Grand Rounds: Medical Considerations and Health Literacy, presented in partnership with The Ohio State University

Presenters: Gail Whitelaw, PhD, Christina Roup, PhD, Morgan Leatherman, BA, Christina Martin-Smith, MGS, Liam Smyth, BA, Aubrey Stoll, BS, Aryn Robinson, BS

Well, everyone, we had a great group with us today for our grand rounds on medical considerations and health literacy, presented in partnership with the Ohio State University. And thank you so much for everyone for being here. And at this time, I'm going to turn the microphone over to you, Doctor Whitelaw. Thank you. Thanks so much, Calista.

Welcome, everyone. We think we have a great group of people here today to talk about some cases that they're very interested in, and hopefully you'll find them interesting, too. We might run short on time, so I want to make sure we move ahead, and I will introduce each presenter as we move forward. Our first presenter today is going to be, oh, and I need to talk about our disclosures first. Sorry.

Here are our disclosures. You can read those. And I want to let you know what our objectives are for today. After you guys complete this course. You should be able to describe the critical role of audiology in supporting differential diagnoses based on hearing and balance care that is provided by audiologists.

You should be able to discuss considerations in addressing the person as a whole and their hearing balance and communication needs. And you should be able to describe considerations of health literacy and patient care. And I'm really excited that we are gonna bring that into it also, because more and more I see that described and discussed and looking at that as a really important aspect of patient care. So I'm really excited. We get to talk about that today.

The first presenter of our group is going to be Aubrey Stoll. Aubrey is a fourth year AUD student at the Ohio State University. She has a broad range of interests in audiology, and she's going to be talking about something, I think, that's very unique. Today, Aubrey is completing her fourth year this year at the University of Pittsburgh Medical center in Pittsburgh, Pennsylvania. Go ahead, Aubrey, take it away.

Thank you so much for that introduction, Doctor Whitelaw. Like doctor Whitelaw said, I will be talking to you guys about the co occurrence of speech disorders and hearing loss within communication partners.

I wanted to start out with a visual about the case we are discussing. We will be talking about a multifaceted relationship that occurs when one member of a communication pair has a speech disorder, like dysarthria, and their counterpart, their close communication partner, has hearing loss. And for the purposes of this presentation, close communication partner is defined as individuals our patients are interacting with on a daily to weekly basis.

We know that in speech and hearing sciences, in clinical practice, and in research, speech and hearing is largely siloed into the two domains. However, active, successful communication requires the participation of both listeners and talkers in a very coordinated fashion. And in isolation, when one has a communication disorder, it impacts their. It shows negative impacts on their psychosocial, emotional and cognitive well being, as well as impacts their close communication partners. When these disorders are again happening in isolation to one person in the dyad, and the complexity of these disorders are only going to be compounded when we're adding another disorder into that pair.

So when they co occur in conversational partners, we need to have a nuanced and specialized approach to their management. And the current prevalence data that we have on this dyad suggests that it is occurring at a high rate, especially in the older adult population that we're working with on a day to day basis.

So this leads me to Mister R. Mister R is a 67 year old male who came to the clinic reporting progressive hearing difficulties. He reports that he is struggling to hear his wife and struggling in noisy situations. He's reporting that these difficulties have caused a strain on their relationship and their communication, and have even been causing him to withdraw socially. If we were just to look at a pure tone audiogram, we see that he has normal hearing through 3000.

It really slopes off at six and eight k in the high frequencies. So at first glance, there might be a mismatch between his case history and what we're seeing from the audiogram. Is there more to the

story than what we're seeing here? Is the pure tone audiogram, nothing depicting the full picture of his difficulties? And as anticipated, yes, there is more to the story for this patient.

The patient's wife, Miss R, accompanies him to the initial appointment, and we find out that she has been managing a number of health conditions, including a diagnosis of multiple sclerosis and trigeminal neuropathy with speech changes, or dysarthria, that are among her primary symptoms. So we now have a speaker with a speech change, a speech impairment, dysarthria, and her close communication partner, Mister R, with hearing loss.

And dysarthria, the term, it is used to categorize a group of motor speech disorders that present secondary to an associated neurologicalal condition that disrupts an individual's muscular motor control for their speech. And there are a variety of subtypes of dysarthritic speech that are based upon the perceptual characteristics that are presented on each case that could affect the respiration, phonation, residence, articulation, and similar to hearing loss, they present in a variety of different spectrum severities for each patient. So we can have a mild spastic dysarthria that impacts the phonation for one person all the way to severe, that could impact the speech signal at many domains. And if we look to the table here, this is the current prevalence data we have for dysarthria, and it's categorized based on its associated neurologicalal disease. And what I hope you see from this table is not only the large prevalence, the large amount of individuals who are, who have dysarthria, but also the large overlap we see in age of onset compared to hearing loss.

For example, with Parkinson's disease, we see upwards of 90% of people throughout the progression, their disease that have these speech changes, dysarthritic speech, with that prevalence increasing with age. And then we compare it to hearing loss that we know that over half of individuals over the age of 70 in the United States have some pure tone hearing loss.

And if we are looking at the perceptual consequences displayed in dysarthria speech, that impacts and degrades the signal at the source, at the speaker, and then cross compare that to what we see with sensorineural hearing loss. We see that the speech signal is being impacted in very similar ways in similar facets, leaving the listener with a very sparse and degraded speech signal. For example, if we look at decreased articulatory preckision, this is going to impact the spectral cues of that speech at the point of production from the speaker. Then we look for sensory neural hearing loss, and we have decreased audibility to that spectral cues. So we're being hit on both ends of the spectrum.

And this is without even considering background noise and the impacts and the effects that that has on speech intelligibility.

And when there is an acoustic challenge at any points from the speaker, the listener, or the environment we are, then it forces the patient to then allocate more cognitive perceptual resources to fill in those gaps that we are missing. So if they have a threshold loss, suprathreshold deficits that increase with age, and they're speaking with an individual with dysarthritic speech, disordered speech, and they're in background noise, they're really getting a very disordered signal that their brain has to then fill in all those gaps over time, leading to higher levels of listening fatigue for the patient and the social withdrawal that we're seeing from Mister R.

Going back more to the case, word reckognition was obtained with 100% in the left, 96 in the right ear. And then we also have speech and noise scores, two different listening conditions, one at plus eight. So the speech is eight decibels above the noise floor. We get 100% in high predictability, high context sentences, 53% in low predictability sentences. Then we look, we make the condition more challenging for the patient.

We still have 100% when we have context, and then we dropped to 31% for low predictability sentences.

He comes back, he's fit with binaural oticon intent. One hearing aids. Real ear measurements are hitting target through 4000 hz across inputs. And at the first follow up we see that he's improving across many domains of his life. However, he's still continuing to have difficulty hearing his wife, which in the next couple slides, we'll talk about tools that we can use in Mister R's case and for patients similar that we can implement in addition to what we've already done in his case.

One really interesting and I think very useful tool that we can use is speech and noise testing. A study done by Sarah Yoho Leopold and colleagues found that performance on speech and noise tests can be predictive of performance of disordered speech. So while we don't have the materials of dysarthritic speech readily available, we can use the tests we do have to predict the outcomes that they might have when they're speaking with their partners with these speech disorders. In this study, they use dysarthritic speech in quiet, and then they use neurotypical speech in noise. And we see, regardless of hearing status and even if their hearing is normal, that the scores were predictive of how they would do with that dysarthritic speech.

So we can use this for baseline testing to evaluate benefit of our rehabilitation or as a counseling tool to set healthy and realistic strategies for our patients.

Some further clinical tools that we can use, again, is utilizing our real ear measurements, like we did in Mister R's case, and being tactful and meaningful with our acoustic coupling to match the patient's needs. We're really trying to maximize audibility and optimize the available cues that they can send users used to hear their conversation partner. We want to bridge the gap between their speaker and what they're able to use to decipher that speech. Then we go to assistive technology, which I think would be a next step for Mister R. The assistive technology, like a remote microphone, would improve the signal to noise ratio, so it would help with the impacts of distance, low level background noise, reverberation in the environment.

And there's also some unique patient centered audiologic, rehabilitation, and counseling tools that we can do. There is a subset of the clear training program that the patient can use their significant other's voice in their rehabilitation program. So they'll use reckordings of their spouse's voice and put it into this clear training program. And the goal of this and the logic behind it, is that familiarization with the target speaker is going to help the intelligibility as well as the importance of environment, timing, and topic identification, like we saw in the RSPIN scores. If we have identified a topic and we can add context and capitalize on that context, narrow the vocabulary bank that we have, the patient has a better chance of being able to understand that speech more readily.

And then finally, utilizing our interdisciplinary care team, not only to have referral sources out, but also to be. Be able to connect with speech pathologists, neurologists, and other professions about what we do to have patients come if they need hearing healthcare to us so people don't fall through the cracks and have to be in these diodes without any help whatsoever.

So, in conclusion, we have. We know that communication is this dynamic exchange that requires the shared involvement from speakers to listeners and gaining insight on the unique perspectives and experiences of our patients and the intricate diets that they form on their day to day basis is crucial for enhancing their care and maximizing their potential with any of the resources we're giving them. And all themes in this case, and moving forward with these patients underscore a necessity for patient centered hearing. Healthcare.

Thank you so much. Thank you, Aubrey. If people have questions they would like for Aubrey to address now, please put them in the q and A, and we can also come back to them when we're at the end of the presentation. I did want to comment on AubrEY's presentation. We were out at the Parkinson's disease.

There's a Parkinson's disease gym in Columbus, Ohio, and they had invited us to go and do hearing screenings. And I knew that our presentation was coming up here on audiology online today. But so many of the people that wanted their hearing screened were actually the communication partners of the people with Parkinson's disease. And they talked exactly about what Aubrey said. Some of them were Even wearing hearing aids.

And they said, I can hear everyone else. And it's very FruSTraTInG to me because my spouse is the person I want to hear the MOst or communicate with the most. And it's really, really challenging. And I think that Aubrey's uncovered a really exciting and interesting area that as audiologists, we're always looking how we can partner with speech pathologists or interdisciplinary care and how we can do better for our patients. And I think this is a really critical area of looking at who the communication partners are.

So thank you for that. I see no questions now, but if you have a question for Aubrey during, you can certainly post it, and I will monitor that. And I would like to now introduce you to Christina Martin Smith, who is a third year student in our AUD program. Christina has a master's degree in gerontological studies, so she comes to audiology from a little bit different perspective. And you're probably not surprised to find that she's interested in the aging population, but she's also interested in a wide range of things in audiology, including tinnitus.

So I will turn it over to you now, Christina.

Thank you, doctor Whitelaw. Hello, everyone. It's a pleasure to talk to you about my case. The end of a journey of a long term facial weakness after a vestibular schwannoma surgery.

To orient everybody to my case, I want to introduce the case, the surgical approaches for a vestibular schwannoma, as well as talking about facial paralysis and what are the risks for it. I'd like to introduce

everyone to Miss Jane Doe about eleven years ago today. Back in May, she reported having decreased hearing, oral fullness, and tinnitus in her left ear. Her right ear has been normal. The audiogram indicated a normal sloping to moderate sensorineural hearing loss in the left ear and then that right ear being normal.

The ENT ordered a scan where they found a vestibular schwannoma on the left side. August of that year, she had a middle cranial fossa surgery that successfully had removed the tumor. However, there was no information provided about her post op facial functioning. In November, she had lost all hearing on the left side to a flat, profound sensorineural hearing loss. She was reckommended to try a Baha or a cross.

In January of 2014, she was fit with the cross, said she felt very well and balanced with it, but there was no additional information for the year going to March of 2015. She then tried an osseointegrated Baha. After adjusting the magnet sizes, making sure she knew how to maintain the device, she reported that she felt well and there was no discomfort. Hopping over to April of 2016, she only had a single appointment that said that she was doing well, which is always a positive sign. Nothing for 2017.

But in September of 2018, she had her five year follow up, and the ct scan revealed that there was no persistent tumors, which is always what we want to see. So over the course of the last four years, there was no information about if she had improved facial paralysis or if her facial paralysis was just persistent or consistent going to October 2023. When I first met Miss Doe, it was her ten years follow up. She had denied having any pain or drainage or anything on that left side. Since the ct scan at the five year mark was clear.

The doctor and Miss Doe just deferred the testing again. Miss Doe also reported no longer wearing her Baha as it pinches and falls out when she gardens, which is a huge aspect of her life. Doctor Wren had discussed other hearing rehabilitation and different devices to use, but she stated that she was satisfied

with where she is currently in life. On her left side, she was given a score of two to three out of six from the house Bruckman scale. Essentially, that just means she has mild to moderate functioning.

So she can close her eyes, but she's not able to fully lift her lips or her eyebrows whenever she tries to smile. She continues to no longer have residual hearing, but she still reports having tinnitus and oral fullness. The right side continues to be normal throughout all of this. Here's the visual audiogram of the hearing from that decade long may is an estimated that normal sloping to moderate sensory neural hearing loss. And then, since the right ear is consistent, the present audiogram in 2023 just kind of mimics that normal hearing.

So why this case study? I actually chose it for a class that we were taking called medical audiology, where we were taught how to diagnose or what signs to look for when looking for a vestibular spondylosislosisl or if we suspect it. But I didn't. I, at the time, did not know that it was a ten year long journey that a person goes through once they've been diagnosed with it. I also knew that there was facial paralysis as a result of surgical approaches, but I had never seen it before in person.

When it comes to vestibular schwannoma, there's four options for managing it, for managing the tumor. Radiology, which is typically through gamma knife observations. So a wait and see. So if the tumor is not fully affecting their hearing or their balance just yet, it might just be a wait or see. There's also microsurgery, which I'll get into later.

Or they can choose a combination of all of them. The deciding factors for the treatment is, you know, is the vestibular schwannoma affecting the auditory and vestibular nerve? And what is the patient's symptoms? What is their health? And do they approve of the option that they chose or the options that were presented to them?

So now I'll talk about the microsurgical approaches. I'll talk. There's a total of three, so I'll only talk about two on this slide. Prior to that, the surgical considerations for which one to choose involves the size and location of the tumor. Is there an ABR and an ECoG able to assess any hearing preservation outcomes?

And then some otolaryngologists and neurologists want a VNG to see how is the vestibular nerve functioning? Is it going to be affected by the nerve, by the tumor removal, or not? One of the first surgical approaches is called retrosigmoid. Essentially, it's a posterior fossacranotomy approach. They want to typically choose this approach if there's hearing preservation, if that's appropriate, if the person has residual hearing.

The second is a translabyrinthine approach, where, unfortunately, there's no hope of preserving any hearing or balance because the tumor is so large it has cut off the blood supply. Maintaining the facial nerve is the primary aspect of the translabyrinthine approach.

The approach chosen for Miss Doe was called a middle cranial fossa, or an MCF. Originally described in 1904 by Perry as a way to remove infections in the temporal, bone, trigeminal neuralgia, or even otosclerosis. It wasn't until it was popularized by Haus in 1961 to remove vestibular schwannomas. According to the literature, only about 3% of the MCF approaches result in a permanent facial injury, and 97% have that house Brockman score of one to two, which is normal to mild functioning. The considerations for an MCF approach include the patient being under the age of 65, healthy enough to endure essentially brain surgery, that there are brainstem evoked responses available, and they can be measured during surgery.

The tumor itself is less than 1.5 cm, so it's about the size of an apple jack. The tumor is not reaching to the brainstem, and they have socially useful hearing. In Miss Doe's case, she was 63 years old at the time of the surgery, and everything else can be assumed to correlate with the considerations.

So while they're in surgery, an electromyogram for facial nerve is connected to a speaker to alert the surgeons whenever they are close or almost in contact with the facial nerve. Essentially, once that goes off, they need to pause and see and reassess where they are. Once they've reached the vestibular schwannoma, they need to really take and take the time to look and inspect all areas for the anatomical locations and how everything is connected. If at any point during the surgery, there is a risk to the facial nerve. It's reckommended that they abandon or just temper any hearing preservation hope in order to maintain that integrity of the facial nerve.

After the surgery, their patient is in the ICU. They had brain surgery. Their vestibular nerve might have been cut or might have been hurt, so they might be experiencing extreme vertigo, where medication can help with that. Follow ups begin several weeks out, and then it's a one, five and ten year mark.

So, talking about facial nerves and the types you et al, in 2013, out of 116 participants, actually described five different facial nerve types of. To orient everyone to this normal tumor here, this darker handle that you see almost like a teacup, is where the IEC would be. So you're going back towards the brainstem. The oval itself indicates the tumor, and then the opening that you see on your left would be the facial nerve coming out towards the nose and then branching off. Out of the 116 participants, 3.4 had this normal looking.

It was for small facial nerves, for small tumors that grew away from the brain.

Majority of the participants in the study had this flat facial nerve, where the visual color of the nerve was the silvery white color, but it was separate from the IAC.

The second most common one was a membrane, where the nerve itself was visually this yellow color. And that was typically seen with larger tumors. One of the more uncommon ones is penetrating. So that

second oval, smaller oval that you see is another tumor that is just intertwining the facial nerve. The fifth one is diffused, so the uneven growth of a tumor caused the facial nerve to be affected more.

But that was not as often as, say, the flat or membrane.

Talking about the House Brockman scale, it was developed in the 1980s by a committee from the American Academy of Otolaryngology head and neck surgery. It measures eight different points, from the forehead down to the mouth, and the movements of all of those, there are six grades, from normal to total paralysis. Going back to Miss Doe, she had a grade two to three, so it was a, which is mild to moderate, so it was less noticeable when her face was at rest. But anytime she attempted to smile, lifting that left side, her lips or eyebrows were noticeable. She did report using a gel at night.

So even though she could fully close her eyes, she used a gel on the left side to ensure that it stayed closed throughout the night.

So, talking about the risk of facial paralysis, there's always a risk when you do brain surgery or any type of surgery. However, the literature indicated that there was no correlation to facial paralysis and one microsurgery. Rather, facial paralysis was more connected to the size of the tumor. So Kahn et al in 2022 did find a positive correlation between the facial nerve paralysis and the size, where out of a 420 retrospective reviews of the surgical removals, less were about the middle cranial fossa approach. Majority was the retrosigmoid and then followed by the translabyrinthine.

But one thing that they did note was that from the initial to the last follow up, they did see an improvement of facial paralysis where 86% had a good score. That one to two scale sympath and et al in 1997 also found a noticeable increase. However, they only looked at the retrosigmoid and translabyrinthine approaches, which just again continues to solidify that it's the micro, it's not the microsurgery, it's the size of the tumor.

There were conflicting articles, however, with the Ocean article in 2014 where they did not find a correlation. However, the caveat of this article was that they only had 67 participants and only nine had facial nerve weaknesses. Out of those nine, six of them had that house Brockman score of a six. So total paralysis. Two had a house Brocklin score of five and only one had a house Brocklin score from one to two.

At the one year follow up, seven of them had improvements to house Brockman score of three. So again, there is evidence to suggest that there is possibilities for healing. There was also another article of Savinski in 2021. However, they looked at tumors that were almost double the size of the potential of missed dose. So there is a limitation with the research in regards to comparing the microsurgical approaches used and facial paralysis because the focus is on the size of the tumor.

So though it's missing from Miss Doe's case reports, there are two assumptions that can be made about her. One, she's had a grade two to three of a house Brackmann score for the entire decade, or she had worse facial paralysis that has since reckovered since then.

Regardless though, once a person is diagnosed with a vestibular schwannoma, it's a ten year journey for them to reach this end. But that only means the end of the follow ups. In Miss Doe's case, she will continue to have that facial paralysis and she will not be able to utilize any of that profound since renewal hearing loss with the Baha just because she chose not to wear the device anymore. So the end of a journey only means the end of the follow ups. The patient still lives with this in their history and they still live with any of the conditions that follow afterwards.

And thank you very much for listening.

Thank you, Christina. One of the things I want, if you have any questions for Christina, please feel free to post them now. But one of the things I want to comment on is in our objectives. We talked about how we, as audiologists, have a really important role. And as somebody who's worked in a couple of medical settings and has seen a lot of vestibular schwannoma patients, I think there's some really great take homes from Christina's case presentation.

One is size of the tumor is huge in terms of, hopefully the tumor is not huge, but size is a really important factor. And the better that we are at diagnosis. And early on, we may be the first person that gets to see that patient and refer them for otologic care and help them to avoid some of the facial paralysis issues. But I also think part of it is that long term commitment to a patient relationship and how they get to know us and we get to know them. And it's more than just about the ear.

And I know Aubrey said that also, so I think that's an important thing for us to think about. I don't see any questions posted for Christina right now, so we will move on to our next present. Oh, and Christina had a couple of credits. We'll move on to our next presenter, Erin Robinson. Erin has just completed her first year in our program, so she started as a second year in the AUD program and getting to know Erin over the time that I've had the pleasure of knowing her, she has a really, really wide variety of interests.

And I love that she picked this cochlear implant case because it really resonated with me, and hopefully it will resonate with you. I'll turn it over to Erin. Thank you, doctor Whitelaw. My name is Erin, and my presentation is called a cochlear implant. Please.

I want to say thank you to the people who've given me feedback on this presentation and the audiologist in charge of this case. They wanted to remain anonymous to give the patient greater confidentiality.

That's just an outline. So sudden sensory neural hearing loss is defined as a sudden hearing impairment of more than 30 decibels across three neighboring frequencies in fewer than three days. Sudden sensorineural hearing loss results in more than 66,000 new cases each year in the US. These are typically unilateral, so only affecting one side, and the majority are idiopathic, meaning no known cause. Unknown causes include infections, autoimmune, otologic or metabolic diseases, ototoxic drugs, and or trauma there are also some known risk factors such as poor cardiovascular health, heavy smoking and certain genetic factors.

So there are four outcomes for people with sudden sensorineural hearing loss, spontaneous reckovery reckovery after the initial round of steroids, reckovery after a second round of steroids, or permanent sudden sensory neural hearing loss.

When it comes to treating sudden sensory neural hearing loss, historically the initial treatment was a systemic steroid. To be effective, the steroid must be administered as closed to the onset of symptoms as possible. If the systemic steroid does not work, then a trans tympanic injection is given. Advantages of that include the avoidance of systemic steroid side effects such as gastrointestinal complaints and mood changes. Also treating only the affected ear rather than subjecting the whole body to a round of steroids that it might not need, and better tolerance by hypertensive and diabetic patients.

There are some disadvantages though, including pain and infection due to tm perforation and patients sometimes experience vertigo. The evidence is clear that steroids are the best course of treatment, but the primary pathway for administration is less clear. It used to be the systemic steroid always came first and then a trans tympanic injection if needed. But from all the research that I read in preparation for this presentation, it seems that in the future, using both a systemic steroid and a trans tympanic injection as the initial onset of symptoms is going to be the norm.

And to conclude the background information, I just wanted to paint a picture of what happens when steroids have not been successful. So many articles have demonstrated that cases of unilateral sudden sensory neural hearing loss, that in those cases, cochlear implants can improve word reckognition scores and decrease tinnitus perception. The second bullet point is a case of bilateral sudden sensorineural hearing loss, which is quite rare. And this patient also was more rare because they also had profound sudden sensory neural hearing loss and they went through two rounds of systemic steroids without any change to their thresholds. But I liked this case because it showed the power of cochlear implants being able to take a patient with profound hearing loss and no speech reckognition to 60% open set spondylosislosis reckognition.

And this patient also reported a dramatic subjective benefit for speech and environmental sounds. So, all right, so this is the case that I observed. This is the information from his initial visit when he was transferring care to his current facility. He's a 60 year old male, well, male, in his sixties. He reported hearing loss for many years with a sudden bilateral threshold shift that made it difficult for him to understand speech in all environments.

I don't know if he had a systemic steroid, but he did have a trans tympanic steroid injection that improved his hearing thresholds, but he still had very poor speech discrimination. And he presented to the facility wearing reckeiver in the canal, hearing aid in the left ear, and no hearing aid on the right. So these are the results from that initial visit. You can see a clear asymmetry. They could not even test word reckognition in his rights, and it was very poor on the left.

So at this point, the audiologist began the best fit process, suggesting bilateral amplification with an entry level hearing aid, the Phonak Naida ultra power. And the patient agreed to be fit with these, and they moved on from there.

So after wearing the hearing aids for a while and having time to acclimate and really give the hearing aids a chance, the patient came back in and reported that they were still struggling. And these are the results from that visit. As you can tell, that is true. He is struggling. The results are very poor.

And so at this point, the audiologist reckommended to get a cochlear implant in the right ear, and the patient agreed.

So I called this the interim because there's a period of time that we're not covering. But in that time, he got the cochlear implant, and these are his current devices. The patient did undergo reimplantation due to device failure and fluid ingress. So this poor patient. Things were already not going well, and reimplantation is tricky on its own because of surgical complications and maneuvering around scar tissue in the cochlea.

This is the visit that I actually observed, so it's the one I know the best. At this visit, the patient reported that the sound from their cochlear implant was rough and raspy, and the sound from their hearing aid was low and weak. So they were concerned about maybe more threshold changes at this point. But later in the visit, it came to light that the patient has not been doing the proper practice with speech. The audiologist reckommended when the patient got the cochlear implant to do listening with practice apps or audiobooks or podcasts with familiar content.

But the patient told us that he usually listens to music for practice, and this is important because cochlear implants are not designed for music listening. And it's really great that he enjoys music through the cochlear implant because that is a little unusual. People usually don't like the way music sounds through cochlear implants, but it's not going to help him get better at listening to speech and strengthening those neural pathways. So here are the results from that visit.

The aided thresholds for the cochlear implant are right where you want them to be. But even though his thresholds are great, he's not understanding speech very well. And 14% is a big improvement from 1% that he had without the cochlear implant. But we can't expect someone to walk around with these AZ bio results and expect them to be functioning well in their daily life. So the reckommendations after this, the patient's hearing aid problems were resolved by cleaning.

There was actually just a ton of wax in the tubing that the patient didn't see or know was there because of the ear mold. And so I'll get into that. But the daily listening practice with the cochlear implant only was reckommended. And on the screen are some examples of speech listening apps specifically designed for cochlear implant practice. But then, due to lack of success, the audiologist reckommended going forward with a cochlear implant in the left ear because they are a candidate on that side.

But understandably, the patient was not interested in that because they have not really had much success in the right ear.

But the patient came back for another visit and they reported improved hearing after doing some of that speech listening. And they've had some time to think about it, and they are more open to thinking about a cochlear implant in the left ear.

What's important to take away on this slide is that the patient's AZ bio results in the right have improved. They went from 14% to 22%. It's still not great, but it's at least better. And the patient feels they're doing better, which is very important for success, how a patient feels they're doing.

And so the reckommendations for this visit were the same as the last. Continue the speech only the speech when the CI only listening practice, and get a cochlear implant for the left.

So these are just the key takeaways and the things that I learned. Cochlear implants sometimes have reputation for being magical. And while they are an amazing piece of technology, they still require patient effort. You can't just pop in a cochlear implant and off the patient goes. This patient is frustrated with their lack of success, but they have not been doing the things that they needed to do that speech listening practice.

And this patient has been wearing hearing aids for about a decade, but they needed some refreshers on how to take care of a hearing aid, because, you know, dirt gets on it and it doesn't sound as good. So he needed a refresher. And I think it's important not to fall into the idea that your patient has had hearing aids for so long. They must be an expert. They don't really need my help.

And I say, don't forget about your resources, because the audiologist reached out to the cochlear implant manufacturer to see if they had any tips to help this patient. And I really liked seeing that, because at the time of this appointment, I didn't know that cochlear implant companies employed audiologists. It makes sense, but I just didn't know that at the time. And so it's important to remember that you have that tool. These companies see cochlear implant patients all the time, and they have lots of research and data, and they want their devices to be successful.

So reach out to them when you need help. And then, last of all, it's frustrating when patients don't do what we ask them to do, but we can't force them. And as we saw with this patient, he came around to what we were saying and saw that we were right. But, yeah, just be patient and your patience will come around. So that's all I have.

Thank you. Thank you. Erin. There was a question in the chat in the Q and A, and it was related to one cochlear implant versus two. And I think you addressed that in saying that he's being encouraged.

One of the things that struck me as you were talking is Morgan's going to talk about health literacy. And I think sometimes we do assume that people know a little bit more than we think they do. And the other part of that is when somebody isn't following through, how do we motivate them? And there's a great technique called motivational interviewing that really works effectively for many of our patients. And so if we're not using that, that's a great thing.

Thank you for that approach. I want to remind you guys that Erin has just finished her first year in our program. And to be thinking so broadly about cochlear implants, I really commend her at this point in time. Our next presenter is Liam Smith. Liam is a third year AuD student at the Ohio State University.

And when I think of people that have really broad interests, Liam is probably a student that I've worked with who has the broadest of interests, and I love chatting with him about patient care. He's outstanding at providing patient care, and he's going to talk about a patient that he saw who has somatic tinnitus, which can be very challenging in the world of tinnitus. So I'll turn it over to Liam. Well, thank you for that lovely introduction, Doctor Whitelaw. And as she said, I am Liam Smith, and we're going to talk about somatic tinnitus.

So I think most people know at this point, tinnitus obviously is the subjective perception of ringing or sound in the ear. And keeping that in mind, somatic tinnitus is tinnitus that is evoked or modulated or any way impacted by inputs from these somatosensory or motor systems. So if you think of muscle movements or muscle tension, TMJ, jaw problems, or any other dental problem, cervical spine issues, you know, movements in the neck. So it's estimated to occur in about 65% of all tinnitus cases. So about two thirds, and kind of under that umbrella.

Cervical genetic tinnitus is a form of tinnitus that's modulated or controlled by neck movements. It's thought to be caused by a neural connection between the dorsal cochlear nucleus and the somatosensory systems of the head and cervical regions. We obviously don't have necessarily

objective tests to diagnose tinnitus the way we do. You say word reckognition, but cervical spine testing, manual. So manual rotations, those have been found to aid in diagnosis, and those should be carried out by a physical therapist, which brings up one of the themes we're going to talk about of interdisciplinary care.

So that brings us to the patient we're going to talk about today. This patient was seen last October by the OSU speech, language and hearing clinic. And like Christina's presentation, I used this patient for a presentation for the medical audiology class. This patient was a 74 year old male. His tinnitus handicap inventory score was 38 points, so a mild to moderate impairment.

He reported that while he had non bothersome tinnitus for about 15 or so years, it steadily worsened starting in the spring of 2023. On a scale of one to ten points, he described it as being about eight points in intensity. Uh, and he described the sound of his tinnitus as being like the compressor on a refrigerator. So if you walk into your kitchen or I'm in a lounge, so I've got one right in front of me, imagine that sound all the time. That's basically what this patient was experiencing.

There we go. And he reported the main thing that aggravated his tinnitus or increased his perception of his tinnitus, of this sound was neck movements. So he is in physical therapy, working on his posture to alleviate stiffness in his neck. And about an hour after these sessions, right on cue, he notices his tinnitus. Tinnitus begins flaring up.

He also reported that falling asleep, like if until things head down. So he's in reckliner chair watching tv, and kind of nods off like that. That neck movement will wake him back up and increase his tinnitus perception. He also reported that playing golf is also worse than his tinnitus.

So the reason he was in physical therapy was because he was diagnosed in 2021 with a degenerating cervical disc disease with symptoms including bulging in the lumbar region and mild stenosis of the c

three to c six region. He was seen by an autologist through OsU in ear in 2023, and that autologist ordered up MRI and CT scans, but thankfully, no craniofacial abnormalities were found. And he also reported that the generating disc disease has been not debilitating.

So once he got to us, he obviously gave us that case history and those questionnaires, like the tinnitus handicap inventory. And then we went through a standard audiologic evaluation. You can see, you'll see his audiogram on the next slide. And obviously, we also speech audiometry. And ten is pitch map.

We matched his tennis to 1500 hertz at 63 decibels hl, which is based on his audiogram, about ten decibels or so hl.

So that's his audiogram. I put two in there. The first one was done in Naples, Florida, where he spends his summers, his winters, in January of 2022. And the audiogram on the right is the one we did at OSU in October of last year. And you can see they paint pretty much the same picture.

You start out kind of at a mild to moderate hearing loss in the lows and sloping down to a moderately severe or even a severe hearing loss in the high frequencies. The audiograms are generally symmetric, with this loan exception here in January. I don't think we ever came up with a good explanation of that, but we. Like I said, the years were generally symmetric.

His prior Titus management, things he had done prior were wearing phonak, I believe, audeo hearing aids for about 15 years, mainly for his hearing loss. And he also used some tinnitus management features, but again, it was mostly non bothersome. And then he was fit with Signia Rick hearing aids with notch therapy. Yet roughly the same time last spring that his tinnitus began worsening. When we looked at his hearing aids they were in the phonak.

He had switched back to those. And his hearing aids were well fit, they were well maintained. They were maybe slightly below nal, two targets, but nothing that we would say was a gross under underfit or anything like that.

So what kind of tennis management can we do now? Well, the literature says physical therapy. Much of the research has been done by Sarah Michiels, I believe I'm pronouncing that right, of Antwerp University in Germany, and then group led by Ostendorp and colleagues. Ostendorp and colleagues in 2016 developed a tinnitus management technique that focuses on static, so unchanging and dynamic, so changing posture movements, and then very gentle, low velocity mechanical stimulation of the joints of the spine, the pelvis, the extremities. Yeah, very gentle movements designed to bring down that tinnitus perception and hopefully lower that thi score.

Mikhail's focused it a little differently. They focused mainly on multimodal stimulation of just the cervical region and physical therapy in that domain. And they found that their technique significantly reduced tinnitus questionnaire scores over a therapy period of six weeks. And then in a follow up period of six weeks, those scores continued to go down. And they expanded on this research in 2017, investigating, you know, predisposing prognostic indicators that can predict positive outcomes.

So that's all great, except for one problem for this patient. The thing that aggravated his tinnitus was physical therapy. So we have to attack this a different way.

And obviously, he'd been wearing hearing aids before. Hearing aids obviously help patients manage their tinnitus through masking techniques and sound therapies. Hear. In audiology, we also refer out to cognitive behavioral therapies. These are relax relaxation exposure techniques, mindfulness based training that can be done in person or online, generally through weekly sessions.

And in the world of audiologic management, there's a new kit on the block. Linear. Linear is a neuromodulation device that employs bimodal stimulation. So again, we're getting multiple modes of stimulation. This is of the trigeminal nerve via headphones.

So auditory stimulation and a tongue stimulator.

So we canceled the patient on all of this. We counseled him on the benefits of new hearing aid technology and appraised some of the OSU speech language hearing clinics. Demo hearing aid program, where patients can demo hearing aids for about a month or so. New hearing aids before they, you know, it's a tribe before you buy. He was also canceled on the benefits of linear.

And then we gave him information for an at home cognitive behavioral therapy option, and then also referred him to an in person cognitive behavioral therapy through OSU.

Ultimately, this patient, after a period of further research and reflection, he opted against pursuing hearing aids, further hearing aid man, or further tinnitus management with hearing aids, and instead decided to move forward with linear. I believe he still wears his hearing aids for his hearing loss. We fit him on December 7, so about two months after we saw him, and then a follow up in February 27. So basically, about three months later, if you round up to March, we saw him for a follow up in your report that his perception of his tennis has significantly gone down. He felt his quality of life was much better.

So in short form, mission accomplished. But what are the takeaways from this experience? Well, first of all, tinnitus is complicated, which makes it both a goldmine if you want to do research in it, and also kind of more difficult to manage clinically. This case underscored the importance of good audiologic interdisciplinary care, because obviously, with two audiologists, an ontologist, and physical therapist all involved, and I thought this kind of looking at the research and the physical therapy as a management technique for somatic tinnitus versus this patient's lived experience, it underscores that our roles in our

path in a patient's case can be strange and unusual. And I thought this was certainly an unusual, unique case.

Obviously, this case had a happy ending. We resolve this tinnitus, at least reduce his perception of it, and that's all I have, and I'll be happy to take any questions before we move into the next presentation. Thank you, Liam. If anybody has questions for Liam, feel free to post them. You know, in looking at Liam's case, just to give, since I follow this patient now also, he is really, really satisfied with what happened to.

But I think Liam's point about interdisciplinary care for people with tinnitus is so important. Many of us, when we were trained in tinnitus, we were trained in things like a person has noise exposure. Those tend to be relatively straightforward. But when we start looking at somatic or cervicogenic tinnitus, we do have to work as an interdisciplinary team. And I think that having that physical therapy input with a physical therapist who's understood this and studied it, and it also gives us, as an audiologist, a great opportunity to reach out and build more of a team and build more of a referral network.

I see no questions for Liam right now. Remember, you can still post questions for us if you would like, and we're going to move on to Morgan Leatherman Morgan is a fourth year student in our program who is doing her fourth year experience at the Lexington, Kentucky VA Medical center in Lexington, Kentucky. And Morgan has a really interesting background in terms of her interests are very much patient care in maybe a little bit different way than providing direckt patient care, but looking at also a more global perspective of how can we provide better service from what we know as audiologists. And I'm really excited to present her research on health literacy.

Thank you so much doctor Whitelaw.

I'm so excited to talk about health literacy with you all today. It was the topic of my capstone, so I would like to also thank Doctor Jody Baxter for being my advisor.

So the outline for my presentation today, I'm going to introduce my case, talk a little bit about health literacy, talk about some audiologic considerations, and finish up with my takeaways.

So this case was a 35 year old venezuelan female. She was diagnosed with a bilateral hearing loss about five years ago. Since then, she has worn binaural behind the ear hearing aids with custom ear molds that she reckeived in Venezuela, and she reported that she loved them. They really benefited her. But she reckently immigrated to the United States and their hearing aids stopped working.

She emailed the manufacturer of her original hearing aids to help her determine how to obtain hearing aids specific to her location in the United States, and that led her to the Ohio State University speech language hearing clinic. Her primary language is Spanish, so the majority of her appointments were conducted through a spanish interpreter using boost lingo video interpreting services.

When the patient arrived to her appointment, she was wearing slim tube beyond online approximately. She reported that the hearing aids did not fit well. They hurt her ears, caused headache, they would often check, and they impacted her ability to communicate at work. So we did a comprehensive audiologic evaluation. Temps were type a bilaterally.

Ipsilateral acoustic reflexes were absent 500 to 2000 hz bilaterally. A dpOAe screening revealed absent OAE's 2000 to 5000 Hz bilaterally. Pure tone testing revealed a symmetric, moderately severe rising to mild mixed hearing loss, and then speech audiometry was not conducted, as the patient's primary language was Spanish.

And here is an image of the audiogram that we measured at her appointment.

After testing.

After testing, we did some counseling. We talked about mixed hearing loss, described it to the patient. It was reckommended that she consult an ENT for the medical evaluation and possible medical intervention. She expressed understanding of this reckommendation but declined, stating she might reckonsider within the next one to two years. She has since been Fitz binaurally with entry level rick hearing aids with custom ear molds using best practices at our clinic, and she reported subjective benefit from these hearing aids at her follow up appointments.

So, happy ending, right? But it left us thinking, why did this patient purchase over the counter hearing aids when she had a history of consistent prescription hearing aid use? Reflecting on the case and reviewing the literature on possible barriers to pursuing prescriptive amplification, health literacy surfaced as an important area of focus.

So what makes this case interesting in terms of health literacy? We determined that she had low health literacy due to a limited understanding of the us health system and how to access it. As a reckent immigrant and also English not being her primary language, however, she had the skills to understand that the hearing aids she acquired online were not appropriate. She was able to navigate health information on the Internet, and she was able to find a hearing healthcare professional in her community.

Now talk a little bit about health literacy. One important thing to know is that health literacy is a central focus of healthy people 2030 and they have six objectives that are related to health literacy. Those six include increasing the proportion of adults whose healthcare provider checked their understanding decrease the proportion of adults who report poor communication with their healthcare provider increase the proportion of adults whose healthcare providers involved them in decisions as much as

they wanted, increase the proportion of people who say their online medical reckord is easy to understand increase the proportion of adults with limited english proficiency who say their providers explain things clearly and increase the health literacy of the population.

Health literacy is not just one thing, it has multiple components. One is personal health literacy. So degree to which individuals have the ability to obtain, process and understand health information services in order to make well informed health decisions for themselves. Then there's organizational health literacy, which is the degree to which organizations equitably assist individuals in gaining personal health literacy. There's digital health literacy, so the ability to obtain, process, understand, evaluate health information from electronic sources and then numeracy, which is the mathematical and problem solving skills needed to succeed in a data driven society.

There are also multiple levels. We have the functional level, which is basic reading and writing skills needed to understand health information the healthcare system and technologies used interactive, which is the higher level communicative and social skills required to extract and discuss health information with others such as healthcare providers and family members and critical, which are the skills necessary to analyze health information and make informed decisions.

So, who is at risk? Looking at the literature, we see that older adults, individuals facing health disparities, individuals with lower education levels, individuals whose primary language is not the primary language of the society they live in ethnic minorities, but really, everyone is at risk for low health literacy.

One thing some things to consider, patients with lower health literacy are more likely to present with more severe hearing loss at their first audiologic evaluation. That's not to say that low health literacy causes severe hearing loss. It's just to say that they're more likely to wait a little bit longer before seeking out audiologic care. High literacy and education levels do not automatically equal adequate

health literacy. So you can have someone who has high literacy, high education, but still limited health literacy levels.

Adequate general health literacy does not equal adequate hearing or audiologic health literacy. So health literacy can vary depending on the topics discussed. And patients with low health literacy may overestimate their health knowledge. And we often see that with the Dunning Kruger effect. And the Dunning Kruger effect is a cognitive bias for having a limited knowledge or skill in a specific area.

In those areas, people tend to overestimate their abilities, their abilities, and their knowledge.

I just wanted to briefly talk about this because it'll be important for the next slide. Patient education materials, which we'll put as poems such as user guides, brochures, and just really information, any information out there. And then patient reported outcome measures like which we'll say is proms like the Ioha, the HHI, and a whole bunch that's listed there and a whole bunch more that wasn't even listed.

I mentioned those because we're going to talk a little bit about literacy and health literacy. So literacy does not equal health literacy, but they can interact. A patient's literacy and the readability levels of common audiologic patient materials must be considered during patient counseling. The average reading grade level in the United States is an 8th grade reading level, so it's reckommended that written materials be written no greater than a fifth or 6th grade reading level for the whole population to have equal literacy access. And those tempos and prompts that I had mentioned before in the previous slide have been found to have readability levels above the reckommended fifth to 6th grade reading level, and most of them are often written at college levels.

So with that said, patient materials for your practice can be developed with health literacy in mind, and that's where you can come in. So making those materials consider your audience's needs, focus and

limit your objective with evidence based content, providing the need to know information, making sure the content meets the language and cultural needs of the audience, and keeping literacy levels in mind. Writing using clear language, using a clear claim typeface, using graphics to complement the content, and emphasizing important information with bolded list and underlining.

Now, for counseling itself, health information should be shared in the patient's primary or preferred language. Using certified interpreters. Use clear and accurate language. Avoid technical words, jargon, acronyms. Focusing on two to three main points you want the patient to remember.

You can always have them come back if there's, if you want to have, if you want to talk to them about more things. But at that appointment, we know that patients don't remember everything you tell them. So just focusing on two, three main points and using the teach back method. The teach back method is a communication confirmation technique that you can use to ensure that patients understand the health information provided so you can have the patient explain in their own words what was explained to them. And through that, you can see if there were any misunderstandings, and you can address those misunderstandings and then using pictures to complement any verbal or written counseling.

So the takeaways that I learned when looking at the literature and thinking about my patient health literacy levels are not static. They ebb and flow depending on age, the experiences people have, the type, the topics that are discussed. Patients with high literacy and education levels may still have low health literacy. So we shouldn't just assume that they will understand what we're talking about in the first go. Frequently used user guides and informational materials are often written at a higher readability level than the average individual has.

And so clinicians can provide health information that individuals can more easily consume and use for best health practices and shared decision making. And finally, encompassing all of that, provider awareness of health literacy is essential for patient centered care. It is something that I am still working

on even in my counseling today. Sometimes I forget and I have to take a moment, remind myself, and look at these steps in order to make sure my patients are successful going forward. And that's all I have for you.

Thank you so much.

Thank you, Morgan. If there are any questions for Morgan, you can go ahead and put them in. I was in a meeting late last week with about 20 audiologists, mostly in private practice, and this topic came up related to describing things in terms of functional hearing loss and APD. I was reminded that for many of our patients who may have even a disorder like traumatic brain injury, their reading level is truly impacted. And so I think the message that Morgan brings is really, really important, and I think we'll see more focus on this.

And when I meet with manufacturers, I joke with them about the hearing aid manuals that are clearly not built for somebody my age. I can't always read them. I have to expand them on my screen or when I give them to patients, I'm often like, not such a great thing. All right, I'm going to finish up our day today with a case that I hope will leave you thinking, and I'm going to go through it pretty quickly so we stay on time. But this is a really difficult case for me to talk about because it's a change in how I might approach audiology from the way that I did previously.

And I want to make sure that you all know that I am not criticizing the audiologists that have worked with this patient. I happen to work with this patient. There's a couple of other audiologists who work with her, but it's a change in focus of how we might work with a person. So my case is, when is faking not faking? This case is a 13 year old girl who has a really complicated medical history and a really complicated hearing health history.

She was initially seen at our clinic a year earlier. So a year ago, due to fluctuant hearing loss that was demonstrated at another facility repeatedly, she would say that her hearing would be good some days and bad some days, and it was very, very frustrating to her. At that time, no speech and noise testing had been done, and the patient and her family were hoping to gain more direcktion and addressing what she reported as communication issues. So they came here. The patient has a history of mental health needs and has requested female only providers since.

She noted that she had had negative interaction with male providers, not just with audiologists, but with healthcare providers in general. She has a complex diagnosis known as complex regional pain syndromerome. If you are not familiar with this, you should take a look at it. It takes a very long time to diagnose because many of these patients are questioned and accused. And it's often in young females from late elementary school into early adulthood, and they are told that they are dramatic and many things.

And so this ties into why I'm telling you about this case. It's an uncommon form of chronic pain that usually affects an arm or a leg, typically develops after an injury, a surgery, a stroke, or a heart attack. And for these patients, the proportion of pain that they have is much more severe than would be anticipated by their original injury or their initial injuries. This patient was seen here for an audio in 2023, and she had significant speech and noise deficits. I'm sorry, I should have put it on the slide.

I think her speech and noise deficit was something like 17.5 on the BKB syndrome. So really, really significant, difficult listening and noise, which was consistent with what she described. So in our clinic we will often fit patients like that who we consider to have functional hearing loss and her history of fluctuate hearing loss. We will fit them with low gain hearing aids on a demo basis. Liam described that we have a lot of demonstration hearing aids and we like to use them and get them in the hands of patients.

So she was seen. She reckeived medical clearance because her physician and her ent at the time were so concerned about her that they wanted to make sure something was being done to help. What she reported she reported considerable improvement in listening in school, in social and extracurricular environments, and her family notes significant improvement in her hearing and listening skills. This is important to her because she is a really cool kid. She's very dramatic.

She would like to be a performer, an actress of some variety. She is so fun to interact with. She also comes in in days and she demonstrates anxiety and depression. And we also did the Vanderbilt fatigue scale on her, which demonstrated significant improvement from pre fitting to post fitting. At this time we were working on obtaining funding for hearing aids and her hearing was being reevaluated on an ongoing basis because she's a little bit inconsistent with her hearing test results the mother contacted me by email on Saturday, April 20 to say that the patient had a significant decrease in her hearing in both ears, but the patient reported that she was deaf in her right ear.

We discussed some options, including going to the emergency department while bringing an otologist into this, and the family opted to wait until Tuesday 423 when they could see me and get an otologic exam. The results revealed a profound hearing loss for the right ear and a moderate to profound hearing loss for the left ear, and she was a little bit difficult to test because she was really above and beyond in terms of believing that her hearing had truly changed. Her results were inconsistent, but her anxiety and the presence of tinnitus make this not surprising to me. She had oases absent in her right ear at the time and present in her left ear, which was consistent with the history we had seen with her, and she begged me to boost her hearing aids. She told me that she was deaf in her right ear.

I explained to her that I was going to do nothing until the medical assessment happened and her hearing was reevaluated after treatment, if any. The otologist saw her the same day that I did and he prescribed. He and I had chatted on the phone before she got there. It's an otologist I really trust. He

was going to prescribe trans tympanic administration of steroids, as we heard in another case today.

However, she was unable to tolerate that. She said that the anxiety was too great, so he prescribed oral steroids for her. She finished her course of steroids and then she was seen at our clinic for follow up. She had the same results, but there were a couple of observations. She could.

I could walk ahead of her and she could respond to questions when my back was to her. And that was a little bit disconcerting. She told me that it was clear and easy to hear me, and her word reck is better than would be anticipated. And the patient was in a really bad mood at the time of testing. She is an 8th grader and had gone to Washington, DC as 8th graders in Ohio do, and she said it was fatiguing and tiring, and she came back with a terrible sinus infection, and she was just really not happy about her world.

She was seen by an audiologist at the otologist's office and the same results were obtained. She had a male audiologist who did confront her and tried to do the stinger and mentioned to her that he thought she was a faker. And again, I'm not criticizing him. I'm saying this is what unfolded. She had an ABR performed at a different hospital, and that ABR was consistent with normal hearing acuity.

The audiologist again reportedly confronted her. The audiologist told me she did, the parent did, and the patient did and told her, insinuated that she was faking and really needed to stop this. And I got a frantic phone call from the mom after all of this, saying that my patient was spiraling. Based on the audiologist's feedback, that the patient is insistent that she has hearing loss, that she is not crazy because that had been insinuated to her by many healthcare professionals, and that she can't understand people in her listening environment. So I reached out to a pediatric psychologist I work with on my grant for direcktion, and the patient had been seeing a psychologist for pain.

Based on the patient's reported symptoms, there's something that the psychologist talked to about that I want you to be aware of, which is called functional neurologicalal symptom disorder. It's a health condition in which the patient experiences symptoms that are associated with a neurologicalal or a sensory condition like hearing loss. That is not confirmed by our clinical findings. Functional neurologicalal syndromerome, symptoms that may include abnormal control of movement or alterations, and sensory experiences such as perceived hearing loss. In my patient's case, FNSD can be diagnosed only when there is a clear evidence of incompatibility between symptoms and test results, which you may say, well, people with pseudohypoacusis have that, or malingerers have that.

This is a little bit fresher take on how we can engage these people in a different manner. There is an ICD ten code for this. It's f 44. And I would encourage you to take a look at that. So, what to do?

These are the things that are helpful. It is important to validate the patient's experience and their symptom review. Yes, I understand that you think that you're experiencing hearing loss in that ear. Yes. You are really struggling in a noisy environment.

It is important to partner with a pediatric psychologist who understands this disorder and not to transfer care. I think about my own approach to this. In the past, I probably would have said my patient needs to go see a psychologist and the psychologist who does FNSD, but I'm not going to be involved. And what all the research says is that the healthcare provider, for whatever the condition is, should continue to walk along with that patient, should continue to be on their team, and then supporting the parent to be a coach for their child. What doesn't help is an overemphasis on the patient's mental health, as has happened to this young woman many times, where mom has confirmed for me, and just to let you know, I don't have any reason to believe that her parents are Munchausen by proxy, which I've worked with those families before.

I think these are parents who are really vested in their child, invested in their child, and very realistic. And they have told me that physicians and unfortunately, audiologists have said in front of her, I think she's crazy. I think she has significant mental health issues. And that, by the way, just in case you guys were wondering, isn't in the scope of our practice. And many patients can have a comorbid psychiatric diagnosis or stressor that goes along with this, suggesting that the symptoms are all in the person's head and confronting the person as a faker.

So how does this relate to what we do? As audiologists? We've been taught and conditioned to see patients as malingerers. I go crazy here at Ohio State because one of the first things, and all of our students can tell you this, one of the first things we talk to them about is there's a potential for people to be fakers. Indeed there is.

We know that. But that's if you look at the literature, and I did a deep dive on this for a presentation last year. Unless you're in certain populations such as the VA medical centers, who may see a higher incidence of malingering, or people who come in with lawsuits who may see a higher incidence of malingering. It is not something that you see routinely, especially in a pediatric population. Historically, we might have referred to these people as psychogenic, and that that would be any hearing loss that we couldn't explain with an organic cause.

Sometimes in general, this is called a conversion disorder, and you may have been taught that in your programs, there's at least a subgroup of patients who demonstrate hearing loss that cannot be explained to by hearing results. FNSD is a real thing, and it requires a partnership with the patient, with the family, with the psychologist, and with us. So this, my 13 year old patient, she's been evaluated by a behavioral psychologist who does FNSD, but there are no community resources for us to refer her to. She made it clear to me that she would do the evaluation, but she was not interested in following up with the treatment, that this wasn't her area. I'm continuing to work with her as her audiologist.

She acknowledges that her anxiety is there and believes that her hearing loss is real. Previous audiologists continue to identify her as a faker, and they have continued to encourage me to call her out. And this information may be able to reframe how we perceive malingering behavior or how we approach it. It's not to say that what's going on with this patient doesn't match up with what our behavioral testing is. And this is a really different way for us to wrap our head around things.

And so I encourage you maybe not to totally jump into where I am today, but to think about this. When you see patients where their behavioral results and the report don't match, and something seems very, very radical. Most of you that know me know that I am a huge believer in functional communication issues. And we routinely see patients where they have normal audiograms, and you do speech and noise testing, and it's really very, very difficult for them. This goes a step beyond that, and I just want us as a profession to be aware of that, especially when we're talking about this topic.

If any of you have questions for me, I know we're really short on time, and you are more than welcome, as always, to email me. I would love to chat about this or get your thoughts or opinions on it. We would like to thank you all for being here today. I hope that you get to see the amazing group of people that I get to work with every day and how bright the future of audiology is. So thank you for being here.

And I will now turn it back to Calista for some information she wants to share with you.

All right. Thank you, everyone, for attending today, and what a wonderful event. Right. So I just want to remind everybody, there is a post course exam. It'll be available ten to 15 minutes after the conclusion of the course today.

Make sure you're logged into your account, go to pending courses, find this course, and then hit take exam. But you do have the next seven days, though. So if you're not able to take it today, you do have the next seven days to do so. So it looks like we do have one question. Doctor Whiteloff, you want to

answer that?

And then we will close out for today. Sure. Let's see. That's a great question about did we maintain low gain hearing aids? We've decided to keep an aid in her better hearing ear and not to aid what she describes as her poor hearing ear because we're not sure what to do.

And I probably would be happy to maintain the low gain hearing aid in the right ear. But other audiologists, and I consider them part of our team, are very concerned about overshooting and damaging or hearing. And I'm really, really pleased with the otologist in this case. He's very quiet and I don't think he's particularly aggressive. And he said, I will support whatever you choose to do because I want this young woman to get what she needs.

So we're going to revisit that once she starts school in a few weeks. But thank you for that question, and thank you for bringing me back around to thinking about that.

All right, wonderful. Well, we're going to wrap up. That was our only question. Thank you all for presenting today and sharing your cases, and we're going to go ahead and close out. Have a wonderful rest of your day.

Bye.