Audiological and Vestibular Care of Patients with Parkinson's Disease

Presenter: Melissa Newell, AuD

Hello and thank you for joining today's webinar entitled Audiological and Vestibular Care of Patients with Parkinson's Disease. It's my pleasure to introduce our presenter today, Dr. Melissa Newell. Dr. Newell is a clinical assistant professor in the Speech, Language and Hearing Sciences department at Purdue University. Her experience includes advanced vestibular assessment and collaboration with rehabilitation providers. She currently supervises and teaches first and second year AUD students in the Purdue Audiology Clinic.

Welcome, Dr. Newell. And the floor is yours. All right, so today we're going to talk a little bit about our patients with Parkinson's disease. And, you know, I just really got interested in this topic because of our patients. I'm kind of in a position here where I spend most of my time in the hearing clinic seeing hearing patients with hearing loss and hearing aids, supervising our students in that clinic.

But I also am in charge of our vestibular clinic here and teach the course on vestibular care. So I kind of see both sides of the. Of the field on this one. And I had quite a few patients recently that have had Parkinson's disease, which kind of sparked my interest in learning a little bit more. Two of the patients I've had recently, both were former professors at Purdue, and it just got to spend a lot of time with them and their wives and talking a little bit about how Parkinson's affects their lives, not just in terms of audiology and vestibular care, but just in general what they're going through.

And so that's kind of what sparked my interest. One of the patients, he would come in very tall, thin man. So he just fell a lot, you know, swayed a lot because he was so tall. And he was. Would come in frequently with bruises all over.

And unfortunately, he passed away in this last year. So I learned a lot from that patient. And I'm just very appreciative that I got to work with him for a while. But this, this talk is really because of him and, and another patient, particularly that I've been working with.

Screen's not advancing. Sorry. There we go. These are my disclosures, if you'd like to read through them. And then there's some limitations and risks that you can also read through when you have time.

The learning outcomes are listed below. We're going to get to go through these pretty quickly and then just jump into the regular talk and then the agenda, if you'd like to look at that. All right, so let's just go ahead and get started and start talking about a little bit about Parkinson's. Just kind of quick overview information. So I'm sure most of you know that Parkinson's is a neurodegenerative, progressively worsening disorder.

And one of the things that, you know, we, we talk a lot about how we want to keep our patients up and moving and doing things. And one of the things I was surprised to find out about is just the overall depression that goes along with Parkinson's disease. That comes in many ways and part of it's from the actual disease progression itself, but then part of it is from the limitation of the ability to do things. But then also these patients talk about how they know that their symptoms are going to get worse. And that's part of the depression that goes with it, is that it's difficult to have this kind of I'll keep fighting through it and have a good attitude kind of thing when they know it's a progressive disorder that will get worse and it becomes harder and harder to treat.

So it's a hard diagnosis for a lot of people just knowing what their future is going to look like. And it's hard for the significant others too, knowing what type of treatment that their significant other is going to need and potentially what's going to happen to them physically and mentally.

But primarily what we think of with Parkinson's disease is the motor symptoms that are affected. And TRAP is the acronym that you can use. That's the easiest way to remember the, the four motor symptoms that are typically involved with Parkinson's. So tremors, rigidity, akinesia, which is slowness or no, no movement, which is often. This one's listed as bradykinesia or just slowness of movement and postural instability.

So you can see, at least in there, the postural instability. Maybe audiology needs to be involved. But I would say it's a lot more than just the dizziness, it's the balance issues. It has a lot to do with the overall care of the patient. But I think we have a role in these patients more than we know.

One of the big things is with Parkinson's disease there are a lot of non motor symptoms too that result in sensory impairments and can really contribute to the overall difficulties that the patients have.

So really we talk a lot about postural instability, feeling like they're going to fall. A lot of patients with Parkinson's just feel like they can't initiate movement or stop movement. And you know, because we know it's a neuro, neurodegenerative process, we know that, you know, this is a central issue going on. But really, there's more going on than just the central changes. These patients are twice as likely to have actual dizziness, so vertigo.

And they're often overlooked because I, you know, I know with my Parkinson's patients in the past who think, well, yeah, we know they're falling, but we know they have Parkinson's. So you don't necessarily recommend them for a vestibular evaluation or any kind of vestibular treatment because kind of already know what's happening and kind of assume that their physicians are taking care of the, you know, referrals to therapy and things like, things like that. But we do know a lot about fall risk and can help patients with this area. So it is definitely an area that we can look at. And I would encourage you to actually consider vestibular testing for these patients just to see what type of vestibular function they do and don't have, which can help their therapist direct therapy a little bit better.

We do actually know that Parkinson's disease can cause vestibular dysfunction in multiple different ways. But one of the big ones is that Lewy body changes have been seen in the central vestibular structures. And we're going to talk about Lewy bodies in just a little bit. But the fact that there's a buildup of these protein related changes, these build up, the buildup of these Lewy bodies in the central

system tells you that the vestibular system is going to be affected in some way. Now, if the peripheral function is normal, then the, the brain's still got to make sense of that information.

But what about those patients that have abnormally, have abnormal peripheral function and not only also have a central component to make sense of that disordered information. So I think it's important that we kind of know what, what is functioning and what isn't functioning for these patients so that we can help direct therapy a little bit.

One of the things that we may see, too, is that the patient may not complain of vertigo per se. They may not come in, come in saying things, feel like they're spinning, but they just may feel like their balance integration is poor. Or they, you know, often feel like. They say they're. They feel like they have weights on their feet or they feel like they're going to fall backwards or forward there.

Things like that may not come in as what we typically think of as a patient with vertigo that need to have a vestibular evaluation. I think it's a little deeper and more of a mix of things, a bunch of stats. I don't want to read all through all of them for you, but just to kind of give you an idea, really, it's. Parkinson's disease is the second most common neurodegenerative disorder in the US Behind Alzheimer's disease. So this is a big thing, you know, that it affects a lot of people.

I'll be honest. My grandmother had it, and so I've always been kind of wondered if, if, you know, if there's a chance I'll have it or my children will have it. But it looks like it's only about 15% of people with PD have a family history. There are mutations that can occur before early onset or in late onset, but there's also potentially some environmental causes, too. But most of the time there's just not really a.

No one really knows the reason why. It is more common in men, but when women have it, it tends to progress a little bit faster. So. And, you know, those early onset ones really can be just, you know, horrible for people to have to live their whole lives with, with the disorder, which will result in earlier

death.

Okay, so back to the motor symptoms. Again, we're going to go back to those and just talk a little bit about why they occur. There are these four main symptoms that patients see. See the pill rolling, I thought was an interesting one. It just often they will say that they'll see people doing the pill rolling, looking like you're kind of rolling pills between your fingers.

They said sometimes that will be an early sign before the patient even starts having any other symptoms, they might start doing this pill rolling. But a resting tremor in the hands or in the head is very common, too. The rigidity is it lumped into two categories. These patients often have cogwheeling in the upper body and more of a lead pipe movement or lack of movement in the lower body. And this is specifically related to the way the neurotransmitters are pumping chemicals in and out of that, those cells that produce muscle movements.

And we're going to talk about that a little bit in just a minute. But basically, you have neurotransmitters that are being released to either excite or relax a muscle. And the dopamine reduction that patients have with Parkinson's disease causes a disruption in that transmission. And so the muscles don't contract and relax properly, resulting in these kind of jumping, cogwheeling, jumping movements in the upper body. But in the lower body, more just this solid lead pipe where they just can't initiate movement and can't really can't move.

The akinesia or bradykinesia is just, yeah, again, a really slow kind of shuffling movement. They just don't seem to move very well. But one of the big things is this mask face that a lot of patients get. And that can be very difficult for the significant others because this, your person you love is now starting to kind of lose their facial features and just not have the expression that they used to have. So it causes these other issues in interactions between families.

And the patient doesn't have control over it and may not realize that they're changing. The postural instability. They're often very hunched over. And we'll talk about a little bit about those patients with instability and those are the ones that usually have abnormal semps. So we'll talk about that a little bit more.

But you see those patients with postural instability and I think they need vestibular evaluation.

The non motor symptoms are due to loss of norep. Norepinephrine? Oh gosh, I can't say that. Norepinephrine, I didn't get that out right. But you'll get the point, you can read it, which is made from dopamine.

So basically, again, it's this the way that the neurotransmission is occurring in the cells. And if you think back to your audiology days of learning how calcium and potassium pump in and out of those hair cells in the inner ear causing, you know, neurotransduction, it's basically the same thing, but just with different chemicals pumping in and out causing those muscle movements. But for the non motor symptoms, it also relates to increased fatigue, poor blood pressure, which is one of the reasons why a lot of patients have orthostatic diz. It's just really dizzy when they stand up quickly. But they can also have some digestive issues and definitely cognitive, mental health and emotional issues.

And so particularly when we're seeing these patients and we're talking about hearing aids and if they need hearing, we know there's a lot of information these days coming out about cognitive health and hearing care. So particularly for our patients with Parkinson's disease, if we can ameliorate some of the symptoms that they have with properly fitting hearing aids and good counseling with the family, this might be a good family that would do well with oral rehabilitation, maybe even assistive listening devices. There are things that you can do with the family that maybe can take some of those hearing concerns off the table that may be contributing to some of these issues as well. So we all know a lot about what we need to do for Patients long term cognitive and mental health with hearing. And this is

very true for the Parkinson's patients.

And I would say they really need us at this point because there's so much at risk for all the things we know that hearing loss can cause all the detrimental effects of hearing loss.

Here are the 10 early signs of PD, some of the ones that we've talked about already. The smaller handwriting. One of the things I always notice is when I'm reading a patient's case history form that they filled out, I take, I always pay a lot of attention to their handwriting. You can typically see some neurological changes. I'm sure plenty of you do that as well.

But a lot with Parkinson's disease, they'll start writing really small. Besides having the tremor in it, the dizziness and fainting is obviously there in the stooping and hunching over some of the things that we need to look at. The softer low voice I found has been a problem when the patient's significant other also has a hearing loss. So as we've. I've had that discussion a lot too, is that the significant other has hearing loss and they struggle to hear their spouse who has Parkinson's disease.

So again, back to the etiology a little bit. So there are dopamine nergic neurons that produce dopamine in the brain and basically they're not functioning or working properly. And they're all found in the basil ganglia, which is where we control movement. So this is what we've talked about before with just this excitation or in inhibition with the neurotransmitters coming in and out of the cells. The dopamine does not transmit into the cell the way it's supposed to.

So then you have issues with GABA and glutamate being released properly. So get an imbalance of these neurotransmitters. So the cells just do not function properly. And then that just results in altered motor movement or non motor movement too in some areas.

So Lewy bodies are formations of protein clumps and they're common in lots of neurological disorders.

And the thought is that this is probably what's causing the neurodegeneration is that basically they just continue to grow and clump and form over time and they start to spread out, basically attaching to anything that's nearby and then start forming clumps there as well. So it kills off the nerve cells, causes damage to them, and they just build up in the body and build up in the brain until they're so many of the patient ends up having significant cognitive issues. They are working on therapies to treat it, but that is the big thing. If we can find a way to treat that, I think it's going to be pretty phenomenal.

So treatment for Parkinson's disease is then based on the issue with the neurotransmitters. The first line of treatment is always L dopa, which does cross the blood brain barrier. But it does, it does address this issue with the dopamine not being produced properly. But again, it doesn't quite make up for the fact that you have loss of some other neurotransmitters, particularly the choliner. Cholineric neurons.

I can't pronounce words today. Sorry about that. They can be used, but they're often the ones to treat. This issue can cause some confusion for patients. And so when you have patients already going through mental issues, obviously you don't want to do that.

And then frequently these patients need to be treated with SSRIs or antipsychotic psychotic medications to deal with the mental health issues.

So I don't know about most of you, but in the last quite a few years, I've made sure to add an anxiety and depression scale to my vestibular assessments. It probably something we should be doing more often with our auditory assessments as well, just for our hearing loss patients, particularly with vestibular patients. Anxiety can be a very tricky loop that patients get into. So the dizziness causes anxiety and the anxiety causes dizziness. And then you just get in this big cycle and it's hard to get out.

So I really try to make sure that I look at the anxiety and depression issues with patients with vestibular disorders. And obviously for this patient population, it's a extremely important that we look at that. Probably it's being managed by their neurologist, but it's definitely something you want to ask about. And then there is some medication for trying to help with those voluntary involuntary movements and help with the dyskinesia of it.

All. Right, so earlier I said that there were some. We don't always know. Most of the time they don't really know why people have Parkinson's disease.

But there is some concern that there are environmental causes and pretty good indicators that may be a combination of genetics and then, you know, some exposures that we all could potentially be around. Head trauma is one of them. So, you know, we think about all these kids getting concussions. There's been lots of discussion about concussions over the last, you know, 20 years and the importance of, you know, protecting your head. And so, you know, it's kind of tough with these patients.

How do you know that they didn't have head trauma, you know, 60 years ago? So things like that may be an effect that may be difficult to track the patient's geologic location. So they're just hot spots where things are worse depending on their occupation, if they've been in particularly areas where they're exposed to different chemicals. These are the solvents that are typically seen and is the most common, commonly found in groundwater. Paraquat is used in the U.S. it's a pesticide.

It's been banned in other countries, but apparently we, we still use it. So, you know, there's some concern about that. So definitely some things that maybe we can do to get rid of some of these over time, maybe get re. Remove some of these risk factors, maybe if we can do a better job and maybe we can see some changes. But I think there's just a lot more that needs to be known about what to do about it.

Okay, so orthostatic hypotension is a difficult thing for us as audiologists because it's really not anything to do with the vestibular system. And so we tend not to kind of assess it and think about it. But it really can cause difficulty with thinking, foggy headedness, more blurred or dim vision, things that potentially if it's going on one, the patient doesn't feel well and hopefully they can treat that. But it's just common for patients with Parkinson's to have orthostatic hypotension. So they may have vestibular concerns and have this as well.

So I think that's one of the things that's so complicated about this patient population is that it's a kind of a moving target. Lots of things can be contributing to the same problems with the Parkinson's being kind of the overall arching causing all of them. So you still need to know if that's what's happening with the patient because that's going to be a separate treatment compared to the vestibular issues.

And then obviously every medication out there, one of the first things they'll say is it can cause dizziness. So there's so many medication induced symptoms. And then when we start getting into polypharmacy too, then how do you know that these medications are not interacting and potentially causing some dizziness as well? So it's a really tricky, can be kind of a moving target, a little bit difficult to figure out. But I think these patients need the time and effort that audiologists put into seeing these patients.

I think we all say that we spend a lot of time with our patients, talk to them a lot. And, you know, I don't know how many other patients fields get to do what we get to do and spending time with our patients like that. So maybe we're a good field to help kind of tie this stuff together.

Some patients choose to have a, or end up with a deep brain simulation that should say stimulation. So just to help with some of the motor symptoms. And they can be really helpful in a lot of patients, that's kind of another talk to get into those in depth. But typically the dizziness that's after that resolves, it's usually a temporary thing and it goes away. But that is something you may want to track with your

patient and just kind of, if you know that's happening, kind of keep an eye on it.

There's some literature that indicates that there may be an increased risk for BPPV with patients with Parkinson's. More research is needed in that area. So if nothing else, they may have BPPV that we can be easily treated. Obviously they're at higher risk for TIA or stroke. The anxiety that we've talked about before truly can be a big contributing factor to dizziness, and it can lead into all kinds of other issues with dizziness because of the anxiety, particularly even the withdrawal from activity.

You know, anxiety just has all of these little, you know, just impacts so many things and spreads out and gets to so many different areas of patient's life that then just, it's kind of this, you know, just multiple effect that causes the patient to have difficulties. So if the patient's anxious and not wanting to move, they're more likely to sit more, which is going to make that, you know, have less muscle strength and more likely to fall. And it's just a, you know, going to cause more anxiety. It's a bad cycle to get into. So mental health services is very important for this group.

They really should have a professional they can talk to, you know, if possible, somebody that is familiar with degenerative disorders like Parkinson's disease that might have some ability to help the patient deal with knowing that they have something that's progressive. And then because they have some digestive issues and often get kind of forgetful, dehydration and other issues related to diet can be there too. Heart conditions and then migraine, you know, this is a central nervous system issues there, problems going on in the brain. So migraine like symptoms might be There as well. Foreign.

So the VOR and the vsr. We talk a lot in audiology about the vor. So just to remind those people who aren't vestibular audiologists, your vestibular ocular reflex is basically that link between your ears and your eyes. So your head moves one direction, which sends a signal to the brain. The brain then says, great.

Moves the eyes in the exact opposite direction. And no matter what tiny little head movement you make, your eyes are making very slight adjustments in the exact opposite direction. So that is what happens. So that we can move our head around in the environment, move our heads while. And keep our vision still so we can look at things and still be able to see it without things in our environment jumping around.

When the VOR is intact, we can function like that. But when we have patients that have disruption in the vor, they often have dizziness or lightheadedness, Lightheadedness when they move their head. Very common in audiology. Just, you know, very typical vestibular patient that might have some. Something going on in the semicircular canal is usually unilateral, typically treatable, and vestibular rehab is often very helpful, depending on what else is going on with the patient.

But we don't talk a lot about the vestibular spinal reflexes as much, and it's becoming more and more common to talk about them. But your ears then tell your brain where your head is above your body, and then there are reflexes that tell your body how to move appropriately to maintain your posture. So if I'm reaching forward with one hand, how do I know to correct my posture back in the other direction, just to maintain my posture so I don't fall over? And these reflexes occur in the utricle and saccule. We assess them with VEMPs, with OVIMPs and CVEMPs, and these are often what changes we can see in these Parkinson's patients.

So their reflexes are just affected. And a lot of us that see vestibular patients, even without Parkinson's disease, when they have damage to these spinal reflexes, not only is the patient at risk for falling, but they're at risk for getting hurt more because they don't catch themselves when they fall. So, you know, do you pull your head up and put your arms out to protect yourself when you fall? Things like that. So they're more likely to be injured when they fall.

They can't catch themselves. They're not correcting their posture. And particularly for patients with Parkinson's disease, when they have a Difficulty initiating movement or stopping movement. If something causes them to fall, say they trip or some, you know, they get pushed or something happens that causes them to lose their balance, they're not going to catch themselves. And then when they do fall, they're going to get hurt worse.

So we really should be looking at these reflexes. And even if you don't want to do a full vestibular assessment, doing testing, CVIMs and OVIMPs might be enough just to say, look at this patient and maybe they need some vestibular rehabilitation.

So are the, is the dizziness related to central, peripheral or both? And the answer is, yeah, it's, it's all of it. It's definitely central, but they often have peripheral dysfunction too. So it can be a combination effect. And peripheral vestibular dysfunction, you know, may not can be completely treatable in all of these patients with therapy, but at least portions of it, we might be able to get better.

And dizziness is such a common symptom for Parkinson's disease. I think it's really important that we do listen and, and, and maybe spend some more time trying to figure out how we can help.

One of the things is dizziness is sometimes something that they've been complaining about for years. And I always kind of wonder when we have these patients that come in and complain of dizziness and maybe we test them and we don't really find much out. Like, you just kind of wonder, like, is there something going on that we're going to see in 10, 20, 30 years? I don't know what the answer is to that, but definitely these patients are having some issues for years before they're diagnosed with Parkinson's disease. So, you know, keeping records, doing long term studies, repeated studies, we don't tend to repeat vestibular assessments a lot of.

And because they're so long and it's a lot to put the patient through, it's not as easy as a hearing test, but maybe doing serial vestibular evaluations and tracking how the patient's doing is important.

So just like most things in audiology, we just need a lot more ears to look at. We need a lot more anatomical research really looking at cell structure. So there aren't a lot of studies out there looking at the peripheral structures, but some of them have shown some potential changes in the vestibular system.

So it's a little bit difficult to know. But we do know that Lewy body pathology, that the buildup of the proteins in the body is widespread and can be in the central structures.

Some of looking at the research about test results, it can be very confusing. Some things say one thing, another study will say something else. I think the big issue with doing per research with Parkinson's disease seems to be that you have to know when you're testing them. They have on and off periods. So they may have a period of time if you're testing them, that they're using all of their dopamine they have that day to get through that test for you.

So maybe the next day they have a worse day. Is it going to be different? I don't know. So that's the thing that a lot of the discussion was when the patient was being tested. Their symptoms may be different than on another day or maybe at a different time of the day.

Even the patient I mentioned that I spent a lot of time talking with, they would frequently talk about saving his dopamine. And I don't know the scientific background behind this, but at least for that patient, they felt that if they knew he had something he had to do that day, like come in for a hearing test, they really wouldn't do anything else. It we very easy, non stressful day because they wanted to save all of his ability for to do that test and then he'd be kind of wiped out for the day. So kind of keeping that in mind. And the other patient that I have that has Parkinson's, that's been coming in recently, he seems

different on different days.

Most days he's very aware of what's going on, very capable of handling his hearing aids. And then other days we've seen him and he's been confused, not able to do some things that he's done for a while, things like that. So it part of testing these patients is just you don't know what day you're getting them, where their medication is, what's working and what's not working. The medication stops working over time and has to be changed. So it's a little difficult to know when are you testing that patient.

However, some of the studies indicate that there may be a higher prevalence of peripheral hypofunction. So these patients potentially have a higher incidence of peripheral vestibular dysfunction. So again, something that we can look at and help direct therapy and determine what needs to be done.

We do know obviously that patients who have hypofunction, if there's peripheral hypofunction, you're going to have instability. It is just part of vestibular function. So again, another good reason why we should be looking at the vestibular function of these patients.

Here's a list of some of the central vestibular structures and kind of an overall look at some of the research for this area. Really the main research that overall looks at postural instability, which is really just the biggest problem that the patients have. But then there has been some looking at it that maybe these patients also have some proprioception issues. And again, the Parkinson's disease is affecting sensory integration. So it makes a lot of sense that any sensory information coming in, proprioception, vestibular vision here, anything is going to be reduced or just not processed properly because the brain is not processing that information the way it, it should.

PISA syndrome is a lateral trunk flexion of 10 degrees or more. This is one that you'll see is that the patients will often have absent semps bilaterally. So they just have no input then coming from, from the saccule. And they tend to have a, a, a trump flex, a significant trunk flexion. Then they can have

freezing of gait, where these patients just say they get frozen and they just can't initiate activity.

But then again, once they get started, often they have a hard time stopping again. This is back to probably a sensory integration issue of being able to put all of the things together that you need to put together to maintain your balance. Impaired saccades are frequently seen and that's just because of those Lewy bodies and the, the dysfunction in the vestibular nuclei and in the basal ganglia. Just, it's just part of the dysfunction to that part of the brain that you're definitely going to have. Most likely you're going to have impaired saccades.

And then we also know in the pedunculine pontinucleus, the PPN is really there for, to integrate that information from the vestibule processing or the vestibular system and the sensory integration, integrating all that information together. So I would love to know more about this. You just, you know, it's kind of central vestibular processing, processing, and they just think it's a really interesting topic that we don't know enough about. But definitely in these patients, that's where we're getting a lot of breakdown and the poor loss of neurotransmitters are causing a breakdown there and you're having poor processing and integration.

So looking at the VOR research is kind of really all over the place. And again, I think it depends on when you're seeing these patients and where, not even just day to day, where along the, you know, have they recently been diagnosed with Parkinson's have they had it for 10 years. There can be so much variability in the patients themselves that the outcomes on the research is also variable.

Definitely indications that if a patient has reduced caloric responses, they're going to have more postural instability. So if there's a peripheral, you know, something going on in especially the horizontal semicircular canal for testing with calorics, those patients are more likely to have postural instability.

Patients who have a lateral trunk flexion, they're moving one side or the other tend is often seen as having a unilateral hypofunction. But there also has been some indication that gain can be really high. So you might get some really high gain on some tests that would be indicating more of a central problem than in areas that you typically don't see. And then for those people who are doing shim testing, it's not something we do here yet at Purdue. I'm hoping to get to do that soon.

But results so far are showing that gain's not affected, but they may have some longer saccade latencies and reduced saccade velocities.

On VNG testing, they may have hypometric saccades and abnormal pursuit. So again, those things that, you know, we typically see hypometric saccades and abnormal pursuit, and we're just going to say it's a central vestibular issue. And if you already have a patient with Parkinson's, you know that already. But it is good to show what is going on. And then potentially, I think, you know, we still just need to work with our physical therapy partners more and learn.

Okay, what do we do with this information? How does that help them treat the patient?

Okay, so for vemp testing, like I mentioned before, if you're doing ocular or cervical, they're often delayed or absent, but it kind of is correlated with the disease progression. So, you know, if you have a patient early on, they may still have functioning CVIMs, but as it progresses, it may worsen. So this may be a good reason why you would want to do serial audiograms. I'm sorry, serial vestibular testing for these patients. Maybe working with neurologists to say, when you have diagnosed a patient's patient with Parkinson's, let's do this test, and then we're going to track them over time.

And so I think there we just have a lot more room to work in this area and to see what it. Where it takes us and what we can do.

The subjective visual vertical is cause inconsistent results, which I was a Little bit surprised about because these are, you know, typically with like, head trauma, other neurological issues, this can be an issue. But there's definitely some indication that PD patients have some spatial orientation issues. So I definitely. There's more work that needs to be done in this area.

You can use questionnaires. I think we. We all love questionnaires and audiology. I get in spurts where I'm so excited and I use them all the time. And then I'll go for a while and forget to use some of them again and then get back excited and use them again.

But there are a few that I use really frequently. The Dizziness Handicap Inventory, for sure. If you haven't used the Dizziness Symptom Profile, it came out of Vanderbilt and comes with a really nice spreadsheet where you can plop in the patient's responses and it gives you the likelihood of what the diagnosis is. It'll give you kind of a list of differential diagnoses and you can then kind of look at them and see. Yeah, I agree with that.

I disagree with that. It kind of, at least for teaching here at Purdue, it's a. A nice teaching tool to help the students kind of understand and type and kind of put everything together, put the big puzzle pieces together.

Like I mentioned before, I use the hospital Anxiety and Depression Scale pretty with all of my vestibular patients. And it is surprising how many people have significant issues in these areas but are not treated or don't realize that they're having issues and how it can impact their life. The PDQ 39 is definitely for Parkinson's patients alone, so you're welcome to use that. And then I always like to bring up the same study program, which is from the center. The CDC has the study program and it's stopping the elderly.

I knew should have written it out, so I didn't have it. But basically it's preventing falls. And so what the CDC has done is compiled this beautiful program so that you can run fall risk assessment clinics. You

can do basically fall dizziness and fall clinics. It's all set up very nicely.

There is really great information that you can print out for the patient and for their caregivers about maintaining an independence. Things you can do for your balance, things you can do for safety, explaining a lot of different things to patients. And it's all very easy to understand. It's a quite comprehensive program they have. So I encourage you to look at it.

If you have any interest in doing any kind of fall risk assessments or fall clinics where maybe you're working with patients and teaching them about fall risk and what they can do to improve their. Their balance and you know, what to do if you do fall, how to get up and what to do for yourself. The thing that I want to say about the study program is that audiology is not mentioned in it at all. So the CDC has this beautiful website that's very comprehensive, but we're not part of it at all. And I think it's a real shame that anything that has to do with falling and dizziness, that audiology is not even.

It was not even on the radar. There's a slight mention that vestibular rehab may be needed and that's about the end of it. So if anybody has any control with the CDC and work, I. Anytime I get on there, I send a note about it. I don't know if it helps, but I always.

There's a comment section and I always send information. So if you want to get on that with me, that'd be great. But definitely a very useful program. I've used it a lot when I'm doing dizziness and balance screenings with the community or doing education about falls. It's a really wonderful program to use.

So let's talk a little bit about the sleep disorders in pd.

Really, I mean, it's not obviously this excessive daytime sleepiness is expected if you're not sleeping a lot. But these other issues, these motor issues, acting out dreams really can be very bothersome and very difficult for the patient and for the significant others, the vivid dreams and nightmares can be really

awful. And again, it kind of then feeds into this poor mental health that they end up with as well. So then you have, if anybody's ever had times. I always think back when my kids were little and I was not getting a lot of sleep, how much mentally that affected me that I wasn't able to function.

Just when you're sleep deprived for very long, it really does start impacting every part of your life. So these patients really need to go to a sleep clinic and make sure that they're getting care to keep this functioning as much as we can. So that sleep is just so important for their dopamine production to get the brain to rest. So the sleeping is super important and something you might want to ask your patients about. I always think too, with the sleepiness, when you're trying to test them, doing a hearing test and they're falling asleep on you, it's not easy.

We've talked a little or quite a bit about the mental health concerns, but I just found it interesting that that anxiety and depression changes often are the first symptom that patients notice that there's just this sudden change in mental health without a good reason for it. And about half of the people that really just notice, they just, for whatever reason having. Are having these mental health changes. So that could be an early sign along with that pill rolling. If you see those two things together, it could be potentially an early sign.

And as the disease progresses over time, then the symptoms obviously become worse. We talked about the off periods, so the, the medication does tend to wear off in between doses. So then you may have these time periods. I was thinking, you know, like, if you're trying to teach a patient to put a hearing aid in and their tremors are so bad, it may be better just to do it on a different day. So things like that, you may just know that the day that you have your patient may not be their best day.

So you might want to talk to them a little bit about that and how they feel about it. Do they feel like, you know, you might want to let them know maybe if you. You're having an off day, you don't, you know, reschedule your appointment or something like that. I think a lot of our patients don't like doing that kind

of thing. And it's.

It's okay if it's not a good day. You know, support groups are super important because, again, this is. That it's a different type of thing when you have something that, you know, you can kind of fight back and maybe overcome or live with, but knowing that this disorder is going to get worse and that is going, you know, that you're potentially going not to be able to move or talk or eat or, you know, or you may have dementia. You know, it's a scary thing for patients to go through to know that that's potentially going to happen or you may fall and die. I mean, it's.

It's a hard thing to live with. And so I really think these support groups are very important and also for the significant others, because, you know, if you're caring for someone that you know you love, that's slowly going downhill. It can be really hard on both of you. So a lot of our skills that we've learned as audiologists about handling hearing loss, we can apply to these other areas. And just remember that we have to take our patients as.

As they come, and they come with other issues besides hearing or vestibular problems. So I always think, like, I, you know, if we can. I spend A little extra time with these people just so they're not alone, but if that's good for them, you know, that's the thing you got to remember too. And it's sometimes because of the face mask, they don't have a lot of expression. It's kind of hard to know what's going on, which again, can be hard for the significant others just to not get that kind of feedback about things.

There's just kind of a blank expression sometimes, and that can be a little bit difficult.

So obviously, we want to try to reduce anxiety for these people as much as possible. So again, report, working with a mental health specialist may be really important for dealing with things that we can't control as audiologists, but maybe we can refer to them, the right people, along with, you know, the depression and anxiety. They can also develop some hallucination and impulse control problems too.

So. And generalized apathy, which couldn't.

Can be very difficult. If you have somebody who's been living a pretty good life and all of a sudden they just kind of don't care anymore. And that can be a concern if, you know, you're trying to talk with somebody about maybe they need hearing aids or, you know, and they don't really want hearing aids. So we can talk a little bit about what hearing aids can do potentially to reduce anxiety or depression or isolation. So, you know, it's definitely.

We want to treat our hearing patients because they have hearing aids, but we have to kind of think about their overall why, what they need to make sure that their life is not more stressful. We want to reduce stress as much as we can.

So we do know that patients with Parkinson's disease have more hearing loss than patients who don't. So if nothing else, Parkinson's patients just have hearing loss. So we need to take a look at it. Speech and noise difficulties can sometimes be an early indicator of Parkinson's disease. And I know, you know, not everybody does speech and noise testing, but I think it's important.

I don't know how we can use this information, but I definitely have seen changes in patients in their word recognition that doesn't make sense necessarily with their hearing loss. Maybe the hearing loss hasn't changed, but the word recognition is changing significantly. These are patients you still want to refer on to physicians to be checked on because, you know, there could be something going on if they're. If it doesn't really correlate or things are changing more than you expect.

And obviously then there can be neurodegenerative effects on the Auditory pathway then too. So we've talked a lot about central processing, but there's definitely auditory processing issues. So too. So, you know, your indicators about success with hearing aids may be quite a bit different. So your goals and what the patient's goals are for hearing aids may be different.

Or with the family, you may have to talk about that. So just understanding that they may have more difficulty in background noise simply due to an auditory processing issue, or they may be because of fatigue, they may not be able to understand as well. It all integrates together. And patient may have on or off days. There are some medications that are ototoxic as well.

They're not frequently used, but if necessarily, if necessary, they may have ototoxic medication. And we have to obviously track those patients. But it really is this cognition that's getting worse over time and just kind of trying to help the patient be as successful as they can during the time period you're in.

So these are all the things that we know about hearing aids. We. It's going to improve communication. I'm not going to read through all of these for you. I really want you to use assistive devices.

It's on there twice. So I really, really, really want you to use those assistive listening devices. But again, I think it comes back to this whole thing of trying to reduce anxiety, frustration, isolation, improve cognitive function, improve interactions, keep people active. It's all of those things that we think of for all of our patients with hearing loss. I haven't mentioned cochlear implants, but particularly, you know, we're implanting more people all the time.

The candidacy is lower than it used to be. And we, we're seeing a lot of patients with cochlear implants do extremely well when they weren't doing well with hearing aids. So those types of things being really kind of just there and maybe following up with your patients, having these patients come in a little more frequently so you can monitor them and make sure they're getting everything from you that you can do to help them. And then I think it's really important that we are helping make those appropriate referrals because again, we're those people that are spending time with patients. We don't always have other professions don't have the time to spend with patients like we do, whether it's good financially or not.

A lot of us spend time with her, a lot of time with our patients. And I think maybe we can help kind of direct some of this quickly. I just want to talk about caloric vestibular stimulation. It is some basic research that's going on. A lot more needs to be done.

But basically it's a little device that the patient can take home that delivers cool and warm air at different intervals to the earth. And it's stimulate. Basically you're doing calorics over and over again. But basically you're stimulating the brain. You're stimulating the vestibular system which stimulates the central system.

And they're thinking that there's just this improvement in neural connectivity because of it. So it's patients have said it's tolerable and manageable. I don't know anyone that's doing this anywhere nearby. It's something I would be interested in finding out more about. But is is some therapy that is out there for Parkinson's patients.

Deep brain stimulation is also something that can be used particularly for patients with tremors and dyskinesia. I have one patient that has a deep brain stimulator. It's not for Parkinson's, it's for something else. And it's incredible when he turns it on and off, the difference it makes in his tremors and his dyskinesia. So there is quite a bit, but there can be some problems with those devices as well.

But obviously this isn't going to stop the progression. It's just to help the symptoms. And that's the big thing with Parkinson's is there's, you know, all the medications and treatments are treating the symptoms, but not really and trying to treat the progression. But the medication is limited and doesn't work over long term.

Vestibular rehab is, you know, what we do without our physical therapy buddies. But they really, these patients should have, in my opinion, hearing tests and a vestibular evaluation when they're diagnosed so that we can kind of compare things over time and then we can really quickly start making

recommendations for therapy or to refer to therapy. And maybe early on, if these patients start with treatment early, they can progress maybe over time better we'd have to see. But you know, we know vestibular rehab is really very, very beneficial. It reduces symptoms, it promotes patients improving and improves their balance, reduces falls.

So you just need to work with somebody that knows about Parkinson's disease, somebody that you can really kind of collaborate with with these more difficult patients.

Assistive life devices and lifestyle modifications are obviously important and we're not going to be the ones addressing this. You know, you might be want to refer to PT and ot. You know, if you know your patient's going to have difficulty I would assume their neurologist is already referring them, but you know, you definitely want to check because you just never know that you step walker. You know, it can be helpful when they're freezing so they have someplace to stand or sit down. But really we need to work with our therapy partners to make sure that they're getting the lifestyle modifications that they need.

So reducing the risk for pd, ibuprofen, so other anti inflammatory drugs could sometimes be helpful. Surprisingly, nicotine may protect against it. So smoking is one time I've seen smoking be, may be a positive thing. Vitamin D, they're doing research on that to see if it helps. But exercise seems to be the biggest contributor to all of it.

Early and often exercise throughout the whole life, keep those muscles moving, move, move, move. That seems to be the biggest and most important thing for all patients. You know, again, that gets back to that whole leg strength and risk for dementia thing. You know, it all just kind of goes together. Caffeine may reduce with risks and then the uric acid or urate, it's kind of unclear.

Diet is, and nutrition is extremely important with these patients. Extremely. So they'll often work with a dietitian, nutritionist to find out what they need to take. Sugar, caffeine, Caffeine can be helpful, but they can also help disrupt sleep and, and they really need to be able to sleep. Sleep has got to be a big, big focus for these patients.

Bone health, brain health, all of that is really important. Anti inflammatory foods are important to help with those, the Lewy body buildup, all of it's very important. Patients with PD often have nausea though because of the digestive issues. So they have to work with their physicians on that.

And again, interprofessional care for nutrition, this is just, you know, making and making sure that we're seeing all the people that they need to see. Swallowing evaluation might be a very important problem for these patients. That, that can be a really difficult thing. And then, then they often end up keeping food in their mouth for too long and then you end up with dental and gum problems. So it can be kind of this overall overarching.

Everybody you can think of, all hands on deck to help this patient.

All right, so what do we need? We need a lot more studies on peripheral vestibular function. But again, when do we test these patients? How do we know how their medications affecting it at the time? And we may not know, but we need to be doing this more often and communicating with physicians a lot more.

More of the studies need to be completed on Humans, we need more optimized protocols for, particularly for this, our Parkinson's patients and then earlier identification. So I, my goal is to start working with the neurologists in the area and saying, you know, consider sending your patients to us when you early diagnosis and then we can kind of track them and see how things go. So we need to really collaborate more. You know, as always, we need to work together more with our partners so that

we can all make sure that we're taking care of the patient and uses the best treatment options we have.

So I think really the important theory is, is that we have a role in the care of these patients. And it. You don't have to be a vestibular audiologist. You know, most of us are here take care of hearing patients, but you, when you see those patients, they're, they're more difficult for a reason, and so they need a little bit of additional care. But even if you're not a vestibular audiologist, if you have somebody you can refer to, I think it's really important that we, that we really take care of these patients a little better than we are.

You know, again, when you see your patients coming in frequently falling, it can be really hard. And it is, you know, and eventually they pass away and it's a really hard thing to watch. So. And be there for the significant other. And then make sure you're working when you've got a good physical therapy buddy that you can work with for therapy too, for rehabilitation, if you find something.

All right, well, that brings us to the end of today. I'm happy to answer any questions anyone has, and I did. I don't know if I added my email, but it's my last name. Newell newell7@purdue.edu and Purdue is P U R D U E. Feel free to email me if you have any questions.

Thank you, Dr. Newell. We do have a few minutes, so if you have any burning questions, feel free to type them into the Q and a. Or as Dr. Newell mentioned, you can reach out to her after the class. I also want to point out that Dr. Newell provided a really great reference list. So if you're interested in digging more into something that she reported or referring back to something that she talked about, you can find the reference list under the Resources tab here in Zoom, and also on the Pending Courses page on Audiology Online.

So I'd like to thank Dr. Newell for sharing her time and expertise with us today. And I'd like to thank everyone for joining in on the course. Remember to complete your examination, which will be posted in

the next 15 minutes or so on on your pending courses page. Remember to do that in the next week so that you can get CEU credit for the course. We look forward to getting your feedback on the course evaluations and hope to see you on future courses here on Audiology Online.

So this concludes today's course and have a great rest of your day.