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Topic: A Role of Telecoils in Hearing Device Use

Speaker: Linda Kozma-Spytek

>> Toni: I think we're ready to begin. Hello and welcome to the HLAA monthly webinar series. My name is Toni Barrient, the director of services for the Hearing Loss Association of America. And each month we bring interesting programs for people with hearing loss. With us today is captioner Jeanette Christian with 20/20 Captioning, so thank you, Jeanette, for being with us tonight and working through the problems, and technical difficulties. I would like to point out a few things that you see on your screen so that you can out of today's program. Change the size of the captions by clicking on the CC button, part of the captioning screen. A menu will pop up and click on the word font, and you will see that you can make adjustments to the size and contrast of your fonts. There is a caption box -- there's a question box next to the captioning screen. At the bottom of that box you can type in the question for the speaker and click the return button. You may submit your questions at any time. We will have questions and answer session after the presentation. Below the webcam of our presenter you will find file share. This is where you can download today's presentation, just highlight the file, click it with your mouse and then download it to your computer and then save it to your computer.

New web browser will open and save the file. As with all of our webinars, the information and opinions expressed by any of our guest speakers are those of the speaker and not necessarily those of HLAA. Mention of goods and services does not mean HLAA's endorsement or should any -- any exclusions suggest disapproval. This webinar this evening on telecoils is the first in a series of three webinars that are part of getting in the loop, joint project of the Hearing Loss Association of America and the American Academy of Audiology. The two other webinars, which have not yet been scheduled, will be the latest assistive technology and how to advocate for it. Our presenter will be talking to you about telecoils, also known as T coils and T switches. Telecoils are added feature to hearing aids or cochlear implants. After tonight's presentation you will know everything you need to know about telecoils and learn how to use them. Our presenter Linda Kozma-Spytek has been a research audiologist in Technology Access Program at Gallaudet University for the last 12 years. She actively participates in standards development for hearing aid compatibility, digital, wireless and cordless phones and published and presented extensively to consumer and professional groups alike on these and related topics.

She has been recognized for her work in these areas in awards for the Hearing Loss Association and telecommunication association. Welcome, Linda, we are very delighted to have you here. I know you have a lot you want to share, so I am turning the microphone over to you.

>> Linda: Thank you very much, Toni, and I'm very happy to be here this evening. I'm going to go ahead and get started right into the talk, given that we're a few minutes late getting started due to some of the captioning issues.

This -- when I was asked to give this talk, I was asked to give sort of a general

overview on telecoils, so what I'm going to be discussing tonight is description of telecoils, how and why they're used in hearing devices, settings and products that are designed for telecoil use, ways in which telecoils can be used to interface hearing device with audio products and technical uses. First we will start with description of telecoil. As Toni indicated, it is another component in a hearing device.

Component you can find in hearing aids as well as cochlear implants. It provides a way to input sound into a hearing device, just like a microphone is able to do.

However, the input into the device is magnetic in nature, it is not acoustic like it is for a microphone, and the input is not going to come directly from the speaker who is talking. It is going to come through this intermediary device that provides a magnetic signal.

And the telecoil is going to pick up that magnetic signal. Here you can see in the PowerPoint. There is a telecoil here, and this telecoil consists of a metal rod, and it is going to be wound with wire, and that is a very standard typical type of configuration, and as I mentioned telecoils respond to magnetic fields, and when you have a telecoil, what you want to have happen to have good coupling with your telecoil is for that magnetic field to cut across all the turns of the wire in the telecoil. How they should be oriented in a hearing aid, and they can a number of different orientations.

What I have here is just a picture and you should be able to see the telecoil right here, and when it is had the orientation, it is a vertical orientation because the telecoil is up and down in the hearing aid, and in this case what we would like to have happen in terms of magnetic field coupling, and like for the magnetic field to be coming up and crossing all those wires in the telecoil.

This is going to give you maximum coupling with the magnetic source that's providing the sound to your hearing device through the telecoil. Now, what happens in a situation where that magnetic field is coming from a different direction. And in this case I'm just going to give you an example where the magnetic field is now coming in perpendicular to the hearing aid telecoil and this actually results in no coupling at all. So sound does not get transmitted under these circumstances.

So this is one of the most I think important things to remember about telecoils is that they are highly directional devices and magnetic fields that they use to convey sound are also directional and have directional components in them. If we look at another possible orientation of a telecoil within a hearing aid, now they're looking at the back of a behind the ear hearing aid and we have now an orientation where the telecoil is horizontal in the hearing aid in this case the field that it is going to pick up best is one that crosses all of those turns of wire in that telecoil.

If the field comes from this direction, then you're not going to get any sound, any cup Linn, so we do have to be thoughtful about the orientation of telecoils within hearing devices and then what kind of magnetic field directions and components are going to be encountering.

What I'm showing you here is a picture of a hearing aid. This is a behind the ear hearing aid, and now you can see an actual telecoil within that hearing aid located right here, and in this case when this hearing aid is placed on someone's ear, that telecoil is going to be in that vertical up and down position. Now, telecoils as I mentioned are picking up magnetic signals that are delivered to it and the telecoil can have different levels of sensitivity, and that sensitivity to those magnetic signals is very much determined by the geometry of the telecoil.

So how big the telecoil is, its size, how many turns of wire are going around that telecoil as well as the size, the wire size of a telecoil. So all of these things determine how sensitive the telecoil will be to that magnetic field that is of interest that's conveying speech. Now, the telecoils that you have seen so far, the ones I have picked, have been what we call passive telecoils. These were used primarily in hearing aids at least initially, but more currently what we have are amplified telecoils in hearing aids and other hearing devices like cochlear implants, and what that means is the telecoil has an amplifier attached to it.

You can see the amplifier that is right next to the telecoil. Why is it important to have an amplified telecoil in your hearing device? Well, because it provides additional sensitivity to the telecoil on the order of 20dB, which is quite significant and that amplified telecoil input from your hearing aid comparable to a hearing aid microphone, and that's something that's quite desirable because if you are switching between listening through your hearing aid microphone and your telecoil, you would like that sound that you're hearing when you switch between them to be similar in level.

The other thing that modern telecoils typically have in them is electromagnetic interference protection. This is protection against those interfering sounds that you can get when you listen to a digital cell phone. So getting a telecoil in a hearing device, you want to make sure that you have a telecoil that has this electromagnetic interference protection in it. Now, one thing we obviously want to do is we want to make sure that any hearing aid that has a telecoil within it is performing properly, and there is a standard. There's a standard for measuring hearing aid performance.

This particular standard is used for testing hearing aids to make sure they perform as

the manufacturer intends, and the standard has a set of tests that can be done. There are three measurements that are made, and they look at the sensitivity of the telecoil. Just what we were talking about to magnetic fields. This is something that an audiologist will do in the office, part of the assessment of the hearing aid when it arrives to be sure that every component of the hearing aid, the performance of the hearing aid, is working in the way the manufacturer specifies.

There are three different types of measurements that are made, and in the end those measurements are compared to how the hearing aid performs in microphone mode when the hearing aid is picking up acoustic sound. So we want the performance in both telecoil mode and microphone mode to be as similar as possible. Now, there's also some other ways to verify telecoil performance. They're not done very regularly in offices, but there is some discussion if we have any audiologists in the audience tonight from Grimes and Mueller about assessing telecoils using real ear measurements. What that means is it is a measurement that is made with the hearing aid on a person's ear engaged in the telecoil setting and then we take a look at the sound that's produced in the person's ear.

These articles talk about how to make that assessment for telephone performance as well as for other kinds of devices that you might couple to your hearing aid through the telecoil. Now, what I have here are just some pictures of behind the ear hearing aids, and the reason I have those is to give anyone who might not be familiar with the telecoil setting, an understanding of how you engage the telecoil, how you make it function, when you want to use it. Each of these slightly different but the circles indicate where the telecoil is accessed.

In the first picture there's a slide where you access the T for telecoil, so simply move

that slider up to the T position in order to engage the telecoil. In the second picture it is a switch as it is in the third, and in the fourth picture what we have is just a button that you would push, and this would engage a telecoil program in your hearing aid, but it is the way you access that telecoil in a hearing device. It is very similar in behind -- in the ear hearing aids and a switch you might use for engaging telecoil in the hearing aid. Sometimes there's a switch and a button to select the telecoil program, same on this in the ear hearing aid.

Now, there's another type of telecoil, and it is called the touchless telecoil, and it really is just exactly what it implies. Don't have to engage a switch or push a button to activate the telecoil, and it simply responds to a magnetic field being present. Now, this happens with telephones, particularly telephones where there's a dial tone, and when that hearing aid senses that magnetic field, it automatically turns on the telecoil for you.

Now, one thing -- one word of caution about this is you would also want to have some kind of manual override on a touchless telecoil so you could engage it in situations where that sensor isn't actually aggravating the telecoil for you. Typically you find touchless telecoils working with telephones that have a dial tone. Otherwise for other applications you're going to be able to override that and to be able to engage the telecoil on your own.

Now, telecoils are used in hearing devices to really connect to all kinds of things, but there are generally three categories that we'll be discussing tonight. One is telecoils in hearing devices allow you to connect to Hearing Assistive Technology, and you can connect to certain types of Hearing Assistive Technology like Induction Loop Systems directly with your telecoil so you don't need any kind of receiver or any other kind of

equipment with you in order to take advantage of an induction loop system. You're already carrying your Hearing Assistive Technology with you in your hearing aid in the form of the telecoil and will look at a slide that displays that.

Other Hearing Assistive Technology that you can access using your telecoil would be things like an FM system or an infrared system, and you're going to do that, an accessory, head loop or silhouette, and we will talk about all of those devices as well. Second sort of class of devices that you can connect to telecoil or audio devices and connect to telephones, music players, computers, TV, but you have to do all of that through an additional device like a neckloop, a silhouette or a headset.

I think the device that we're maybe most familiar with connecting to is the telephone, and we now have the ability to not only use our telecoils on landline phones but not too long ago the FCC also required wireless devices, things like cell phones, smart phones, at least some of them that have telecoil coupling capability, and we will talk about that as well. One of the things you might be wondering is why would I use telecoil coupling when I can use microphone coupling.

One reason you may want to use telecoil coupling is when you're coupled with your telecoil, telecoil is only responding to magnetic signals, so any background noise that's occurring in the environment that's acoustic in nature is going to be reduced, and that's true regardless of what a communication setting you might be in. Now, there's always a positive. Sometimes there's always something of a negative as well, and because a telecoil responds to magnetic signals, there can be magnetic noise in an environment. So it is not that a telecoil may be completely noise free, but you aren't going to be hearing the acoustic background noise in the environment and if the system and setting are set up properly, the magnetic noise you might encounter

should be very, very limited.

Another reason that you might use telecoil couplings is to reduce the effects of poor room acoustics. Things like reverberation, and that's true in all communication settings where you might be in a situation where anything that's being produced in terms of sound is bouncing off hard surfaces, walls, floors and coming back and reaching your hearing aid microphone, that can interfere with speech understanding, so the ability to eliminate that through the use of a telecoil is quite a positive thing.

The other thing that it does is it can reduce the effects of distance. We know that the further away we are from the thing we want to listen to, the softer it is. And when you're using a telecoil, the speaker or the sound of interest is coming through a microphone and that microphone should be close to the speaker's mouth and in that case you are not suffering from that reduction in level to being further away from the speaker. Now,, of course, you are susceptible to where that microphone is placed that's picking up the speaker's voice in order to transmit it to your hearing aid, telecoil or cochlear implant telecoil.

So the microphone location is going to be something that's important and something that needs to be paid attention to when you're listening to a speaker and I'll talk about that in just a minute a little more when I show you a diagram of how this might work. The other thing that telecoils are important for is related specifically to listening over the telephone. When you're using a hearing aid and you're listening to the telephone with your hearing aid's microphone, you can pick up or hear a whistle. You may get feedback. It is called acoustic feedback from your hearing aid, and if you're using a telecoil, that will eliminate any acoustic feedback that could occur during telecoil coupling.

Now, what I have here is just a little diagram to try and illustrate those points that I was making about the benefit of telecoil use. In this case the example I'm using has to do with one of the Hearing Assistive Technologies that I mentioned previously and that's an induction loop system. What we have here is we have our speaker here in the front of the room. She's speaking into a microphone. We have the hearing aid wearer here, and this person is sitting in a very good location relative to the speaker, same side of the room as the speaker, in the front of the classroom but yet under these conditions and this kind of large space, the speech that reaches his hearing aid microphone, whether it comes from the speaker's voice or other loud speakers that might be conveying the speaker's voice, because of the distance involved between the speaker and the person listening, that speech is going to arrive at his hearing aid microphone at a softer level.

Always the possibility of someone carrying on a conversation or creating noise, in an environment like this. That noise can impact how well speech is understood, and then if you remember I talked about reflected sound, and in this case sound can be reflected from the speaker, from the noise in the environment and those reflexes can also impact how well someone understands speech. Let's imagine that in this room we've installed an induction loop system, which means that the hearing aid wearer and put his hearing aid into the telecoil position, the speaker's microphone will be hooked into the induction loop system and her speech will be transmitted magnetically to the hearing aid wearer's telecoil.

When that happens eliminates any issue with reverberant sound, sound bouncing off walls, and also will reduce any noise that's in the environment and make the speech from the speaker as loud as it is at the microphone that's up that speech. So we've

reduced the effects of background noise, we have reduced the effect of reflectant sound and we have reduced the problem with distance between the speaker and the person listening all through the use of the induction loop system and the telecoil in this person's hearing aid.

One way that you can know that a Hearing Assistive Technology is available and in particular have some information about whether or not that Hearing Assistive Technology is available through your telecoil is through a variety of symbols, and what I have in this picture are a set of symbols. In fact, universal symbols for during access. You can see a set here in the lower left-hand corner of the slide. The color is not important here. They can be black or they can be blue. That is not particularly important. They mean exactly the same thing. You will notice that this one has a T in the symbol, which does indicate that the hearing access that is provided is available through the telecoil in the hearing aid.

Now, there are some additional symbols that I have included up in the upper right-hand corner. Some people have some slight objection or maybe even more than slight objection to the symbols below because it looks like a line going through the ear, indicating no hearing here or something negative about that, so some people actually prefer the use of the symbols on the upper right. These symbols also are associated with loop systems. Again, here is the T in this particular picture but when you see any of these symbols, you can assume there's some form of hearing accessibility that's provided and in many cases you will be able to access that through the telecoil and hearing aid.

Now, I also have two pictures here. This first picture on the left-hand side shows a seating area in an atrium where lectures are given, and you can see here the symbol

for hearing access with some text below it to indicate that there is an induction loop system in the setting of this atrium area that someone with telecoil in the hearing aid can access. Same is true for the symbol. This happens to be a symbol or signage right outside of a clinic area. Indicates that there is access during access in this area, and the access takes place in the use of your telecoil for talking with anyone who might be here in the reception area.

So if you see these symbols, you will know that there's hearing accessibility technology available to you, and that in some cases that can be accessed with a telecoil. You talked about the fact that you can access various types of devices through your hearing aid telecoil, but what I want to talk about a little bit is that access to sound through your telecoil needs to have certain considerations about the magnetic signal that's used. So just like we have considerations we need to have consideration to the magnetic requirement to the telecoil be and one requirement we need to think about and certain considerations and standards that I'll talk about in a minute is that there's enough signal available for your telecoil to pick up. You also want the noise to be low. Low distortion. That's going to give you a good signal to noise ratio, and you also if you remember we talked about how directional magnetic fields were and how it is important to have the orientation of the telecoil so that it is able to pick up the field orientations that these various devices that provide magnetic signals produce.

Now, we also want there to be a large enough area that the magnetic field covers so that you can sit in various locations or stand in various locations and still receive inadequate magnetic signal from the source. The other thing is you want to have a good frequency response. So these are all things that when you're using a system that is able to produce a system for your telecoil to pick up, that you want someone to

be thinking about, whether it is someone who produces telephones, someone who installs Induction Loop Systems, someone who makes those accessories that you will use to interface with your telecoil.

You want someone to be thinking about these magnetic requirements. In fact, they do in certain circumstances. And the reason I'm sort of talking about standards a bit is so that you're away that certain types of products have standards that they have to meet in terms of performance for magnetic signals. Other types of products don't and require more trial and error probably on your part to find something that works and meets your needs with your telecoil. So there are standards that are developed.

Those are used to assess whether or not a product is working the way it should and does it conform to what the standard says it should do? These are simply documents that are developed. I work on committees of this sort and they're written by experts in the field. The one thing that's important to understand is even if there's a standard in place by which something is measured to produce a magnetic field, complying with that standard is completely voluntary, and that is unless the government points to that standard in its regulatory framework, and that standard becomes mandatory and consumers have recourse, at least a stronger line of recourse if a product does not perform the way it should.

Now, we talked a little bit about Induction Loop Systems. We showed you a diagram of how it might work. That was really a simple kind of loop that went around the perimeter of a room, but there's actually a standard that has been developed, an international standard for Induction Loop Systems. So if you happen to be a consumer who is interested, for example, in having a system like that installed say in your place of worship and maybe you need to find someone who will install it for you, it would be

important for you to tell that installer that you want to system to comply with the standard, and any contractor should be able to -- who installs something like induction loop system should be able to do that for you and they should be able to provide test results as well as a certificate of conformity, so letting you know that their installation of that system meets this particular standard.

So anybody who might be interested in a system like that, either having one installed in some places that is a public venue that they go to and if you find if you're trying to use a loop system and it is not working well, one you can ask is if the induction loop system needs this standard. So it is one thing that you can know approximate and inquire about either when you're using a system like this that may not be working well, inquire whether it meets the standard or if you happen to be in a position where you're advocating for a system like this to be used, you would want to be sure that an installation complied with this particular standard.

However, this standard is not referenced in any regulations or any laws, so it is certainly not mandatory, but it is certainly something that's important to take into account. Now, there is one type of product where there is a regulatory mandate on whether or not that phone meets certain criteria for producing a magnetic signal that hearing aid, telecoil, cochlear implant can pick up, and it is the telephone. It is quite interesting because there's a hearing aid compatibility act, and this is actually the language from the law, and it is somewhat convoluted, but especially what it is saying is that telephones have to be capable of working with hearing aids effectively, so the burden is on the telephone. It is what's regulated and the ability to produce that magnetic field that will couple to the telecoil has to be built into the phone. And finally that compatibility has to be established through one of these standards that I have been talking about, so it has to meet certain technical performance requirements, but

you will notice that the word telecoil or telecoil coupling is not in this language for the hearing aid compatibility law, but at the time it was enacted telecoil coupling was the means by which means to which couple wireless three and that's how the standard was written. We had a hearing aid compatibility act in 1988, and by 1989 all telephones that were landline phones had to be capable of coupling with a hearing aid's telecoil.

When 1988 act happened we really didn't have many wireless phones and there were other reasons for this but the FCC, the Federal Communications Commission decided to exempt wireless phones completely from this telecoil coupling capability. They actually modified that exemption in wireless phones in 2003, thanks in great part to the efforts -- advocacy efforts of HLAA and what that meant, at least in part, was that wireless handsets had a requirement, wireless devices like cell phones and Smart phones have a requirement to be able to have telecoil coupling capability. However, not all wireless handsets have to have this capability, and at the moment only seven handsets or 33% of all the handsets that carrier offers, carrier like T-Mobile or Verizon or AT&T or Sprint, they only have to have a third of their inventory or seven hand set models that are telecoil capable.

There's one more thing that I should mention about phones, and this time it has to do with digital cordless telephones. As I mentioned before since 1989 any kind of corded or cordless landline phone has to be capable of coupling with your telecoil and your hearing aid, but what we found was that there was some significant noise that hearing aid wearers who use telecoil telephone coupling encountered, and through that standards process that I talked about we were able to come up with a way to measure that interference and make requirements about how much there could be in order for a cordless phone to be considered hearing aid compatible.

This is the only situation in which we have a voluntary compliance with a standard in the telecommunications industry. Now, the telephone has to meet certain requirements for producing a magnetic signal that the telecoil can pick up. I will move through this a little quickly, but you have it in your handout so you can take a look at it later if you have any questions, but I want to talk just really briefly about the magnetic signal that comes off of a telephone, and you can see here that we have a telephone receiver right here, this round circle, and the lines coming off of it are the magnetic field components, and they are highly directional and depending on what kind of orientation of your telecoil in your hearing device, you will be able to pick up different parts of this magnetic signal. And I will show you in the next slide a demonstration of that, but this just is a way to show you that the magnetic fields that a phone produces or any device that's producing a magnetic signal, signal and components of the magnetic signal are very directional and can interact with the hearing aid or hearing device in different ways.

So what I'm showing you here is a hearing aid telecoil that's oriented in this horizontal position before, and if we take a look at the phone to the right and we turn it on its side, we can see a magnetic field coming straight out from the receiver. That is going to be field that a horizontally placed telecoil will couple with, and that is why many times a -- there is the advice given that you should have your telecoil placed horizontally in your hearing aid to couple best with a telephone. However -- here we have the hearing aid on an ear, but I want to show you that if you have your telecoil placed vertically like it is in this picture, that you can still couple with the magnetic field that's coming around the side of that telephone receiver. Here and here and all the way around this telephone is magnetic field and these components circle the receiver.

If we now put the hearing aid on an ear, place the telephone near it, you can see that there's almost perfect coupling here with a telecoil that's oriented vertically or up or down. So you can couple to a telephone with a hearing aid that has a telecoil with this vertical orientation. That orientation is also good for the inductive loop kind of system and show you some of the labels that you would encounter when you're looking for a wireless phone. So wireless phones themselves are not labeled if telecoiled coupling capability, but the call-out cards and carrier store will be labeled in this way. You want to look for a T to indicate that it is telecoil coupling capable and you want to look for a number either 34, the higher the number the better the coupling.

Also labeling requirements on the box of the cell phone, and you can see that right here, here again that T indicating telecoil coupling capability, so if you are looking for a wireless device, you want to know that it has telecoil coupling capability, look at the call-out cards in the carrier store. You should also see the same labeling on a box. This is just another possible symbol that you might see indicating telecoil coupling capability.

Cordless phones you might actually see this label on a cordless telephone. That's indicating that this phone produces reduced magnetic noise interference, and you will notice that the symbol looks very much like the hearing access symbols that we saw previously for telecoil coupling. Finally what I want to show you are some accessories that you can use when coupling telecoil to other kinds of audio devices so you can couple as I mentioned before for assistive technology like FM systems or infrared systems using the accessories, and also the couple the things like iPods and computers and in addition to that, phones as well, and you can use headsets. There are particular headsets that have telecoil coupling capability in them. You can do the same with neckloops and some of them do not plug directly into the audio device but

use Bluetooth coupling between the device and this coupler and then the Bluetooth transmits an inductive signal through the neckloop to the telecoil.

Finally there are things called silhouettes. They sit behind your ear as opposed to a neckloop, which goes around your neck. You will notice that in some cases you can couple to two hearing aids and in other cases a single hearing aid. I'm getting a message from Toni. I think my time is nearly up. I'm hoping that maybe I could take a few questions here and finish up just a couple of points. I'm going to skip through these points because you will have them on your handout and just mention that it is important to consider placement of a telecoil and any new hearing aid you might purchase. It provides additional means of accessing speech and sound. If you have a device already and don't know if you have a telecoil, then you need to go ahead and ask your audiologist. It is not uncommon to retrofit an already existing hearing aid from the telecoil, even volume control if there's enough space. That can be an additional cost. And you want to talk to your audiologist about your telephone use and ask them about Hearing Assistive Technology and if you have a telecoil how you can couple that technology to your telecoil and finally you want to make sure that your telecoil is programmed for use.

You can have telecoil programs and you can actually have specific telecoil programs for telephone use. So I'm going to take some of the questions that I have now. One of the questions is how expensive would it be to have two telecoils and an aid, and I'm going to talk a little bit about cost and in fact, you would have a single telecoil, and single telecoil one in one hearing aid, one in the other, and the cost varies according to the hearing aid manufacturer, but I have seen prices quoted on the order of \$50. For example, if you want to retrofit a telecoil and in fact, most hearing aids that you wear behind your ear and hearing aids that are in your ear actually come with telecoils in

them.

So you would be paying the price of the hearing aid, but there would not be an additional charge necessarily for the telecoil if that hearing aid comes with the telecoil as a matter of course. I have another question -- uh-oh. I'm not sure what happened, Toni, but somebody cleared my questions. So I had a list of probably six questions and they were cleared somehow, so I can't see them any longer. Somebody sent me a question, I'm wondering if maybe they could ask that question again so that I could actually see them because the question box just got cleared.

I'm not sure what's happening if folks can stay on, but the question box just disappeared. There we go. So I have a number of questions. I have one that says I have a tech connect. Is that similar. There are a number of hearing aid companies. In fact, most of the major companies that have something that they use that's different from a telecoil, it is some sort of streaming that they use between hearing aids and separate device and then that device may be able to couple to other audio devices that have Bluetooth in them but the streaming that occurs between those devices and hearing aids is something not proprietary and not necessarily a magnetic signal or a signal that's picked up by a telecoil. So I have a question about how a telecoil is designed with electromagnetic protection and generally when a telecoil is has electromagnetic immunity built into it, what they're doing is trying to shouldn't that signal that's being picked up, the interference signal away from the component that sends the electric signal and electrical signal on to the hearing aid, but I don't actually know the particulars about how that protection is implemented.

It now is implemented by I think there are at least three major telecoil component manufacturers, all of them produced telecoils that are amplified as well as have electromagnetic interference protection so it should be something that you actually want to make sure to request when you're asked about when you're telling your audiologist that you would like to have a telecoil. I have another question. Telecoil pervasive, can you carry on a conversation while connected to a telecoil? Telecoils now are in about I would say 60% of hearing aid fittings. That's maybe from the 2009 survey that's done by Kirkwood so they are actually becoming more prevalent and can you carry on a conversation?

You cannot just turn your hearing aid to telecoil and talk with someone. If you are in that situation and you don't have something that will take their voice and convert it to a magnetic signal, then you're not going to hear them talking, but if you have a Hearing Assistive Technology like a personal FM system and then your -- they're wearing transmitter with a microphone and you're wearing a receiver that has say a neckloop on it, then you can turn your hearing aid to coil and pick up the magnetic signal from their speech but you can't do it directly, so it is not the same as listening over your hearing aid pike phone which is acoustic connection. It is a direct acoustic connection. Using the telecoil will use some kind of intermediary device between the speaker and you, and that device is what converts the person's voice who's speaking or the sound you're listening to into a magnetic signal. I have a comment here telecoils can be used with a neckloop attached to a personal amplifier. That's absolutely right. Many of those accessories that I have showed you are able to be connected to all kinds of audio devices, including something like a personal amplifier.

I have a question here about iPhones and whether or not their telecoil compatible? I think we all know that there are different versions of iPhones, the most recent verse of

the iPhone is called the 4G, and actually apple has recently put up information on their iPhone website related to the telecoil coupling capability of their latest generation phone. It was certainly the case that more -- that older iPhones were not telecoil coupling capable, but the latest version, the iPhone for the 4G, does have coupling telecoil capability and you should be able to find that information on the iPhone website.

My question box was cleared again. I don't know if that's -- Toni is giving me a little note saying that we do need to end and wrap things up.

(laughter)

>> Toni: We are a little over time. But you know, Linda, it has just been wonderful. I have learned quite a bit tonight myself, and I have been around the block a few times with telecoils, so I really appreciate you coming and sharing your expertise. Certainly when it comes to telecoils, you are the expert, and I thank you for being here tonight.

>> Linda: You're very welcome. It was a pleasure. If someone didn't get a question answered, they can certainly look me up on the -- through the Gallaudet University website and find me in the Technology Access Program there and send me an e-mail and I will try to follow up with you and answer any questions that didn't get answered at this particular time.

>> Toni: Thank you, Linda. This webinar will be available for play back. If you are on Twitter following HLAA, I will tweet the link shortly after the webinar, and our webmaster will post the play back link within 24 hours on HLAA website hearingloss.org. I want to take a moment to tell you about the upcoming webinars on November the 18th, understanding acoustical design requirements for schools, and December an important webinar again on financing your hearing aids. In January we'll have the doctor speaking on hearing research, new treatments and remedies that you

can expect, and in February masking -- mask of hearing loss, bluffing 101. We have a great line-up for you and hope you will be able to join us. Details will be available at hearingloss.org. I hope you enjoyed the webinar today. Please consider hearing more about Hearing Loss Association of America and its work on behalf of 36 million people with hearing loss in the United States. If you would like to support the work of HLAA, join today and begin receiving Hearing Loss magazine. Bring you legislative updates, personal stories and much, much more. Hearing loss is a major public concern. It should be prevented, screened and treated, and HLAA opens the world of communication to people with hearing loss with information, education, support and advocacy and helps to minimize the associated stigma. If you are not already a member, please join us today and thank you for joining us. See you next time.

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