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CONSUMER: CASEY JUDD

EHDI

NARITA A/B – SPOKEN LANGUAGE OUTCOMES: AGE AT IMPLANTATION

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>> So last one. Last half of the last slot of the last day. The finish line is in sight. You have almost survive ed. So my name is Erin Thompson and I am a speech language pathologist and listen and spoken language specialist with the implant center. I am happy to share some significant findings on a research project that we have been recently working on and it's looking at what is more predictive of language outcomes? Age of cochlear implantation or age at full‑time use of their cochlear implant? So to understand kind of how this came about it might help to know a little bit about our team at UNC. This is a photo of our adult and pediatric teams. Most of us anyway. It's hard to get everybody together at the same time. We are a team of six surgeons, six speech pathologists and listening and spoken language specialists we have four pediatric cochlear implant audiologists, four adult implant audiologists. Three researchers and then three clinical researchers. Don't ask me exactly the difference between that but they're both important. And then we have so many support staff that I can't even count how many or name and cannot forgot them. So they are the glue so then looking specifically at the children's cochlear implant center at UNC and about our in addition with the pediatric team. Our mission is to maximize hearing access for optimal communication potential. And we have strived to do that in four different ways. Provide quality services to children and their families regardless of their ability to pay. We figure it out. Empower parents and families to be their child's primary teachers and advocates. Coach. And working to improve outcomes of cochlear implantation through research and cutting edge science. So two that really come into play today are empowering parents. And research. So that's our mission. But what is our need? So our need at the children's cochlear implant center is to determine how to continue to improve outcomes. And our need is also to empower caregivers and how can we continue to do that? So those two needs have really been the catalyst for what is now a significant portion of the services we provide at the clinic and that is co‑treating and after hearing, go, it was the Shepherd Center, back in 2012 I believe. At the AG Bell convention in Scottsdale, Arizona we heard a presentation about co‑treating and we were all ears pun intended but we had no idea how to make that happen at our clinic at the time. After a couple of years of brainstorming and grant writing, Hanna our director afforded us the ability to start doing this at our center. She received a grant to help support us doing this. Because we weren't billing for this service. So you might be asking what is co‑treating? Well, simply, it's audiologists and speech pathologists working together, co‑treating in an audiology mapping appointment. A little more technical, a little more descriptive information about it is that co‑treating is collaboration. It's collaboration between the speech pathologist and audiologist before mapping appointments. We get together, we review chart notes we brainstorm goals for the session. We talk about what our plan is for that appointment. It's collecting information during the appointment, we're trying to figure out what auditory skills the child has, whether that's helping out in the sound booth, whether it's helping outside of the sound booth if the kiddo doesn't quite cooperate and we need to do some functional things in the mapping room. Maybe we're trying out link six sounds or learning to listen sound comparison to see if they are hearing some super segmental differences or hearing across the speech spectrum. We're also tracking outcomes through the functional listening index during those appointments. It's caregiver support in whatever form or fashion is needed for that family, that caregiver at that time. It might be brainstorming how to work on different goals at home. It might be troubleshooting some, obtaining services in their local area. Whatever that caregiver or that family may need. And it's communication.

It's communicating with local providers early interventionist, sometimes case service coordinators, teachers of the deaf, speech pathologists and school systems. Communicating with them before appointment to gather information on what may be beneficial for us to know going into the appointment and then communicating with them afterwards to share what we learned.

Share goals that the family is going to be taking home, things like that. And we're doing all of this to empower parents and hopefully continue to improve outcomes. Well, we've been implementing our co‑treat model now for about five years and we have co‑treated with approximately 400 families. We are trying to keep track on all of those things. That research part. So what have we learned? We learned a ton and that would take up three or four more presentations to cover all the things we learned but when it comes down to it we are learning more and more and more about babies because we are seeing more and more and more babies. With the 1‑3‑6 guidelines, with kids being diagnosed earlier and by one month of age, or screened by one month, diagnosed by three, services by six months. Sometimes if necessary, and if that's the family's goal, we are seeing children referred to the implant team younger and we are seeing them in these co‑treat appointments and these mapping appointments. Well, you might be saying, all right, Erin, we already know about implanting and babies and younger. And we already know that younger is better. Well that's not in question today. We already know that. We know that there is tons and tons of research showing about there's less time of auditory deprivation. There's increase plasticity of neural pathways. We have better speech perception, better speech intelligibility. We have anything coming out of the low‑key studies about language outcome. I'm not questioning that at all. But in co‑treat something we're learning is that we found is a very common theme we can say, or hurdle or snag. With these little ones and that my friends is retention. Wear time. That has truly become the number one topic with babies and toddlers in those beginning mapping appointments. It's a point of frustration for families. It is a point of they are trying to bang heads into walls like I can't do it. Help me. We spent a lot of time talking about wear time in retention.

And there's somebody out there making millions out of pilot caps and go on Etsy and there are franchises of things because keeping devices on the little ones is really hard. So we're really trying to support parents in doing this. But this really brought about our question with co‑treating. And started asking ourselves what impact is wear time having on receptive and expressive outcomes? So we decided to take a look. And we decided to compare age of cochlear implantation and age at full‑time use of cochlear implants and specifically looking at which one alone is more predictive of spoken language outcomes at a year post implant. Okay, so our method, when I say our, Lisa Parks method. Unfortunately, she is shuttling off to O'Hare right now to try to get home but she ran a multiple regression analysis in our database that tracks everything we do.

And she did that so that we can look at more than one factor at a time so we can look at age of implantation, and age ‑‑ and when these kiddos met full‑time use of their implant. So we ended up having 38 kids that we were able to look at. And how we got those kiddos is we had to have expressive and receptive scores at a year out. These kiddos had to have devices that had some sort of data logging capabilities. And then which at the time was ‑‑ well, I think maybe still is but met our cochlear so kiddos that had cochlear even though many may know that the data logging capabilities of those two devices is different. But then we also had to have those language scores, they had to have cochlear or MED‑EL and had to reach full‑time use of those devices. That gave us our 38 kiddos. There was not an age requirement that they had to be 12 months when they got their implant or under a certain age. We just had to have language scores and data logging information. So you're probably asking yourselves, okay, full‑time use is vague. That's vague. That's vague information, Erin, what do you mean full‑time use? So let's talk about that first so how did we ‑‑ how did we get to our level of what we're requiring for full‑time use? We used seven hours. That's not enough but we used seven but how did we get to seven? Well we know that the American Academy of Pediatrics has recommendations on sleep for babies and so we started there and we looked, okay, if we're talking about babies and we look at that four to twelve month we know that they say, the average is the median awake time is ten hours. All right? We also know from the outcomes of children with hearing loss study that ten hours or more of use really showed great language outcomes for kids with hearing aids. So we have that information. And then there was another study by Katherine wiseman that referenced conventional definition of full‑time use being eight hours. All right so all of that to say, seven is not enough but we had to start somewhere. And we will excited to see what seven hours was able to show us.

We are still pushing and pushing for higher amounts of use but we needed some data. Okay. All right. Okay. So first we are going to look at receptive language and this is not my most recent slide ‑‑ or my most recent version to I'm going to like reveal at the end after I explained it a bit. Receptive language and age of cochlear implantation so we are not debating whether early implantation is better than later implantation. We are not talking about that at all. We already know earlier is better.

We are now looking to see how predictive age of implantation is. So the technical description I was given of this first chart was that this is a hot mess. Very technical.

But and it was from our clinical researcher but she said it is a hot mess so we have our 38 kids and we had a mean implant age of 17.7 months.

And then if we look at the chart, or our graph, the age at ‑‑ the age of surgery is across the bottom on our X axis and then the receptive language scores are across the Y axis going up the side. So kiddos that were implanted around 12 months that were then tested around 24 months, you'll see all of their data points at that twelve month mark because it's looking at when they were implanted. So for the statistical brains out there we had an R square of .302 so looking at only 30% predictive of outcomes when you're just looking at age of implantation. So not very predictive.

So then if we look at receptive language and age at full‑time use. We see that we have a better slope and more following that line. Something that I thought that was very interesting was out of those 38 kids we know that our ‑‑ they had a mean age of 17.7 months for implantation but mean age at full‑time use it took until 28 months. So we are between 10‑11 months for our kids to reach that seven hours which we already know was still not enough. Seven hours of use. And that is almost the entire first year of listening so thinking how much we still have to go and figuring out how to improve that. Then expressive language and age of cochlear implant. So this is not, again, not as much of a hot mess as the receptive language scores were. But I'm still not seeing it being very predictive. Our R square, let me go back to the right one, is 50%. Thinking about, because something I did not talk about on the method part. Let me swing back. Language testing. So we use the language ‑‑ we use standard scores and we use testing that was most appropriate for that child's age. So if they were under three we were using the PLS 5. If they were over three we were using the owls. Since we ‑‑ so they ‑‑ so that just ‑‑ to give you a little more information on that. And thinking, with the little ones, and why expressive language maybe is more predictive than receptive language because that seems counterintuitive. But thinking about some of those guidelines ‑‑ some of the benchmarks on the PLS if there's anyone out there that is familiar with some of those. Some of those are some nonverbal communication things. So not directly tied to their hearing but then receptive language scores were more tied to that. So ‑‑ okay, and then, looking at my final graph, expressive language and age at full‑time use and we're seeing that we are ‑‑ that they are following much tighter to the slope. We had an R square of 73%. So we're looking at it being 73% predictive of outcomes. And it may seem pretty intuitive. If they aren't wearing their device they're not going to be able to develop that expressive spoken language. So while we know that early age of full‑time use would not be possible without early implantation, the actual early full‑time use of the device is much more predictive of outcomes at one year than just placing the device alone. Both must be done in tandem. So you might be asking, what other factors could be contributed with these kiddos. I talked about co‑treat. What about socioeconomic status? The only way we were able to control or to look at that in our database was based on type of insurance so we could look at if families were medicaid or private insurance because there's that financial cutoff there. What about communication mode that the families chose? We have some families in here that are total communication and some that are spoken language and what about unilateral or bilateral. If they have one implant or implanted sequential ly or simultaneously. Did that make a difference? Well Lisa was able to control for that. And to look at it and she compared all of those things and she found that the only factor predictive of outcomes one year later was the age of full‑time use. So questions that we could ask ourselves like how do we take this information that does seem intuitive but now getting to see some information in a chart form, graph form, how can we use that going forward? Does this change how we support parents? Does it change how we counsel families that are trying to reach spoken language milestones for their child? Do we all go invest at an Etsy shop. How do we take this information to local clinics, local state organizations and use that? And thinking about how to just continue to improve outcomes for these kids that we see. A final thought it's time for us to counsel beyond early access to sound and truly towards full‑time access. To sound. Thank you all very much. So there are a few minutes. Left and I'd be happy to try and answer some questions. And if I just preface it if I'm not able to answer it I know that I can find out the answer and get it back to you. Yeah. Sure.  
>> Does that, there we go. So I know you mentioned that you use seven hours as that cutoff for full‑time use I'm curious if you had changed that to ten hours and reran your data did you try that and if so what did it look like?  
>> That would be a great question for Lisa. I think it would give us not very many kids to look at unfortunately.  
>> What do you think the barrier was for just being the seven hours is it the families not wanting to put them on the baby's head or the baby not wanting to wear it?  
>> You know, that's ‑‑ that's a great question. And that would be, you know, completely opinion. You know, I think, and this was discussed in the last session I was just in that there's so much implicit bias that goes on and we actually have all gone through implicit bias training at my clinic and knowing and really knowing that parents want the best for their children. And then looking at and talking to them, finding out their stories. Finding out and asking them what's going on at home and we do that a lot in these co‑treat sessions. To find out what the barrier is. Is it ‑‑ that I haven't done a good enough job explaining the need for wear time, maybe, you know, there's so much about earlier is better with implantation, earlier is better. Maybe they just haven't gotten enough education and counselling about wear time. It might be that, you know, we need to look at the child care center they're at during the day. It might be that we need to try some different retention options that the pilot cap or hearinghenry didn't work for this kiddo and we try something else.

We go through lots of different options for different kids.  
>> My best suggestion is to turn that beeping on, advanced bionics and it will be very motivating to the day care provider to put it back on that kid's head.  
>> Good to know. We got two minutes.  
>> I was just wondering if you took any data on what the parent's reported the use was because I know I was previously in EI and a mom came back to our visit from our audiology appointment and the child was wearing it five or six hours a day, it was a baby and watching the hour the magnet had fallen off about 10‑15 times and by the time mom knows you're already three to four minutes into it being off. So I just wondered what the parent's perception of that was.  
>> I don't have any data on that but just from my experience in a lot of co‑treat sessions and my time with the pediatric audiologist at the hospital dealing with little ones and hearing aids too a lot of times parents will say that they think, you know, they're like what do you think? How is it going? Not judgmental, how many hours, what is it, how are you, but just saying parents are very, very surprised by the data logging number being lower than what they think and that generally ‑‑ that doesn't always happen. Sometimes they underestimate and it's actually higher and we celebrate that. And we celebrate all of the hours that are on there because we know that the five hours or whatever it was really hard. But it allows us to talk more in depth about their day. And kind of figure out what times are going better and what times it's seems more seamless and what times of day are seeing more types of events seem challenging and we try to break down and get in the nitty‑gritty of where that time is happening and maybe it's not happening as much as they think. And then we brainstorm ideas and options and choices and things. I think that was my timer.  
>> In the past I've taught children the age of two about cochlear implants. The co‑teacher I was working with had counselled a mother to take the implant off.

To stomp the screaming. Seemed there was a mapping issue potentially or maybe that ‑‑ the child was scared by the signal that they were receiving.

Do you have any suggestions that could be used in those types of situation where is the child is clearly upset because of the use of the implant.  
>> Well, as a speech pathologist and not audiologist I would recommend calling the local audiologist and having them come in to make sure there is not something that is causing pain and once we can rule that out, then we can talk about other behavioral motivating kinds of things potentially but we would definitely want them to come in and see their audiologist to make sure that it is not something that is too startling. That is upsetting them. With the device.  
>> And what about g ‑‑ language? Is there a backup language that could potentially ‑‑ that could be used in that situation where the implant is not able to be used?  
>> Potentially. If that is the choice of the family that ‑‑ I would ‑‑ it would all be dependent on what the parent's choice is. We do not make choices for parents on mode of communication. That is completely independent and family to family. So if the parent wanted to use sign language or cued speech or Spanish or whatever the case may be then that's absolutely the family's choice and we would support them and brainstorm with them on how to do that.  
>> Thanks.  
>> Absolutely. Ya'll made it. Congrats. Unless you're here tomorrow for short course. Keep going but, okay.  
>> (Applause).