallow. So if you're controlling the trials and structuring the swallow evaluation such that you never get to serial swallows with liquids, you may not have the whole picture. And just as an aside, if you're doing serial swallows as part of your instrumental assessment, you should know that laryngeal penetration is a very normal finding with serial swallows. So not something we would consider disordered. Not something to be concerned about. There is some research, some of it goes back to the 90s, some of it is a little more recent as you can see, that gives us some insight into what we should be paying attention to as we begin our swallow trials during our clinical assessment. What are the things? And all of this research had a very similar design in each of the studies they did.

Clinical evaluation followed by instrumental evaluation to see what were the things that were showing up in the clinical assessment that were predictive of aspiration on the instrumental assessment? And I'm sure, to a large extent, this sort of matches that protocol you carry around in your head. These are the things we're looking for. Changes in voice, changes in speech, cough, abnormalities in the cough. Now you notice abnormal gag response showed up on this study, we are gonna talk about the research around gag in just a few minutes. It's not consistent, certainly. Here's another study, a little bit more recent study. Again, some of the same kinds of things. Changes in vocal quality, changes in speech, cough, abnormalities in the cough. Interestingly enough, in this study, hemispatial neglect was predictive of aspiration. Again, no ones suggesting this is causative, but they did find a correlation. And again, I think this goes back to that cognitive dysphagia, right? The lack of vigilance, the poor tension that we know is connected with an inability to maintain good safety in some patients. Here's a study that was done, specifically done with stroke patients. What were the predictors? Breathy voice quality, wet vocal quality, weakness in the jaw in this study was actually predictive of aspiration. Poor oral hygiene, that's a whole other course, right? And

difficulty with larger volumes. So again, here's more evidence. It says we need to be sure we're looking at not just single bites and single sips. We need to be sure we're challenging the swallow system as part of this bedside swallow evaluation. Here's the research around gag response that I was referring to a moment ago. You can see there are a number of studies here. Is the gag response predictive of aspiration? Well, apparently it depends on who you ask. In some studies yes it was predictive, in other studies it wasn't. As you look at the research as a whole, I think what an absent gag tells us is that this is someone who has some diminishment in terms of their neurological function. Is that always going to translate into an impairment in swallow function? No, not necessarily.

But it does give us some insight into overall neurological functioning, and that's certainly valuable on its own. Is it likely to allow us to predict aspiration in any sort of reliable way? No, I think we have to say no. What about laryngeal palpation? Those of us who are trained by Jeri Logemann back in the 90s certainly learned to do this, right? We placed our fingers on the neck and felt for laryngeal elevation and hyoid elevation. What is that actually telling us? Well, again, this is some area where the research is far from unequivocal. There is a lot of variability in terms of normal laryngeal elevation. Normal hyoid elevation.

So that is certainly challenging in terms of trying to determine from palpation alone, is this laryngeal elevation truly reduced, truly impaired, or is this just part of the normal variability within that wide range of normal. Certainly there are a lot of things that get in our way. There are folks who don't have a lot of neck space, perhaps. Patients certainly with trachs, patients with cervical collars, so there are a lot of things that could potentially get in the way of doing laryngeal palpation. That 2016 study that you can see there in the middle of this slide, they did find that laryngeal palpation, or I should say they found that decreased laryngeal elevation as determined by palpation was correlated with an actual impairment and high laryngeal excursion, but not consistently.

Not on all boluses. And there's a very recent study that was published just a few months ago that found that speech pathologists were able to use palpation to identify differences in anterior hyoid movement, but not in elevation. And that it really wasn't helpful in terms of differentiating our clients in terms of their function. Certainly one of the things that laryngeal palpation does is it tells us whether or not the patient swallowed. And so that can be helpful sometimes when patients can't really tell if they swallowed or they didn't swallow. So I'm not saying don't do the laryngeal palpation, I'm saying let's interpret our impressions very cautiously. This is some work that doctors Steele and Cichero published a few years ago. This was a review of all of the available literature at the time around respiratory indicators. What are the things that we should be paying attention to at the bedside that have some evidence to support them as being predictive of the swallow impairment?

One of those was respiratory rate. I think I mentioned earlier, if you're working with an adult patient and you're seeing that respiratory rate increasing over swallow trials, or even if the baseline respiratory rate is upwards of 25 breaths per minute, this is someone who is going to have some impairment in terms of breathing swallow coordination. Because of the demands that swallowing, again, places on the respiratory system. There's again that information about baseline oxygen saturation measure being the thing to pay attention to. We wanna look at respiratory swallow patterning, specifically as I mentioned before, looking at that post-swallow pattern.

Are you seeing a post-swallow inhalation? When are you seeing it? There's good support in the literature for looking at that patterning and being able to make some predictions about aspiration. And also making some judgements about the duration of the respiratory pause, the swallow apnea associated with the swallow. When that is shorter than typical, patients have to return to breathing earlier, they are more likely to get into trouble. They're more likely to aspirate. So who has shorter than typical respiratory pause? Well, anybody in any sort of respiratory distress. So your patients

with COPD, your patients who are post-extubation, anybody who's having any sort of underlying respiratory compromise is likely to have a shorter than typical period of respiratory pause and that could be a significant risk factor for aspiration. This is some work that J. Rosenbek in his group did back in 2004. Now they were trying to identify, I'm sorry. They were trying to develop a specific protocol for clinical bedside swallow evaluation. So they had developed a protocol that they were field testing and had questions about medical history and oral mechanism examination, questions about speech intelligibility, questions about vocal quality and assessment of trial swallows. And they did this protocol. The speech pathologist doing the protocol ran their patients through the protocol and then answered a final question about overall risk assessment prior to the instrumental assessment. They did fluoroscopic swallow studies. There was no single item on the protocol that had high predictive ability, in terms of predicting aspiration. But, as the risk factors piled up, as more and more risk factors became apparent, the likelihood that the individual was aspirating increased.

So here's the evidentiary support for that protocol you have in your head, right? If you're evaluating that patient and you see COPD in the history and a weak tongue on your oral mechanism examination, and dysarthric speech, and you do your trial swallows, and you start to hear wet vocal quality and eventually the patient's coughing, well as these factors are piling up, you're getting more and more concerned that that patient has aspirated. And you're right to. Because this research tells us that the more of those risk factors that are apparent, the higher the likelihood of aspiration. So this is good evidentiary support for that protocol we all carry around in our heads. And remember that overall assessment of risk? I said the speech pathologist in the study ran their clients through this protocol and then did an overall risk assessment prior to instrumental assessment? That overall risk assessment did in fact have good specificity and good sensitivity. So the key, here's the important part of this whole webinar. So the key to a good clinical swallow assessment is not any one particular item that you include or you don't include. The key to a good clinical bedside

assessment is our ability to integrate the results. It's the overall impression that we form. It's the interpretation of our observations. That's where the validity of a clinical evaluation comes into play. This is some work that was done a few years ago with the MASA. You may be familiar with the Mann Assessment of Swallowing Ability. It is a standardized protocol for clinical assessment. It's been around for a long time. Back in 2011, these folks did MASA followed by instrumental assessment. They were trying to see whether certain items on the MASA that had higher predictive ability when it came to predicting aspiration. And there was no single item on the MASA that high predictive ability.

But the MASA too, has an overall risk assessment, they call it the swallow integrity score. The clinicians overall impression of the patient in other words. And that was the one item that did have good predictive ability. So again, it's not about anything, you know, one particular item you include or you don't include, the value, the validity of the clinical swallow assessment comes in our ability to integrate our results. It's our overall impression. Here's some work that doctor Steele did a few years ago. They were in the process of trying to develop a swallow screening tool. And so they had speech pathologists and nurses trying to predict aspiration based on individual clinical signs and they couldn't do it. But, when they asked the nurses and the speech pathologists to make predictions about aspiration based on their overall impression of the patient, that's when their predictive ability improved significantly.

So that's the value of the clinical evaluation. It is not in any particular item, it's in our ability to integrate our results. And that's what we need to be teaching students and new clinicians to do. Not teach them to a specific protocol in my opinion, but teach them to get better at integrating the results. And so this a review article that was published a few years ago that says what I'm trying to say a lot better than I'm trying to say it. The concern consistently expressed in the research about our inconsistent use of recommended CBSA. That's the clinical bedside swallow assessment.

Components may be misplaced. Standardized item based assessments may constrain the clinical reasoning process and it is likely that our awareness of our own clinical reasoning processes will improve diagnostic specificity and sensitivity. In other words, our ability to rule in and rule out dysphagia and improve our clinical management and outcomes. That's what we need to be talking about. That's where the value of the clinical assessment lies. It's in our overall impression. It's integration of all of the information that we're getting. I know that I can't predict aspiration at the bedside, definitively, and I certainly can't answer questions about swallow physiology, pharyngeal swallow physiology, but I'm looking for risk factors for aspiration. But I'm also looking for, to make some prediction about risk of aspiration pneumonia. And that means putting the patient's risk of aspiration in the context of their risk for aspiration pneumonia.

And there's a whole lot of information here that I think I've actually covered in another webinar, that you could certainly take a look at. But as we think about our patients potential for aspiration pneumonia, what their risk would be. These are the things we need to think about. We need to think about overall medical condition, comorbidities, presence of infection, nutrition, hydration status, lung function, and oral hygiene. We know that when we put aspiration in the context of a patient with a lot of medical comorbidities, a patient who's sick, who has low endurance, they're more likely to get pneumonia. We know that when we put aspiration in the context of a patient who's nutritionally compromised or who's dehydrated, they're more likely to get pneumonia. We know that when we put aspiration in the context of underlying lung disease are more likely to get pneumonia. And we know that when we put aspiration in the context of poor oral hygiene, that patient is more likely to get pneumonia. So it's not just around identifying aspiration risk factors, although that's an important piece of it. But it also means that we have to put that aspiration in context to make some judgements about whether or not they're more likely or less likely to get sick as a result of this aspiration. There are some things that we can try as part of our swallow assessment to

see what's going to be an affective potential intervention for these patients. And one of those things are sensory interventions. There's research to support the use of sour boluses, research to support the use cold carbonated and combinations of boluses. Cold plus sour in one case. Cold plus high flavor in another. So these are things we can kind of experiment with as part of our clinical assessment. As part of our swallow trials to see, do we get a more timely swallow response? Does it help with the coughing? Does it change the vocal quality? Some other compensatory strategies we can think about trying as part of our clinical assessment.

Volitional swallow, this is sort of that bolus hold. Ask your patient to just stop for a second before they go ahead and swallow. Chew up that sandwich but just stop for a second. And sort of let your breathing kind of regulate before you swallow. This has not been studied in patients with dysphagia, but in healthy subjects does seem to improve oral containment. So that might be something to try. Effortful swallow is actually fairly well studied and is a good compensatory strategy to try as you do your swallow trials. It seems to improve pharyngeal transit and may also improve esophageal transit in some clients. We don't have a lot of one size fits all interventions in the work that we do. What if we had one one size fits all? It would probably be slowed down, right? Slowing down makes a lot of things better.

Rarely makes anything worse. And so that's certainly something to try as you're doing your swallow trials. Certainly we play around with bolus sizes. Generally smaller sips, smaller bites tend to be safer. And so that's something that we can try as we do our swallow trials as part of our swallow assessment. Probably the best studied of all of the compensatory strategies is the chin tuck or the chin down head position. We know that this maneuver improves airway protection by changing the spatial relationships in the pharynx. And it requires a little bit more effort. We do need to be cautious about this because it does position the airway at or below the level of the pyriform sinuses. So if this is someone who's aspirating residue from the pyriforms, this has a potential to

actually make things worse. We need to pay a little bit of attention to what's happening beyond the pharynx as well. In the early days of dysphagia intervention we were taught that the esophagus was really not part of the picture. But we know now that pharyngeal function and esophageal function are very much interrelated. Dysphagia in the pharynx and dysphagia in the esophagus often co-exist and could be...

Esophageal dysphagia can exacerbate pharyngeal dysphagia and vice versa. And so this is something we do need to pay attention to as we're doing our swallow trials. Particularly as we think about some of the maneuvers we might be trying as part of our assessment process. We know that maneuvers like the Mendelsohn maneuver, effortful swallow, they have an impact on esophageal peristalsis. This was a study from a few years ago that looked at esophageal functioning under manometry. The normal swallowing conditions, effortful swallow, and Mendelsohn maneuver, and they found that the Mendelsohn maneuver was the one that was really most problematic.

And seemed to have more of a diminishing impact on esophageal peristalsis. Effortful swallow as I said earlier actually seems to improve esophageal peristalsis. And then the normal swallows are somewhere in the middle in terms of their impact on esophageal function. So we've completed all the various components of our swallow evaluation. Tried some maneuvers, tried some strategies, and now we're gonna go forward and we're gonna make some recommendations around diet, around safest way to administer medications around potential exercises, around quality of life, and one of the most important things we have to determine is, do we need to go forward with instrumental assessment here? So it's important to understand what instrumental assessment does add to the process and what it doesn't do for us. Certainly if we want to review the pharyngeal anatomy and physiology, if we wanna know definitively that aspiration occurred, if we want to know why it occurred, what the swallow physiology, what's happening in terms of swallow physiology, we need instrumental assessment. Our clinical assessment simply can't answer those questions. But we also have to understand that instrumental assessment doesn't simulate real life eating and doesn't

allow us to rule out aspiration. I can only say what happened today during this study. And also importantly, doesn't allow us to determine the impact of the aspiration on the individual. So, in other words, for my instrumental assessment alone, I can't say, "Oh yeah, you're aspirating. "You're definitely gonna get pneumonia, right?" That's part of that overall assessment process. Looking at not just aspiration risk factors, but also aspiration pneumonia risk factors. That's how we can answer that question. If you're thinking you do need to go forward with instrumental assessment, which type do you need? Well, unfortunately, a lot of times that's determined based on what's available to us. We don't often have a choice. But the endoscopic swallow evaluation and the fluoroscopic swallow evaluation do answer different questions to a certain extent. Fluoro gives us a nice view of phase transition, allows us to watch a bolus move from the oral cavity through the pharynx into the esophagus. We get a nice view of hyo-laryngeal excursion. But endoscopic evaluation gives us more insight into laryngeal function. Certainly more insight into the appearance of the larynx. Redness, swelling. Sorry, redness, irritation, swelling.

Both studies would give us information about whether or not aspiration occurred and why, and what the clients response to the aspiration was. But again, neither will help us to answer some of those questions that only a clinical assessment can answer. What about fluctuations in performance? What about fatigue? What about endurance? What about real life eating situations? That's something that only the clinical assessment can do for us. So again, to just kind of pull all of this together, it's not about any particular item that you include as part of your assessment protocol, it's really about overall impressions. It's putting all of the pieces together to make determinations about whether or not aspiration is occurring, and then we have to put that in the context of potential for pulmonary clearance and potential for pneumonia risk. Certainly our bedside evaluation is critical as we go forward, make decisions about further assessment, and may also help us to identify a particular compensatory strategies or maneuvers that might be helpful to our patients going forward. So, let's see what we

have in terms of some questions here. I think we have a few more minutes left. Is that right Amy?

- [Amy] Yes it is. We'll see what we can get to here. Someone asked a question about when you were talking about sour boli, if you have any suggestions for specific things beyond like a lemon glycerin swab or something to that affect.

- [Angela] Right, so I actually would recommend not using a lemon glycerin swab. The glycerin tends to have a drying affect on the oral mucosa. You get that sort of initial burst of saliva, but then there's often this rebound drying effect and so I wouldn't recommend lemon glycerin swabs. We use like lemon ice or cold lemonade.

- [Amy] Okay, great. Someone was asking about laryngeal palpation. So what is the status of thought on that as an assessment tool and is there a recommended protocol for that if so.

- [Angela] Well the protocol that we have is the original protocol that Jeri Logemann taught us all to do back in the 90s and that is index finger just underneath on the fleshy part of the jaw. And the next two fingers on the larynx. As I said as we were looking at the research around laryngeal palpation, it's certainly very helpful in terms of telling us whether or not a swallow occurred. It may be helpful in giving us some information about anterior hyoid movement, but probably not so much around vertical laryngeal movement.

- [Amy] Okay, thank you. Karen is asking about using the free water protocol with patients that are on CPAP or BPAP and does their respiratory status mean that it's not very safe to use?

- [Angela] It's not. When you look at the research around the water protocols, those kinds of patients with that kind of underlying respiratory compromise typically have been excluded from the research. They haven't been included so we don't know anything about how those patients would do with free water because we don't have that research. And also that's a group of patients who are fairly high risk of pneumonia. That's typically not a patient population at my facility that we include when we do water protocols. In other facilities they may have more experience with doing water protocols with those clients, but we just don't have any research for those folks. In fact, in most of the studies, those are the folks who are excluded from the research because of the impression of higher risk.

- [Amy] Okay. Here's an interesting question. Someone is asking about why do I often see dysphagia significant dysphagia in patients that have renal disease?

- [Angela] I think it's probably related to homeostasis. We know that when the renal system is down, the respiratory system is taxed. That and you might think, okay so, you could see why there might be some difficulty, if you did aspirate into this respiratory system that's already compromised, that this would be someone who'd be more likely to get sick, but why are they aspirating in the first place? And I think that it goes back to respiratory swallow patterning, right? If the renal system is down, and not contributing to homeostasis, that puts more pressure on the respiratory system to do that work. If the respiratory system's taxed, then it can't do some of the other things it's supposed to do. And one of the other things it's supposed to do is provide us with breath support during those periods of swallow apnea or respiratory pause. So without that breath support, people get into trouble in terms of their breathing swallow coordination. Again, this is not a population we have a lot of data to share. But given what we do know about homeostasis, that's my best guess. And that's certainly true in my facility as well. We see a lot of dysphagia in folks with renal failure.

- [Amy] Okay, thank you. Let's try one more here.

- [Angela] Sure.

- [Amy] Someone is asking about, she says in her ICU in her facility that some of the nursing staff seem to be taking their pass fail swallow screenings a bit farther than perhaps they should and making assessments about the patients actual swallowing ability and I think this is much a comment as a question. But do you have any thoughts about that?

- [Angela] So yeah. I always have thoughts, right?

- [Amy] I think we all do on this one.

- [Angela] I have a couple of thoughts. One is I think that, one of the reasons I'm always so happy to talk about clinical assessment is because I'm a strong believer in the value of clinical assessment. And I think clinical assessment often gets short triffed. I'm sure I'm not the only speech pathologist who ever had a nurse or a nurse aid say to her, "Oh you don't have to watch him eat, "I watched him eat." Right, as if that's the only thing we're doing in there. But because so much of the clinical evaluation happens in our heads, right, it's all about that integration. It's the big picture. It's pulling all of those pieces together, right? That's the thing you can't see me do. And so it looks a lot easier than it really is. And so I think that's some of what's going on there. I also think that there's just a lot of confusion, and I see this not just among nursing staff, but I think in physicians sometimes too. There is some confusion. They don't understand the difference between a swallow screening and a swallow evaluation. And so we've asked nurses to take this on in a lot of facilities. To take on this swallow screening role because they're there three shifts. They're there 24 hours a day, right? And it's important, and a lot of these swallow screenings tools have been validated for use with

nurses. But that's not the problem. I think that that has caused some confusion because they often don't understand the difference between a screening and a full evaluation. And so it's just another one of those things that we have to keep talking to people about and keep selling our services and demonstrating what we do that's different and what we can add to the process. Including making recommendations. Making better recommendations.

- [Amy] All right, well thank you very much Angela for being here today with us. We really appreciate you presenting this Back To Basics Course along with the swallow screening related event that you presented a couple of weeks ago. I'd like to thank our participants also for being here with us today. I'm gonna go ahead and close up the classroom, but I'd like to thank everybody and hope to see you back soon in another webinar.