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Sound Solutions: Empowering Unilateral Hearing with Innovative Technologies

Presenter: Megan Quilter, AuD

- [Megan] All right. Hello everyone. My name is Megan Quilter. I'm an audiologist with GN Hearing and today's topic is Unilateral Solutions. So let's dive right in and discuss what unilateral hearing actually means. The World Health Organization doesn't usually provide a very specific definition for unilateral hearing or unilateral hearing loss, in when you look at its international classification of functioning disability and health, or any other documentation, actually. The World Health Organization generally focuses on broader issues related to hearing health, including the prevention of hearing loss and provision of hearing care services. But in terms of a real specific definition, they don't really have that. So we look to our other bodies in this industry for some guidance on that.

In terms of the American Speech and Hearing Association, ASHA, unilateral hearing, "Means that hearing is normal in one ear, but there is a hearing loss in the other ear. The hearing loss can range from mild to very severe." And then if we take a look at the American Academy of Audiology, they've noted that unilateral hearing loss is, "Hearing loss that affects only one ear is known as unilateral hearing loss. Having one ear completely ineffective or has no usable hearing. This hearing loss can range in degree from mild to profound." So we do have a couple of different definitions, but what is agreed upon between everyone is that unilateral hearing loss can occur in both adults and children.

So we need to be well aware of what is going on out there and who it's happening to. When we ask ourselves if unilateral hearing loss is the same as single-sided deafness, well, that's a big question. Single-sided deafness is one form of unilateral hearing loss. Single-sided deafness is when one ear is completely ineffective or has no usable hearing, but we know that those with unilateral hearing loss could actually have a working ear, but a hearing loss on that side as well. So I would say the best answer to that question is that single-sided deafness is one form of unilateral hearing loss. And

when we think about the possible causes of unilateral hearing loss, I mean, it can vary, obviously, but it can be caused by a number of various factors.

We have different congenital conditions, acquired conditions. We see unilateral hearing loss with noise exposure, other infections that may be going on in the body, as well as other factors that that may go on as well. What is important to note is that unilateral hearing loss has significant implications for individuals quality of life, and with this comes a lot of difficulty and we'll talk about that throughout this presentation. But in terms of possible causes, I don't wanna say sky's the limit, but I have noted a few here. Illnesses or infections seem to be a hot topic these days. I've been hearing quite a bit about this as well as head injury and traumatic brain injury. So we see that a lot.

We also see that a lot in the VAs, if you guys cover the VAs at all. When we talk about prevalence, unilateral hearing loss can be present at birth, in which case it would be congenital or it can also be acquired later in life. Unilateral hearing loss can be progressive, meaning that it develops gradually over time or it can occur suddenly, in which case I've been accustomed to seeing this happen quite suddenly. Congenital unilateral hearing loss can occur, oops! Went back a slide there. Congenital unilateral hearing loss can occur spontaneously, without having any known risk factors on their birth or it can just be caused by other craniofacial differences, family histories. You'll see that there are a number of different factors here and a number of different numbers actually.

So the overall prevalence of unilateral hearing loss is around 7.2% with 5% of that having a mild loss and 1.5% of that having a moderate or worse loss. And when we look at the prevalence of single-sided deafness in the US, we see that hovering around 0.11% to point 0.14%, which is less than 350,000 Americans. So we've got our prevalence statistics here, and we also wanna talk about some legal definitions of hearing loss as a disability and where unilateral hearing loss fits in. Hearing loss does

not automatically qualify patients for Social Security Administration benefits. It doesn't mean that nothing qualifies, however. If you meet certain characteristics because of your hearing loss, you may qualify to pay for medical bills, credit cards, food, housing, other daily living expenses.

But Social Security Administration evaluates medical conditions that are based on a specific list of impairments and this is known as the blue book. And while this blue book includes various medical conditions, it doesn't really specifically list unilateral hearing loss or even single-sided deafness as qualifying conditions. Individuals with single-sided deafness though, they may be eligible for disability benefits, if their condition is in combination with other medical conditions that meet that criteria. But even if you meet the above criteria, you may not qualify for disability benefits and the reason is because social security administration disability benefits are means tested, which means that the Social Security Office will turn this down. They'll turn your application down, even if you have hearing loss in one ear, but not the other ear.

And even if the loss in that ear is complete. So I would definitely tuck in more, look at state by state if this is something that comes up for your patients and they're looking for this type of information. But on that end, we do know that unilateral hearing is very important and unilateral hearing loss is also very important for a number of reasons, due to the potential impact on individual's quality of life. We see this across quality of life. We see this across communication abilities and just patients overall wellbeing. There are a number of key reasons why it's considered significant. I've listed eight here. I would say that sound localization and reduced spatial awareness is probably the one I hear most of.

This is gonna be our ability to locate the source of sounds and it depends on having two functioning ears in order to do so appropriately. With unilateral hearing loss, sound localization is more of a challenge for these folks. It becomes really difficult to discern

the direction of the sounds and the proximity and we know that this can also be a safety concern as well. We've got speech understanding and noise, also a consistent complaint for those who have unilateral hearing loss. Having to be able to understand speech and noise with just one ear can significantly affect an individual's ability to understand in really, really noisy environments and also just in mild noisy environments. It's really particularly challenging for these folks to filter out background noise and to focus on specific conversations or maybe the signal of interest.

We also have social and communication implications. This kind of falls into a little bit of quality of life. Also, we see educational and occupational impact, especially for children with unilateral hearing loss. It can affect their academic performance. They're gonna struggle to hear and understand what's happening in the classroom and what's happening with children around them. And adults with unilateral hearing loss may actually experience challenges at work, in the home, especially in meetings or other work related situations. We also have some emotional and psychological wellbeing, this also plays into the quality of life role. We see safety concerns. We can compromise safety by reducing awareness of warning signals, alarms, maybe vehicles that are approaching, buses, traffic. There's all types of dangers from particular directions.

We have our quality of life. It can impact an individual's overall quality of life, it limits them with participation. This is where you start to see folks say that they don't wanna go out and do different activities. They may not wanna do things that involve music and theater and other different forms of entertainment that they're used to enjoying. There's also a risk of sudden deafness. I've seen this a few times in my career. This is where unilateral hearing loss would act as a symptom of an underlying medical condition, one that may need immediate attention. I used to see a lot of these in vestibular clinic, with a lot of head trauma. So given these different considerations, I think it's important to make sure that we are addressing unilateral hearing loss appropriately and that we're also addressing it quickly, because time is of the essence.

So in terms of treatment, well, treatment options for unilateral hearing loss, depends really on the underlying cause and also the severity of the hearing loss, as well as what that particular patient's specific needs are. So I've listed out a couple of common treatment options for unilateral hearing loss. I guess the choice of treatment is gonna depend, again, on our patients or individual specific hearing needs, their lifestyle and kind of what their preferences are. But to start, we've got a CROS hearing aid or a BiCROS for that matter, CROS hearing aids. They're designed for individuals with normal or near normal hearing in one ear and a significant hearing loss in the other. And this is where you have a microphone on the impaired ear that's gonna capture that sound and it's gonna transmit it over to the other side to the hearing aid on the better ear, allowing our patients to hear sounds from both sides.

We also have BAHA devices. This is gonna be surgically implanting a small screw in the bone behind the impaired ear and using a hearing processor that's gonna attach. We've got cochlear implantation, this is also very common. This is in cases of severe to profound hearing loss in one ear, a cochlear implant may be an option. Obviously it's gonna involve some surgery to place the electrode array into the cochlea of the impaired ear and that's gonna stimulate the auditory nerve directly. We've got bone conduction devices, we see a number of those out. These devices are going to transmit sound through sound vibrations, through the bones of the skull and the cochlea. This is gonna enable folks that have that unilateral hearing loss to hear sounds via the bone conduction.

We'll talk a little bit more about this towards the end, but we also have assistive listening devices. We've got a slide on that. We've got remote microphones and personal amplifiers. We've got different TV setups that can be used and pass-around mics. All of this is used to enhance sound in these challenging listening situations for these folks. These types of devices are also really helpful for noisy environments or

when you're trying to hear during conversations. We've got oral rehab trainings, I don't hear a lot of action in the oral rehab world going on lately. So if that's something that's up your alley, I don't hear a lot going on about it, it's definitely needed. We've got communication strategies and learning effective, which also kind of goes hand in hand with oral rehab, but different communication strategies, learning effective communication strategies, to kind of better navigate conversations that are going on around us, conversations that we wanna take part in, especially those in noisy or group settings.

We've got monitoring and management. I think this is actually really, really important, because sometimes we don't know what unilateral hearing loss, you know, it can be a symptom of something else. So regular monitoring and management of hearing loss is crucial for anything, but these are definitely the folks who we wanna remember to get reminder cards out to. And then medical evaluations, again, if unilateral hearing loss is sudden or associated with other symptoms, we definitely wanna have that evaluated as quickly as possible by an ENT. For today's talk, we are going to focus on a couple of these. We're gonna focus on the CROS and BiCROS. We're also gonna focus on cochlear implantation, as well as assistive listening devices.

So let's go ahead and get started! First, I'd like to introduce you to our new CROS product that is going to join our Nexia portfolio. It is a Nexia CROS transmitter. It's available as a rechargeable receiver in the canal. The CROS transmitter has an actual regular receiver on that other side and it matches the connectivity and the noise reduction to the other side. Directionality is defaulted at soft switching, but this can also be changed in the software. And this particular guy works with receivers that are low power, medium power, and high power. So what is not included on this is the Murray receiver. And for the Nexia CROS transmitter, we're seeing a battery life of about 16 hours and this is gonna be when we're streaming the entire time.

I'm gonna give you a little schematic of this. You can see exactly how small it is, it's nice and tiny. In fact, it's 16% smaller than the mini RIC and 25% smaller than the standard RIC that's out there. And let's take a look at actually what's happening with the CROS. But before I do, let's go back into the history books for a bit. CROS technology has been around for many years. It's historically the best way to address single-sided deafness. In fact, Harry Teeter of Telex Corporation, he patented the CROS. He patented this concept back in 1964 and the first CROS hearing aids were fitted the following year. But what he failed to do was patent the microphone on the other side, which is, as we know, the basic concept of CROS.

So a year later in 1965, Hartford and Barry introduced CROS and BiCROS hearing aid fittings. Little fun fact, that same year Telex introduced the wireless eyeglasses, which also proved to be successful. So we've got a lot coming out of telex, back in the day. But this is a visual of exactly what's happening. So let's take a person who has single-sided deafness on that left side. This would be a classic example using birds. And you can see what happens is the CROS transmitter picks up that auditory signal and reroutes it over to the better ear. Given that it's not possible to provide these types of patients with a two eared listening experience, the next best approach would be to provide a two-sided listening experience.

And for those of you who have concerns about our patients who also have a hearing loss going on, don't worry, we also have you covered with a BiCROS. So a BiCROS is just gonna be having a hearing loss in that better ear. When we talk about the benefits, I think there's a ton of benefits with CROS and BiCROS. If you haven't fit these, I would highly recommend them. The main benefit of CROS hearing aid is gonna be to address the specific challenges that are associated with hearing loss in that one ear and provide advantages that are gonna include sound awareness, which in my mind is one of the primary benefits of a CROS hearing aid is that it's gonna restore sound awareness on the side with the hearing loss.

But the microphone on the deaf ear captures the sound from the side and then transmits that with the receiver onto that better ear. So it's gonna allow individuals to regain awareness of the sounds that they would have otherwise missed if they didn't have the system. On this list, we also have improved sound localization. This is again, our ability to determine the direction of sounds and proximity. This is significantly enhanced with the CROS hearing aid. By transmitting the sounds from the bad ear over to the good ear, it's gonna help our patients accurately locate the source of the sound of their environment and give them that little bit of sound localization back that they're missing. We've got enhanced speech understanding.

Again, in noisy or challenging situations, a CROS hearing aid's gonna improve speech understanding for our folks. Again, it's picking up from sounds from the bad side and transmitting them over to the good side. It helps people focus on speech, while reducing the interference from from the background noise that they may be experiencing. We also have increased comfort and convenience. The Nexia is quite small, as you could see from that last schematic. So discretion really isn't a problem there. We have social and communication benefits. I like to kind of bulk these into quality of life, but it's definitely gonna enhance an individual's ability to kind of participate more in conversations. The conversations that maybe they are not used to participating in, or maybe the conversations that they would've otherwise kind of dropped out of.

They can up their social activities, daily interactions, I've seen this lead to increased self-confidence and really important, reduced social isolation. We also have some research that shows reduced listening effort. With better hearing from both sides, people can experience reduced listening effort and fatigue, so they don't have to strain as much to hear and understand conversations, which is also gonna play into how tired people get. And then, again, improved quality of life. I would say that across situation

with quality of life, it just makes the patient's life a little bit easier to navigate those really dynamic listening situations and then hopefully get out and enjoy a more active and engaged lifestyle, that they may have been missing out on.

Well, let's talk candidacy here for a moment. Unable doesn't always mean deaf. I used to work in a really busy vestibular clinic and we'd see patients with many errors or sudden hearing loss quite a bit. Even those with severe trauma, we would be able to get in some dexamethasone or corticosteroids in time to preserve and raise their thresholds back up. But in the end, a good portion of these people, their discrimination just would not get any better. It just tanked. So when you think of candidacy for a CROS, it doesn't always mean just having a deaf ear. We could also venture into an area with poor discrimination as well. I would say the most important part is just recognizing and understanding the challenges that are faced by our patients with single-sided hearing and figure out if this is a solution that can help them and hopefully help and provide them an intervention that they didn't have and support and optimize their hearing experience and communication abilities.

So I think it's always really important to kind of step back and look at the person as a whole. Again, it doesn't have to be a deaf ear, but it could also be someone who's very active and used to having two ears, they want to be able to continue their active lifestyle, they may have the thresholds there, but the discrimination may be low. Couple different fitting considerations with a CROS and a BiCROS. There's no need to differentiate between CROS and a BiCROS fitting, within the GN SmartFit fitting software. The microphones are turned on automatically in the receiver device and even when there's normal hearing in the better ear. So, across fitting. To avoid having the patient experience any occlusion, we do that.

And the balance control allows for adjustment of the sound balance of the CROS transmitter, relative to the hearing aid receiver side. And the balance control should

also be adjusted based on the patient feedback. So they do need to take part in this fitting. And then also make sure that you do the probe mic measurements. If you have a BiCROS set up, one thing I used to do, is I would always make sure that they had a program where they weren't using the full streaming mode. Some people like to take a break from streaming, so you can also make them a traditional hearing aid program to work with. A few other tips for fitting CROS and a BiCROS, we've got user balance adjustment, might be needed in situations where the hearing aid wearer wants to hear more or less from the CROS or BiCROS transmitter side.

And then in the manual control screen you can see use the short and the long button, press options for CROS, up and down functionality on the transmitter side and the volume up and down on the receiver side. We have some quick guides that will be coming out for these as well. So hopefully you'll be able to see some more tips and tricks from us. With the Nexia CROS and the BiCROS, our patients are gonna enjoy a full day of battery life on a full charge. If anyone's ever met me, they know that I'm usually, whatever electronic is near me is usually dying and in the red, so I always appreciate a good charger. The CROS transmitter is only available in the rechargeable style.

There's no CROS or BiCROS option that has batteries, so rechargeable style is what we've got. It can be charged via one of these three inductive charging systems in front of you. We've got a premium charger, a standard charger, as well as a desktop charger. And again, what I really like about these chargers is a quick 30 minute charge is gonna deliver eight hours of battery life. I believe ten minutes is also gonna give three hours. All right, so we've talked a little bit about the CROS and a BiCROS option. Now I want to flow into cochlear implantation and bimodal hearing. I'm proud to say that GN and Cochlear have a really strong Smart Hearing Alliance. This is a partnership, that we've come together and so we've got all our bimodal needs that are covered.

Bimodal hearing is important. It's very important. It refers to the ability to hear and the process sounds using two different types of sensory modalities. So you've got a combination of acoustic hearing from the hearing aid side, as well as electric from the cochlear implantation, the electric stimulation from the cochlear implantation. Bimodal hearing can have a couple different advantages, several different significant advantages and benefits. And I think sometimes we forget about the leap that people can make, when they're going from maybe just a hearing aid only or a CI only and then going into a bimodal fit. This is definitely really important for individuals with severe to profound hearing loss in one ear and residual hearing on the other.

I would say that the most common complaints of mono-listeners are difficulty with localization and difficulty understanding speech in the presence of background noise or obviously in noisy challenging environments. In the bimodal listening condition, we do see performance on both tasks improving quite significantly. When we talk about bimodal definitions, you can see this is acoustic stimulation in one ear. So we've got the hearing instrument, gonna be on that side, an electrical stimulation or bone conduction on the opposite ear. So that's gonna be the cochlear implant or the bone conduction implant side. With the Smart Hearing Alliance, we've got full compatibility with five different processors. We have compatibility with Cochlear BAHA, Osia, Kanso, the N7, as well as the N8 and that's gonna be on the cochlear side of things.

When you look on the GN side of things, we've got full compatibility with the Nexia product that just launched. Our ReSound OMNIA, ReSound ONE, the ENZO Q line, the ENZO 3D line, LiNX Quattro and the LiNX 3D, so we do go back quite a bit. when we think about why we have two years, it's pretty important. It really helps sell the bimodal story, especially for individuals who are a little apprehensive about moving forward with either side, whether they wanna move on the cochlea side or whether they want to move on the hearing aid side. But we definitely have two ears for a reason. It also helps

obviously sell that story to the patients. And I've listed out a few different areas of importance here, when we think about bimodal.

We have improved speech understanding. Again, this is gonna provide better speech understanding in these challenging listening environments or places that are really noisy or you can even think about reverberate spaces. Combining acoustic hearing in one ear with the electrical stimulation on the other from the implant, it also leads to a more complete and kind of accurate perception of speech sounds. We see a lot of satisfaction there. We also see benefit with sound localization, just like we've already talked about, having access to both the acoustic and the electric hearing has been known to significantly enhance individual's ability to be able to localize the source of the sounds of their environment and kind of find that signal of interest that they're looking for.

This is also a safety and situational awareness. We know from one or two slides, and also just from being in life, that safety and situational awareness is really important. You wanna be able to localize where traffic is coming from. If you're out on a bike, you wanna be able to hear different sounds, if you're walking, et cetera. It's going to increase the overall listening experience for people. We've got natural sound perception and organic hearing. Bimodal is going to allow the benefit from hearing, kind of more naturalness on the acoustic hearing side, so that hearing aid ear, while simultaneously being able to benefit from the speech clarity that is provided by the CI side on the other ear.

We also have extensive research to support that when folks are fit bimodally, that they have enhanced music perception. Music listening is pretty enjoyable for a lot of people and this is one of the complaints that we hear quite a bit, when people come in and they say, they've kind of lost their zest for life and they used to do things that they don't do anymore and one of the big things was music listening. Whether they're

musicians or just listening with their Alexa in their homes, music listening was enjoyable for people at one time and when they get the hearing loss, it doesn't become enjoyable as much. But if we can fit them bimodally, we've got the research to support an enhanced music perception.

What it does, it provides kind of an opportunity for them to appreciate music with the hearing aid side, while still having the advantage of clear melodies and rhythms through the CI side. And if anyone at the end is interested in having this research, I'd be happy to send that on. We also have benefit with redundancy and robustness in cases where someone's hearing is compromised due to factors like ear infections or temporary issues, having bimodal hearing can provide redundancy and ensure that the individuals also hear and communicate effectively. So redundancy and robustness is really important. And then I feel like this presentation is all about, somehow tied in with, the improved quality of life, 'cause we keep going back to that.

So again, back to an increasing quality of life, bimodal hearing, it allows a higher quality of life by reducing communication difficulties for our patients and our folks. Again, we've kind of talked about this in a few other slides. For the people who feel isolated and haven't wanted to go out anymore, this can help increase individuals participation in social activities, conversations, just in their daily life! And we are also having more individualized solutions, as this industry progresses, we see a lot of individualized or personalized solutions and bimodal hearing is tailored to each and every person's individual specific hearing needs and preferences and it's a great way to personalize and optimize our patient's hearing experiences. Here you can see, while the cochlear implant provides the patient with clarity, the hearing aid is going to provide some sound balance.

Benefits include better hearing and background noise, and again, that music appreciation. This was some research from Cochlear and they did a large multicenter

study, they found that about 70% of the recipients utilized a bimodal solution. Cochlear conducted a multicenter study. They had an N of 96, so 96 patients, and 94 of them were qualified for bimodal fittings. So up to 70% of CI users could benefit from bimodal hearing in this particular study that we're going to look at. So let's take a look at some research. You can see that patients experienced some bump in their hearing. Sorry, the typing is a little bit small. In the gray boxes you'll see bilateral hearing aids versus the yellow boxes, which indicate bimodal hearing at six months.

And you can see that they got a bump in their hearing performance in that bimodal condition. There was about a 40 percentage point improvement in CNC words while in the Az Bio condition, using the AZ Bio, even with a plus 10, DBSNR patients improved 24 percentage points. So this is really big news, but I guess the bigger question, we can look at lab stuff all day long, but another big question is, how did the patients themselves feel about their hearing performance? And let's take a look at those numbers. In the best fit bilateral hearing aid condition, patients obviously struggled, but self-reported satisfaction changed dramatically when patients were asked the same questions after six months of bimodal use. So you can see here their hearing performance in terms of satisfied or very satisfied.

Oops! That was supposed to be a 96, actually, I'm not sure... The six may have been cut off there. There we go! 96, sorry about that. You can see that big bump here now. So let's go back one here and just show you the hearing performance with just the bilateral hearing aid conditions, people were struggling. So they're satisfied or very satisfied, it's 9%. Ability to understand what's said on TV, 13%, which is unfortunate because a lot of people who are isolated are home watching TV. So for them not to be able to enjoy that, even in their own home, is unfortunate. Ability to understand conversations in small groups, 8%. You can see why people aren't going out as much. Hearing performance in background noise, 2%.

Ability to listen and appreciate music, 13% and the ability to understand people on the phone, 6%. So let's change those numbers upside down here and you can see that their self-reported satisfaction changed, again pretty dramatically, when they were asked the same questions after six months of use. So we see massive jumps here, just on the hearing performance alone, going from 9% to 96%. It is well established that hearing with a cochlear implant and a hearing aid and bimodal solution can significantly improve hearing performance. And you can see that this is easily illustrated by Rene Gifford and again, if anyone would like access to the study, please let me know. I can get this out to you. Going from a 28%, with average hearing performance with two hearing aids, going up to 75% with average hearing performance with a bimodal condition, so CI on one side and hearing aid on the other.

I do wanna highlight here, this is also that multicenter study and I wanna highlight that this is six month data. So people haven't even been wearing this a year. And this is where I wanna take a moment and break it down for you into individual contributions. And I apologize in advance, I realize now looking at the screen, that these may be a little bit difficult to read. On the left hand side here, we've got one hearing aid on the ear to be implanted, then we've got the contralateral ear and then we see that nice binaural bump. We've got the CI alone more than doubles the score and then you also get a nice little boost again when you add the Contra hearing aid back in.

And these are statistically significant. You see a similar pattern, seen for noise, although the final binaural boost is a little bit more pronounced. So all jumps from the cochlear implant alone to the bimodal condition, so CI+ hearing aid are statistically significant in this particular study. And again, I think it's important to highlight that this is only six month data. So if you have anyone who is on the fence of not knowing if they wanna go the bimodal route, I think the best thing to do is supply the evidence and the evidence generally speaks for itself. Going back to our last treatment options,

another one I'd like to discuss towards the end of this presentation, is going to be assistive listening devices.

Unilateral hearing loss can work really well with assistive listening devices for several reasons, but I have met a number of patients who have sworn by these devices and they feel like they can't even get through their daily lives without a little bit extra help here. I've identified seven different reasons for going with the ALD options. First is gonna be improved signal to noise ratio. These assisted listening devices, or ALDs for that matter, are designed to enhance a signal to noise ratio for folks. And what this does is it makes it easier for users to hear and understand that signal of interest or their desired sounds or speech, while reducing the impact of the background noise that they are near.

This is really beneficial, especially for people with unilateral hearing loss, because again, these people struggle in noisy environments, due to the lack of binaural hearing cues. So if we can give them a little bit of a boost, I say, let's do it. Number two is enhanced speech clarity. If you haven't worked with assistive listening devices, they directly transmit speech and other, again, those desired sounds or the signal of interest, to the impaired ear, making it easier for our patients to hear and understand conversations and lectures. Again, that signal of interest, anything that's kind of around them and this is really helpful in situations where the sound source is located on that impaired side. Because remember, if the sound source is over on that impaired side, this will definitely be helpful.

They're gonna be able to use this and be able to localize a little bit better there. Which brings us down to improved sound localization. The ALDs really provide people and our patients with additional auditory cues, to kind of help them with that sound localization. So while it may not totally represent or replicate the natural sound localization abilities that a binaural hearing would give us, the ALDs definitely offer directional information,

to improve the the user's awareness and sound sources we've got personalization. These can be personalized to individual specific hearing needs and their preferences, meaning once you get into the software, you can really tailor these to however the person wants. They can fine tune those devices to their liking and you're just essentially helping optimize their listening experience for them when they leave your office.

ALDs also reduce listening effort. It helps reduce the cognitive effort that's required to hear and understand in those noisy environments, so those challenging listening situations. what it does is it just kind of helps people, especially with the unilateral hearing loss, it helps everyone, but when we're talking about unilateral hearing loss, to kind of focus more on the content of the conversations or the presentations and less straining on the ear. So this is where you start to see people come back into the office and say they're not as tired by the end of the day. ALDs are pretty flexible. These have really come a long way over just even a short amount of time. But they come in various forms, they've got personal amplifiers, remote microphones, we've got looping systems, we've got something new and exciting that's coming out, it's called Auracast.

What this does is it provides our patients with options to choose what is kind of the suitable device for them and for their specific needs and preferences and keeping cost in mind. It also improves communication and social interaction. It basically improves speech understanding by reducing the communication difficulties. ALDs, they enhance the ability of people with unilateral hearing loss to really kind of re-engage with social interactions and be able to participate in those lectures and participate in those meetings that maybe they had dropped out of, because they weren't able to hear fully. There's nothing like sitting through an hour long meeting and you're only hearing a little bit of it. That's a lot of strain on the ears, that's a lot of headaches waiting to happen.

So I think if we can get some of these ALDs out to our patients, especially those with the unilateral hearing loss, we really can help our patients enjoy various activities and get that back into their daily lives. This is a ReSound Multi Microphone. It's a smart and flexible hearing aid microphone. You can enjoy crystal clear sound with this guy. It goes up to about 80 feet away, so you can hear about 80 feet away there. It's a pretty flexible solution, you don't have to wear an extra device around the neck. It also acts as a table mic. You can place it horizontally on a level surface, like a table, and it switches automatically to a table microphone and that's gonna allow the user to pick up different multiple speakers or multiple speakers voices that are around the room.

And I just wanna note that this is also compatible with the Smart Hearing Alliance products. I am also really excited today to talk to you guys about some Bluetooth LE Audio. This is really transforming and standardizing how audio is transmitted over Bluetooth low energy. This is going to offer up a number of different features, but most importantly, it's gonna combine better sound quality and longer battery life, with this Bluetooth low energy. This allows our patients to directly connect to different smartphones and tablets, PCs and streaming. What you can think of, this is Bluetooth version two. So with a Bluetooth LE Audio you also get something that's called Auracast Broadcasting. We'll dig into that in another AO course, I believe there's one or two that are already out there.

If you haven't heard of Auracast Broadcasting, it's very interesting. It comes with the Bluetooth LE Audio and we are already setting up our products to be compatible with this type of technology. Our Nexia CROS transmitter, our Nexia portfolio, is Auracast ready, as well as our TV Streamer and I also believe there are other products that are in the works that you'll see from us very soon. We have a new TV Streamer, it's called the TV Streamer+. I think everyone's gonna be pretty pleased with this. It has a couple new features. First off, the TV+ works off of again, that Bluetooth LE Audio that has just

been released and is gonna be Auracast ready. So again, we could set up an entire AO course for Auracast.

Take a watch out for those, log on and see if you see any Auracast classes that are coming up. We'll be ready to talk about those. The TV Streamer+ also has MagicPairing. MagicPairing is where you have one press of the button and everyone in the room gets paired into it automatically. This also, I should say, works with Smart Hearing Alliance, not to mention it's smaller, it's much smaller in size, and it also ships with Velcro, so that you can put it on the back of the TV, just like you can see in the picture right here. It's nice in the back and kind of hidden away. And again, this guy is Auracast ready. We've got a new streamlined design.

If you're familiar with our regular TV Streamer, you can see that this is much smaller, there's a big size difference here. In fact, a colleague of mine put this photo on my desk, this photo over here to the right, they put a photo on my desk of this and I wasn't exactly sure what I was looking at. But what this is a picture of is the new TV Streamer+ in front of a post-it note and that post-it note is in front of our old TV Streamer. So you can see that this guy is much, much smaller. If you haven't worked with a TV Streamer in the past, I would highly recommend it. I've had a lot of patients who come with unilateral hearing loss and just struggle.

They have somehow made it work during their work hour, during their careers, but I think I've come across a lot of people who tend to be workhorses and they get home and they are just exhausted from working all day, which I'm sure we all are, but these folks come home and they are just absolutely fatigued and tired and they have headaches, the last thing they wanna do is be able to not relax at home. I've had a number of unilateral hearing loss people who always do really, really well with accessories. I would definitely and highly recommend setting your patients up with

some accessories if they have unilateral hearing loss as well as any hearing loss for that matter.

But for those who have the unilateral hearing loss, sometimes they really, really come in and they say, "Wow, that has made a huge difference." So I would definitely set them up with that. And for the sake of time, I only touched on two, and that being the ReSound Multi Mic as well as the TV Streamer, but we have an entire lineup of accessories that patients can benefit from. So please check those out. And I should also, I wanna mention that Smart Hearing Alliance and Cochlear Company, they're also compatible with these devices. And we are nearing the end of this presentation. I do see a couple of questions, I'm gonna take those here for just a moment.

We've got a question from an audience member. And the question is, "Does the receiver side of the CROS system work with the TV Streamer? Not both sides, correct?" Correct. The receiver side of the CROS system works with the TV Streamer. And it looks like there are no other open questions. I'd like to thank you for participating in this conversation. I think that what is really important when we think about unilateral hearing loss is to really dive in to see what our patient's lifestyles are like, what their preferences are and also obviously it's going to depend on what the severity of the loss is. We know, obviously if someone has a dead ear, we're gonna treat that a little bit differently versus an ear with a little bit of hearing loss in it.

I've had a number of patients who have not wanted to go with anything on the other ear, whether it be a CROS or a BiCROS or a bimodal setup, in which case, these patients are the ones I usually hone in on with the extra accessories. There's nothing wrong with putting a low gain instrument on as well and getting access to these accessories as well. These, again, are the patients that seem to do really well with this. If you have bimodal patients or people who are interested in getting that bimodal solution, if they are from a cochlear on Cochlear Americas, the GN products are set up

directly for that. And if you haven't seen the Bimodal NSA, which is the app from Cochlear, we now have a shared app for our bimodal users.

So if you haven't seen that, please check that out. It is on the NSA, which is the Bimodal NSA, it's the app. The bimodal part is piggybacked onto the Cochlear app for that. The folks who are using the shared app will also be able to use their GN app separately if they want to, but you'll notice that you can make changes now with that shared app. So they should be good to go and only have to use one and not the other. We've done extensive testing to make sure that whatever changes on the NSA app are reflected into the GN app as well. So any changes are already reflected, we don't have to worry about that at all.

But I would say the biggest deal with unilateral hearing loss patients is to really hone in on what their lifestyle is like, what suits them, and then kind of guide them down the correct path from there and give them as many options as possible. With that, I'd like to thank you for joining our course and I'm going to see if there are any other questions that we need to take.

- [Melissa] Alright.

- [Megan] I was just gonna say, if anyone would like access to some of those studies or the research that is available out there, please leave me a note in the chat, I'd be happy to get those out to you, as well as you'll have copies of this presentation. Thank you very much.

- [Melissa] Thank you so much, Megan. That was wonderful. It was a pleasure again to have you. I also don't see any further questions. Just a reminder again, if you could give us the phone number for ReSound, in case anyone needs to call into the company. Contact info?

- [Megan] Sure, yeah. Let me get that. Yeah, let me get that information for you. Because I work for Denmark, I don't always have the Bloomington phone number, but I will get that right now. Fantastic. And again, if anyone has any questions, my email address is meganmquilter@gnresound.com.

- [Melissa] Great. I'll just send that to everybody in the chat.

- [Megan] And then for anyone who is looking for the phone number for ReSound US, it is 1-800-248-4327 and that's located over in Bloomington, Minnesota. And then again, my email address, just in case you guys need that, is mquilter@gnresound.com. Thank you so much.

- [Melissa] Thank you everybody. Have a great rest of your day and thank you all for joining us.