

(Captioner standing)

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**WILL EISERMAN:**

I would like to welcome everybody today which will be starting shortly. You are in the right place for today's webinar, titled 'Unilateral Is Not Uniform' brought to you by the National Center for Hearing Assessment and Management.

We are going to be starting at the top of the hour, in about four minutes from now. We just want to give everybody an opportunity to get your volume adjusted to your liking.

You will also notice on the right side of your screen, you will see some videos available for you to view, the presenters and our interpreters today.

Now you can adjust the size of the screens on the right by identifying a vertical line on the right side of the PowerPoint slide, about 1 inch away from the edge of it. And then clicking on it in the middle and dragging it to the left or right. When you do that, you will change the proportions of the PowerPoint slide size and the video slides. So, feel free to manipulate those to your liking.

You will also notice that you can click in the bottom of your screen where it says 'show captions'. And that is a great way to turn on the captioning for today.

And again, you can also manipulate where the size of that, and the placement of that on your screen is. So feel free to play around with how you would like that to show up or not.

And again, we will be starting in just a few minutes. People are signing on at a fairly rapid pace right now. Thanks for putting up with me. Because I will repeat everything I just said for those that are signing on early.

**SPEAKER:**

Recording in progress.

**WILL EISERMAN:**

I would like to welcome everybody today to our webinar entitled 'Unilateral Is Not Uniform'. My name is Will Eiserman and I am from the National Center for Hearing Assessment and Management at Utah State University, also known as (Unknown Name) where the NTRC, the national technical resource Center is housed. As a part of our NTRC, we frequently have webinars of relevance to the EHDI

community and this is one of those.

Today's webinar is going to be recorded, so if anything disrupts your full participation today, or if you think of people who are not attending live who you think might benefit from today's webinar, know that it is being recorded and will be posted on our website which is [infanthearing.org](http://infanthearing.org), in the next couple of days. Remember, you can always go back there. If there are particular slides you would like to look at, you can just stream through and advance forward to the place that you want to review again, or you can review it in its entirety.

There will also be a transcript available there as well. So, keep that in mind.

We want to give a shout out to our interpreters and our captioners today. Thank you so much for your talents, skills, and services in helping us make this as accessible as possible. We always appreciate that.

Our presenters are first, going to give the presentation and then, and they are finished, we will invite you to enter any questions you might have in our Q&A box. And then I will read them aloud for our presenters to respond to.

But please hold your questions until they have wrapped up their remarks, because they may answer your question before they are even done. We are not going to be monitoring the questions as we go, we will invite you to do that once they have wrapped up their remarks, and then we will address your questions or comments at that point.

So, we have two wonderful individuals from Texas with us today, from the great state of San Antonio. And so, I will allow them to introduce themselves. Take it away!

**LOGAN HORNER:**

Thank you, will. So, I think I will go to the next slide where we have some information and I will let Ana start.

**ANA SEI:**

Hi everyone, my name is Ana Sei. I am a link you will parent infant advisor here at Sunshine Cottage. I have worked for 12 years here at our parent infant program and we have's -- we see babies birth to 3, with different types of hearing loss and we work with their families.

**LOGAN HORNER:**

My name is Logan Horner. Thank you for being here with us today. I know you have a lot of options and a lot of things going on, and I'm so glad that you are here with us today, whenever that is. Thank

you. If you have any questions for us that we do not get answered during the webinar, you will see that we have our email addresses on this page. Please email us. We would love to talk to you and converse, and find out what you are doing, because I think this topic is one, for us (audio issues) is hard for all of us. So, we would love to hear from you.

I have been in audiologist for 16 years and most of that has been at Sunshine Cottage but I did do a year working with just cochlear implants. Ana and I also wanted to give some credit, we originally did this presentation and put all of this information together, Melissa Jensen was a part of it.

She is not at Sunshine anymore, she is putting all of her great knowledge elsewhere, but we wanted to give her credit because she really did help us with this information.

ANA SEI:

So, for today we will talk about five common unilateral hearing loss profiles.

You will learn unique aspects of each profile and how they impact amplification and therapeutic needs.

And you will also learn about amplification and intervention plans for young children with unilateral hearing loss.

What makes unilateral hearing loss different? Well first of all, what is unilateral hearing loss?

I'm sure most of you know, hearing loss that affects only one ear is known as unilateral hearing loss, right?

This hearing loss can range in degree from mild to profound, whereas we have single sided deafness which is a form of unilateral hearing loss, where one ear has no usable hearing.

And we will talk more about that right now. So what makes unilateral hearing loss different?

First of all, many people think that if you have normal hearing in one ear, then the other ear will make up for the ear with the hearing loss. And this is something very confusing for families to understand unilateral hearing loss because yes, the child has one normal hearing ear and will detect sound.

Also, families may not see the challenges their child with unilateral hearing loss can experience in the early years because they may be in a home environment. It is usually when these kids start school where parents or teachers start to notice that these kids experience difficulties in listening and understanding.

I have read the children with a unilateral hearing loss may be 10 times more likely to fail a grade in school.

So, localization and noise. One of the biggest challenges for people, and especially children with a unilateral hearing loss, is listening and noisy situations.

Hearing from a distance is also a challenge. Our adult brains have the capacity to filter out background noise with two ears, and focus on what the speaker is saying.

But a child's brain who is barely making connections, barely making sense of what they are hearing and the sounds, cannot do that with one ear.

Our brains know that where sound is coming from, based on which ear receives the sound first, but with unilateral hearing loss, localizing is a challenge. They may detect but they will struggle to localize and even understand.

We know that children with unilateral hearing loss have been found to have lower language scores, which in turn, impact reading and academic success later in life.

Wear time, this is a big one. Putting the hearing technology and keeping it on all waking hours is a big challenge for a lot of our families, especially when it is hard for them to understand the hearing loss when it is not as obvious. Unilateral hearing loss is not as obvious as a bilateral may be, severe to profound hearing loss. Then it is more obvious. You notice a difference.

These kids do have one good ear that is doing all the work. So it is really hard for parents to see these early years that hearing loss.

So as therapists, we coach parents and we coach families on establishing routines to achieve full-time use as well as educating families so that they understand the hearing loss and the impacts it can cause so that they are motivated to put it on more consistently.

We see that if families understand why, why it is important and how it can affect later on, then they are more motivated to put it on.

And we have all heard the phrase 'two ears are better than one', right? Well, with unilateral hearing loss there is something called a head shadow effect, where the intensity of the sound is reduced when it travels from one ear to the other side of the head.

And two ears contribute to better listening and improved speech recognition abilities. Whereas with unilateral hearing loss, this is a challenge.

LOGAN HORNER:

The five different profiles were going to talk about our conductive hearing loss. So if a child has microtia atresia, meaning that you have -- not have an outer ear and they are using a bone conduction hearing aid of some kind.

The next profile we are going to go over is a sensorineural hearing loss. With the mild-to-moderately severe hearing loss of their using a hearing aid.

The next room we will look at is severe to profound sensorineural hearing loss, where we have confirmed that they have in auditory nerve and they are wearing a hearing aid.

Profound sensorineural hearing loss will be our next profile that we go over. That is where we have good auditory nerve and we have received a cochlear implant.

The last one that we will go over is a profound hearing loss where we know that we have an abnormal nerve or cochlea and we are using a bone conduction hearing aid for that.

ANA SEI:

So the parent infant program at Sunshine Cottage was part of ODDACE, which you see right there.

ODDACE stands for the outcomes and developmental data assistance Center for EHDI programs.

We shared all of our assessments with ODDACE, they analyzed this for children who are deaf and hard of hearing, they do this for different programs throughout the United States, this is from birth to six.

That is where we were able to get these numbers and compare our Sunshine program to other programs in the nation.

You can see on the slideshow that at least in the parent infant program here at we pretty much fit all of her kids with some type of hearing technology that the audiologist feels is appropriate. We have a small percentage of kids who are not fit with some type of hearing technology for a unilateral hearing loss compared to other programs in the nation that maY may decide not to amplify.

You will see that the majority of our kids in the parent infant program either use a bone conduction hearing aid, which Logan will talk about more right now in the next slideshow of why, and to the cause.

So they either use a bone conduction hearing aid or a hearing aid.

LOGAN HORNER:

This is kind of a breakdown to show you that at Sunshine, how many kids do we have with unilateral hearing loss?

We actually have a pretty high percentage of kids. We have the birth to three program. Then we also have a day school that has a preschool until fourth grade. Within adding both of those groups together are parent infant and our day school. We have around 360 kids. 20% of those have a unilateral hearing loss.

So we have a fair chunk of kids with unilateral hearing loss that we work with and try to work with, and are confused with and really want to help. So, we are going to use some of those kids and how they are doing to help educate us all and hopefully have a good conversation about what this can mean for the child in their development.

Alright, so we will start off with our first profile here. This is where we have that conductive hearing loss that is because of microtia atresia. When we look at it for this year, it is the right ear that has the conductive hearing loss. So, this outer ear and the ear canal are not formed.

We have no way to get sound to the ear.

When we look at the left ear, we are hearing within normal limits, as long as we do not have an ear infection in that year. Sound comes in within normal limits.

This child has a moderate conductive hearing loss, so pretty much a maximum conductive hearing loss for this one.

When we do the testing with these kids, we compromise the left ear and we compromise it by putting a foam ear plug in that ear, and then we actually have an ear muff that goes over that ear.

I know that this is not taking away that ear completely but it is the best way for us to be able to simulate a real life situation. If you had an ear infection, what would that be like? How can we figure out how this is really helping the child?

We have been using that and it has been successful for us to be able to do that.

So, for these kids, usually they are going to use a bone conduction hearing aid on a softband until they qualify to get a surgery.

Bone conduction hearing aid technology that we use is Oticon Medical or the Cochlear Americas. Bone conduction technology is great and can also be really finicky for these kids. Usually my microtia atresia kids that are wearing a softband, they are pretty good users of their equipment because they see the benefit, and because we are able to that sound to that cochlea that is working.

There are some factors that really influence these kids. It may not just be the ear that is actually different when you have microtia atresia, or asymmetric. Those asymmetries with the face may mean that you have to have some surgeries. You may have some downtime for hearing. It could also be that our speech and language pathway, as far as articulation, is compromised.

So maybe these kids do not quite have good (Unknown Name), perhaps they had a cleft palate. All of those things will influence their development in different ways.

The next profile that we will go over his sensorineural

WILL EISERMAN:

Could you speak up just a little bit please?

LOGAN HORNER:

The next one, is that better?

WILL EISERMAN:

I think so.

LOGAN HORNER:

The next profile we will go over is hearing loss that they have, sensorineural hearing loss that we can actually fit with a hearing aid. So they have enough hearing that a hearing aid can help us give them the access that they need, because our goal for unilateral kids, like Ana talked about, is to get that bring information from both ears.

We want that brain to get information from the right and the left side so that it can work together so that things like listening at noise and distance can be better.

So, when we look at what that looks like, the right here in this case is hearing within normal limits. The left ear has this slight sloping to moderate sensory neural hearing loss and they are fit with the hearing aid.

When we look at the picture, we see the damage is where the cochlea is. We know if we can get

enough sound to the cochlear nerve, it will send the signal to the brain.

The application would be hearing aid. Influencing factors could be could be have enlarged vestibular aqueducts? Maybe we have the slight, to moderate hearing loss and that your right now. Could it change?

If it does, does that mean we could have enlarged vestibular aqueducts in the other ear? Could that your change?

Same thing with cytomegalovirus. If they have CNB, their hearing could progress. And if it does, how does that change our aggressiveness in treating that child in treating that hearing loss?

A lot of the times with this you can have imaging issues, so knowing what is going on with the kid and structurally, for both ears, is really important, and helps us to be able to determine the best course of action. But it can be hard to get imaging on a child. We run into that a lot.

We would really like to know what we are working with here, but because of insurance, or because of the child's age, or risk, all of those things come into play. So it can delay us really knowing what is the best treatment for this type of hearing loss.

Alright, so the next thing we are going to talk about is a profile we have in auditory nerve, we have confirmed that with imaging, but we still have a profound hearing loss. OK? So that means our hearing loss, when we look at the left ear here, is still just in the cochlea. But the cochlea is fully firmed. It is they are, but what is inside of the cochlea is not able to send the information needed to the brain, or as much information that we would like so that they can truly get information from both the right ear and the left ear.

Usually for us, kids in the situation are waiting to get a cochlear implant.

Things that we have done for kids with this type of hearing loss is a hearing aid, because we want that auditory nerve to be sending the signal to the brain because the brain needs to be primed and ready for some. If we are giving the brain the sound for that side, even if it is not optimal, it is still creating some really great pathways in their.

And those pathways are going to become a slight blueprint so we can build on those or a language structure which is really important for these kiddos.

Another thing we have started doing is putting a Roger Focus II, which is a receiver you where. They are better in the classroom to get the teachers voicing their better hearing ear so they are not missing

out on some educational information. It is a way to kind of help capitalize on that fact but not compromise the hearing of that better ear.

Another option would be a CROSS Hearing Aid. I will be honest with you, we have tried them, sometimes they can be finicky working with RFM system. Sometimes how they work and how they are made, they just cannot withstand the kid moving and being a kid.

So, we had more breakdowns using that equipment then we did trying some other options. I still have hope that the Cross Hearing Aid will work with some families. We did not have the best of luck. It does not mean it is not possible but we have not found the right family for that.

Influencing factors for this one are similar to the previous profile. So you have enlarged vestibular aqueducts and CMV. Those could be influencing factors that can change things.

Again, with unilateral hearing loss like this, we are looking at progressive hearing loss. You always want to be monitoring that better hearing ear. And this is the time when we start counseling about CI and thinking, will that be appropriate? Is this something we want to explore to see how a child will be doing for that?

So our next profile is when we are using a cochlear implant, OK? So, for this profile we have the right ear, where we know the cochlea is not functioning, and they actually have implanted that cochlea.

When we look at this, you see the left ear is hearing within normal limits. The right here has that profound sensorineural hearing loss. When we look at the As for this profile, we see they are in this light to within normal limits for that range. They are truly getting good and if it while using that cochlear implant.

Where if we look at the previous profile, you saw their benefit was more around the mild to moderate range for that year, when the better hearing ear was compromised.

So, amplification, a cochlear implant, advanced Cochlear Americas or Medel. Again, you're going to be look at, do we have enlarged vestibular aqueducts? Do we have CMV? Do we have something that could cause this to be progressive?

Depending on the child's insurance under age, it has been tricky for us to get implantation, within the last three years before they are five or six, which is hard on all of us because we know that there little brains are primed to take in good information and use it when they are younger.

So I think the more we are doing research and the more we are seeing these kids do well, I think the

age for unilateral implantation will change and will be able to get that easier but right now it can be tricky for this to happen. We find that doing some testing in different situations and trying to really improve and show the benefit that the hearing aid is giving versus the potential benefit of a cochlear implant is important for getting this approved.

The next profile that we are going to talk about is no auditory nerve. So we are going to use a bone conduction hearing aid. How this one is different, when we look at the left ear we are hearing within normal limits. For the right ear, testing and imaging has shown the outer ear is clear, the middle ear is clear, no infection, no abnormalities. That cochlea is working.

We've been able to test the cochlea and we know it is functioning. Imaging shows the cochlea's fully formed. But then our auditory nerve is not sending a signal.

Another way that you would be in the situation is maybe the cochlea is not formed, maybe there is an absent cochlea and absent auditory nerve. If that is the case, and we know that if we even put a cochlear implant in here, the nerve cannot send the signal. Or if the cochlea was not formed enough, or a cochlear implant to send a signal, then the best way to help this child here would be wearing a bone conduction hearing aid. And capitalizing on the fact that the child's brain will learn that sound, even though it is always going to go to the better hearing cochlea, the sound that comes from this side where they are wearing it is different.

So the child's brain figures it out. That sound is different once he gets over here. So, when we look at this and see how are they able to hear? What we find when we compromise in this case the left ear by putting that plug in muff, these children are hearing within normal limits to a slight loss.

But again, we are relying on this left ear for that. All of the information is being fed directly over here. And then the brain is figuring out how that works, OK?

For the child to truly use the brain and the neural capacity there, they need to be wearing it so that the brain can be able to learn and produce those good pathways. And that can be tricky. That is one of our biggest things with her unilateral kids is actual usage time of the device.

So for amplification for these kids we talked about the bone conduction hearing aid. You could also use the Cross Hearing Aid for these kids and the Focus II receiver their better ear.

We want the kids to have the access they need for language development. We think about how can we best give the kids that information? How can we best give their brain that information?

Big influencing factors for this population is localization. Can they identify where a sound is? Is that

bone conduction hearing aid giving them what they need to localize sound?

And if it is, that is great, we love that. But then how do they do in noise? The only place a child is truly in a quiet environment, maybe not the only place, but one of the only places, is in an audiology booth. In a soundproof booth. So we need to do testing annoys to say, "OK, how much benefit is this giving the child? How can I simulate a real, live situation so that we know, is this working? Is it worth it? Is it going to make a difference for them?" And then go from there.

So, Ana and is going to go over some rehabilitation things. She helps families guide and mentor them through.

ANA SEI:

Is first frequency, we see our children with unilateral hearing loss and their families twice a month for therapy, but we also provide opportunities each month for parents to connect with other families in our program by hosting what we call parent group meetings, where we provide dinner and babysitting. It is a pretty good deal for families. They come in, we feed them, we take care of their kids and they are able to connect with other families in the program.

It is not just parents, we invite the whole family. We invite grandparents, we invite babysitters, whoever is spending time with their children because it is also important for them to understand.

We talk about different parenting topics and then we try to tie it into hearing loss. And parents really do learn a lot from other families, especially because they are the ones living this. They can relate in their journey.

So sometimes parents have better suggestions on what is working for them to keep the hearing technology on. Sometimes just even coming in and seeing that there are other kids with hearing loss and wearing the same type of device just helps them accept the hearing loss. Sometimes parents think they are the only ones so it is harder to understand and to accept that hearing loss.

For habilitation, we educate families on outside therapy services. Yes, we are providing mostly auditory verbal therapy, but we also want to educate them on the other early intervention services that are available to them.

We try to connect them to their early childhood intervention agency and see what other services they qualify for. Especially with the hearing loss, then we know more than likely they are going to qualify for speech because a hearing loss can affect speech and language.

But sometimes kids have other things going on and they can qualify for additional services. So they

are ECI agency can provide that if they qualify.

We also want to connect them with the deaf and hard of hearing teacher in their school district. There are also other private or at home agencies were these families can get the services that we can connect families to.

A great part of the habilitation is coaching families to monitor and to adjust their listening environment, and always position themselves on the child's better hearing ear, especially when they are spending time with their baby. When they're interacting, when they are going to play with their baby. Especially when we are waiting for hearing technology.

Sometimes we get babies right when they are born at one month. Sometimes even less than one month and maybe we are waiting for hearing technology. That is when it is really important for parents to know to position themselves on their child's better hearing ear.

We coach families on again, monitoring that listening environment. For parents to be aware, is the TV on? My boat play with my baby and talk to my baby but is the TV on? That adds background noise which makes it harder to hear. Is the dishwasher on? AB they are next to a fan.

I have some families who have silent noise running throughout their house and their brain is used to it, to filtering out that sound, but for a baby they cannot do that. We want to cut down on the background noises and ensure that when someone is talking to them that they are hearing their voice as best as possible.

I know sometimes we coach families, "Maybe you can go into a quieter room if there are a lot of people in one room, when you're going to have that one-on-one time with the baby."

At each therapy session we practice listening to the Ling sounds working on detection... Does the child comprehend what they are hearing? Can they tell us what they are listening to?

And for this we use the earplug and then the earmuff. I have an earmuffs here so y'all can see.

When a child uses a hearing aid or cochlear implant, we also connect directly to a FM system or a remote microphone to better stimulate that hearing ear.

And we do this in order to reduce participation of the better hearing ear when we are assessing and working on auditory skills. That is when we use the earplug as well as the earmuff or for a child who has a hearing aid or cochlear implant than we can correct directly using either that FM or remote mic.

In our therapy sessions we also focus on the child following directions without the use of visual cues. We know with unilateral hearing loss the child will detect, they have one good hearing ear. But just because they can detect does not necessarily mean they understand and comprehend what they are listening to.

That is why we work on those listening skills. Can the child follow directions and commands from simple to more complex commands when parents are not pointing?

We encourage families to use their personal remote microphone, especially in noise and environments like the car, grocery store, restaurants, in order to improve the noise ratio. When parents get their child's personal hearing technology and they have the remote microphone, sometimes they forget they have that. So reminding them even to bring it to sessions, to get them used to using it.

Sometimes that is a good tool or a great strategy, having the parent where it because it is a visual reminder for the parent too to talk to their child, especially if the parent is maybe not as talkative.

As far as struggles, like Logan and I have mentioned before, the biggest struggle we see is the lack of where time. So a great part of our time with families is coaching these families to achieve that full-time use.

When we see the audiologist, we can also look at the data logging to get an approximate number, amount of time that the child is using their hearing technology and then we can set some goals.

We never want to try and look at it in a negative way. It is always a useful goal to help these families, one, have an idea of how long they are putting it on, how long has their child wearing it? And then what is going to be the next goal? We always try to set reasonable goals. We will go from one hour of wear time to 10 hours of wear time. What is doable for these families? And we are going to be working in setting these goals every time we see them.

Because children with the unilateral hearing loss take some time to achieve that full-time use, we do see that they have a hard time paying attention. And listening so my favorite strategy to work on and working with families is alerting the children to sounds and reminding them to listen by pointing to our ear, and then asking the parents to consistently remind them by pointing to their ear to listen.

Now I'm going to go on to tracking tools. In our parent infant program here at Sunshine Cottage we use what we call the CASLLS, and we have different levels. This is the presentence level. It stands for the Cottage Acquisition Scales for Listening, Language and Speech. We can track kids from birth to when they are older for cognition and play skills, listening skills, expressive language. So we are consistently using the CASLLS and this is where we set most of our goals for listening and language.

We also use the Little Ears Auditory Questionnaire.

First mass mints we use the DAYC the Developmental Assessment of Young Children. This looks at all levels of development, cognition, self-help skills and we are also looking at receptive and expressive language.

We are concerned about language, both receptive and expressively, but we also want to make sure that the child is developing appropriately as a whole, and is not behind in other areas of development, because that can affect speech and language as well.

We also use the MacArthur Bates Communicative Development Inventories. We start with the words and gestures and then it moves on to words and sentences, and then we have the MacArthur Three. The MacArthur just looks at language, from receptive language to expressive language.

We know there are a ton of other auditory checklists and other assessments for language like the (Unknown Name) but this is what we use here in our program to track your kids with any hearing loss.

LOGAN HORNER:

First I am going to unmute myself. Now we are going to go over our audiology unilateral testing battery.

This is it written out step-by-step. I will go to the next light because it actually has some scores of a child that I think will make this a little easier to understand, and show you why we see benefit in it.

The first thing we are always going to do is do unaided testing and then make sure the child's hearing aid is programmed to meet their hearing loss. We use DSL targets and we use simulated targets to make sure we are meeting those.

After we have done that and validated their hearing technology we are going to test them in their everyday listening condition. So that is with her hearing technology and their better hearing ear.

As you see, with this little fellow, he was wearing his BAHA and he had his right your open. He did well. He is typical hearing for stop if I test him in a soundfield with that agreement he does well.

With his BAHA and we plug and muff the better hearing ear, his scores decreased in the lows and the highs but he still did well what that because he is a really good listener.

But when you look at how his SRT is, how soft could he repeat back a word, he went from 0 to 50,

which is a 15 dB jump.

The next thing we will do, I love that I can have these numbers to look at across the frequencies from the audiogram. Great, but is it practical?

The child goes around hearing those beats and whistles for me, right? How does he do with words? I want to know. How much access does he have?

The first thing we will do is do testing and that every day listening condition for both atypical hearing level and then a soft level.

So this little guy got 100% and 96%. I like to tell families, when we do at the soft conversational level, this will tell me how nosy can your child be? How much can they overhear? Because that is important. We want them to be able to overhear language. They do not just hear it back and forth. They need to be able to overhear it.

So this little guy, he is very nosy, he can hear 96% in a soft conversation level.

The next thing we do is add noise into that. We did multi talker babble, which is a lot of different people talking in the background and single words with a 0 dB single to noise ratio. He got 80% with just his BAHA on in his right ear.

When we add in that personal assistive technology, like an FM system, he gets 96%. You can really see that that helps them and gives them the benefit to improve that signal to noise ratio.

The next thing we do is we compromise the better hearing ear. So this would be if the child has an ear infection in that better hearing ear. They are going to need to rely a bit more on the other ear.

In quiet, 96%, did really well. Once we add noise into it, he had 76% as you can see it really becomes more challenging when the better hearing ear is compromised. And a lot of the time for kids they will get an ear infection. They could get an ear infection that lasts for four to six weeks. That is going to affect their ability to listen in the classroom, at home, socially, all of those things.

The last thing we usually do with kids is due the same testing with no equipment. So the child... We would take off, in this case, the child's BAHA and we would have them listen to single words with multi talker babble.

You can see, for this guy, who in his everyday listening situation could get 80% of that, when we take away that BAHA, in the same situation, he gets 0%. So noise really affected him.

Another thing we start to see in the green and red situations, so when the ear is compromised or not wearing a BAHA, is their ability to sit and participate becomes impaired. They are moving all over the place. They are leaning forward, trying everything with their bodies to make it easier. You are turning your better hearing ear towards the speaker.

All of those things really come into play, but I'm sure all of you have seen.

So, our last light here is just an info graph that we made to help us be able to counsel families and think about, "Oh, how does this really work? How do we show this visually when it is so hard to see as you are just with the child who is hearing you? What does that mean for their brain?"

Over here you can see we have the noise. Noise, when you have two ears that are working, goes to both ears, right? Speech goes to two ears. Our brains ability to focus out and remove the speech, and remove the noise and separate them so that our brain can distinguish, "OK, I want to listen to the speech and I want to ignore the noise" is easier because you have a coming from two places. You can better figure out what is important.

When you have speech and noise going towards that one year, then, when we look at this we see that the noise really overshadows the speech and the speech overshadows the noise. It does not know what is important.

So having this is kind of a funner way to have a conversation about what it means for the brain and what it means for listening. Ana and I would be more than willing to share this with you if you want to send us an email. We will send it to you via PDF's you can have it to use if you think it would be helpful.

What we really wanted from this presentation, for you guys, is just to give you some information about what we are seeing and what we have found is helpful. This is our last slide. So if you guys have any questions, I think we do have a few moments for those, so, thank you for being here. We appreciate you taking the time to be here today.

**WILL EISERMAN:**

Thank you, both of you. Wow! It looks like people have been submitting questions all along the way. (Laughs) OK. If you have questions you would like to submit, you can use the Q&A box now and we will start to address the questions that have come in.

Are your email addresses going to be on the screen there anytime?

LOGAN HORNER:

We can move back to the slide where they were. Will that work?

WILL EISERMAN:

That would be great. If those were on the screen, that would be great. OK.

Here's a question for you (Reads) "Why is the term loss being used when the child was born with this hearing level?"

LOGAN HORNER:

You are right, that is there born hearing level. That is probably what we should be using. That is probably me miss speaking and probably years of using the words loss, but we should be saying that this is their hearing level. You are completely correct.

WILL EISERMAN:

I think, for people who are really new to this world, that word, that terminology, 'hearing loss' is more intuitive to people even though it may not be exactly accurate. I think people continue to use it for that reason, in my experience anyway.

OK, the next question (Reads) "I have had parents ask if it is confusing for the child to hear CI sound along with the normal hearing sound for the unaffected ear."

LOGAN HORNER:

That is a great question. So here is my take on it and working with kids who have gone from having a hearing aid and then going to using a cochlear implant. Children's brains are amazing because they figure it out a lot faster than we do. So we think, "Yes, that would be really, really confusing" because we have that all preconceived notion of it should be this and this. A child's brain figures it out so fast, because it is different, the brain loves it. It is more information for it to work with and build those pathways. So most of the kids that I work with, it is not confusing to them.

It is confusing for a few weeks, like it would be for any of us who get something new, but they figure it out, which is just amazing.

ANA SEI:

And also take into consideration the brain plasticity in these early years, right? The earlier the better because their brain, that becomes their normal.

WILL EISERMAN:

Here's the next question, (Reads) "Wouldn't a child with the present/functional cochlea but a pathology

of the auditory nerve benefit from a cochlear implant versus a hearing aid?"

LOGAN HORNER:

That would depend on the actual function of the nerve. So sometimes the nerve, the function there, is not enough to give them a good stimulation. That is where you would really have to look at doing some trials to see, OK, how much is that nerve functioning?"

Because until you actually would do the surgery and find out how well the nerve is functioning, sometimes we do not know. And parents do not want to take the chance of having OK nerve function. So I would say it is kind of on a case-by-case basis for that, of looking at the auditory nerve and the benefit there.

WILL EISERMAN:

The next question is (Reads) "What do you do in instances of unilateral auditory neuropathy?"

LOGAN HORNER:

That is a great question! Most of these kids, when we are in this case and we have done a hearing aid trial and maybe not seen it be as successful, we have gone ahead and done the implant to see if that will help. And we have only had I think two kids that have done this, and I have seen a benefit in each of them.

One of them got very good benefit from the cochlear implant, you could tell. The other one, just the fact that we cut off that loop of having different sound kind of coming through. So just the cochlear implant surgery itself. In between having the surgery and then the initial activation which takes place about two weeks later for us, you could see a benefit just by that. By just taking away that input that was coming from the auditory neuropathy, which is kind of amazing.

So before even activating the implant.

WILL EISERMAN:

(Reads) "Would you mind to expand the acronyms for ECI?"

ANA SEI:

It stands for early childhood intervention.

WILL EISERMAN:

Several people have been asking about the single ear muff. Can you show that I and tell people where they might look to get one of those?"

LOGAN HORNER:

Ana is showing you, we put a link, but on the top of... Let us see... This page, Alpine Hearing Protection. That is the muff we used. It comes with two muffs, you can take them off and move them around.

ANA SEI:

This one says earmuffsforkids.com, too.

WILL EISERMAN:

The next question, (Reads) "Do you encourage the introduction to sign language?"

(Multiple speakers)

ANA SEI:

Like Logan was going to say, our program is truly listening and spoken language, that does not mean we discourage families to introduce sign language. Sometimes there therapist from early childhood intervention are introducing basic science. Especially when we are working on those auditory skills and trying to figure out if the child is copper handing or not, then at those times we do limit the visual cues. That does not mean the parent cannot continue to learn sign language and communicate with the child using sign language.

It is different because for unilateral hearing loss, we know they have a normal hearing ear and they have potential to develop listening and spoken language.

WILL EISERMAN:

So this next question is (Reads) "I also have a question on the budget for your monthly parent connection dinners. How do you fund that?"

ANA SEI:

That is a question for my director. I know the food can be expensive every month, providing dinner for our families. We have about 120 families enrolled but not everyone comes to our parent groups.

You know, sometimes we have anywhere from like 15 families come to our dinners, but than the kids, and sometimes we have one parent, sometimes to parents, so it still adds up.

We do have a budget, I cannot tell you how much (Laughs) per year and so, our director is in charge of that budget. We try and find cost-effective but also yummy dinners to provide to our families.

WILL EISERMAN:

I have to tell both of you, there are so many remaining questions that we are not going to be able to get to. Unfortunately, we are at the top of our our. But your emails are on the screen, so those of you that have unanswered questions, I am so sorry we did not get to them.

But you can contact Ana for Logan through their email addresses here if you would like to inquire further.

Before everybody runs off, those of you who are participants, if you look in the chat box you will see a link to a short evaluation survey will also generate a certificate of attendance to today's meeting, webinar, so if that matters to you, that is how you can get a certificate attendance for today.

Obviously, I want to thank Logan and Ana, our interpreters and our captioner today, for helping us make this be as accessible as possible. That link is in the chat now. Just look there now. Some of you are quicker (Laughs) than we are and telling us... Let us see... Many people are saying that they cannot see it... OK, it is there now.

Everybody, take a breath, it takes technology to refresh. Alright, so the link is there. Click on it and he will be able to get a quick evaluation survey that will generate a certificate of completion.

Thank you everybody. This webinar has been recorded and it will be hosted on infantheating.org in the next couple of days so that you can go back and look at any of the slides that you want to think about further. And also, if there are individuals who you think would benefit from today's webinar who were not attending live, this is a great way for them to go and access the same information.

So thank you everybody, again, have a good week.

ANA SEI:

Thank you.

(End of webinar)

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