REALTIME FILE

NCHAM-Hearing Loss: Types, Causes and Degrees
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>> Hello everybody. This is Alex Meibos in Logan, Utah at Utah State University. Thank you, Brook. It looks like you're all set up to do the captioning. I'm going to put up a poll here in just a second just to see for you Elena if the sound is coming through okay. So if you could just rate the quality of audio on your end, I'll go ahead and reopen this.

And you can just let us know how the sound is coming through on your end and if there are any technical glitches that we may need to solve before we start at 11 o'clock.

It looks like you may not be there now. We'll go ahead and reconnect with everyone in about 10 minutes at about 5 until the hour. Thanks.

>> Okay, welcome everyone. Thank you for your answers to those poll questions. I'm going to pull up the audio one just here in a second again. We want to welcome you to today's 15-minute webinar that we'll be starting at 11 o'clock Mountain Daylight Time. If you can just indicate on the poll whether or not you can hear my voice coming through, we would appreciate that so we can determine if there are any technical things on our end that we need to make sure are working. Thank you to those two of you who have responded. If everyone could chime in. It looks like there are about seven or so of us who are here. We just want to make sure that that audio is coming through nice and clear. You may need to turn up the volume on your end to hear things a little bit better. We'll be using a conference microphone via a telephone equipment on our end.

Thanks to those who responded. It looks like fair to good is what we're getting on your audio end. Hopefully that is sufficient for you to be able to hear this presentation today. If you run into any other technical issues, we've got a number to the left of your screen

for personnel here who can provide technical support. His name is Daniel Ladner, if you feel like there are things that are just not working to the best of their extent, you can give him a call and he may be able to help you work through any troubleshooting.

Otherwise, we will plan to beginning the recording of this session at 11 o'clock. And we thank you for being here with us this morning.

>> Audio recording for this meeting has begun.

>> Good day everyone. My name is Alex Meibos, and I would like to welcome you to today's Hear2learn.org Community Learning Together 15-minute webinar brought to you by National Center for Hearing Assessment and Management and Utah State University in Logan, Utah. Today's presentation is Hearing loss: Types, Causes, and Degrees, which will be presented by Ana Caballero, who is an audiologist at Utah State University and also a Ph.D. student. At the end of today's presentation, I will open a text field for you to enter questions and comments for the presenter. I will shift it over to Ana. We welcome her and look forward to her presentation today.

>> ANA CABALLERO: Thank you, Alex. Welcome everyone. Today as Alex mentioned, we will be talking about hearing loss, causes, types, and degree. So as we all know, parents are often very anxious when their child, when they receive the diagnosis of hearing loss in one of their children because of several reasons, but also because we tend to give them a lot of new information.

Many of these parents, they may not be familiar with hearing loss in general. So after parents have adjusted or accepted a diagnosis, finally the diagnosis that they have received, it is usually helpful to review in the future appointments or during different interactions the information the day of the diagnosis.

This presentation, my goal is intended to be useful to share with families with children with hearing loss who would like to become more familiar with the functional impacts of hearing loss.

So let's start. At the end of this webinar, participants will be able to understand the parts of the ear and how the hearing system works, learn the definition of hearing loss and common causes among children, discuss different types of hearing loss, and the variety of and degrees of hearing loss, and understand how to read an audiogram.

At the end of this presentation you will also find a link to different resources that will helpful to the families with which you work so you can share with them and also with teachers and other professionals who are not very familiarized with this topic. In this light, we will be talking about the anatomy and the physiology of the ear. It is always important to recognize that any problem with the outer, inner, and middle ear has the potential to cause a hearing disorder or hearing loss. There are three main parts. I

have labeled them.  We have the outer ear, the middle ear, and the middle ear.

The outer ear, or external ear is the part of the ear that you can actually see.  It includes the pinna or the ear canal.

The middle ear, you can see that orange section.  Normally it should look like an open airfield space that houses, that's the area where we find the tiny little bones, and the space between the window and the anvil that connects to the cochlea.  We see the Tympanic membrane.  We have the Malleus, the Incus, and the Stapes.

And finally we have the third section, which is the inner ear, which is located just beyond that middle ear and it houses the cochlea.  You can see in the purple color, you can see that structure that looks similar to a seashell or a snail and this is the organ of hearing.

So as part of the inner ear, we have the cochlea, which controls hearing.  The vestibular system, which controls balance, and the auditory nerve, which goes from the cochlea to the brain.

So now let's talk about how hearing normally works.  In order to start talking about hearing loss, we first need to understand or just refresh a little bit how hearing works.  You can access a video at the end of this presentation that I added the link.  It's from MED-EL.  It does a pretty good job of explaining how hearing works.  I'm going to be super -- try to be as simple as I can so I can explain the process.

Sound waves enter the outer ear, they travel through the ear canal, and then strike the eardrum.  This causes the eardrum to vibrate back and forth and also stimulates, makes those three bones or ossicles, which are in the middle ear to vibrate, as well.  The vibration of these ossicles causes the inner ear to vibrate.  One structure moves so the rest moves, as well.  In the inner ear there is a fluid that stimulates the hair cells.  These hair cells vibrate in response to sound waves.  The fluid's wave-like motion kind of bends and bends a lot of thousands of hair cells, setting off the nerve impulses that pass through the auditory nerve to the hearing center of the brain.  And there is where the sound waves are translated into sounds and the brain is able to recognize them.  So as I mentioned before, you can watch this video at the end or any time you want.  We're going to add the link to this webinar, as well.

Now that we have talked about the parts of the ear and how normal hearing works, we will now talk about hearing loss.  What is hearing loss?  In basic words, simple words, hearing loss is when your ability to hear is reduced.
The type of hearing problem will depend on which part of the ear is not responding well.  So those problems can be located at the outer ear, middle ear, or inner ear, auditory nerve, or any part across or along the auditory pathway.

This chart or figure that I added here, it's a little bit too complex, a little bit too crowded.

But I think it's nice to see how your child's hearing loss can be described depending on different categories. So during today's webinar, we might not be talking about all of these categories. We might do it in the future. But it helps, this list can help parents understand the best way to describe how children may or may not be able to hear.

So when describing the hearing loss, we generally look at several categories. The most common ones used in audiology are the type of hearing loss, the degree of hearing loss, and the configuration of hearing loss. Today we will address the ones that are highlighted or in red, shaded in red, the type, or the origin, the degree, or severity, and the cause of the hearing loss.

What's the prevalence of hearing loss? This is something very important to talk to families. At the beginning, during the sitting session, or at any point during those interactions with them, because some parents just by knowing the cause might release a little bit of that guilt that they might be feeling.

50% of hearing loss is caused by genetic factors. 90% of the children with congenital hearing loss are born to normal hearing parents. This is super important because it's hard for a lot of these parents that they have normal hearing to decide or even to know all the information related on what's the best approach or even chosing the mode of communication with the children. So always remember that percentage. And it's always useful to mention it to the parents so it helps them to understand a little bit more that they might not be the only ones going through this process.

20-30% are unknown causes of genetics, hearing loss.

And then premature babies have a higher risk of hearing loss.

So when we talk about common causes, so there are several myths related to disabilities among our society. And sometimes parents feel that it is their fault or like to find someone to blame for their child's hearing loss. So these are normal feelings that parents experience as part of their grieving processes. And the causes of hearing loss are important to discuss with families when they are ready and willing to discuss them. In some cases parents can accept their child's diagnosis of hearing loss if they know the cause. It can give them certain peace of mind, however sometimes it is not possible to determine the cause of the hearing loss, so that's something that they also need to be aware.

So hearing loss, the way how I present it here can be present at birth or acquired later in life due to different causes. Some of the most common causes of hearing loss, prenatal causes, or before birth are infections during pregnancy. So we have that virus, syphilis, and rubella. We have maternal diabetes, maternal use of hall or drugs, and other maternal viral or bacterial illnesses.

And the post-natal phase, some causes are low birth weight, lack of oxygen, birth trauma, childhood illnesses like rubella or meningitis, severe injury to head or ears, and serious Otitis Media, or ear infections, and Ototoxic medications, which damage the organ of hearing, and excessive noise for duration.

Let's start talking about the three types of hearing loss. We have conductive, sensorineural, and mixed.

The first one, conductive hearing loss, as you can see I have highlighted the area that could be affected. So problems in the outer or middle ear space. Common causes: Ear infections, fluid in the middle ear, foreign objects in the ear canal, damage to the eardrum, or malformations such as pinna, auditory canal or ossicles.

Sensorineural hearing loss, again I highlighted the area that might be affected. So we have problems in the inner ear, the cochlea, or the auditory nerve. Common causes, malformations in the cochlea, auditory nerve, ototoxic medications, meningitis, or severe head injury.

And then we have the mixed hearing loss. You can see both kind of are together. Problems in the outer, middle, and inner ear. And it's a combination between a conductive hearing loss and a sensorineural hearing loss. As an example of cause of a mixed hearing loss could be the presence of Otitis Media, plus the malformation in the inner ear.

So now let's shift and talk about the degree or severity of the hearing loss. This is another component that is important for parents to understand because it will not be the same, the programming of hearing aids for a child with a mild hearing loss compared to a child with a severe hearing loss.

Oftentimes parents have noticed that they can respond to their voice even without wearing their hearing aids especially with a slight or mild hearing loss. Parents can't really hear the difference with or without the hearing aids. However, there are important sounds that are in that speech banana that are important sounds that can help them understand which sounds their kids have access and which they cannot hear.

Also emphasize with the families that kids learn from incidental experiences. That means they need to have access to the sounds surrounding them and if the child is missing some of those sounds, that could cause delay in their listening and speaking skills. So I've also added that it's a nice way of explaining the audiogram of familiar sounds so you can also share that material with the families to easily explain the different degrees of hearing loss, as well as which sounds they're hearing and which sounds they're not.

And finally here we'll be talking about audiogram interpretation. I'm not going to go

super deep on this specific point because there is a nice tutorial at our website Hear2Learn.org. We're also going to be adding that link to this webinar so you can access it with the parents.

Basically the take-home message is the audiogram is a graph that shows the information about your child's hearing abilities. It also shows how loud the sounds need to be at different frequencies for your child to hear them. And as you can see here on the left side, so there is one of the audiograms that we have there. We have in the top you can see the frequency. So the pitch from low to high. Low frequencies we refer to frequencies from 125 to around 500. And then we have the high frequencies that are from 2000 to 8000.

Also, you can see how on the left side of the audiogram we have the intensity level or the volume that go from - 10 to 120. Normally a child should be able to respond to the softest sounds as less than 15 decibel hearing level. If the child is not able to hear the sounds at that level, we have to increase the intensity or volume until we obtain a response.

You can also see in the same right graph how the child was able, like if you see that example, their response of that child was at 90 degrees. So you can identify right and left ear. So the red circles is the right ear and the blue X's is the left ear. You can see how in this case this child has a flat severe hearing loss because all of the responses are within that 70-90 range.

So by watching that tutorial you can share with the families, it's around a six-minute tutorial. It's nice because they can have a better representation of the specifics of their child's hearing loss. So that could help them alleviate some of that anxiety, as well.

So the resources, as I mentioned before, we have a couple of resources that you can have access to, as well. And if you have any questions or would like to request the materials that we used today, always remember to contact us through our website and you can also have access to my e-mail. Thank you for your participation in today's webinar and now I open it to questions.

>> Thank you, Ana. I'm now going to bring up a little area for you to type in any questions that you have for Dr. Caballero today. As you're thinking of questions, I want to remind you that there will be a recording of today's presentation that will be added to our website heartolearn.org that will be added within 1-2 weeks of today.

Okay. It doesn't look like any questions are coming in. We want to be respectful of your time. And I know it's a busy time of year as you're getting ready for the holidays. So we want to thank you for your participation online. And at the close of this session, you're going to be asked to complete a very brief survey that should take no more than 30 seconds. And that survey will help us improve future webinars. So we thank you again

for your participation and hope to see you back for our next ones and hope you have a happy holidays.