IDDSI: Rationale and Framework, Part 1
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- [Amy] All right, let's go ahead and get started, I'd like to welcome everybody to our SpeechPathology.com webinar. We have Denise Dougherty joining us today, who is presenting on IDDSI: Rationale and Framework, and this is part one of a two part series on the IDDSI. Denise Dougherty owns and operates a private practice in Indiana, PA, where she conducts therapy with children and adults. She received her bachelor's in communication disorders from Marywood University and her master's from Saint Louis University. Since 2007, Denise has served on the expert work group of the physician's office quality measure project for Quality Insights of Pennsylvania, working on initiating quality measures for CMS to improve effectiveness, efficiency, economy, and quality of services delivered to Medicare beneficiaries, specifically medication review. She's a past president of the American Academy of Private Practice and Speech Pathology and Audiology, a past member of ASHA's Health Care Economics Committee, and co-editor of Private Practice Essentials, a practical guide for speech language pathologists. Denise works as a forensic speech pathologist and expert witness in litigation involving dysphagia, chocking deaths, and surgical errors. So welcome, Denise, it's a pleasure to have you join us today.

- [Denise] Thank you, Amy. Today, we're going to talk about the rationale and framework of the IDDSI, International Dysphagia Diet Standardization Initiative. When we are going through our slides, the very first thing I need to talk about is the financial disclosure. And I am receiving an honorarium from SpeechPathology.com for the presentation. When we take a look at our learning outcomes after the session today, you will be able to define the levels in the National Dysphagia Diet, explain the rationale for developing a new system of standardization, and identify three findings of the systematic literature review that was undertaken during the development of the IDDSI framework. As far as our course description, the IDDSI framework was finalized in 2015, and it provides a much more comprehensive guideline for diet selection than we found with the National Dysphagia Diet. So this seminar is going to discuss the rationale behind the development of the new terminology and the criteria for the diet selections. When we take a look at the IDDSI, any time we are citing or showing you

different images from the IDDSI, we do need to make sure that we are using this citation for the IDDSI, so I wanted to make sure that not only was it in the bibliography, but it's also on the PowerPoint slide itself. So question is, where did the diet standardization start? And there were reasons why there was a movement towards coming together with an understanding on what different diets mean, what you should have, what you should not have, and that's where we found a lot of frustration. There was certainly a lack of standardization when we're talking about the food textures that we were providing to our patients who had the diagnosis of dysphagia. There was lack of standardization about the liquid consistencies, and just the terminology.

So with all of these areas very fuzzy as far as the criteria, there needed to be something done. So what happened is the National Dysphagia Diet was a project that was conceived by the Dietetics in Physical Medicine and Rehabilitation, it was a dietetic practice group. And they started this initiative in 1996. What they did was put together a taskforce, they wanted to study the issues around the confusion with diets. And they wanted to come up with a new diet plan. They were looking at using scientific food properties and clinical swallowing problems to help them formulate the different diet levels. And when they involved individuals, different groups in this task force, they wanted to make sure that there was representation throughout the different fields that would be involved in working with an individual who had the diagnosis of dysphagia. So we have food scientists, clinical and consulting dietitians, we have the speech language pathologists, representatives from the various food industries that would provide or manufacture the modified foods that were out on the market, the different thickeners that were out on the market. They needed to be involved in this as well. So all of these individuals who were brought into the task force had an interest in the field of dysphagia and experience. The goal was to standardize all of the dysphagia diets. And we wanted to do this on a national basis, that way, when different professionals were coming together to discuss, there was common terminology. It would help with the communication between the individuals, it would help with communication between the professionals and the food preparers, the institutional food preparers, and

the food industry leaders, so we could come up with more consistent care, better care for the individuals who had the diagnosis of dysphagia. And what was the result is a multi-level dysphagia diet. This National Dysphagia Diet was published in 2002, the American Dietetic Association was publisher. And they proposed the National Dysphagia Diet, this is a system of food classification. And they came up with textural properties and foods that would be included in each of those levels, so there was a hierarchy in what was the most restrictive coming up to the least restrictive. And when they put this hierarchy together, they wanted to make sure that they would identify foods that were able to be included on those diet levels and foods that you should not have. So that was determined at each of those levels, and it was based on the work of that task force. So when we take a look at the National Dysphagia Diet, there were four different levels for the semisolid/solid foods.

So we have the level one, this is your Dysphagia-Pureed. So when we're looking at this type of consistency, it really requires very little chewing ability. It was pudding-like, so very basic, this would be your least, your most restrictive diet on these levels. We have level two. This is your Dysphagia-Mechanical Altered, and with this level, it does require some processing. So we have a cohesive bolus that we can form, the food is moist and is considered to be semisolid. We're looking at Dysphagia-Advanced diet, and that would be your level three, so this required more chewing ability than level two, and the foods tend to be more of a soft texture. And then we move up to the regular diet where you have all the different foods allowed. Now, when we take a look at the National Dysphagia Diet levels, everywhere that I've worked in my career, every facility tended to have its own spin on what was included in these levels. And in some facilities, we only had the puree, then we went to mechanical soft, and then we went to regular, so we were missing that step in between the mechanical altered and regular, so the step that requires more chewing, but it's certainly a softer consistency than what we would have on the regular diet. And it became very difficult, if you were working in several different facilities, each one could have a completely different version of what they considered to be level one, level two, level three, foods that you

would get, foods that you would not get, and that became extremely confusing. Now, when we take a look at the National Dysphagia Diet, Becky Dorner put out a book, it's called It's Tough to Swallow, and she had all the information on the diet levels in there. And for instance, when we're talking about bite sizes, they were looking at, for level two and level three, if we were talking about casseroles, the pieces should be half inch or smaller. When we're looking at fruits that were soft, there was talking about bite sizes that were about half inch or smaller. When we're looking at meat, level two, they wanted to have the bite size about one quarter inch, and that would be chopped or ground or a cube. When we're looking at the advanced level, level three, it would be soft cooked, tender, chopped, ground, shredded, but there wasn't a specific dimension that I found in those resources. But we're looking at bite sizes anywhere from a quarter inch to a half inch. A lot of facilities, that's not what you got.

One of my frustrations in facilities was the foods that would come out that we would consider purees. The ones that were really difficult and became very sticky and very gummy tended to be the pureed noodles or spaghettis or pastas, macaroni and cheese was one of those nightmare meals. You could almost take that wad from the plate, throw it on the wall and come back in a week and it would still be there, it was so pasty and gummy. So when I had a client that was on puree and they got that sticky mess of macaroni and cheese, my preference is, we really shouldn't feed this particular patient this diet, because they don't have the skills, they don't have the strength, they don't have the bite force, they don't have the dentition, but it was puree. So we needed to educate the staff, so if they got this macaroni and cheese that was extremely sticky, you needed to take a look at your individual that you were feeding or supervising and say, I think we need to get a substitute, because this isn't going to go well for them. The other thing that we always ended up reprocessing basically at the table was mashed potatoes, because they came out really dry in this big ice cream scoop, and it wasn't creamy. So we would often, between myself and the staff, end up putting milk in it, so it ended up being a very smooth creamy consistency. And I would always tell the staff, think about Swiss Miss pudding. And when we take a look at some of the

processed foods that we consume, if you've ever had the Bob Evans, and I hate to drop names, but if you've had the Bob Evans mashed potatoes that you microwaved, those are very smooth and creamy. That's what the potatoes should be like, instead of this hard wad that your patient may not be able to actually break down and swallow. The other thing that I would run into, and I'm sure other individuals have as well during the course of their career is what is pureed cake? Pureed cake in most facilities was kind of a pudding consistency, it was cake batter like. But in some facilities, what came out as pureed cake was a piece of cake floating in a bowl of milk. And when I would ask the dietician, what makes you think this is puree, she would say, well, it is puree because we smash the cake into the milk before we feed it to the individual. And I hated to burst her bubble, but number one, I've never seen anybody smash the cake into the milk before they were given to a patient, and number two, if the patient was on a thickened liquid, the milk in that bowl was rarely ever thickened, and number three, when you smashed the cake into the milk, it's particulate matter that's floating, so that would be a mixed consistency. So if that's how we're going to make it, I would have to say that my patient, my resident, my customer here, whatever terminology we're using in your facilities, they cannot have cake, because this puts them at risk, it's a mixed consistency.

So it was very very frustrating when we look at different spins on the National Dysphagia Diet. Now, they came up with different labels for liquids, and they were looking at viscosity levels, the thickness or the resistance to flow. And they came up with four terms, we use these now if you haven't made the transition to the IDDSI. The ranges were considered to be a common sense approach, but they recognized that there also needed to be more research. So the levels that they came up with are thin, nectar, honey, and spoon-thick or pudding. And they identify it by the centiPoise level, and that is a level that measures the thickness of the liquid. So thin was considered to be one to 50 centiPoise. Nectar was 51 through 350. Honey was 351 through 1,750, and that's a huge range. And then we get to the spoon-thick or the pudding, which was anything over 1,750 centiPoise. One of the frustrations when you're working with

staff is they don't know how to thicken. So many times, they would throw a spoonful of the powder into the liquid, stir it, and then give the drink immediately to the client to consume. And what they didn't realize was it hasn't bound yet. So the patient is actually drinking thin liquid with the powder swirling, it hasn't bound. Or what they would do is they would put in a spoonful, again, not measuring, but they would dump a spoon of the powder in, stir it, and then eyeball it and say, hmm, you know, I don't think that looks thick enough. So they'll put in another spoon and the same thing, gosh, it's not thick yet. So they keep adding the powder. And there is that fine line between thin and wallpaper paste, and it gets there extremely quickly when you use that method. So it became very difficult. When you would work with individuals that were thickening, they would often come to me in the hallway and say, does this look thick enough to you for nectar, so we're eyeballing it. Well, again, there is a range. So even though it's thin, it technically could be nectar if you did the line spread test to determine the consistency, so it was very difficult, and supplements were a nightmare to mix with the powders.

So it was just very difficult training the staff. Either they would eyeball it, but again, there's a range. Jane Garcia wrote an article, she was one of the authors, this article came out in the ASHA journal August 2013. And she talked about what was called a line spread test, this is a visual clinical tool. And they gave you directions in this article to cut or have a PVC pipe cut to a certain dimension. And then you had an illustration of circles. So you would put the pipe on the circle that was in the middle, fill it with your thickened liquid, lift up the pipe, let the liquid spread for 60 seconds and determine, based on what circle it reached, is it thin, is it nectar, is it honey, or it didn't move at all and it's pudding. So that allowed the staff or the patient to have a little bit better idea, are we within that range of centiPoise. But not many people would be able to utilize this type of test. So we ended up with just the eyeballing. So that created an awful lot of confusion. And what they looked at is, now that the world is much smaller, people are traveling abroad more frequently, they found that there was a lot of confusion, when you were on a modified diet, if you went from country to country. They found that

there were so many different names and labels for dysphagia diets. We didn't know exactly what we were talking about, so if you're on nectar thick liquids in the United States and you travel to Australia or you travel to Germany, it may not match up, that terminology may not even be recognized. So it became extremely confusing. And just as we have inconsistencies and errors when we're talking about medications, we found the same thing with diets and the thickened liquids. Individuals were dying because they were given the inappropriate food textures and it didn't, it wasn't appropriate for them or the liquid wasn't the appropriate consistency. So it was time to really figure out a better way. So at ASHA, the IDDSI was a big topic of discussion for a number of years at the national conventions. And the IDDSI, the International Dysphagia Diet Standardization Initiative, this is a committee that was founded in 2012. They were incorporated in 2013. This is considered to be an independent not for profit association. It was registered in Australia and it operates under Australia's regulations. Everyone that was on the IDDSI committee was a volunteer, so there are no paid positions for the individuals that were part of this committee. They wanted people around the world to be involved in this initiative, so individuals around the committee represented 10 different countries. And they have a number of different professions that are on the committee as well. So there were individuals from nutrition and dietetics, from food service and catering, speech pathology, occupational therapy, physiotherapy, gastroenterology, nursing, mechanical engineering, and food science.

So we have a lot of different areas that are being represented, getting everybody's input. The problem was where the heck do we start with this, we've got this National Dysphagia Diet, we have the liquids determined by centiPoise, where do we go? So the very first thing they wanted to do was do a survey. They had 33 countries that the survey was sent to, individuals that were practicing in those areas, and they ended up with 2,050 responses. And what they found was there, when we're looking at food textures, it was pretty common to have three or four different levels, but the problem is, there were 54 different names to talk about these three or four different levels. The same thing when they looked at liquids. They found that there were more than three

levels of liquid thickness utilized around the world, and they had 27 different names. So lots of confusion here. Just to give you an idea of the various terminologies, when we're looking at thin liquids, we tend to talk about it as thin or regular, in some areas of the world, they call it less mildly thick or normal. We get into the naturally thick fluids, some individuals, some countries would call it grade one, very moderately thick or mildly thick or just call it thickened liquids. Looking at nectar, fluid stage one, level 150, grade two, syrup, or thickened. Honey like, you are looking at stage two, level 400, grade three, jelly, medium. And then when we're looking at pudding like, we have thickened liquid stage three, level 900, grade four, paste or creamy, full protection. So it was almost impossible to figure out exactly what the levels were and what you might get. Same confusion when we talk about the labels for foods. When we're talking about regular, there were some areas where we called it level five normal diet, easy to chew, solid, regular or cut. Moving into the dysphagia advanced, texture E, texture A, level four, coarse pate. Mechanically altered was texture D, texture B, level three, mashed, so so many different names for these foods. Looking at puree, texture C, level two, jelly food with protein, jelly products. And we keep going. So extremely confusing terminology, and what the IDDSI committee wanted was something that was global, that would be recognized anywhere that you would travel in the world and you would end up with the right foods, with the right liquid consistency, because right now, not happening.

So this was a huge concern, they felt we needed the standardized terminology, and that would help the communication between the different fields, the different professionals around the world, the patients and caregivers, and they felt that the patients and caregivers really could not assume that, when they bought a pre-thickened liquid from one company, that it would be exactly the same as another company. That we can't assume everything is the same level. They needed to make sure that the food texture and the drink thickness had standard names everybody would recognize, and that was really important when we're looking at dysphagia research, because how can you take research that was done in the States with certain

terminologies and compare it to something that was done in Turkey or Italy, because we don't have the same descriptors. So they came up with this, the diet, it was a three year effort, and the final framework was established in 2015. So we have eight levels, we have levels zero through four, and that is the measure of the liquids, and then we have levels three through seven, and that measures the foods, so if you take a look at those levels, there is a little bit of an overlap between the food and the liquid. They wanted the common terminology that would describe the food textures and the drink thickness so everybody can understand it. They also wanted to make sure that there was a way to test the foods. Does it really meet the criteria for those different levels? So they have what is called the IDDSI testing for food and for liquids, and it really is very easy. They also wanted to make sure that, when you were testing whatever food and drink you had concerns about, that you were testing it under the serving conditions, especially the temperature it was supposed to be served at, because they found that the food or liquid actually could change consistencies if it was supposed to be served warm and you ate it when it was cold or vice versa.

So very clearly identify, we need to test it at the intended serving temperature. They came up with the idea of sponsors for the development of the IDDSI, so you'll recognize some of the names that are on this list. These four companies that the IDDSI committee reached out to for their support. And when we're talking about the role and the support that they provided, it was basically financial. This was going to be a costly endeavor for the research, the administration, the analysis of the data. But the committee wanted to be clear that these companies were never involved in the design of the diet or the development of the framework, they were there for the financial support. Now, these sponsors were briefed periodically as the committee reached different milestones over the course of the project. The committee also reached out to different professional associations and organizations that were involved with individuals who have dysphagia. They wanted these organizations and associations to know there is this initiative that we are working on, and they wanted to invite these professional associations and organizations to participate and provide support as well.

So they had conferences every month, and then they had two in-person meetings. They also did a systematic literature review. And they went through this review in 2014 and published the results in 2015, so we'll talk a little bit about what they found. And in 2013, they decided to do another survey. So we know the terminology is all over the board, nobody really agrees on anything for the food and liquids. So in 2013, they developed five different surveys for specific groups. One group were individuals who were with the diagnosis of dysphasia, they're caregivers or organizations that were providing support to the individuals who had the dysphagia diagnosis. Another survey focused on the healthcare professionals, the food service professionals, getting their input.

A third survey went out to the dysphagia research scholars. The remaining two surveys went out to companies that either manufactured the texture modified foods or the companies that manufactured the thickening products or the pre-thickened drinks for individuals who have dysphagia. So those surveys went out and that information was utilized. Continued to survey, in April, in June of 2015, they looked at 57 countries and they had 3,100 individuals complete. And they found that 79% of the individuals who completed the surveys were healthcare professionals working with individuals who have dysphagia, and the other 10%, 319 individuals were food service professionals, so that was the breakdown that they had in their discussion about this process. And what they found was there was continued confusion or misunderstanding or people weren't familiar with various terms. One of the terms was slightly thick. 6.5% had no idea what that meant. And they weren't sure how that was distinct from level two, which was moderately thick, and level two seemed to be the terminology that individuals used for thickened infant milk. They also looked at level seven, and the term here was meltable or dissolvable. 6% found that was confusing, and that type of food actually needed a new name. We needed more information about it, we needed examples, what exactly are we talking about when we're saying multiple or dissolvable? So that resulted in a category called transitional foods. And when you look at the diagram for the IDDSI, transitional foods does not have a level number like

all of the others, because it crosses several different levels on the pyramid. So when we get into the literature review, some of these I'm sure you're going to recognize from your courses, your continuing education, your professional experience. What they found was thicker liquids reduce the risk of penetration and aspiration, but in doing so, it also increased the risk of post-swallow residue in the pharyngeal area. So if you've done FEES, if you've done modified barium swallows, I'm sure you've seen those particular situations. They found that there really was not great evidence talking about the difference in viscosities, so that was an issue. They felt that, when we're looking at how we determine the best food consistency for our patients, we tended to do that in our evaluation. We explore how the patients handle the various levels and then we make a determination based on how they performed. And we know that, when we have a thicker bolus or a thicker liquid, that requires more oral processing and we need more oomph behind the swallow to clear the pharyngeal area of that bolus.

They found that foods that were hard, adhesive, sticky required increased chewing rate, longer chewing to process, and it required more muscle effort because the foods were much more difficult to process. They found that, when we are doing normal chewing, the tongue and the jaw are very coordinated in their movements, so we avoid biting the tongue when we chew. They found that there was no posterior tongue to palate seal with foods. And it wasn't uncommon to see masticated food collect in the pharyngeal area, usually in the vallecular space, whenever we're still continuing with the oral preparations, we have that poor oral containment, the food falls over and it sits in the spaces. They found that there wasn't a lot of information to support the viscosities, including some individuals would talk about a viscosity similar to water, but there really wasn't evidence to support exactly what that was or what that meant. They also talked about the shear rate, and this is where we start getting into terminology that's a little bit different for us to understand. The easiest way I can explain it to you is how the bolus breaks down when the layers slide over each other with the stress and the force of processing. And they found that that sheer rate changed with tongue movement and what happens in the pharyngeal area when we have the shortening and

the constriction. There weren't very good guidelines again with the different consistencies and the viscosities, and that resulted in confusion and difficult comparison of various studies. They also found that there was bias. Some of the biases, we had problems with selecting individuals who would participate in our studies, we had missing data, we had problems in how we measured the behaviors of everybody that was involved in those studies, and they look at all the 36 studies in this review and they found that every one of them had risk with bias. And I listed the most common risks of bias, we have very small samples. When you're reading studies, sometimes they're going to say we looked at three people, we looked at six people, and that's completely different than we looked at 3,385. They found that the protocol was incomplete or they only did a single trial per bolus type. And if you've done modifieds or FEES, sometimes you've seen that the patient does, performs differently on the second trial than they did with the first one. So you can have a misperception about their safety or their ability to process. And they found that the samples were unbalanced, it was male versus female, females only.

So there were a lot of concerns when they look at those 36 studies in the literature review. We didn't have great evidence for how to modify the foods to guide our selection. They also felt we needed to look at terms, like food properties such as hardness or the slipperiness of foods. And they really didn't see much information out there on how to objectively measure the texture-modified foods. So lots of issues that they came up with. They felt that we needed to adopt terms that are already in use in the food oral processing world so we can capture the characteristics of the food. They looked at the behaviors that we have of our individuals when they're consuming different stimuli, so we need to keep that in mind. And we also need to look at the tongue pressure. We have some foods and liquids that flow very easily over the tongue and then others that require a lot more active movement of that tongue to initiate the flow. There is problems with how the tongue moves the food around, we have problems with containment, the premature spillage, chewing, and that can actually increase the risk of choking. So we need to be aware of the fact that we have some

populations in the field of dysphagia, behaviors may actually create situations where they're not appropriate for a specific level, and you'll see that in the IDDSI when they talk about contraindications for upgrading the patient's diet, they give you some very clear cut specific information. If this individual has this, they should not be upgraded to level seven. They looked at how to test liquids. We talked about the line spread test for viscosity, they were looking at a syringe based flow test. So they looked at 13 different thickeners, they had a combination of powders and gels, and they also looked at the commercially pre-prepared thickened liquids. And they mixed those products, the powders and the gels, with Ocean Spray cranberry juice, and they wanted to take a look at the flow. And as they were going through this testing, they realized there was a need to identify a level for the thickened infant formula. They also felt that we needed to be able to evaluate things we don't consider to be liquids or drinks.

So here, they're looking at evaluating the sauces or the condiments, the soups, nutritional supplements, and liquid medications. So we can test those. They came up with a flow test, so there's a standardized volume. There's a standardized flow time you're going to let the liquid flow through the syringe. There is a standardized syringe dimensions, so that we're looking at consistency. And this allows valid comparison between studies, because now we have a tool that we can use, we know exactly how much liquid we're going to put in this tool and how long we're going to let it flow before we stop the flow to determine how thick the liquid is. So easy way to test the liquids that we didn't have before. When we're looking at terminology in the States, we're pretty familiar with nectar and honey terminology, but that's not the case in certain parts of the world, especially Asia. And we tend to use the term honey. When I was doing modified barium swallows and the radiology techs were talking to the patient, they would tell them, now I'm gonna give you some honey, and the patient, and sometimes they'd think, the radiology staff thought we were actually giving them the food honey rather than talking about the honey consistency. So there was some thought that there would be that confusion, the food honey versus the thickness of a liquid. And plus, honey has a botulism risk for infants under the age of 12 months, so

they felt we needed different terms to talk about those liquid consistencies. So they came up with labels, descriptors of our foods and our drinks. And as we said, you'll see some of that overlap. Some foods are also considered a drink consistency. And what they wanted to make sure that we understood is there is ways to test the foods using a spoon, using a fork, they have testing methods for feel of the fingers on the food product, and also chopsticks. So even if the spoon or the fork is not available in areas of the world, we can still test it with a chopstick or we can test it even just with our fingers, what happens when we have that bolus between our thumb and our index finger. We also are looking at how it behaves or how we have that mouth feel of the food. They looked at the definition for thickened liquids. And what they did was come up with a rationale for each of those levels, why you would use it, who is this appropriate for.

So extremely detailed when we're looking at the IDDSI breakdowns. The final framework came out in 2015. We have a diagram that has the labels and the colors. And on this diagram, you'll see that sidebar, that gray, called transitional foods. Those foods are appropriate for every category that that gray bar touches, so it would be appropriate for minced and moist, soft and bite sized, easy to chew and regular. Because the food has a specific texture that breaks down very easily when you have saliva mixed with the food or the temperature change. So it's appropriate anywhere from level five all the way through level seven. They also have the details on the testing, and they found when they were doing the surveys that we tend to use visual inspection or observation of the foods and the liquids, and that was our determination, does this meet the criteria? So now we have a better way to do that. And you'll take a look at all the different colors, they wanted these colors to be very distinct from each other. The other thing that they considered very seriously was, what if you're colorblind? So if you are colorblind, you should still be able to differentiate the various colors on these pyramids. So they came up with this twin pyramid design. This is the type of labeling or imagery that they were using in Japan for dysphagia diet, so it was felt let's just continue with this one. They wanted to avoid the color red, because in medical world,

red is a cause for alarm or danger, and there were cultures where red may have had some symbolism and the committee wanted to stay away from anything such as that. So there is not a red on that pyramid anywhere. One of the features, as I mentioned, is you have that overlap between food and liquids, so pureed and extremely thick liquids are both considered level four. The same thing for liquidized or blenderized and moderately thick liquids, this is a level three. So we have the same number, we have the same color. So there is that ability to consider it both a food and a drink, it's the same texture flow property. Now, I mentioned the criteria to consider before you even advance an individual on the diet levels, and here, they wanted to be very clear, when we are looking at level six, which is your soft, easy to chew, they wanted to make sure, if you met this criteria, you were not advanced to level seven, which is regular. So the contraindications for advancing this individual to level seven, if they have dry mouth. You are not going to be advanced if you have a diagnosis of xerostomia. If you require dentures, you are not advancing to level seven.

Same thing if you have problems managing mixed textures, you are not advancing. Here's a criteria that I really think we need to pay attention to, if you are impulsive, you are not going to be a level seven. I can't tell you the number of choking deaths that I see in my work in the forensic speech pathology world, where the individual was very impulsive and they were given what technically is a level seven diet. Too impulsive, weren't safe, and now we have an issue. If we have a cognitive impairment, if we have delayed oral skills, impaired strength or stamina, you are not safe on level seven. So very clear. So we mentioned we wanna make sure that we can test this food. So if you don't have a fork or a spoon available, we can do the finger feel between the index finger and the thumb, and we can also look at the chopsticks to test. Testing these foods is extremely easy. So very easy to educate your staff and your families. So we have that transitional framework, transitional foods, it covers a lot of different levels. So these foods are technically level seven foods, but when you process them, you add saliva or there's a temper change, temperature change, the food changes textures. So it would be appropriate for anyone who is on the minced and moist level. When we

take a look at chewing, there is a number of factors that determine how you're going to be able to break down that food, so we're looking at how tough the food is, and we often see this with meats in our facility. You can't cut that meat with a fork, let alone a knife. It's just too chewy, they can't break it down. They're looking at the moisture content of the food and the ability to adsorb versus absorb, big difference. Absorb, AB, saliva, the saliva penetrates the food product. If it's adsorbing, it's on the surface, it is not soaking into that food. And then we have the food that is very fibrous by nature. One of the foods that's surprising as we talk about it in part two is bread.

So that'll be a part two discussion. When we're looking at moisture, they believe this is the most important variable to determine when the food is ready to swallow. It needs to be that most cohesive bolus. The saliva moistens the food, it helps soften and it helps disintegrate and helps dilute the food. If we have an individual who has a complete set of teeth, they're fully dentate, even those individuals, when their saliva flow is reduced, that hinders their ability to adequately prepare that bolus for swallowing. So we need to recognize the role that saliva plays in the breakdown of foods and recommending a specific diet level. When we look at chewing, we found that, during the reduction of the foods, the normal bolus is not lump-free, it still has texture, but it's moist and cohesive. The role of saliva, where you have the addition of sauces and gravies to help moisturize that meat product or the food product. Now, we talk about the testing of the food. They came up with what is called a spoon tilt test. And this is going to assess the cohesiveness and the adhesiveness of the bolus. So when you put the bolus on the spoon, the sample should hold its shape. And when you tilt the spoon, it should fall off very easily. There should be very little residue left on the spoon. So if that bolus, when you tilt that spoon, it doesn't fall off, it is not meeting the criteria for that diet level. So this takes care of that really sticky pasty macaroni and cheese and the mashed potatoes that we were talking about earlier. They're not going to pass that spoon tilt test. We need to fix the recipe. We're looking at food hardness. So a practical test was using the fork or the spoon. And you're going to press down on the food. Now, the problem is, when I press down on the food versus another individual, we may have

different levels of force or pressure that we're applying, so they wanted to come up with a criteria that people could understand. And what they found was the blanching of the thumb nail. So when you're pushing down with that fork and your thumb nail blanches white, that means that the pressure you're exerting overcomes your arterial blood pressure. And they've identified this is at 17 kilopascals on the IOPI, and that corresponds to the typical tongue pressure that we use when we're swallowing. So when we are testing our foods, if that thumb nail blanches white, that's different than it was just an easy pressing down.

So you'll see that criteria in the testing, the thumb nail blanches white. And when you remove that pressure, the food should not spring back up to its original shape, it should stay compressed. Now, they looked at testing the food with chopsticks and the finger pressure. So with level six, when you press down, you will have that thumb nail blanch white. And when you remove the pressure, that food should not bounce back up to its original shape. If it does, it doesn't meet the criteria for that level. With transitional foods, we can test those. So again, they're extremely specific about bite sizes. So you're going to have this transitional food, your sample is 1.5 by 1.5 centimeters, that is the bite size. It's soaked in a specific amount of water for a specific amount of time. If that sample squashes or it disintegrates or it no longer resembles its original shape, it's melted, then it is a transitional food. If it doesn't meet that criteria, it is not a transitional food, so very easy to identify, is this the right food for my patient, my loved one? Now, they looked at foods that cause choking deaths or put the individual at risk for choking. So when you go into the IDDSI framework, in their frequently asked questions, they will give you information on foods that have been found in the autopsies. Whenever I look at the autopsy, I will see there was a baseball wad of scrambled eggs in the person's throat or there was a piece of meat that measured this by this in between the vocal cords, or this is what we pulled out of the lungs, so they are looking at foods that create a death, food asphyxiation. So we are looking at removing those foods from the various diet levels, because it is a choking risk. Now, we talked about some of this earlier, we need to have the ability to modify

the foods to make our patients safe with the specific food item. So we have the diet levels, but we do know that, if we are thickening the liquids, we tend to have pharyngeal residue. We know that in the process of making this food easier for an individual to process, it can create that residue in the pharyngeal area. So there is a catch-22, we need that therapeutic benefit for the modified food, but it could also be problematic for our patients. What they found is children who are younger than three, adults over the age of 65, individuals who have poor dentition and those who have neurological conditions are all at a higher risk of death from food asphyxiation. So we really need to look at our patient's medical history and consider that as well. Again, going back to the criteria, you are not going to advanced to level seven, we have the cognitive impairment, we have the impulsive behavior, that really does increase your risk if you are at a level seven. Now, they found that healthy individuals have the ability to form a cohesive bolus after they process and they initiate that swallow. We do need to modify the texture for some of our individuals to have a safe swallow. So we are trying to minimize the choking risk by modifying the foods.

So altering the foods, we're looking at the choking risk. So we're chopping, we're dicing, we're pureeing. We have a lot of literature that talks about different foods and the increased risk of choking and asphyxiation risk, so we're modifying the texture, the shape, and the size. There's a lot of detailed information about foods that fall in these different categories, but these tend to be the foods that have a high choking risk, anything that's hard or dry, chewy or sticky, crunchy or crumbly and floppy. Floppy, an example would be a piece of lettuce. When you swallow that piece of lettuce, if it would go into the airway, that piece of lettuce is wet and it's very flimsy, so it lands on top of the vocal chords. If you try to cough and clear that, that expiratory force of that cough may actually cause that lettuce to fly up. But when you're done coughing, it comes down and covers the vocal cords again. So that's a no no. We also have the food that is considered fibrous or tough. They have husks where they're stringy. One of the things they talk about is when you peel an orange, you have the white on the orange. We need to get that off, because that is a choking risk. Anything that is round

or long in dimension, we have a lot of individuals who choke to death on a sausage link or a piece of a hot dog. And then they talk about multiple or dual textures, what we would called mixed consistency, so you'll see a little bit of different terminology, the dual textures. We're looking at the framework. So when we are at our soft and bite size, extremely picky about the bite size. Level six, soft and bite sized, 1.5 by 1.5 centimeters, that is the width of a standard dinner fork from left to right. So easy to measure that from the point of the staff person or a family, if it's wider than that fork, it's not appropriate. So we can look at that. The other thing that they talk about is the width of the thumb nail.

So another way that we can visually look at the food, look the width of the thumb nail, if it's too big, we need to deal with that and fix it. Now, they also found that we have individuals with cognitive impairment, they're at risk for choking because they don't self-monitor. They can't self-monitor, they have poor safety awareness, poor judgment. So they are not paying attention to their food size, the bite size, or the rate of ingestion. They're shoveling, they're guzzling. And sometimes, the bite size, when the staff cuts the food into bite sized pieces, it might be bite sized for the staff, it's not bite sized for the patient. So again, really clear, very very specific bite sizes for individuals on level six and on level five, minced and moist. They found that, even if this individual does not have a formal diagnosis of dysphagia, if they have fewer than 20 teeth or they have dentures, they might actually do better with a softer food because of mastication, dentures, they don't process the food, our chewing efficiency with dentures is about 25% of what it is with your natural teeth. So they came up with level seven, soft to chew, it's a subcategory of level seven. When we take a look at dentition, we have a loss of what is talked about as occlusal units, and that affects the bite force. So if you have more than 20 teeth, and we're looking at pairs of teeth, antagonistic teeth, you have a top tooth that touches the bottom tooth. That's how we need to process. So when you have more than, 20 teeth or more, the normal bite force is 555 newtonian. And as we lose dentition, that bite force is reduced, so if you only have 10 to 19 teeth, it goes from 555 to 383. If you have one to nine teeth, now you're down to 180. And if

you're edentulous, you're at 155, so if you take a look at the 555 and you're edentulous and you're 155, we've got some problems. So that increases our risk for choking, even if we don't have a formal dysphagia diagnosis. When we take a look at our liquids, we need to look at the thickness of the drink and how that works for an individual. So in the framework of the IDDSI, you have thin drinks and then three levels that increase in thickness. When they were looking at the surveys, individuals who work with pediatrics felt that there was a need for something that was a little bit thicker than water, but not quite nectar. So this is what we come up with as level one, it's called slightly thick and that's incorporated into the framework. So you might have an individual who, an adult that actually does well with slightly thick, level one, they don't quite need nectar, but thin gives them just a tad of a problem.

So this level one, very distinct description compared to the other levels of thickness. So when we take a look at everything we want to get out of part one, we have the National Dysphagia Diet, which was a good attempt to come up with criteria. Problem was, we had some weaknesses with that, and then it didn't help that every facility tended to have their own spin on things. We talked about some of the key findings of that systematic literature review, I'm sure you have seen many of the things that we talked about that came out of that. We have the rationale for the IDDSI, why they decided it was time to move on from the National Dysphagia Diet. And you saw that with the survey with the various names for the diets and the liquids. We needed a criteria, we needed a more defined bite size, and then we have the food and liquid pyramid that they put together, looking at the various colors and the criteria. And what we will do in part two is investigate that pyramid a little bit further, what do all those levels mean, who is it appropriate for, what is the rationale, and how can we test it, which is really critical for our staff to understand. They need to be able to look at that tray and realize, no, it is not appropriate for this client and we need to take it back to the kitchen and have a do over. So we'll see you in part two.

- [Amy] All right, well, thank you so much, Denise. This is some really, really great and important information and really sets us up nicely for part two, which will be coming soon. So thanks for sharing your expertise, as I said earlier, it's always a pleasure to have you join us, so thank you.