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Navigating Case History, Candidacy and Clinical Considerations for Vestibular Evaluations

Presenter: Kaitlin Ryan, AuD, CCC-A

- [Moderator] It is my pleasure to introduce to you Dr. Kaitlin Ryan for the very first time on Audiology Online. Dr. Ryan currently practices in the state of Massachusetts in a large hospital, and she just has a love for vestibular, what she's gonna share with you today. If you'd like to learn more about Dr. Ryan, you can read her bio on the course registration page. At this time, I'll hand the mic over to you, Dr. Ryan.

- Thank you very much. I'm happy to be here. Hopefully we can all learn something today. We'll be talking about navigating vestibular case history and candidacy, as well as some of the clinical considerations you might have in preparation for having a patient come back for a vestibular evaluation. These are my disclosures and you can read those. These are the learning outcomes that I hope that you'll achieve over the course of this lesson. And as far as our agenda today, what I hope that we'll be able to achieve is we'll be able to define dizziness. We'll talk about the art of how to obtain a case history. There's a lot of assessment tools out there that sometimes can be used in addition to case history, and we'll go over some of those.

We'll talk about who is a candidate for vestibular testing, some of the patient considerations we might make in advance of the testing and when taking a case history, and we'll also talk about some case studies toward the end. So first, in regards to dizziness, the main thing that I will always have people do is say, "Don't say dizzy. Tell me about your dizziness, but don't say dizzy." And it is extremely important that they kind of stray away from this word for a lot of reasons. But dizziness is in general an umbrella term that doesn't, it means everything and nothing at the same time. So someone will say dizziness and they have in their mind a specific idea of what their dizziness is, but I might have a completely different idea of what their dizziness is.

So I try to have them describe it without using the word dizziness. They're typically a couple of buckets that dizziness can fall into. One is imbalance or sort of gait instability. There's lightheadedness and then there's true vertigo. In addition to having

patients describe their dizziness, I will always ask about the fear of falling in any anxiety or apprehension regarding their dizziness because it can inform a lot about how they describe their dizziness. So there are non vertiginous complaints primarily, and that starts with imbalance and dizziness or lightheadedness, is what I prefer to label this as. But imbalance is usually ataxia, unsteadiness. You can see people shuffling their feet or perhaps they tell you that they shuffle their feet.

They have decreased mobility in perhaps their trunk or their lower limbs, and they will maybe describe what they consider to be disequilibrium, which can come with or without the illusion of movement, but usually it's without. And this will often lead to falling. Imbalance is typically what's going to lead somebody to falling for a number of reasons. And it is often present in elderly populations, but usually with sort of a multifactorial involvement. So it could be a number of things related to, for example, diabetic neuropathy in the feet, or it could be because they've had knee replacements and they didn't maybe do well with their physical therapy. And then on the side of the lightheadedness, that's usually things like syncope or head fog, and it's common in individuals with psychiatric disorders or it's a common kind of symptom in a list of what they're feeling.

It's usually a very, very vague sensation and it's typically described as constant and not always episodic. And usually I find that this group of patients, they don't have a great handle on what they're feeling so it's quite a bit of a journey to get the information from them. When talking about true vertigo, it is the illusion of movement that is either rotating or spinning, and it can be that yourself is spinning or that the environment is spinning. And this can be coming from a central or a peripheral reason. The attacks of the true vertigo are often characterized by the duration of the episode, which can be seconds to days or even weeks for some people, but they are episodic so that they will stop.

And there's often associated events with the true vertigo. Sometimes there isn't but they can also be additionally characterized by having hearing loss, whether that is fluctuating or not, fullness in the ears, drop attacks, which are incredibly dangerous and they're usually, at least where I work, something that really needs to be addressed quite quickly by an ear, nose, and throat doctor. Thinking of tinnitus and typically in one ear, and then they can have the amplification of sound within themselves. Autophony, they might have pulsing in their ears or they might hear their own body movements move, usually like their eyes blinking or their eyes starting back and forth. So you can ask those types of questions to people.

However, there's a lot that's left on the table if that's what you stick to. And there's a lot that's not always being offered right away by these types of patients, and it sometimes needs to be kind of pieced out of them. So some things that you may not be asking is what their functional behaviors are. Are they avoiding things? Are there day-to-day triggers that maybe they have now started to avoid? What was their life like before the episode started or before the dizziness began? And you can sometimes trick people into revealing these behaviors if they don't offer them freely. My favorite thing to do is check their range of motion and maybe they'll freely turn their head to the right.

And when they go to turn their head to the left, it's a full body rotation and one with sort of fear in their eyes. And it's usually that they've avoided a leftward movement, whether that's turning or rolling or kind of looking toward the left. I'll also like to ask them what happens in between the episodes. And this is often a way to trick them into telling me that it's not a constant sensation. A lot of people will tell me that they have constant vertigo all day, every day, and they have for months. And if it is a true room spinning sensation, my kind of thought goes to that it will eventually stop. It stops at some point.

How long does it take to get it to stop? And so I'll ask them, "What's happening in between the episodes? When you're not dizzy, how do you feel?" And usually they'll say, "Oh, I'm symptom free." And in the context of something like a positional vertigo, it feels like it happens all the time. But when you start to piece away, "Well, what happens when you're not dizzy? What are you doing?" And maybe they say, "Well, I'm just sitting there," or, "I'm walking," or, "I've been laying down for a few minutes, and the dizziness does go away." And they start to extrapolate on the more positive aspects of their day versus being completely sort of taken down by their vertigo in the brief moments of time that it's happening.

Another thing I like to ask is, "What's triggering the dizziness?" or, "What triggers have you identified?" And sometimes people have a good answer for this and sometimes they're just overwhelmed and it's at random. They haven't really thought about patterns. But I do find that the people who have a true vertigo response could tell you the day, the time, the minute, the hour, the sort of position of the sun in the sky when their dizziness began and what caused it. People who are truly, truly debilitated by their dizziness have all the answers typically, and triggers are usually part of that answer, whether that is complex visual environments, grocery stores, foods that they're eating, stress, laying down, turning their head to the left, they'll know those answers and that can sometimes be very helpful.

And other things that are not always offered immediately, but sometimes patients will offer over time is any sort of mental health involvement that they may have. So anxiety about their dizziness, anxiety in general, sort of different medications that they take regarding their mental health that might make them dizzy. And then the thing that I don't always understand about patients but I do find this to be the case frequently, is that they're here to address a set of symptoms that maybe has occurred over the last six months. However, this has been something that they've been dealing with for

maybe 13 years. And this actually just happened to me yesterday. A woman had new dizziness for about six months and I asked her, has this ever happened to her before?

And she said, "Yeah, I had a full vestibular test 13 years ago." And that wasn't kind of identified until I had asked, "Has this happened before?" And it turns out she had an old kind of uncompensated loss that then her migraine started to kind of creep in and make her symptoms feel worse again. And then the other thing that I find is not always immediately offered is the true nature of symptoms, is that they're so overwhelmed by their experience that they have a really hard time characterizing it. And so it takes a long time to get patients to understand the line of questioning that you're asking. Sometimes they weren't even aware that they would be answering all these questions today.

I get a lot of patients that are overwhelmed by the idea of having to describe their dizziness because it's not something that they expected to have to do. And so getting the true nature of what their experience is like can be quite difficult for some patients. So as far as case history goes, there's several goals that you have to keep in mind when you're trying to understand what's going on for these patients. And I always, like I said, I have them describe their symptoms without using the word dizzy, and that throws people for quite the loop. Some of the goals that I will have are clinic-based. My goal is to understand a patient's health and to work towards a diagnosis with them so that they can be moving in the right direction.

My second goal is to of course, avoid any potential harm that might come to the patient through this test, and I will also very much be working to try to direct their treatment and identify any need for a further workup through my question asking, but also possibly the testing. The patient-centered goals, I try to stick to is I try to balance empathy and active listening with efficiency. I would love to sit there and talk to them all day and I'd love to be able to allow them to talk all day about what's going on.

Some people really need that, but at the end of the day, I have an hour. I have an hour to make them feel comfortable, make them feel heard, and make them feel listened to.

And that's not always possible when we're trying to be efficient. So I'm try to balance that empathy and compassion with efficiency of getting the information that I need to help them. I will also try to accurately document their experience, which is a point of contention, I think, for all types of people who work in clinical settings but accurately documenting what they're telling me can take a lot of time and a lot of care for people to feel like they have been documented accurately. As a patient myself, I'll read some of my physician notes and I'll say, "I definitely didn't say that," or, "that's not what I meant," or, "I think they're taking it out of context.

" And for someone who has dizziness, it can feel like the stakes are very high not to be kind of pushed off or discredited. So that accuracy is really important to patients with dizziness. I also try to keep in mind to patient's literacy with their healthcare. And depending upon the area that you live in or the sort of patient base that you see, healthcare literacy can vary quite a bit and that can also play a role in perhaps, if they speak English, if they don't speak English, the sort of translation to their native language can reduce what they're understanding or what they think the question is asking of them. So keeping in mind sort of where they're at versus where I'm at with my questions.

I know these questions like the back of my hand and maybe they weren't expecting them that day. I also, again, keeping patients at the center of my care. I respect their privacy and I respect their safety with the utmost respect and I try to keep that in mind with whatever I'm doing. Some of the other considerations, like I said, is healthcare literacy, but especially if patients have a language barrier between the two of you, if they're not sure perhaps what the question is asking, then it can lead to a very confusing appointment. And as an example, I recently learned, in my clinic, we see a

lot of patients who speak Portuguese and they're from Brazil, and the word for vertigo and dizziness in Brazilian Portuguese for a lot of patients, is the word labyrinthitis.

So they've told me that they've been diagnosed with labyrinthitis. I take that for what I know and understand labyrinthitis to be, and then I get very confused. So it leads to a whole new set of questions and then I become very skeptical when sort of other things don't seem to line up. So that took some time for me to learn, and now that is one of the considerations that I have when dealing with sort of that population. I also look at their family and the caretaker involvement in what they may observe, but also if their family is the one that's concerned but maybe not the patient, I try to understand where the disconnect is coming from.

And again, I respect their patient privacy as it relates to family involvement. There's a question here. It says that, "When you say you have an hour, do you mean you have a full hour for case history or a case history and evaluation?" So the answer to that question is, in my clinical setting, we have one hour to obtain a full vestibular case history, do a full audiometric assessment, talk to a patient about the results, and then develop their plan of care, whether that is canceling their vestibular tests and having them go back to their primary care, skipping the vestibular test and seeing ear, nose, and throat, or talking them through what the vestibular test entails, providing patient instructions, and making sure that they're comfortable with the testing.

So I have an hour to kind of go over all of that. Usually the case history can take anywhere from 10 minutes to 30 minutes. So navigating this, it's really important to establish trust through validation, in my experience. I try to make sure that they know that I believe them, which is a simple phrase to say, but it also can be very, very powerful for people to hear that you trust what they're saying and you believe that they don't feel their best because it's a very tricky situation to be dizzy and not have anyone believe you. But there can be very valid problems that are happening that really need

addressing. I also try to offer broad terms or descriptions to help a patient tell me what they're feeling.

"So you say that you have a sense of motion or you say that you feel dizzy, does that mean you feel like you're rocking? Do you feel like you're swaying? Do you feel like you might pass out?" And I try to give them terms that might be more common than, "Do you feel like you are experiencing an event of presyncope," or, "Do you feel oscillopsia?" Those aren't words that maybe they know so I try to offer more broad, simple terms. I also listen for buzzwords that I try to listen for. So things like environments that make them feel dizzy or descriptors of their dizziness, like spinning. "I get dizzy when I bend forward." I listen for those types of things and then I try to build my questions from those buzzwords.

I also try to have the patient lead me in their conversations. So I try not to let it be me badgering a patient with questions initially. I try to let them start off the conversation and then I will listen, write down what they're saying, and then fill in some of the gaps with questions that I have that they did not answer. I also, this is a skill I have that's still emerging, redirecting and preventing patients from going on tangents and sort of pulling them back in. The last thing that I have time for, although it might be very important to the patient, is learning about their uncles, cousins twice removed's brain aneurysm that caused him to feel vertigo.

I want to understand them. I don't need to know about a distant, distant, twice removed relative. So learning to kind of pull them back in can be quite tricky. I also like to use observation of the patient, how they're walking, how they get up from the chair, sort of the look in their eyes when they come into the booth. I look for different indicators of patients and what their symptoms might be telling them. I use an audiogram and I use sort of other knowledge of just being in the world of vestibular, I

use all of those things to kind of pull together a story that maybe they're not offering initially or using it to build off of my case history.

So some of the questions that I do try to ask is, "When did it start? When did this dizziness start?" And of course, "Has this ever happened to you before?" I also try to understand, is the episode constant or is it episodic? Is this something that never, ever, ever goes away, 24 hours a day, seven days a week, no breaks? Or does it come and go? Usually it comes and goes. If it comes and goes, how long does it last? How often does it occur? Have you noticed any patterns? I will also always ask about changes in their otologic health during the episodes. For example, does one ear start to ring? Does two ears start to ring?

If two ears start to ring, I'm less skeptical of it being a vestibular event. If one ear is only ringing reliably every time as they're warning that dizziness is coming, I become more intrigued about a potential ear involvement. And I also ask what else happens during the dizziness? Does the room go black? Do you get tunnel vision? Do you vomit? Do you pass out? Do you lose consciousness? Does your speech change? And I ask lots of different questions about that. And I also ask questions regarding their medical history. So specifically, do you have migraines? Do you have anything resembling seizure activity? So loss of consciousness, tongue biting, loss of bodily control, convulsions, drooling. Those types of things are extremely dangerous and not something that I'd like to induce during the vestibular test.

So I try to make sure that those things aren't part of the puzzle. I kind of interview them about their cardiac health, if they've had head traumas or falls related to the dizziness or maybe that started the dizziness. I often will ask about a family history of dizziness, although I do find that that can be a slippery slope. And I ask about different medications that they take specifically for the dizziness. So a lot of times I'll get people who feel very head foggy, very dizzy, very unbalanced per what they're telling me.

Turns out they're taking like six meclizine a day. And once they stop taking the meclizine, they magically feel much better. So I always will ask about medications.

So for this next slide, I do have a bit of a poll that I'd just like to ask and see what kind of information might be out there. So what is an early red flag for audiometric features for a vestibular disorder? So the audiogram is a huge part of a kind of candidacy workup for vestibular testing. So some of the early features that might pop up, would it be in your opinion, Type B tympanometric tracing, an asymmetric sensorineural hearing loss, absent OAEs in one or both ears, positive pure tone Stenger, there's some early red flags that we start to look for when we start to put together a hearing test for these patients. Okay, so it looks like 6% think of a Type B tymp.

91% are looking for that asymmetric sensorineural hearing loss, 0% are looking for those absent OAEs and one or both ears, and 3% are looking for that positive pure tone Stenger. So the overwhelming majority says an asymmetric sensorineural hearing loss and I happen to agree. One of the things that I do is I will always start a new patient with OAEs if I've never seen them before and if their tymps are normal. And so if I get one ear that has these beautiful perfect OAEs and I get somebody in the opposite ear that has no OAEs, I start to think, oh, I might be looking at an asymmetric hearing loss. So those are sort of my early red flags. So I agree with you there.

So what I look for is, again, a significant asymmetry. What does the worse ear look like? Is it a flat loss, low-frequency sensorineural, high-frequency sensory sensorineural? What does the the better ear look like? I also am on high alert for suprathreshold bone conduction. That can be a huge indicator of superior semi-circular canal dehiscence. I'll also be looking for acoustic reflex and OAE results. That's sort of how I kind of look at it in my mind. But again, I'm looking for differences between the ears primarily. So some of the assessment tools that we can use are in some cases

used to fit into the case history. So where do they fit and what can they tell us about clinical considerations?

What kind of assessment tools are there and which ones might be most helpful?

There's what feels like hundreds. And a main question that a lot of people ask is, can these questionnaires be used to reduce time to take case history? So there's lots of different categories of these types of assessments. There's ones that will just measure the symptoms of the dizziness. So we have the Vertigo Symptom Scale, which is a 36-item questionnaire that characterizes frequency of symptoms and the anxiety symptoms, so somatic manifestations of anxiety over a 12-month period for a patient. Then we have the European Evaluation of Vertigo, which I'll talk about in just a second. Then we have assessments that are designed to measure the strictly the impact on the quality of life, which the main one that we probably all know and love is the dizziness handicap inventory, which I'll talk about in a second as well.

And we have the Vestibular Disorders Activities of Daily Living questionnaire, which is designed to measure the self-perceived disablement of dizziness by addressing the kind of independent activities of daily living in a patient. There's multiple subscales, including functional disability, ambulatory disability, and instrumental disability, which would be the self perception in higher-level, more sort of socially complex tasks and how that might be impacted by their dizziness. Then we have the Vertigo Handicap Questionnaire, which is also designed to assess a patient's perceived beliefs and behaviors and difficulties associated with their dizziness. This also has four subscales, including restriction of activities, social anxiety, fears about their vertigo, and severity of attacks. Some can be quite helpful. There are also assessments that sort of mix these two things, the symptoms measurement as well as the impact on quality of life.

And there's the VRBQ, the Vestibular Rehabilitation Benefit Questionnaire, and that is designed to assess the outcome of vestibular rehabilitation, especially over kind of a

long period of time. And it has subscales related to dizziness and anxiety, motion provoked dizziness, and quality of life. There's also the Vertigo Dizziness Imbalance Questionnaire, which again assesses symptoms and quality of life and patient. And those are just the two subscales that are on that questionnaire. And then there's also the Dizziness Factor Inventory, the DFI, which is a 44-item questionnaire, which is kind of long. And there's three subscales, symptoms, factors, responses of significant others to their dizziness, which I thought was an interesting little subscale, and activity level. So this is where I feel like it could have some benefit.

Patients are usually quite sedentary when they're not feeling their best. Then there's also some assessments that focus on mental health and are meant to be used in sort of a medical setting. And one of them is the Hospital Anxiety and Depression Scale, which has four questions all about anxiety and four questions about depression and different symptoms that one might have that could indicate that they're experiencing either of those two things. And also will measure the physical manifestations of that like fatigue, insomnia, and excessive sleepiness. And then there's the Patient Health Questionnaire or the PHQ-9, which is a general mental health questionnaire that's very, very commonly given out at doctors' offices. So the European evaluation of vertigo is a quote, "physician administered questionnaire" from France and it's designed to assess symptoms over a seven-day period.

There are five subscales including the illusion of movement, duration of illusion, motion intolerance, neurovegetative signs and instability. There was a pilot study done regarding this survey and its validity and there was relatively valid as far as different metrics that they compared it against. For example, how these symptoms reflected a patient's diary entry about their symptoms as well as a physical dimension of disability scale. That's another common assessment that's given out in Europe for patients with dizziness. And it alleges over time that it can be used to measure and monitor changes in patients' symptoms, specifically as they're following a course of treatment, whether

that is vestibular rehabilitation or some type of medication, anti vestibular medications or injected medications, ablative measures, surgeries even.

Then the DHI is a 25-item questionnaire and there is a short form version of it and it assesses patient's functional, physical, and emotional impacts on their quality of life perceived by the patient related to their dizziness. And it's very careful to state that it does not use the word dizziness. Actually, it uses the word your problem. So whatever that means to the patient is your problem. And studies done suggest a high validity in some areas, including that there's an increase in frequency of symptoms which might lead to an increase in functional and emotional scores, however, not in the physical category. However, there are some patients that the frequency of their attacks is not related to necessarily the degree of their handicap.

However, it can in some studies relate to a higher impact to their sort of activities of daily living. And as far as it relates to testing and testing candidacy, it did show a weak to moderate correlation with posturography, but there was no correlation between age, gender, and then other vestibular testing results like specifically caloric irrigation and rotary chair. The PHQ-9 is a nine-item questionnaire and it screens for the severity of depression in patients, which I do find that in dizzy populations, these people can be incredibly impacted mentally by their dizziness, by what they're used to be doing and what they are currently capable of or what they feel they're currently capable of. It's been validated in studies across eight primary care clinics and seven OB clinics, and it is used as a screening tool primarily, but it incorporates the DSM diagnostic criteria for depression amongst other symptoms.

And it does have an 88% sensitivity and specificity rate for major depressive disorder. There are several advantages to using this screening questionnaire that it can observe small scale changes that might go otherwise unrepresented or unnoticed by a patient, and it can be easily confounded by other problems. So there can already be

depression in this patient's wheelhouse or perhaps what they're experiencing is more stress and it manifests as depression or there can be stressors in their life that maybe we're not accounting for because it's really not our business to know patients' sort of intimate details. So there's a lot of disadvantages to it that can make this in some cases a slippery slope. However, it can be quite helpful in some instances where a patient may not really be aware of what they're experiencing until they have the chance to reflect.

So the research overwhelmingly validates the use of these questionnaires as outcome measures that this is going to be administered prior to a treatment, whether that's vestibular rehab or medical management or surgery. However, there is very little evidence across most of the literature that I've read that suggests any correlations between predictability of testing outcomes and kind of functional quantitative measures of testing and these questionnaires. So we can't use these questionnaires to predict an outcome or predict a candidacy for the test unfortunately. So I now have another poll. And for anyone out there, how do you use these questionnaires or any questionnaires in the context of case history? So some may not, so I don't, or to reduce case history interview timing to try to gauge candidacy for testing to better understand the type of questions to ask a patient or perhaps something else.

So 23% of people out there say, "I do not." Some, about 10%, say to reduce case history interview timing, another 23% say to try to gauge candidacy for testing. 45% are saying that they're using it to better understand the types of questions to ask patients and nobody says category other. So again, I agree with the majority here. I use it myself to try to better understand where the patient is coming from. So I use it in sort of my clinical prowess to help start a conversation. I use this to understand what the patient might be kind of at the baseline experiencing and how to better characterize my questions. I also use this to allow patients to reflect upon their symptoms and prepare for the appointment because, like I said, there are sort of more cases than I wish I

experienced where people are just not prepared to be kind of in the firing line of all of my questions.

And so providing them these questionnaires can give them a chance to reflect on what they're experiencing. I also think that it can help providers understand where the patient might be starting from, from a standpoint of, okay, they're getting ready for this test and they're already feeling extremely anxious on a great day about their dizziness. How can I help kind of redirect that energy into working on a diagnosis? And I also think it can help patients identify areas in which they may not be realizing is highlighting their symptoms. So anxiety versus vertigo or, "You know what? Maybe I am avoiding grocery stores or I am avoiding crowds, or I'm avoiding family functions because my balance is not good and I don't want people to know.

" And maybe they're not really noticing that until they do a little bit of self-reflection. And so I do find they can be helpful. So now we'll move on to who might be a candidate for testing. And I do find that there are are a couple of schools of thought. So as far as candidacy for the test, there are what I would call a slam dunk, a big mystery, or that rule-in rule-out, or I'm essentially humoring a patient. The slam dunks are the ones where you know something is going to come up on the test. There's an apparent vestibular incident that has occurred. They had one week of debilitating vertigo. You test their hearing, there's an asymmetric loss.

You can pretty much predict the outcome of the test. You're just looking to see how much damage is done. Maybe they've had a family history of vestibular disease and they all have Meniere's and now this patient is starting to kind of present with these Meniere's-like symptoms. If their symptomology is very clear, so if they only get dizzy for 10 seconds when they bend forward and when they stand up from bending forward. and it is a clear room spinning and they're otherwise asymptomatic, that's very clear to me so I know exactly what I'm walking myself into. And I also again have

that audiogram in case history align very nicely, like with a labyrinthitis or Meniere's disease type of patient.

The ones that I like the best are those big mysteries where there's like a vague pattern, but it sounds like there could be something there. I do really love those. People who have a very complex but very present vestibular history, I had a patient that had left ear Meniere's disease and he had Gentamicin injections and he was doing quite well for a long time, but then suddenly something changed and nobody could figure it out. Imaging was clear, they couldn't understand what happened, but it sounded vestibular. So enter our vestibular test to help them understand that he had some type of event in the opposite ear and it ended up looking like he had some type of central involvement as well.

So it helped clear up a very fuzzy picture. If a patient has a history of vertigo that has changed, this testing can be incredibly helpful. Again, I had a woman just the other day who had a big incident of vertigo about eight years ago that they thought might be related to an optic nerve aneurysm and they didn't really bother to do vestibular testing because her hearing test was normal. And she got better after vestibular rehab, but now it's back, it's gotten worse and it's six months later and her history of this vertigo has completely changed. So now instead of perhaps maybe one incident, she's now dealing with a second. And the symptoms that they're experiencing aren't super apparent and you don't really have a great hypothesis, but maybe you're trying to grasp for straws, this is a good test for those types of people.

And then the last category is sort of that rule-in rule-out, humoring the patient, or sometimes the provider who's referred. They typically have no apparent vertigo, but maybe their history is sort of vaguely supportive and you don't feel great about saying definitely no. And I use this to encourage a patient that their system is working beautifully, that this is not the answer so let's focus in on what maybe the answer is,

let's redirect your care. So I kind of find these people are the most effectively tested. I also find that there are several groups of people that are not great candidates for the testing, and I use this to factor into what their testing might entail.

People who have a rich complex medical history, I tend to send to ENT first for clearance. I don't often get those people back. That includes loss of consciousness with their dizziness. They have cardiac mobility or visual deficits. Another patient that I could not do the testing on is someone who had a disorder of her extraocular muscles. That is everything that we capitalize on in testing and if those are disordered, my test may not be valid. So I wouldn't want her to put her through that without her getting cleared by the appropriate providers first. If they're not really able to describe their symptoms but it's super vague, they don't really know when it started, it just kind of is, I usually look to their medical history and if it's very complicated, I send them to see ENT first.

If they have epilepsy or seizures of any kind, this is not the test that I'm comfortable doing on them. I will often do a modified test if I do believe that they're a candidate, but oftentimes I'm sending them to see an ear, nose, and throat doctor or encouraging them to see their neurologist. And additionally, if they have other neurologic symptoms, tremor, excessive sleepiness, really apparent room light, spontaneous nystagmus, that's kind of worsened with gaze, they're going to a neurologist and I probably won't see them back. The other thing that I really take into consideration is the amount of attention that a patient has to spare for this test. This test takes a lot of attention. It takes a lot of wakefulness and participation on the part of the patient.

So if their attention is not able to be provided to me, I don't feel comfortable administering the test because I know it likely won't be valid. And those categories of people are those with dementia. If they're not able to follow a simple instruction or their family member has to provide the case history, this is probably not the test for them. If

they've got an active drug addiction and asking them to stop participating in their recreational drug use for several days upsets them or might send them into a harmful situation, I don't wanna do the test on them until I know that they're sober and clean. If they're excessively tired, either intentionally or from a disorder or medication intentionally, then they may not be able to stay awake and I might have to discontinue the test.

So I often will say, "Don't take any medication that might be sedative to you, and if that's acceptable then great, I'll happily see you." If they've got developmental delays of any kind and it's going to affect the way that they participate in testing, I do try to ask some sort of gentle but pointed questions about involvement and if the answers are that they don't really feel like they could participate the way that I'm asking, then we agree that it's not a good test for them. And again, all of this sort of hinges on a patient's ability to follow instructions. And then something that I also look at that would count as not really a candidate is if I can easily help them explain the dizziness by something else.

If a patient has documented that when they get these episodes of lightheadedness, their blood pressure is either through the roof or down in the gutters, it's likely a cardiac problem. It's probably not a vestibular problem. If they only get the dizziness when they have extreme stress or they start to panic and they exhibit signs of panic, it's probably not a vestibular symptom. And if they are taking a bunch of medications that all create dizziness, I probably will have them try to understand pharmacologically speaking, what's going on, and then if nothing changes, then we can revisit the testing. These are also patients that I don't say a hard no to. I say let's look somewhere else first, and if we aren't getting the answers from looking through other avenues, we'll revisit this testing later.

As far as patient considerations, there's a couple of things that I do focus on and in my line of work, particularly where I work, an elderly dizzy patient is sort of the main type of considerations that I have to make. 24% of the population over 72 years old will have difficulties with dizziness, and studies will suggest that half of the population over 85 years old will also have dizziness. So it kind of increases with age. BPPV is the most common peripheral disorder among aging populations, however, it's certainly not limited to that. But the main typical cause for concern is postural stability, which can be multifactorial and it can kind of produce a functional deterioration for these patients. And any additional vertigo can lead to falling or increased risks for falling.

And it's typically the way that a patient can also talk about their dizziness, is that they have a difficult time concentrating when they used to not have that issue six, eight months ago. There's lots of different postural stability systems that we need in order to stay upright. I watched a TED talk where he said, "Standing in front of you right now is a miracle," and that could not be more true. And aging can take a toll on that miracle of standing, it can take a toll from a visual somatosensory, neuromuscular, and vestibular point of view. From the vestibular point of view, specifically, we need our vestibular spinal reflex to keep our postural control and we need all of our otolith organs and semicircular canals to continue to work together to keep that VOR in motion.

And any type of age-related deterioration is in some studies likened to the natural decay of hair cells in the cochlea. So it's a similar degradation to age-related hearing loss, according to some studies, The fear of falling is also something that can be very, very dangerous for people and in and of itself a reason to do the testing to kind of put their mind at ease. There are studies that will suggest that 30% of patients over 65 experience this. And it's especially prominent in people who have experienced even just a singular event of vertigo. And it can include changes to their gait, reduction in activities, social isolation, depression and anxiety, and it can cause a general stiffening

of the body that may or may not be conscious to the patient, but it will put them at a higher risk of falling.

And I saw this just the other day. This gentleman has been going through the whole process of becoming diagnosed with Parkinson's disease based on the way that he is walking. He walks on his tippy-toes and he is very, very stiff when he is walking. He is a very tall man but he takes very short steps and his feet barely leave the ground when he is walking. And I read some reports from his physical therapist who said that based on her evaluation, these are all precautionary so he does not fall. He's had incredible anxiety since he was diagnosed with BPPV and it's something that he's still not recovered from because he is so afraid of backsliding in his therapy and falling.

So he has sort of stiffened up and he walks very, very conservatively, which according to some studies, for every one 0.1 millisecond that a person might reduce their speed, they're put at a 7% increase for falling, which is crazy to me to think of people just moving that much slower at such a high rate of falling, already can be even at a higher likelihood of falling. Some of the ways that you can consider your case history for these types of patients is asking about their functional abilities before and after the onset of the dizziness as well as how they lived their life. All the rage right now is pickleball so I find that a lot of patients equate their dizziness to "How well I can currently play pickleball.

" And so that is something that we will talk a lot about, how they typically play, now that they're dizzy, how do they play with their dizziness? We've got another question. It says, "If the term 'dizziness' is not a vestibular descriptor, then what is? Or is dizziness considered a vestibular descriptive?" So I find that dizziness, and I should have mentioned this earlier, what I typically do with patients who I'm seeing for any type of vestibular evaluation, I let them define their dizziness. I say, "I want you to describe your dizziness." So does that mean I feel rocking and swaying and imbalance while I'm

in motion and then I feel fine at rest? And if that's what they're describing their dizziness to be, that's what I now describe their dizziness to be.

Whenever I say the word dizzy, that's what I'm talking about. And I will say that to them. I say, "So what you're describing to me is your dizziness is a few minutes of imbalance and swaying while you're in motion." And if they say yes, I say, "We'll now agree that that's what your dizziness is. That's what we're defining as your dizziness." And for each new patient, I find that their dizziness is a different definition, but I have them define it without using that word. But then that becomes what the definition of dizziness is for that encounter. And that's what I'll document in the note, that patient has dizziness described as imbalance while walking for a few minutes.

And then anytime I use the word dizziness, that's what I mean. That's a good question though. So some other case history considerations for patients who are elderly is that I will ask them about previous falls or injuries that are either related to the dizziness or that may have started the dizziness. I talk about multimorbidity of maybe poor circulatory health, neurologic decline, arthritis, neck pain, surgeries that they've had. I'll ask about polypharmacy and I will also ask whether maybe their family has observed about them if their family is present. And then I think to myself, "Is a functional assessment more important than maybe a vestibular assessment?" So is physical therapy going to be more effective for them than a vestibular assessment?

For the pediatric population, I do find that this is a bit of a rare topic. It's not one that I've seen a tremendous amount, but I have seen it. The pediatric population, our vestibular system is developed fully at birth, but it will kind of start to integrate by the time we're about two years old and continue to develop up up until we're about 15, is when we can start to look at people, look at kids in the similar normative data as adults. Our clinic starts that at about 12,13 based on our research. There is a 43% higher likelihood of a peripheral vestibular problem in children with a sensory neural

hearing loss. And that's typically unilateral. And then there's also 16 times higher likelihood of a central vestibular problem in children with headaches.

And typically it's of the migraine variety, which can lead to either a vestibular migraine diagnosis or a benign paroxysmal vertigo of childhood diagnosis, which some research does suggest that BPVC is a precursor to a vestibular migraine. The most common diagnosis of dizziness in children is related to migraines. And the second most is BPVC, followed then by head trauma. and then vestibular neuritis would come after that at about 10%. The general occurrence in children with vertigo is similar to adults, however, the presentation tends to be a little bit different. So some of the considerations that you might have is instead of asking, "Do you feel nauseous, do you feel dizzy?" You might ask the family if they had cyclical vomiting when they were younger or extreme motion sickness.

When do they complain of dizziness? Is it when they're only in that one math class that they hate or is it even when they're doing something that they're feeling really excited about, like their soccer game? If they complain about headaches, if they just appear clumsier than they should?. Some kids, they may not feel dizzy, they just are quite on balance, but maybe they don't realize. And then specifically as they kind of progressed through young childhood, did they meet their milestones appropriately, specifically gross motor ones like crawling, sitting up on their own, rolling over, running, walking, being able to kind of coordinate? And you can also ask about a child's behaviors, if they're avoidant of things or afraid of things, and see how they play.

And you can also do this in your office if you have toys depending on their age. And you can also talk to the the kid, if a kiddo is pretty well read, they might be able to help you understand what they're experiencing. And I always at least provide them the opportunity. Maybe they're too shy, maybe they don't know, but that opportunity is there for them. And some of the medical history considerations I might make for kiddos

is if they've got a history of headaches or migraines, particularly of family history, what kind of history of otitis media they might have, if they've got head traumas, CMV, vestibular aqueduct enlargement, if they've got that connexin 26 mutation, which might cause a hearing loss and it can cause a vestibular loss as well, depending.

What type of ototoxicity may have they been exposed to childhood chemotherapies and different cocktails of medications during their childhood. There are some studies that will go dose by dose with different medications. And they did find kind of universally that typically kid with ototoxicity have less residual vestibular function than their age-matched peers with other types of bilateral vestibular loss. And then there's also meningitis that we might consider. The last group would be patients with traumatic brain injuries. This can cause damage to the central nervous system, vestibular labyrinth, neck or combination, and it can cause considerations for impaired cognition. The nature of the injury, so the specific type of brain lesions they might have, changes to their sleep or other behaviors as well as headaches or migraines.

I'll have some patients that will get post-traumatic migraines from a car accident that leads to dizziness. And there might not be like a central nature to their symptoms. They might not really have all the answers that you're looking for. And whether that's because of the nature of their injury and cognition or just because it all kind of happened so fast and then they were not really focused on their dizziness, they were, you know, trying to work on other things to recover first. So sometimes we'll see like a labyrinthine concussion manifest as a unilateral weakness that maybe they had no clue was there. A lot of times people will have BPPV after specifically big traumatic accidents like car accidents.

And if depending on the patient, you're finding that maybe because of their traumatic brain injury, the testing set up as you have it might not be the most effective, you can modify. So you can consider the nature of their injury and determine sort of the most

nuclear and important tests that would be the most helpful. If what they're describing sounds like BPPV, maybe you just start there and see what they can accomplish. Maybe you split the testing up over multiple days. If they aren't able to sit for the two hours of the test because of their back problems, maybe you split it up into two one-hour appointments. And then you can also think to yourself, how important is this test?

Do they have other fish to fry? Do you think that their care would be better? Again, more functional versus diagnostic. So these are some things that you can consider with patients with brain injuries. So we have a little bit of time left and so I have some case studies that can, oh, there's another question. It says, "Do you have a cutoff age for testing? What are the ages that norms are based off of? I am frequently sent VMGs for patients older than 85." So I find that particularly age is just a number. I've done full vestibular testing on a 93-year-old man who had BPPV, and I've done it on an 80-year-old that had advanced dementia and couldn't follow my instructions.

So I do find that it is very conditional. The older a patient is, the more I take results with a grain of salt. So if they've got lots of ischemic changes based on imaging and they're closely followed for multiple strokes by their doctor, I might take that ocular motor testing with a grain of salt and more focus on the peripheral testing. But I don't really have a cutoff age. I mostly just go based off of what the patient is telling me and if I feel like the testing would help them. But I do have norms, our clinic has norms that we use, but we typically use the same group of norms for older groups and we tend to take those ocular motor tests with a grain of salt, depending on the person.

But that is a good question as well. So I'm going to where we're a little shorter on time, I do want to give you a case history that was a truly humbling experience for me. And it was one that humbled me to my core and is something that I think about constantly. This patient, oop, another question. "Do you have any specific or polite phrases you

recommend using if a patient is rambling or getting too off topic during case history?" When I first started doing this, I got stuck in that loop and I would just listen to them. I now try to think of a question while they're talking to me once I've kind of heard enough and I try to think of a question to kind of interject and redirect them very quickly.

So if they're going on and on about their cousin's twice removed brain aneurysm, I'll say, "Well, it's wonderful that you don't have that based on some imaging that you've had done recently. Did the aneurysm that your family member had have dizziness?" And if they say no, I say, all right, let's get back to it. And then I kind of try to cut them off and remind them that we're here to talk about their dizziness. So I'm trying to help you, let's not talk about your second cousin twice removed. Easier said than done, I feel. And I'm still working at it myself, sometimes I get stuck. So this case was a 70-year-old man who reports his only symptom of dizziness or what he claimed was dizziness was that he would nearly drown when swimming.

And this happened over the last five or six years. And he reported this to the audiologist at our practice who helped him with his hearing aids. And previously he told me that he was an avid scuba diver. However, after he was swimming laps in a pool and nearly drowned, he no longer felt safe doing that. When the sensation first started, he noticed seconds long spinning when rapidly turning his head to the right, that would go away very quickly. And he was otherwise extremely active, but occasionally would notice imbalance when he couldn't see. So if it was dark, he found that his balance got much worse. He told me that he did have an instance of vertigo about 15 years prior that lasted one hour and that he thought he may have just had food poisoning and it kind of went away and he went back to life.

And then he also noticed about five years ago that he had a sudden loss of hearing in one ear, but he did not experience vertigo at the time, but he had a sudden total loss of

hearing. So that was his history, and I thought to myself, "This isn't a match but I'll do the test anyways, he's very motivated." And before I share the results, I just have one final poll. What does anyone think might have been the results of the test? So we have, it was normal, he had a bilateral weakness, it was central, or it was a brainstem origin. So nobody said normal, which if you kind of know what I'm getting at, maybe you'll understand why.

54% of the group said it was a unilateral vestibular weakness. 19% said a bilateral vestibular weakness. 19% said a cerebellar origin and 8% said a brainstem origin, which is all very good guesses. They were better than my guess 'cause I thought he'd be normal. However, the results were that he had a moderately severe to severe hearing loss in the right ear, word rec 32%, left ear was like basically just a nice, gentle sloping hearing loss. He had present cVEMPs but the amplitude was low on the right and it was absent on the left, which immediately made me go, "Oh boy." And he had no oVEMPs. His oculomotor was beautiful, but he had very, very low tracking gain for OPK when tracking left.

And he had low gain tracking right, which is again, in the absence of other oculomotor problems that makes me a little quizzical as well. His positional assessment was normal, but this is where it kind of humbled me to my core. In the top left corner, you'll see his SHA testing had such poor gain that there was no phase or symmetry available, which is a classic bilateral sign. He had a total caloric irrigation of two, which again, that's almost as bad as it gets. And his VHIT was pretty much the worst I've ever seen it, with an average gain of about 0.08. It looks like 0.13 was I think the highest gain that we got. So this gentleman had a complete bilateral vestibular loss in both ears.

And the best guess that I had is that that sudden loss took the one ear of the right ear and that one hour episode of Vertigo sacrificed the left ear 15 years prior. So this was a truly humbling day for me to see that, but the patient was very relieved that he had an

answer. So we're just about out of time, so I'm gonna wrap up. Case history is something that can be streamlined, it can be done over time, it can be done in pieces, and it can be tailored for a patient to be more productive for them. It does require a big picture sort of perspective as well as clinical reasoning skills. Questionnaires unfortunately do not replace the case history, but they may help aid in obtaining it.

And there are different considerations that we might take for individuals that we can not only use to help drive a better diagnosis with the proper provider But it can also make testing not only safer, but more effective. And the most important thing I can impart to you is that you should trust your gut, but also be prepared to be humbled. Are there any other questions?

- [Moderator] Thank you so much Dr. Ryan. We don't have any questions in the queue, but for those of you who need to log out, Dr. Ryan has concluded the content portion of this presentation. And we do have just a couple questions here. We have a member that asked, "Could you let us know the results for the other three cases?"

- Sure. So the first one, which I think will be available as a reference, this gentleman had intense, intense anxiety. He had daily panic attacks that he thought was dizziness. He was very, very convinced that he had a brain tumor and he was desperate for the test. He had episodes of tunnel vision, elevated heart rate, numb arms, full body sweats, kind of disorientation that would happen for a few minutes a few times a day. And he was skeptical of medication. He wasn't agreeable to the thought that he might have anxiety and he was very certain he had a brain tumor. So that was number one. Number two, this woman came to me with the statement of, "I'm here for my Meniere's disease.

" And that's because she had bilateral tinnitus, bilateral pressure in her ears that had been going on for years and she had occasional room spinning when she stood up and

that someone feels like they're pushing her head forward. She ended up having vestibular migraines, which there are some theories that they go on a spectrum. This girl, she had been kind of given the runaround and she was really distressed, For number three, she had a normal neuro exam, eye exam, Holter monitor was normal. They were trying to get her to do a lumbar puncture but she wasn't having it. They had not done a CT scan, but they did do a vague, I think MRI. Her main symptoms were a rocking sensation, intense pressure.

She had pulsing tinnitus and fullness in her ears and she didn't necessarily hear her eyes move, but she felt like she could hear her nerves firing. And she also had autophony in both ears. When I did my test, she ended up having likely a CT in both ears. They determined that the bones were incredibly thin, but they had not yet separated, which I thought was a very interesting kind of turn of events.

- [Moderator] Thank you, Dr. Ryan. Oh sorry. Go ahead.

- No, that's okay. I was gonna say there's one other question and I'm happy to answer it if there's time.

- [Moderator] Yes, there is. And this person said, "What was your recommendation or what referral did you make for the client with the bilateral vestibular loss?"

- This gentleman was already basically doing everything he needed and wanted to do. He did not really feel that inhibited by his symptoms currently, but he did wanna get back to swimming. So I did refer him to the ear, nose, and throat doctor, and I'm sure they recommended vestibular rehab, but he had already done it himself basically. He told me that he had this theory that if he could recalibrate his body from the outside in, he could get better, which is exactly what vestibular rehab is. So he had been doing

that with a lot of walking and head turning. But what he and I did talk about was ways that he could perhaps safely swim again. And one of them was wearing goggles.

Wearing goggles that were very clear and good quality so that he could at least see where he was at, where he became very disoriented in the water. So we talked about wearing goggles.

- [Moderator] Thank you, Dr. Ryan. That concludes today's course, everyone. We just wanna thank Dr. Ryan for her knowledge and expertise and sharing the last hour with us on vestibular. We hope you enjoyed this course and took away several clinical tools. Have a great day. Thank you so much.

- Thank you.