- [Kristy] At this time, it is my pleasure to introduce our first presenter, who will kick off our Audiology Grand Rounds Veterans' Issues. Dr. David Jedlicka earned his AuD from the University of Pittsburgh. He currently serves as a staff audiologist at the Pittsburgh VA and is a part-time instructor in the AuD program at the University of Pittsburgh. Thank you, Dr. Jedlicka. And at this time, I'll hand the mic over to you.

- [David] Thank you, Kristy. I think for today's presentation, we have some excellent cases ahead. There's probably some folks in the audience today who are not audiologists at the VA, and that's okay. The topics we'll be covering today are specifically veterans that we saw in our clinic at the Pittsburgh VA, but all of these cases can be applied outside of it. The topic information is certainly not just limited to anybody in the VA system. So we have, in addition to myself, three excellent audiologists here today, or I should say two other audiologists here today. Leslie Cody unfortunately couldn't be here. So I will be tackling her content after Dr. Michaux gives her presentation. So what our goal is today is to cover some topics across a wide range of areas. These are going to be things that hopefully you can take something from, even if it's not necessarily your specialty. But we wanted this to be wide-ranging, and we wanted to focus on what we do in our everyday clinic, so that way we can provide you with information that hopefully you can take and use to implement or improve your practice. So one other thing we're going to try to do is, since we have a good number of people registered for this course, there's probably going to be some good questions asked. So we're gonna give ourselves some time at the end to address any questions that you have. So if you do have any questions, don't be afraid to ask them to us. So let's move on here to our learning objectives. So what we're hoping to do here today is we're going to be talking about some patient outcomes. We're going to be talking about how to handle some difficult or challenging patients or cases. And then we're going to be talking about these specialty practices that you can use clinically that will lead to better patient care and outcomes. So the first case that I'll be presenting today is a gentleman that I've been working with for a long time now. With this is a gentleman who's 90 years old. He is a Korean War veteran. And he's been
using behind-the-ear hearing aids for 15 years now. In addition to this, he's also had assistive technology paired with the hearing aids. And he's been a very, very successful user. One of the benefits with the VA system is we have access to these devices that the patients can use without having to pay out of pocket for them. So this veteran, in the past, has used amplified phones, ones that connect to his hearing aids or just ones that were amplified in general. He did try a caption phone previously, but was not successful with it. And we'll talk about that a little bit later. He's used FM systems, back when he first got his hearing aids, and that was really mainly just used for the remote microphone technology. He's used his TV device extensively. And he has a cell phone, which he has devices paired to, so that way he can stream all of his phone calls to his hearing aids.

So one of the most important things about this case is the veteran's family information. He has two daughters and one son. He currently lives with his son, but he's independent around the house. He has one daughter that lives out of state. But the daughter we're going to talk about the most is the one that takes him to all of his appointments. She's his primary clinical decision maker. She makes sure he takes all of his medicines. And she's a nurse. So that's why she's involved in it. She's a work-from-home nurse, which I didn't know existed until I started working with these patients. But given the flexibility of her schedule, it works out well. So that way this patient can come to all of his appointments and she can be there with him to make sure that all the instructions are being followed. So I just mentioned a little bit earlier that the patient wasn't a good user of the caption telephones. Now, he hasn’t used any of the newer ones. He tried them about 10 years ago. That's when he started having some issues with macular degeneration. So reading the screen, for him, was pretty challenging. He was diagnosed with mild peripheral neuropathy, which was believed to be due to a longstanding vitamin B-12 deficiency. One other issue that makes this case challenging as well is that the patient has chronic otitis media and otitis externa with discharge. He's had this his entire life. It's not something that's due to the hearing aids. It's just something that he's been dealing with for a long time. Veteran, like many
patients we see, can be pretty stubborn. So he doesn't use any devices to help him with his mobility. So he's been recommended to use a cane or a walker, and he doesn't do that. He wants to be fully independent. So given the mild neuropathy, given his age, he does have a history of falls. And he does have a history of hypertension as well. So not surprisingly, he says, "I'm fine, except when I stand up too quickly, "I become a little light-headed." So these are just some of the things that are making the case a little bit more complex than we might see for a younger VA patient that isn't suffering from these things. So this patient, we first started seeing him about 15 years ago. As you can see here, these were the audiometric findings back from 2004. There was a conductive component found with that right ear. And at that time, the patient was fit with behind-the-ear hearing aids. The hearing aids that were originally ordered, they were returned for credit after two months. That was because the patient was reporting not having much success hearing in background noise or other challenging environments.

So the hearing aid that was selected was one that had compatibility with an FM boot. And that way the patient can use an FM system without requiring any body, neck-worn devices. And he can just have direct connectivity to the FM system. Due to his otitis externa and all the other ear infections he's had, the patient was having some difficulty with his tubing becoming occluded quite often. So this was having the benefit of having his daughter around. We were able to order him a second set of ear molds. The ear molds were connected to the hearing aids with the ear hooks that were twist-offs. So the veteran's daughter was shown how to disconnect the existing tubing and clean the molds. And then while she was doing that, letting them dry, they had a backup set that they could attach and he could use. So this solution worked out really well for him. So for five years, that's what he used. And overall, things were great. So 2009 comes around, we see the veteran back. At the VA, we like to replace hearing aids when the patient either has had a significant change in hearing or if the hearing aid technology has improved to the point where a new set of hearing aids would be best care for the patient. So again, we're seeing some conductive components to his hearing loss.
There were really no major changes, other than a slight decrease in his word understanding. So we go with behind-the-ear hearing aids again. We went with the same manufacturer, a very similar FM system. This time, he was able to use a Bluetooth device to connect to his cell phone. It was one he wore on his neck and had a large button to push to answer and hang up phone calls. And I’m not mentioning any manufacturers’ names during my portion of the talk. This is just because the issues that the veteran was having with the devices and the things we'll talk about moving forward were really not the faults of the manufacturer. These were just due to the case.

And so if you're wondering why I'm not just saying, oh, it was manufacturer A or B, it is simply because I don't want to portray any manufacturers in a negative light, simply because these were not things that really, the patient was having issues were due to their design or anything like that. So again, five years roll by. It’s 2014 now, and it’s time to get him some hearing aids. Now we see air conduction thresholds are worsening. There’s a decrease in word understanding scores. It was a big, big decrease in the right ear. The left ear was still doing all the heavy lifting for that side when it comes to word understanding and for hearing. So what do we do? This time, the daughter, being a nurse, was reading some evidence put out there by some manufacturers. So she was wanting to switch to a different manufacturer, but stick with the same BTE style. The reason why she wanted to switch was because of the smaller remote microphone that this company was offering at the time. And it also was able to pair it to his phone. So we set him up, counseled him. Everything seemed to be okay at the fitting. But when we saw him back at the follow-up, the veteran was not happy with the sound quality of the hearing aids, and he was having difficulty using the streaming function of the accessories. So what do we do? We return these devices for credit, got him back in the same hearing aids that he had received in 2004 and 2009. We went back to that same neck-worn Bluetooth adapter. We were able to pair it this time with some new accessories that this company put out, including a TV streamer and a remote microphone. The veteran, right of the bat, was very thrilled to be back in the manufacturer that he was comfortable with. The only issue that we had this time
around was we were having a lot of difficulty making good fitting molds because the patient was having a bunch of ear infections at this time. So the old molds weren’t fitting well. New molds we were making weren’t fitting well. So we made several over the course of a few months. And finally, once the patient had some treatments, we were able to get a better two pairs of molds. The biggest benefit, in my opinion, or as an audiologist and having to see this patient quite often was that with his daughter being able to change the ear hooks at home and switching out the ear molds, that he wasn’t having to come back in quite frequently. And that was something they could not do with the other manufacturer.

So where are we now? About a year ago, we started seeing a big decline in the patient in many different areas. So first, the patient’s wife passes away. And that’s when he moved in with his son. Around that time, he lost three sets of hearing aids over 18 months. Two of them were under a loss and damage warranty, and one was outside of that. So we had to order one that’s almost like a brand new set of hearing aids. Around this time, due to the neuropathy and due to some issues with his memory, the patient was having a lot of difficulty not just changing the batteries, but also remembering to change the batteries. So he was often inserting the hearing aids with nonfunctioning batteries in there. So this time, the patient, living with his son, every room, they said was carpeted. It wasn’t like his old house, which had a lot of hardwood floors. Patient starts to have a lot more falls. Again, he refuses to use any assistive mobility devices. So because of all this, his daughter takes him just for a full primary care visit. They recommend seeing neurology. And they determine he actually experienced several mini strokes. And then around this time, he also reported the macular degeneration had worsened to the point where was having difficulty seeing most of the things on the hearing aid, and the neuropathy had gotten worse. So he was having trouble feeling the hearing aids as well. This is where the case becomes a lot more challenging. The VA primary care provider that the patient was seeing for over a decade leaves the VA. And he was assigned a new primary care provider at the VA. They did a cognitive eval on the veteran, called the SLUMS, and the veteran scores 10 out of 30, which basically
is pass/fail criteria, veteran failed. And they determined this could be used to make a recommendation that there's a possible for existence of dementia here. The primary care provider recommends that the patient be seen by our Geriatric Evaluation and Management Clinic. Patient's daughter was not, not very happy about this, told the doctor that she knows his case history inside and out, and her father does not have any of the issues, and she refuses to go to that clinic.

So I see him again, 2019, do an updated hearing test. Very similar to what we had with a little bit of a decrease in word understanding in the left, no usable speech understanding in the right. One of the things that I'm a big fan of doing is when we have an asymmetric word understanding score like this is to do word understanding score bilaterally. And when we did that, his score's 72%. So that gave us some options moving forward for the patient. So when discussing this with the patient and his daughter, we talked about sticking with the behind-the-ear option, or with switching to a BICROS. The daughter was very, very hesitant about switching anything. She wanted her father to keep the same BTE style. She wanted him to stay in the same manufacturer. And she wanted something that was going to be rechargeable. So luckily, this same manufacturer did have a set of rechargeable BTE hearing aids that were on the VA contract. So we get this all ordered for the patient, but we run into some problems. The new rechargeable BTEs require manual activation of holding down a push button. When this happens, there will be a light that flashes to let the patient know that the hearing aids are turning on. Well, with the patient's vision and dexterity problems, he's unable to feel the button, and he's unable to see when the light is on. This company does put a little mirrored sticker in their case, and they say you can push down on the button on that mirrored case so you can see when the battery is turning on if the finger is covering it up. Again, the veteran was not able to see this. The veteran, just like before, when he was unable to change the batteries, was actually putting the hearing aids in with the batteries, or with the hearing aids turned off. So there was no improvement there. So when we discussed having the veteran’s son help him out with this, the daughter was not very happy about this. She said she
didn’t want her brother involved in the patient’s care at all, that that was her responsibility for her father. So if that was going to be the case, we knew were in some trouble, just because he’s not able to turn the hearing aids on, and getting benefit from that. So what do we do? We’re kind of at a difficult crossroads here at this point. So what we end up doing is we returned the BTEs for credit, and then we switched to a power RIC hearing aid with custom molds. Now, there’s a little concern that we might not be able to achieve audibility with these. But luckily, with the programming, we verified we were hitting all of our targets and everything looked good. The biggest benefit from this is that the patient would still be able to use the accessories. The hearing aids would turn on automatically. And the veteran would be able to keep all of the same benefits he had from his previous style, but it would just be a different manufacturer, which he said he was okay with switching. When we did the counseling of the accessories, the remote microphone that the patient had become accustomed to was actually given to his daughter. So she keeps that for herself, and she uses that whenever she’s with him. So he does not keep that at his house. What do we do for the TV?

Well, set him up with a TV device, had everything paired. And we were able to order a very simple three-button remote control. We have plus sign for volume up, minus sign for volume down. And then the third button doesn’t have any indicator on it, to let him know to push that button to active the TV device. So what we did was we actually took our label maker, and then I just put in the biggest font possible, it says, TV, and put that right on the remote control. So the veteran knows to just hit that button when he wants to start and stop streaming of the TV device. After going through all of this, the daughter tells me that he’s not using a cell phone anymore, because she had purchased a tablet for him that’s designed for seniors. And basically it just has a few different functions on it. There’s basic internet, there’s video chat, and there’s a few games on there as well. So for him, having a Bluetooth-connected phone accessory was not as important for him now as it was a few years ago. Because of all of this, the veteran’s daughter finally agreed to enroll him in the VA GEM clinic, where he’s
currently being treated. And it's been a much better process for him now. He's getting a lot more of the help that he needs. But we were able to find some of those options that worked out well for him. So that was the first case. Now we're going to talk about just the topic here of hidden hearing loss. This is something that we are seeing with the veteran population that's a little bit different than what you see outside of the VA. And one of the big things right now is people are prescribing hearing aids as a treatment for this, just low gain hearing aids.

And I'm gonna present two quick cases that will show you how we can kind of look at the patient in a different way in order to help them out with just simply and easily putting a set of hearing aids on these patients. So our very first patient, we call him the hidden hearing loss or auditory processing disorder group, patients we saw about 10 years ago. At this time, the veteran was a 37-year-old male. He worked as a police officer. And his main complaints were that he was having difficulty hearing at home and at work. Whenever we do our case histories, we always have the patients put out their medical history. We do activities of daily living. We do a Hearing Handicapped Inventory for Adults, as well as COSI goals. So this patient on the Hearing Handicap Inventory for Adults and screening versions scored a 40 out of 40. And just doing a quick records search for this veteran, he was diagnosed with Post-Traumatic Stress Disorder, anxiety, a traumatic brain injury. The patient who was diagnosed by this mental health provider did make a note that he was being noncompliant with medications for these issues, as well as declining the option for cognitive behavioral therapy. The veteran did bring an audiogram with him from when he was discharged from the military. And the only scores on there were just simply air conduction thresholds. And it just showed a flat 60 dB loss. And that kind of raised some red flags for us. So what do we do? I always start off SRT for my audiometric battery for cases just like this. So start off and we find thresholds at 15 dB bilaterally. Jump into pure-tones and we're right back down to 60. So we know something's not quite adding up. The patient was re-instructed a few different times about responding whenever he heard the sounds, even if they were very, very soft. And we got him back up to about
30 dB across the board. I decided to then modify my testing strategy a little bit. So I did some Word Rec testing at 20 dB, 40 dB, and 60 dB. Now, at the 20 dB, that was where he missed a few words. But at 40 and 60 dB, he was basically 100% for both ears. Decided to run the Quick-SIN just to see, okay, let's see how he's doing this background noise. And we found a score of 5.5 signal-noise ratio, which was a little bit higher than what I would expect for somebody with normal hearing. But it kind of lend themself to the difficulties he was reporting. So this was the final audiogram. This was not the one that I was able to do. This is actually one that my supervisor completed for him.

So the reason I bring that up is that whenever I was seeing him, I was an extern at this time. And we told him, hey everything was within normal limits. Everything should be okay. And he refused to accept this. He was convinced he had a hearing loss, that he was having problems, and that the VA just didn't want to help him out. So the audiogram that you saw was completed by my supervisor who had stepped in to handle this patient, who was none too happy about the diagnosis of normal hearing, at least whenever it comes to audiometric results. So after we found these, we decided to run an ABR, just to double-check everything. And so we did a threshold search ABR and found basically 25 dB thresholds at four different frequencies. We counseled the patient about his inconsistent results, the lack of need of amplification. Remember, this is 2009. This is before we were fitting these low-gain hearing aids. So again, he was not happy about this, wanted the VA to do something about it. So from this patient, we decided to build an APD test battery. And we did all our homework to come up with the testing protocol and the treatment protocol and things like that. So the tests that we include are the SCAN 3A, Gaps-in-Noise, masking a little difference for 500 hertz, standard responding words, several different things. So when we did this, the veteran, the scores I’m gonna report here, just the SCAN 3A ones, these are what I found to be the most interesting for this case. The veteran provided inconsistent results across all the tests. So typically, when a veteran fails all three sections of the screener, that indicates, okay, it's not necessarily an auditory processing disorder, it's something
else. So the veteran failed basically every test that we threw at him. So what do we do for treatment? We offered him low gain hearing aids, an FM system, Bluetooth device, at home aural rehabilitation, which was just LACE, as well as in clinic aural rehabilitation. The veteran just wanted the hearing aids and accessories. He didn't want anything else. So that's what we gave him. And as soon as we fit him, he said, hey, everything is great. We brought him back a month later for a follow-up. And first thing we actually did was have him repeat those outcomes measures. So we did the HHIA. The veteran had a score of two out of 40. That was a great improvement. But when we took a look at the data logging, we found he wasn't wearing it. So what was going on with that? Well, decided to take a look last year to see was the patient ordering supplies or anything like that. Because after that follow-up visit, we scheduled him back for another one and he didn't come back. In the VA system, we have what's called a Remote Ordering Entry System, or ROES, and that will show us the supplies that the patient's ordering from our outfitter that supplies all the batteries and tubes and domes to him. And the patient didn't order anything after that initial shipment was sent to him. Doing a chart review, we found that the patient was being treated for anger management, anxiety, and PTSD. This was actually required from his job after an issue that he had at work. It was not a good situation, but it luckily got him the help that he starts to need.

So once he started doing this, they reported that, mental health services reported that everything was starting to improve for the patient. Anxiety was being reduced. Cognitive behavioral therapy seemed to be working. And the veteran later reported, I believe it was in 2017, that he was having no hearing complaints. So that was a good way that we found a treatment option for him that wasn't hearing aid related. The next case was a patient. This gentleman had a lot of the same symptoms as the first one, but this gentleman also had very, very poor sleep due to a chronic back pain condition. One of the hallmark signs that we see for these folks, they usually get a 40 out 40 on the HHIA. That's what we saw here. He had great thresholds across the board. When we did the scan, he failed Auditory Figure Ground - 0 and Competing Words. So those
word tests are the ones he was having trouble with. Everything else we tested were A-okay. So we offered him some of those same treatments. Went with the BTE hearing aids, FM system, Bluetooth adapter. We went full on for good listening strategies. And we offered him the aural rehabilitation, which he declined. So when we saw him back for a follow-up, HHIA score again went to zero, but the patient was reporting that he didn’t use the hearing aids. And he said it was just because his main complaint was hearing at work, and that’s where he was not finding any benefit from them. The veteran also had a recommendation and went to his primary care provider to talk about depression and lethargy and then was provided with Citalopram, which when we saw him back, it really hadn’t had a chance to kick in. But just doing a chart review, he did report to the primary care provider that the energy had gone up and that the depression wasn’t as big of an issue. We did provide him with LACE, but he never installed it. At that time, we were providing LACE that we could track the patient’s progress. So we saw that he just never put it into the computer.

So what we decided to do was see, okay, if work is your only difficult listening environment that you’re really having these complaints, what can we do to make this better. So I wrote a letter to the patient’s supervisor. He worked in a call center. So what they were able to do for him was to move him into a corner area, away from any type of doorways or where other people might be congregated. And then they gave him a set of noise-canceling circumaural headphones with a microphone, so that way he could hear and talk to the people that he was dispatching. And then following this, he reported, hey, no more hearing difficulties at work. So that worked out very well for him. It was one of those situations where we had a treatment option that was not really audiologically based other than just serving as patient advocate, and it worked out. So what does this tell us? When you’re working with these folks, take a look at all the symptoms. Don’t worry about just simply having them come in and say, "I’m having hearing difficulty," and then jumping right into hearing aids. Take a look at the whole picture. And if it’s somebody where a low gain hearing aid might work, then go for it. If it’s something where we have to bring in other providers, that’s certainly the way to go.
So that's it for my first portion of this. Next up, we have Dr. Cara Michaux. Dr. Michaux serves as our vestibular clinic program manager. She earned her AuD from Northwestern University, and is going to provide you with a couple of very fun cases here. So Dr. Michaux, the show is yours.

- [Cara] All right, thank you, Dave. All right, so I've got two cases to present today. My first case is my longer one, so I'm gonna jump right in with that. It's regarding a patient with some vestibular issues and hearing aid issues. So this veteran first came to our clinic in 2015, and he's been seen over many years. I was involved in some of his care, but he was also seen by several of my colleagues. But when he first presented in 2015, at that time he was 68 years old. He's got quite a few health issues. So some cardiovascular problems that are managed by a private cardiologist, but also problems with kidneys, diabetes, and resulting neuropathy and retinopathy. And all of these other health issues are managed through the VA system. He was referred to our clinic by his primary care physician due to some relatively new hearing loss. So the veteran, during case history, said that he has been having difficulty hearing in the left ear for about a year. He's also noticing pressure in the left ear. He has constant bilateral tinnitus. He believes this has been around for a while and it's not a primary complaint. He isn't too bothered by it. He does have a positive history for noise exposure during his military service and his work history after the military. But aside from the hearing loss and the pressure in the left ear, he denies any other otologic symptoms, and including dizziness at this time. HHIE score was 18, so he's definitely noticing a significant difficulty.

So here's our audiogram. Right ear, mild high frequency hearing loss, which is not unexpected with his age and history of noise exposure. But in the left ear, we see a flat, moderate loss, and a significant asymmetry in the word recognition ability here. So we're looking at 96 versus 64%. So at this point, we want to proceed with a hearing aid evaluation. But we do want to have a medical evaluation because of the asymmetrical loss. In our hospital, we've developed a program when we have
sensorineural in both ears, normal tympanograms and no signs of middle ear problems and we just basically want Ear, Nose, and Throat to evaluate for the asymmetry, we'll do what is called an eConsult. And this is because our Audiology and Ear, Nose, and Throat departments are located in different portions of the hospital. We have completely different schedules and schedule separately from each other. So in order to save time for the veteran, as opposed to having them come back for a visit to see Ear, Nose, and Throat, we'll just electronically send over a request that they review the file. And if they want imaging to occur, they'll contact the veteran. So they did want imaging. They ordered and MRI and there were no signs of a retrocochlear pathology. So they said all cleared for hearing aids, and we went ahead and proceeded with hearing aid fitting.

So the veteran returns in about a month to get the hearing aids. We did have to convince him to go bilateral. At first, he just wanted to fit the left ear, because that was the ear that was really bothering him. Because the loss was more mild in the right ear, he didn't seem to feel he needed a hearing aid on that side. But we were able to convince him that trying bilaterally to start would be a good idea. So he was fit with Starkey Z Series RIC hearing aids. We used an earmold on the left side and a dome on the right side. He was fit to NAL-NL2 really our targets, which is our clinical protocol. And then he comes back in a month for his follow-up visit. So his follow-up Audiology visit, he reports he is doing okay with the hearing aids, excuse me. At the beginning of the appointment, he kind of makes it sound like he's been wearing the hearing aids on a regular basis. But then data logging gets him and we see that he really has not used the left device at all, and minimal use or part-time use of the right device. So further questioning and probing, he admits that he can't really tolerate to wear the left hearing aid because he feels it's making the pressure worse in his left ear. He's already been experiencing this pressure. And when he puts the hearing aid in, he feels his own voice gets louder and he just can't tolerate the occlusion. So a lot of counseling. We end up switching him from an earmold to a closed dome to see if that will alleviate some of the occlusion, and then make programming adjustments due to that change in coupling. At
the end of the appointment, he mentions that a few weeks ago, he had a vertigo attack. So he had a pretty significant vertigo attack where the whole room was spinning. He was out of commission for several hours. So the audiologist, of course, this is throwing up red flags, and makes some recommendations. The audiologist says, okay, we've worked on the hearing aids. Let's send you home for a month and try to increase to full-time use, see if you can acclimate to the aids. We'd like to see you back in a month to see how you're doing. We also recommended that he schedule vestibular testing so that we can see if this vertigo attack and the asymmetrical hearing loss are the result of some sort of vestibular issue. We also recommend an in-house visit with ENT. So the prior evaluation of asymmetry was just through the medical records. We wanted to have him seen in the clinic, due to this onset of vertigo. Unfortunately, the veteran declines all of our recommendations. His main reason for declining the recommendations is that he doesn't want to travel back to the clinic.

So a kind of a common theme throughout the VA system, we've got our main hospital here in Pittsburgh. But we're serving veterans from the surrounding counties. So we've got four or five surrounding counties where we're providing services for veterans. So some patients are actually traveling up to two hours with traffic to get care at the main hospital. Now, in each of the surrounding counties, there's a county-based outpatient clinic, where they receive their primary care and some specialty care. But for certain specialties, like ENT, and at this time in 2015, there was no Audiology for our VA at the outpatient clinics, they have to come to Pittsburgh. And this patient was one of our common patients saying, "I hate to drive to Pittsburgh. "I hate to drive into the city. "And if it's not necessary, I'm not coming back." So at this time, he said, "I'm not coming back unless I absolutely have to." And we kind of lose track of him in our clinic at this point. But looking back at his charts, over the next few months, he does have significant vertigo episode that causes him to contact his primary care physician. And they convince him you really need to make the trip to Pittsburgh, and see the Ear, Nose, and Throat doctor. So he makes an appointment, comes in and sees Ear, Nose, and Throat. He's now having vertigo attacks several times per week. So based off the
history and the audiogram and the symptoms, ENT suspects Meniere's disease. So they prescribe one of the common first lines of treatment for Meniere's disease, a diuretic. Dyazide is what they prescribe for this patient. And diuretics are prescribed because they help reduce excessive fluid in the body. And with endolymphatic hydrops, we’re trying to reduce that excessive pressure in the ear and excessive fluid buildup. So that's why diuretics are often tried for symptom, symptom alleviation in Meniere's disease. However, diuretics are contraindicated for, they affect the whole body and can affect multiple systems. So they are contraindicated for some of the health issues that this patient has. But they put him on it anyways. He goes back to primary care for his routine blood work later that month. And they find that he has really elevated potassium levels. So this is called hyperkalemia. And this is a problem, because it can cause abnormal heart rhythms. So with his reduced kidney function and other health issues, it's really not good for him to be on the diuretic, and they take him off of it.

So at this point, he’s talking about, I think part of my screen has, my last bullet point isn't there for some reason. But the last bullet point says that he is not wanting to come back to see ENT again. But there’s some communication between his primary care physician and the Ear, Nose, and Throat doctor. And ENT says okay, well, if you don't want to do a diuretic, maybe we can try a low dose benzodiazepine. They suggest Ativan, which is typically prescribed for anti-anxiety, but can also work as a vestibular suppressant. For whatever reason, the patient declines this medication. He never has it filled. I'm suspecting that his symptoms get better and he just kind of says, all right, I'm doing better. I'm gonna move on. But at any rate, he falls off the radar and we don’t see him at ENT or Audiology for the next few years. He does keep going to his county-based outpatient clinic closer to home for his routine health care and goes every year for his annual checkup. And so in 2016, '17, and 18, they ask him if he's having any dizziness symptoms, if he’s had any problems with the Meniere's, and he says no. So that's great. But as we know, with Meniere's disease, it doesn't always stay away forever. It typically comes back. So in late 2018, it comes back, and so does
our patient. So he returns to our clinic in October 2018. At this time, he’s reporting that his hearing in his left ear has gotten significantly worse in the last couple months. And the ringing in both ears, he perceives it to be in both ears, is worse and it’s starting to be bothersome. He’s also noticing increased pressure and fullness in that left ear. He has not had any recent vertigo attacks, but he feels like he's off-balance and that he could go into a vertigo attack at any time. Now he's here for an audiology appointment, but he does not bring his hearing aids with him. He says that, so this is not boding well for him actually being a user of the hearing aids. We're suspecting he's rarely used them, if at all. He says he’s tried to wear the left hearing aid a few times in the last couple months, because of the decrease in the left ear hearing, but he feels that it actually makes his dizziness worse. And he still can’t tolerate the occlusion and the pressure that he's perceiving when he has the aid in. He says he does wear the right aid sometimes when he’s going out socially. And then, yes, so that's on the history for when he comes back. I'm gonna show you the audiogram now.

So here’s our audiogram. The right ear, if you remember before, was more of a mild loss. We’ve definitely seen a decline there. And the left ear has also declined. So I’ve got a comparison. On the left, you have the 2015 audiogram. So 3 1/2 years later, here at 2018, is on the right side. So there’s been a decline in the right ear, which we suspect with time. And the left ear has gone down a little bit in the low and the mid-frequencies. But more importantly, we’re noticing this decrease in word recognition ability. So we’ve gone from 64% in the left ear to 20%. So the audiologist, again, makes some recommendations. We talked to the patient about coming back for another appointment and bringing the hearing aids with him so that we can check to see if they’re functioning properly. And then they’ll need to be reprogrammed because of the change in the hearing. We also recommend he maybe try an earmold again on the left side if he wants amplification on the left side. We're really going to be pushing it to get enough volume with a dome. So we tried to talk him back into trying the earmold, if wearing the left hearing aid is his goal. We also recommend that he consider scheduling vestibular testing so that we can, because the fullness is coming
back and he’s starting to feel off-balance, we want to see if we can get some data to confirm or support his Meniere’s diagnosis. But if you can guess, the patient declines our recommendations again. He has already been scheduled through a referral by his primary care to go back to ENT. So he says he’d rather wait for his upcoming ENT appointment in a few weeks to see what they say before we make any changes in the hearing aids or move forward with vestibular testing. So he waits to see what the ENT says. When he goes to see them a few weeks later, they talk about the different options. They give him a meclizine prescription to use as needed. They suggest he try a low sodium and low caffeine diet. They talk about doing the diuretic again, but ultimately decide that’s probably not a good idea, due to the health issues that resulted last time. And then ENT, surprise, recommends vestibular testing, which we had already said he should schedule. So at this point, we’re now in, going into December before he gets back into our clinic for vestibular testing, even though he presented back with some more symptoms in October. So by the time he returns to us in December, he is having vertigo attacks again.

So the vertigo's back, still having the pressure. He's saying the vertigo's occurring several times per week and it's beginning to be a bit debilitating in his daily life. I have here just highlighted in red some of the significant findings. He had a right beating spontaneous nystagmus, as well as some right beating nystagmus during positional testing. All of this was able to be suppressed with visual fixation. Optic kinetic testing was pretty much normal. During rotational testing, sinusoidal harmonic acceleration showed a phase lead in the lower frequencies that improved in higher frequencies. So that's supportive of a peripheral vestibular lesion. And then maybe most importantly, our last two tests, caloric testing showed a significant left-sided weakness. And also we did ECoG testing, and he showed a significantly high SP/AP ratio. So that supports endolymphatic hydrops and Meniere's disease diagnosis. We also did an audiogram at this point to see if there had been any changes in the hearing. So comparing from October just to December, so in a few months' time, you see that there has been a decline in both ears, I'm sorry, in your left ear, low frequencies and mid-frequencies.
Word rec has declined a little bit more from 20 to 12. So not a significant change, but definitely a decrease there. So the Meniere's is progressing. We want to get him back to ENT and see what they want to do. But here we've got a little bit of continuity lack here. I feel like at this point, when he came back in October, it could have been so much more streamlined. But instead, we're already into January, because he has our testing in December, and we refer back to ENT. So it's not until after the first of the year and the holidays that we see him back in the clinic for ENT. So ENT, at his visit in late January of this year, talks to him about some different, more aggressive options. So they basically recommend gentamicin injections. But they also offer him steroids.

So there are some advantages and disadvantages to each of these options. With the steroid injections, he, there is mixed research supporting steroid injections for Meniere's disease. However, it's pretty low risk and low side effects. So some school of thought says go ahead and try it. There's nothing to lose, it doesn't really hurt. But there's not a lot of good, strong research supporting that it has long effecting changes in dizziness and vertigo attacks. Whereas gentamicin injections, low-dose gentamicin, has research to support that even a single dose can be sufficient in significantly reducing vertigo attacks, and that if a second dose is needed, it almost always is 80% of the time highly effective to reduce vertigo attacks. So the downside, though, to that gentamicin injection is it may cause further hearing loss. I am talking about the low dose method, rather than kind of more of an old school method where they would just give multiple injections of gentamicin to the ear to just basically get rid of any response on that side. So we're not talking about the chemical labyrinthectomy. We're talking about a low dose gentamicin protocol. This patient decides that he wants to go more conservative and go with the steroid injections first, and then see if that gives any improvement. So in January, he receives his first steroid injection. He comes back in February and says that he's noticed that he's still having very frequent attacks, but the duration and intensity seem to have improved a bit. When he comes back in March for a third injection, he has no change in symptoms. Comes back in April, no change in symptoms. So at this point, he finally agrees, let's go ahead and try the gentamicin
injections, because at this point, he's not driving. He's having multiple vertigo attacks a week. And it's been months now and he's ready to try something more aggressive. So he goes ahead on April 5, an ENT administers the first gentamicin injection. He comes back later that month and is really happy to report that he has not had a vertigo attack since a few days after that initial injection. He does feel off-balance, but he has not had a vertigo episode since April 8. Because he's still feeling kind of off-balance, they do decide to go ahead with a second injection. And the Ear, Nose, and Throat doctor also refers him back to Audiology so that we can do an updated hearing test and see if he still has a caloric response on that side.

So he comes back to see us in May. Here's the updated audiogram. So comparing to December to May, unfortunately, there has been a bit of a drop in the left ear. Word rec has gone from 12% to 0%. However, he still has hearing in the left ear. And I think it's interesting to think about how much of a decline would there have been in the hearing just because of the Meniere's progression. If we had not done the gentamicin injections, there still may have been more of a decline. So to this veteran, it was worth losing that 12% word rec ability to have resolved vertigo attacks. He does report again at our visit in May that he hasn't had any vertigo since early April, and he's happy about that. Caloric testing was completed and showed he does still have a caloric response on the left side. It is a weakness compared to the right side, but there is still vestibular function left, which is great. So the patient also feels at this point now that his vestibular vertigo attacks are under control, he's ready to kind of switch gears and focus on the hearing. So we talked to him about different options and decide that we're going to go with a BICROS system and kind of forget about aiding that left ear, since he has not been able to tolerate wearing a hearing aid on that side. And now with zero percent word rec, we think that the BICROS might be a better option. So he comes back in June to be fit with the Starkey Livio AI BICROS system. We were able to tolerate full gain on the right ear at the fitting. We spent a lot of time counseling him about realistic expectations and really trying to be a full-time user with this set of hearing devices. When he comes back for his follow-up visit in July, we find that data
logging shows us he’s wearing the hearing aid seven hours a day. So that’s a great improvement. He's noticing improvement on all of his COSI goals. He does say he’s only using the CROS transmitter on a part-time basis. He finds that sometimes the noise is actually more of a hindrance. But overall, we consider it to be a success with the hearing aids. And maybe most importantly, he feels that he has not had any vertigo attacks since April. And he's a happy camper in that respect, that he's feeling much better. So I presented on this case, I thought it was pretty interesting, because there’s a lot of different issues, some of them veteran-specific. He’s got multiple health issues. Because of his transportation difficulties and scheduling between ENT and Audiology, there’s some lags in care there. But I also think that what was playing a big role was the patient's inability, or unwillingness to follow recommendations from Audiology that we made on several occasions. I do have a second case I’m gonna go through quickly, because I am running out of time. But I think this is an interesting one to share, too.

Case number two is a hearing aid case. This patient presented to our clinic earlier this year, a 52-year-old male. He has multiple sclerosis, and he’s had it for a long time. But it has progressed to the point where he is quadriplegic.

So he has no use of his arms or legs. He does have a motorized wheelchair that he operates on his own, using a chin controller. He does have some other health issues. And he was accompanied to his appointment by his wife, who is his primary caregiver. He reports to Audiology that he’s got gradual hearing loss in both ears that’s been happening over many years. He feels like it started during his military service and just is getting worse. In recent years, he’s noticing some increased difficulty with speech understanding. HHIE score was 22. He also has bilateral bothersome tinnitus. So tinnitus is definitely one of his main complaints. But no other otologic symptoms. Audiogram shows a nice noise notch in both ears. Word recognition ability is excellent, so that’s good. Normal tympanograms. We did send this one over for an eConsult also, because of the asymmetry. They were able to pool imaging that he had had done for other health issues, and there were no signs of retrocochlear pathology. So we went ahead with hearing aid evaluation. So when we were going into the hearing aid
evaluation here, the patient came out with the following COSI goals, tinnitus reduction, improvement in hearing in social situations, and hearing better in the car. His wife, who was present for all of the appointment, was really supportive. And they both had a super positive attitude. But I could tell that this veteran, it was really important to him to have any independence that he could. It was important that he was able to steer his wheelchair and move it on his own without somebody pushing him. He has a really cool setup with his Android smartphone that he has a scroll pad that he uses with his chin to be able to manipulate his phone. And he also wears a Bluetooth headset where he can use voice activation to make calls and text from his phone. So I could tell that anything we could do to make this hearing aid fitting, give him some sort of independence, would be helpful. So we decided to go with Oticon OPN S mini RITEs rechargeable. His wife requested, just for simplicity. She thought it would be easier for the daily routine to put them in and out of the charger at night and in the morning. We liked the Oticon OPN app had the scroll feature for the volume, because we thought if we could download that to his phone, he could use his scroll pad to make volume adjustments independently. We did talk about just doing a bilateral versus unilateral fitting, 'cause he's wearing this Bluetooth headset almost all of the time. That's how important it is to him to be able to have control of his phone. But we talked about going ahead and trying bilateral so that he would have the option to switch the Bluetooth between ears, if he wanted to.

So we fit the patient, he does really well. He comes back for his follow-up. He's noticing significant benefit. Tinnitus alleviation is great. He's doing well. And all of his COSI goals, you know, just improvement. And he's really loving having the option of using the app on his cell phone to be able to make volume adjustments. So he's so happy and grateful that he got his hearing aids. And he was just a great person to work with, as well as his wife. But I just thought this was a really interesting case. And as I think technology continues to advance with hearing aids, you know, when they come out with voice-activated hearing aids in a few years, this is gonna be something that really can make a difference for this patient. So while he may not be able to put the
hearing aids in and out, he still has some control over them. Okay, I know I was talking super fast at the end there, but I was trying to get through all of my information. I am gonna turn things back over to Dr. Jedlicka now, who’s going to cover Dr. Cody’s cases.

- [David] Thank you, Dr. Michelle. All right, so this next part that we’re gonna be talking about here are some cases that Dr. Cody has nicely tied together. So we’re going to be talking about a cochlear implant case first, followed by a hearing aid case. And you'll see how these just really tie together nicely. So first, we have an older veteran, 91 years old, had a gradual decline in hearing. And he’s been using hearing aids for over 20 years now. 1998, he was diagnosed with Meniere's. Notice that decrease of hearing. We also had a span of 15 years where there was no vertigo, which is great to see, very similar to Dr. Michelle’s case. So last year, we see him for a cochlear implant eval. And when it comes to cochlear implant evaluation, if you’re not a cochlear implant audiologist, it's usually comprised of four different parts. You'll have the medical evaluation completed by an otologist to see if the patient medically is a candidate. You'll do an audiologic evaluation, which consists of the standard audiologic test battery, as well as the minimum speech test battery. So ASHA guidelines call for the use of the CNC test, the monosyllabic test, as well as the HINT, which is a sentence-based test. And then the cochlear implant manufacturers have also recommended using the AzBio as a speech test as well. So during this, we saw the patient did very poorly on all of these tests here. So that certainly meant he was a candidate. The patient also underwent vestibular testing. So he was spending a lot of time at the VA. These tests take several hours.

So we had Dr. Cody spending a lot of time with him. But not surprisingly, we saw a compensated right unilateral weakness in the vestibular testing. So August of 2018, the patient is implanted with a Cochlear CI522. There are no complications, and he was cleared for the activation. So this is what we typically do for our appointments. You'll see we'll see the patients on the activation, that day as well as the next day. And then
we'll see them again a week later. And then the intervals tend to spread out. We do the threshold and comfort levels when we're optimizing MAPs. That way the patient has time to adjust. And then as the patient acclimates to the cochlear implant, redoing the T's and C's, as they call them for cochlear, allows us to better fine-tune the device as the patient habituates to it. So this is actually what we saw with our veteran here. So the first week, we had the activation on August 30, and second appointment the next day on August 31. There was drainage present, but it's subsided. He did have some issues with the glasses being comfortable with the ear-worn processor. He was happy with the sound quality. He had two different MAPs programmed into it and his wife and daughter were there. Then things start getting a little more challenging here, moving forward. The patient had to cancel his next few appointments because he was having, all right, apparently they lost my audio. Just checking to see if I'm back on here. All right, sorry about that.

So I'll go back to the slide here. I'm not sure where you lost me. But essentially what was happening was the veteran was having some issues with some infections. So he had to cancel a bunch of appointments. And then due to the discomfort in the ear, we switched from the traditional ear-worn processor to the Kanso. A Kanso's an all-in-one device, which is nice. It's a little bit smaller for the patient, offers directionality. And that should hopefully make things better as far as comfort goes for the patient. So when we started doing this, the patient had his glasses adjusted, so that way he wasn't hitting the wound. The MAPs were optimized like we had done previously. And when we saw him back for week three, the patient was having some issues remembering how to change the program, so we stuck with just that 900 hertz MAP. The patient completed his aural rehab exercises. Everything went well. And another big thing is that the daughter was present for this appointment. So what's happening? Well, because of the infections, there was some discussion with the otologist about leaving the electrode in place. But the veteran does want the revision. So like many patients we have in Pittsburgh, when the snow comes, they head south. So as the veteran was down with Florida, he's able to heal, no complications. And then almost a year after his original
implantation, he's reimplanted, and this time, no complications. So this is good. So we activate him on 7/31. And we do the 900 hertz MAP again. Wife and daughter are present for basically all of these appointments. All the MAPs are remeasured at each individual appointment. Devices are cleaned and checked. Everything is looking good. So great outcomes for us. So what’s happening here with the patient perception of the experience? Well, luckily this veteran was very motivated. He had his family, and he was very happy with the implant and the care he was getting from the VA. So why was the patient so happy despite having to be reimplanted and going through all this? Well, it was a shared decision making process. His wife, his daughter, himself, all discussed everything. The veteran included the audiologist and otologist, took in our recommendations. It was a very, very good experience there. The emotional intelligence of the patient of having realistic expectations was a huge, huge benefit as well.

So Leslie’s included some really good research articles here if you’re ever interested about how the shared decision making process can actually help improve outcomes for patients, even whenever there are less than optimal outcomes. So the biggest thing is having your patients know that a choice always exists. Even doing nothing is a choice that the patient has the ability to make on their own. Whenever the patient has the option to make their own choice that’s going to typically lead to better outcomes. That way the patient can be provided with the different avenues they can take, what the benefits and drawbacks are, and it really makes them more of a stakeholder in their own care. Then lastly, after they have all that information, having a decision talk. Allowing the patient to be the one that has the final say in everything is really what’s going to separate you as an audiologist when it comes to interacting with your patient versus some other folks that are following the clinician-driven model, which is when the clinician tells the patient what to do. Family support is one aspect that can’t be overlooked. The patient really had a great support network with his wife and his daughter. And you’re seeing this in this study here. What was interesting is people with a higher, I'm sorry, people that have a better family support network tend to do better
on AzBio sentence testing than people who live alone. And that was basically just because they’re most likely having more stimulation at home when there are other people talking to them and conversing. Emotional intelligence, the one big takeaway here is that I say people with the high emotional intelligence perceive conflict as a challenge to overcome and use positive coping strategy rather than taking any type of conflict as a negative and shutting down. So that kind of leads into this next one, which is a challenging hearing aid case that Dr. Cody was able to manage very, very well. And again, this is all focusing on patient-centered care. So this is a 75-year-old veteran. He’s been a long-term VA patient. He's worn hearing aids for several decades now.

So this, you know, should be something that should be an easy process for him. With this, we have our first audiogram here to show you from 2005. You can see it's not a fun hearing loss to work with. The patient was fit with Phonak Perseo BTEs. And that's when we start doing some preliminary CI testing. Had the HINT Sentences at 79%, which is higher than FDA criteria. So he wouldn’t qualify for a cochlear implant, since he was doing well while aided. We tested him again in 2006, 2009. Results remain stable, 2009, we set him up with another set of Phonak BTEs, this time, the Exelia model. And then this is a follow-up audiogram here, just to show you staying pretty stable at that time. So 2009, what we’re seeing here is the patient returns to the clinic five times in the 12-month span. And what’s the issue he’s having is he’s reporting his hearing is distorted. He needs to increase the volume. So we’re spending a lot of time doing adjustments and whatnot. We recommend another cochlear implant evaluation. So what do we do? We do another HINT Sentence testing. And this time it did go down, but he’s still above that FDA guideline criteria. The vet decides to defer implantation. He says even though he’s not eligible, he’s still not ready for it. So a couple years later, we see the veteran back. He has a new phone. He says he can't hear well on it, and we make some recommendations, but he’s being noncompliant. The veteran asks about the cochlear implant and decides to do another evaluation. So this time, when we do the HINT Sentences, the CNC word list and the AzBio, the
patient meets the FDA criteria across the board. The veteran did recommend, or want to do the right side, which is the preference that was recommended. So 2012 comes along. The veteran meets with the ENT. He has a medical evaluation, he's cleared. He’s a competitive shooter, so he wants to wait until this season is over in October to just move forward with the surgery. So we schedule it for October. But what happens is, the patient cancels it and says, "I'm having other problems, this is not a good time for me." So what happens? We don’t see him again until February 2013, when we decide to set him up with another pair of hearing aids. He was having some difficulty with his phone before. So we do have the ComPilot attached to it so he can stream through his phone. And we do have the TV device, which he can use for the ComPilot to help him out there. What happens is he tells Dr. Cody that in October, he actually canceled the cochlear implant surgery not because of all the other things going on, but because there is some distrust of the VA. Now, you can see this quite often among VA patients, but you can also see it at other medical centers as well, where patients just might not trust the system where they’re being seen.

So we see him back in 2016 for just a repeat audiometric evaluation. Everything looks good. The patient still not interested in a cochlear implant at this time. And we also talk to him about some different assistive devices for the home, which would really help him out, like a caption phone and a amplified smoke detector. But again, distrust of the VA, patient’s not really interested in it. So what do we have here? Now we’re in March of 2019. We see that the patient still, the hearing thresholds are remaining somewhat stable. And the word understanding scores are still not very good. The patient didn’t want to procure new hearing aids at this point. He said, "It’s pointless." He's not doing well with them. So what happens? Well, when Dr. Cody's discussing the case, or the options with the patient, they start talking about his dog. And Leslie has a cute little puppy at home as well, so that’s a nice little way for them to bond. And it’s really a turning point in the care. So what happens is after having that turning point, they decide to go with a new set of hearing aids. They have a phone clip, a remote microphone, all those nice accessories. Veteran wants them all, except for the TV
device. So the patient, like we saw earlier, has that 40 out of 40 on the HHIE, indicating severe self-perceived hearing handicap. And his COSI goals are hearing in restaurants and hearing his wife while driving in the car. This time, he comes in with a whole different attitude. And after Dr. Cody fits him, everything’s great, and he’s happy and satisfied. He comes back for his follow-up visits. The patient reports that he’s doing much better hearing in the restaurant, or hearing better with his wife in the car and slightly better hearing in the restaurant. But he is still able to hear with the hearing aids most of the time, which is a nice improvement over what he was doing. So what actually made this successful?

Again, just following that patient-centered clinical model. By having the patient realize he has his options, that’s going to give him the ability to say, this is what I’m going to do. And it’ll hopefully lead to better outcomes. And what’s also happening now is with the work that Dr. Cody’s doing, this will allow him to establish more trust in the VA and the services that we provide to him. Now the article here that Dr. Cody included is from Caitlin Grenness. This is one of my favorite articles. And it talks about really just how verbal communication between patients, audiologists, and companions can really vary, and how we are not doing the best job possible with patients in our care whenever it comes to communication with our patients, which is funny, since really, what we’re doing is helping people communicate. So if you ever have the chance, I highly recommend looking over this article. But essentially, take-home message from all of this is just have your patients be more involved in their care. Give them the options and let them be the final decision maker. That’s going to allow them to build trust in the facility, trust with the audiologist, and make them more willing to listen when you do make recommendations for what might lead to better outcomes for their care. And last up here, we have Dr. Tia Mulrooney. Dr. Mulrooney is our electrophysiology expert at the Pittsburgh VA. She earned her AuD from Arizona State University. So now we’ll hand it off to Dr. Mulrooney.
All right, can you guys hear me? All right, sorry, my computer decided to shut down. So I'm going to be discussing two electrophysiology cases and how these tests can add objective information into difficult cases. So our first case is on a veteran who reported sudden hearing loss unilaterally. But I was suspecting a nonorganic hearing loss, or even malingering. So this is how an ABR helped to distinguish between the two and helped me to make appropriate referrals. So this slide is an overview audiologically of what our patient presented with. So just comparing these two audiograms, we can see how sudden sensorineural hearing loss and how nonorganic hearing loss could both be suspected. So let's learn a little bit more about this case. So this is a 65-year-old male veteran. He has received audiology services for several years, since 2014. He is known to audiology for longstanding mild to moderate sensorineural hearing loss, and he wears Oticon RIC hearing aids, issued in 2018. According to his follow-up notes, he's been doing really well with his RIC hearing aids and he likes them. Other diagnoses include bipolar disorder and autism. And I mention this because these diagnoses... Can you guys hear me? Okay, all right, so bipolar disorder and autism. Those previous diagnoses, they certainly could have affected how he performed in behavioral testing, the tests that I recommended for him, and his ability to be an accurate historian.

All right, so this audiogram is from February of 2018. It is pretty representative of his hearing loss since 2014, when we first started to see him as a new patient. I should say that in 2014, his word recognition scores were excellent. They were at 92% in both ears. And then gradually, they decreased to about 72% on this February 2018 audiogram. But pretty stable overall. So keeping this audiogram in mind, two months after that audiogram was performed, he comes in to our hearing aid repair walk-in clinic. And he's saying that he cannot hear the indicator beeps from the left aid. And he feels like his head has been in a bubble for several weeks. Otoscopy is clear bilaterally. We cleaned and checked the hearing aids. The right hearing aid was working perfectly fine. The left aid was not functioning after all of our repairs actions, so changing the receivers, vacuum out the microphones, et cetera. So essentially, his complaint that
the left hearing aid was not functioning was validated. And hearing aid was sent off the
the manufacturer to be repaired. So I presented my findings to the veteran and
validated his concern about the left hearing aid not functioning. But he still felt overall
fullness, quote, over his head, and no fullness localizing to one ear in particular. So at
that point, with the continued oral fullness in the left ear, tympanometry was completed
and he did have Type A tymps bilaterally. I did then ask him if he has noticed any
change in his hearing in either ear, to which he said he was unsure or did not think that
there was any change in hearing. So I then did Distortion Product Otoacoustic
Emissions screener. And that was completed. The results of that were that they were
absent altogether in the left ear and present, but not robust, through about 1,600 hertz
in the right ear.

So this is important because if you think back to his hearing test, he’s right at that
threshold level where we would start to see that OAEs are going to be absent or
they’re going to be present, but not very robust, that mild hearing loss kind of an area.
So what I’m really looking at here, and what really is a red flag, is that his hearing loss
was symmetrical. And so I’m getting very different OAE results from one ear to the
other. So after OAEs were performed, I was able to do a quick air and bone line. Now,
this is still in our walk-in clinic, so I was not able to do a full audiologic evaluation on
him. So just looking at this audiogram, some things I’m noticing, he often shook his
head no at subthreshold levels. So that made me a little bit suspicious for nonorganic
hearing loss. He was not able to complete SRT in the left ear. So he had no responses
there. And some things that make me think this might be a legitimate hearing loss
would be my OAE findings. He said he’s also not sure if his hearing has changed. And
by all means, a patient who’s a fair reporter with this type of decrease in hearing would
probably be able to tell their provider that they do notice a change in hearing. And he
did decline an ENT referral after I discussed with him this hearing test. So because of
all of this, I’m still a little suspicious as to what’s going on. And a threshold search ABR
was completed. All right, so these are the results of our threshold search ABR. I’ll start
with the right ear. The right ear threshold search is consistent with his behavioral
testing. So latency is increasing as intensity decreases. There was no wave V as we near about 10 to 15 decibels above his thresholds in those high frequencies. So that's perfectly fine. That's what I would expect to see. In the left ear, there was a questionable wave V at 6.3 milliseconds at 100 dB nHL. But it's not reliably repeatable. So I'm labeling that as a questionable wave V. There is definitely no wave V at 90 dB nHL. So this was our missing puzzle piece. Because he was a poor historian not able to fully communicate to me what he was noticing about his hearing, this was certainly a necessary test. So once the ABR was completed, our plan was to refer him to ENT for an immediate appointment. They got him in right away. And they began to administer high-dose steroids for two weeks. And then they also did intratympanic injections and an MRI to rule out a retrocochlear lesion.

So unfortunately, those treatment options occurred over the course of about a month-and-a-half. But unfortunately, multiple hearing tests since April 2018, that left ear has not improved much. And then we began to discuss with our patient moving to a BiCROS system. So he was open to moving to a BiCROS system, and he is doing fairly well with it. He continues to follow up regularly for routine hearing aid maintenance and to get his hearing tested annually. So I would say the takeaway message here would be that an ABR should be used along with other objective testing. And it's just one piece of the puzzle. And it's particularly useful if a patient is a poor historian or if your behavioral testing is questionable. All right, and then my next case is about the benefits and limitations of using ECoG or electrocochleography to test for Meniere's disease. So let's start by reviewing electrocochleography or ECoG. ECoG can give a provider information about endolympathic pressure. Specifically in the case of Meniere's disease, we are looking for increased endolympathic pressure. We are comparing the summating potential, or the SP, to the action potential, or the AP. The SP is a direct current potential coming from the organ of Corti. And the SP is an alternating current potential coming from the cochlear branch of the eighth cranial nerve. It's the response of many nerve fibers firing at once. And it's essentially the wave I of the ABR. You'll also see on these little drawings here that we have a BL. That's our baseline. The
baseline is always labeled at the spot just prior to the onset of a response. So we're basically going to be comparing the amplitude of the AP and the SP, and then this is what we're comparing both of those to. So it's a starting point. Now the parameters I used with the upcoming case are pretty typical for most ECoGs. We have a smaller window than the ABR, because again, we're looking at the wave I of an ABR. And so we would want that to appear between one and three milliseconds. We're using a slower click rate of 7.1, as opposed to the click rate of 21.1 that's used with ABRs. And we're doing that slower click rate so that the response amplitude is larger. I used a one channel recording here. You could certainly do a two channel recording. But with my one channel recording, the noninverting electrode is on the forehead. The inverting electrode is in the ear canal. And I'm using tptrodes for this upcoming case. So we do not have access to tntrodes at our hospital. So we are using the gold-covered tptrodes for this one.

All right. So this case, this is a 56-year-old male. He is known to audiology. We've known him for about six months prior to this appointment. He wears RIC hearing aids that were privately purchased. He's known to have a fluctuating sensorineural hearing loss in the right ear only. It fluctuates mostly between a mild to moderate sensorineural hearing loss to a flat moderate. And we're mostly seeing those fluctuations in the low pitches. He does endorse buzzing tinnitus in the right ear and episodic vertigo attacks. He reports receiving a Meniere's disease diagnosis at a private clinic in Florida seven years prior to our visit with him today. So he's suspicious that he has Meniere's disease, and he would like some treatment. So he came to us because he wanted an updated audiologic evaluation, hearing aid check, and vestibular testing. He was referred to us from VA ENT. And they basically wanted us to confirm or disprove his report that he has Meniere's disease, because that would, of course, affect the treatment plan from ENT. And then it's important to note that he did not supply the VA or our hospital with any of those outside test results from his private clinic in Florida. So we did a full audiologic evaluation. We did a VNG, including rotary chair. All of that was consistent with right-sided Meniere's. And we also did an ECoG. So these are our
ECoG results, the right ear being 68% SP/AP ratio, left ear 20% SP/AP ratio. And we're again using the gold-covered tiptrodes. So some of the norms for these, for our tiptrodes we're gonna be using a 50% SP/AP ratio. It's going to be a little less conservative because essentially, we're further away from the source. We're further away from the cochlea. So the recordings are going to be a little bit compromised. Amplitude can be smaller. So we're going to be doing a lot of averaging to fix that. Now the magnitude of our SP is basically the nonlinear cochlear distortion that comes about from having a large amount of endolins. So there are other conditions that can cause that as well. So let's talk about that. So the plan for this guy, the patient followed up with ENT. ENT reinforced a low-sodium diet. He was previously not compliant with that. He admits to having a pretty high salt diet. And they gave him a vestibular suppressant medication to use as needed. He declined all of the surgical options that Ear, Nose, and Throat discussed with him. And they recommended that he return to audiology annually to monitor his hearing and balance. Come back sooner if there is a big change.

So let's talk about some of the limitations of an ECoG. The first one, there's no consensus on normative data. So most clinics are going to be using about 30 to 35% SP/AP ratios if they're able to use tmtrodes as their transducer. In our clinic, we are using tiptrodes, so we're gonna be using 50%. That really does change per clinic, per transducer, and per tester. So there's a big variation there. It can be difficult to interpret, especially if you are using tiptrodes, simply because it's noisy. ECoG results can be abnormal in other conditions, such as superior canal dehiscence, or even perilymphatic fistula. So if in Meniere's disease, we're looking for that increased pressure in the endolymph, you can kind of think of it in reverse for superior canal dehiscence or perilymphatic fistula, because those both have pressure changes that are different from the norm between the endolymph and perilymph. So with superior canal dehiscence and perilymphatic fistula, we're gonna have lower perilymphatic pressure. And then the pressure between the perilymph and the endolymph is off from norm. So in those two cases, we would expect an abnormal ECoG as well. Let's see,
the SP/AP ratios may not be elevated in between Meniere's episodes, resulting in a false negative. So this is the big one. It's really good if you can catch someone while they are in an episode. If they're not in an episode, if that endolymph, if that inner ear is not swelling, you're probably not going to be getting an abnormal ECoG. And then hearing loss can certainly limit your ECoG results. Again, the AP of the ECoG is the wave I of an ADR. So if you have a hearing loss in the high pitches that is moderate, so maybe 40, 45 dB, you're going to start to see your wave I be compromised. And that can certainly affect your recordings. So I would say the takeaway message there would be it's really important to use ECoG in conjunction with other vestibular testings. So caloric testing, rotary chair testing, if your clinic has it. It's certainly an important puzzle piece to have, but I don't know that it can stand on its own. This is an interesting study. So two quotes from it. No significant difference between those with Meniere's disease and those with possible Meniere's disease. And 30% of those with definite Meniere's disease would not be classified as having Meniere's disease based on their ECoG results. And that goes back to my previous point about actively being in an attack. If those people were not experiencing a vertigo episode in the moment, it could certainly affect their ECoG result. Also, there is research that shows that providers labeling the SP and AP is significantly different. So one provider to the next, they may label the AP and SP ratios differently, and then of course, get different results. And then the high noise of the recordings, wave forms not being repeatable. This happens in all electrophysiology, is the tendency for the provider to throw away those waveforms that are maybe not matching up with the others and just kind of picking and choosing ones that look nice together. So it's definitely good to keep all of the waveforms on the page and keep them into consideration. So ECoG should be used as one piece of a test battery. It is one piece of the puzzle. It can certainly be very helpful in diagnosing Meniere's disease.

- [David] Thank you, Dr. Mulrooney. I always enjoy these Grand Round presentations. It's hard to believe that 90 minutes flew by. I just want to kind of wrap things up here, just with some take-home messages for everyone. So I think you were hearing some
really interesting cases here. And really, the big take-home messages are for your folks with auditory processing disorders or hidden hearing loss, it’s really important to think really outside the box. Work with your other mental health providers, like speech pathologists, mental health providers. And audiologists are going to be key in making sure that we’re providing the gateway to services for people who might now know where they need to go. The other thing, too, like Dr. Cody had mentioned with hers, is that the patient needs to have optimal decision making ability. So that really involves creating trust with your patient, making sure that their being involved is part of the process, and really changing the way that we communicate with each other. If we’re able to do that, then that’s gonna make the outcomes so much better for all of us. So what we’re going to do here is we’ll leave the floor open if anyone has any questions. And if not, we thank you all for your attendance today. This is certainly a lot of fun. And thank you for listening in today.

- [Kristy] Thank you, Dr. Jedlicka, and thank you so much to everyone else on the team, including Dr. Leslie Cody, who wasn’t able to make it today. And we just want to say thank you to this wonderful team we have. I have a comment from Erica saying thank you. And we’re going to go ahead and close out the classroom, since there’s no questions at this time. Have a great week, everyone.