AUDIOLOGYONLINE

Educational Solutions for Children with Listening Challenges

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Course Handouts

classroomsolutionsandmodificationshandouts.pdf

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Learning Outcomes

After this course, participants will be able to:

- Identify 2 pre-post questionnaires/surveys that assist in establishing benefit from classroom modifications for children with listening challenges.
- Name a minimum of 4 populations that may benefit from classroom modifications that boast signal to noise ratios.
- Describe 3 classroom modifications that may have significant benefit for children with listening challenges.

Introduction and Overview

Today's world is a noisy place. The importance of a good signal-to-noise ratio (SNR) for all students cannot be overstated. Providing an acoustically beneficial environment can be a challenge, not only at school, but also at home and other settings. Noise and reverberation affects everyone's ability to hear differently, but it is more of an issue for younger children. For certain student populations, placement in an acoustically beneficial environment is crucial to their academic success, as well as to their social success.

My goal today is to provide information about who is at risk, and how we may need to dedicate more effort to improving their acoustic environment. In addition, I will offer some solutions and modifications that can be done to benefit all the students in the classroom. Then we will discuss technology. At times, adding technology to the classroom is inevitable. You cannot always abate the poor acoustics in the classroom.

These days, it seems like a lot of school districts are operating in the red. We have to be fiscally-minded while also trying to advocate for the success of our students. Being able to use questionnaires and surveys to provide solid functional data on our children will help the school administrator to better support us in enabling success for all students.

Hearing and Listening

We know that audibility of speech is directly related to the process of language learning, reading, and memorization of new material for all elementary-aged children, not just those with hearing impairment.

According to studies by Dahlquist (1998) and Smaldino and Crandell (2000), in a typical school setting, students spend 45% to 75% of their day listening. They listen to the teacher, watch educational videos, work on the computer, and talk with their peers. Their ability to hear this information is critical. Hearing and listening and are two distinct events: hearing refers to the sensory mode, where sound is funneled into the ear, and listening is the deliberate act of paying attention to sound.

Top-Down Processing

To illustrate this concept, imagine that you lived in a house right next to the train tracks, and loud trains would pass by at night while you were trying to sleep. Over time, your brain understands that train traffic is a common occurrence, and is not an alarming sound. It is not a sound that should interest you while you are trying to sleep. An adult's brain will habituate, so that the train sound is no longer heard and perhaps no longer interferes with sleep. The truth is, the ear is still collecting the sound, and sending it to the auditory cortex. You are still hearing that information, but the brain has decided how to interpret that noise.

Children do not possess that top-down ability. Therefore, it is important for children to receive a clear signal to the brain, so that they can work on auditory memory, auditory attention and formulate a context for speech sounds. If the system is intact, sound detection and the transfer of information binaurally to the auditory nerve will occur. The auditory information will travel from the auditory nerve to the brainstem and to the auditory cortex. From that top-down approach, the brain is going to assign meaning to the sound. If we have a less than intact system, whether a temporary or conductive hearing loss or a permanent hearing loss, information will be inhibited from ascending.

Children and Noise: Settings

What if auditory the system is totally intact, but the signal-to-noise ratio is not sufficient, and prohibits the information from ascending? Let us analyze some typical settings in which we might find children – for instance, where a mother is talking to her baby at home in a quiet room. Every new parent anticipates the day that their baby recognizes and attends to his or her own name. There is an

abundance of research to support (such as work by Hart and Risely) that the number of words an infant hears, especially relevant chatter, is instrumental for their auditory and speech and language development, and has a direct correlation with academic success.

In March of 2005, Rochelle Newman conducted a study out of the University of Maryland. She examined the effects of noise on infants in day care settings - specifically, infants under thirteen months of age who spent eight to ten hours a day in a noisy day care environment. She found that these infants may not receive benefits from language exchanges, due to the level of mild and ambient noise. Even if we are modeling in the best manner that we can, the noise can interfere with their development.

The following data is from the World Health Organization. They offer a training package for the health sector, which includes a PowerPoint showing the levels of noise in different settings in which children might be in - you can access it here. Sometimes the noise is fun noise. It does not have to be undesirable noise to interfere with the signal of interest.

Noise at home	50-80 dBA
Home appliances	78-102 dBA
Noise in incubators	60-75 dBA (peak sounds 120 dBA)
Noise in hospitals	>70 dBA
Day-care institutions	75-81 dBA
Noise from toys, peak sounds	79-140 dBA
Background noise in schools	46.5-77.3 dBA

If we look at noise at home, typical levels range between 50 and 80 dBA. For context and comparison, the human voice measures at a level of 60 to 65 dB. If we add in the noise of home appliances (e.g., the dishwasher, the clothes dryer, the washing machine), the noise floor increases. What if the baby is in an incubator in the hospital? Incubator noise produces about the same level of noise as at home. Babies in the hospital are at risk, since they are in that noisy environment all the time - greater than 70 dBA. A day care institution is usually between 75 and 81 dBA. If we look at the research for background noise in schools, we find that school levels register between 46 to 77 dBA. Most noise floors are about the same level as average conversational speech spoken at a distance of three feet. If you increase that distance, you are now at a negative signal-to-noise ratio.

Hearing in Noise

In 2004, Shield and Dockrell analyzed 110 different classrooms, and measured noise levels during different activities. When the children were sitting and working together as a group, the mean noise level was 73 dBA. When there was group work combined with movement, the level increased to 77

dBA. Simply working in the classroom results in a negative signal-to-noise ratio, and we need to pay attention to that.

I admire the work of Dr. Jace Wolfe, from Hearts for Hearing in Oklahoma City. In Figure 1, there is data from a study of his (Wolfe, 2012) that looked at three groups: normal hearing adults, normal hearing children and children with hearing loss. They were scored on their ability to recognize speech at different noise levels. The performance of normal hearing adults is represented by the black bars in Figure 1, data from normal hearing children are the white bars, and the grey bars are results from children with hearing loss. How well can they score in speech recognition without using an FM as conditions get worse, as signal-to-noise ratio decreases?

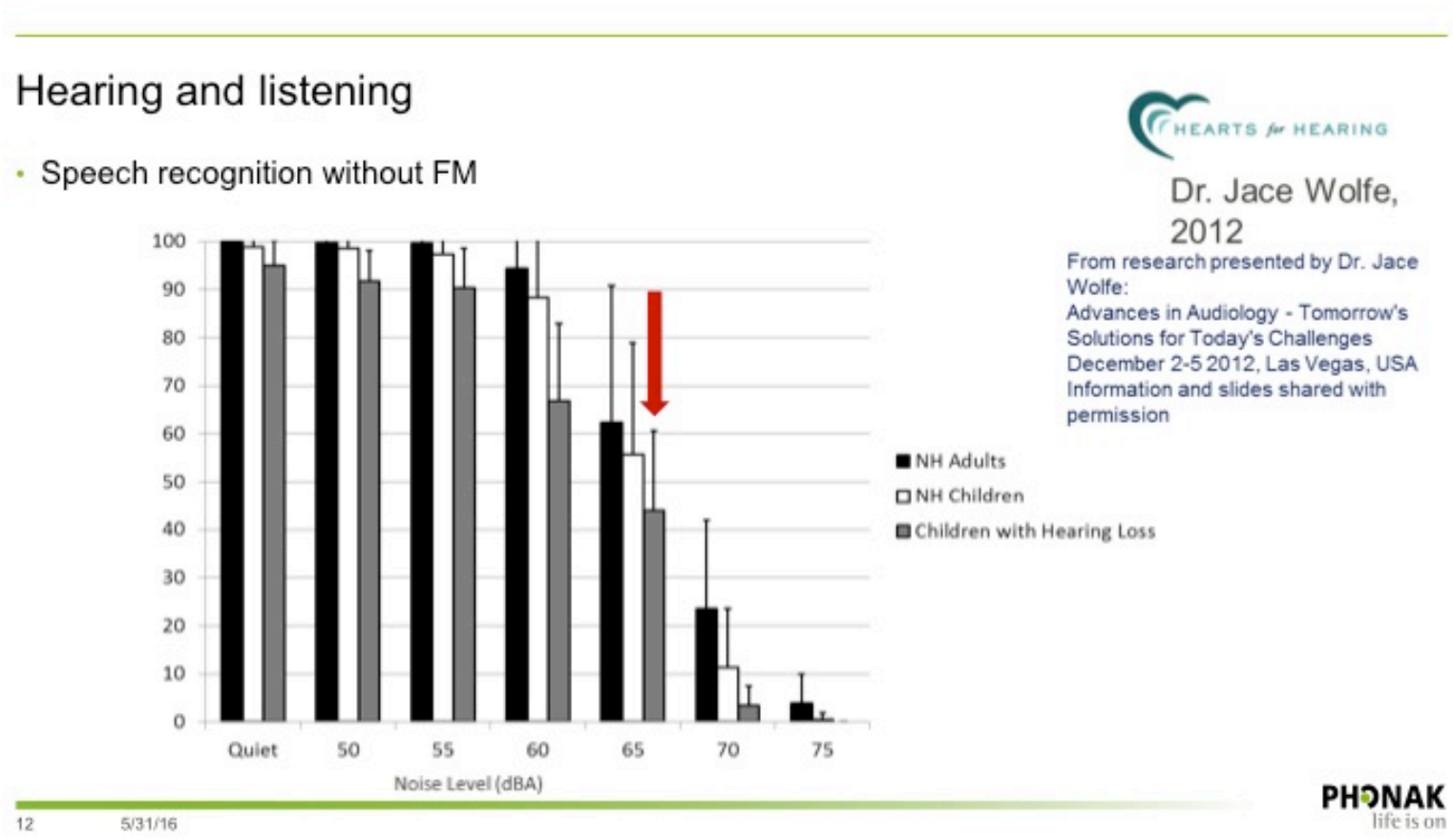

Figure 1. Speech recognition without FM for normal hearing adults (black bars), normal hearing children (white bars), and children with hearing loss (gray bars), from Wolfe, J., 2012. Shared with permission.

Note the portion of the graph marked by the red arrow. This is a noise level of 65 dbA, or a 0 dB SNR, and you see the children with hearing loss performed poorly, with less than 50% speech recognition. If we go to a +5 signal-to-noise ratio (noise level of 60 dBA), you can see that the children and the adults with normal hearing did fairly well. The children with hearing loss definitely scored more poorly, especially in adverse situations.

Who is at Risk?

Children with Hearing Impairment

We know that moderate to severe sensorineural hearing loss will create listening challenges for a student. With early identification, we can try to catch the hearing loss in children early so that we can implement amplification as soon as possible and work toward the best outcomes. Slightly more challenging are children who have a mild loss. They may have passed the newborn screening. The

audiologist may have decided that they do not want to amplify for various reasons. We need to understand how we are going to work with borderline normal or mild hearing loss children who do not wear personal amplification.

We see a lot of children with conductive hearing loss in the schools. These children may or may not wear amplification. How are we going to provide them with the best acoustic environment? For children with reverse slope hearing loss or unilateral hearing loss, not every audiologist will recommend amplification. It may also depend on the financial resources of the parents. These children may not qualify for special education and they may end up with either a 504 plan, or none at all. Then, we may monitor them before making recommendations.

Auditory Processing Disorders

Some children have normal hearing, but have an auditory processing problem. It is challenging to get an official diagnosis of auditory processing disorder, because not very many people perform the testing. A great deal of evidence exists showing that children with auditory processing disorders can benefit from an increased signal-to-noise ratio. There are different types of auditory processing disorders. Some children do not experience as much benefit from assistive devices such as FM or a Roger system. It is helpful to have these devices ready to try, in order to determine if the child will benefit from them.

To summarize, for children with any type of hearing issue - significant hearing loss, borderline normal hearing, unilateral hearing loss, or auditory processing problems – we have an obligation to do everything we can to improve their acoustic environment and to provide the best signal-to-noise ratio possible.

Other Populations

In addition to those with hearing related issues, there are other populations who may benefit from a modified listening environment and increased signal-to-noise ratio. Children with:

- Learning disabilities
- Dyslexia
- Autism
- Cognitive delays
- Attention Deficit Hyperactivity Disorder (ADHD)
- English as a second language

Children with dyslexia and other learning disabilities often have issues with phonological awareness. Nina Kraus and colleagues (2012) have conducted some research on FM use in children with dyslexia. In one study, they analyzed functional behavior and changes in reading scores on a control group without an FM system, and on a subject group with an FM system. They also looked at neurological information. What they found was that the use of the FM sharpened the neural response for information. This is a great example of where FM was used for an atypical population.

Recent research on autism (including studies by Gary Rance and colleagues, and by Erin Schafer) demonstrates that improving signal-to-noise ratio for children with autism is crucial. Children with autism often can be quite over-stimulated. Using listening devices allows autistic children to better

focus on the speaker of interest, and improves their auditory deficit. It follows that children with ADHD would also benefit from a modified listening environment to help them pay better attention to the speaker. Similarly, studies on children with cognitive impairment have shown that using sound field amplification, thereby increasing the signal-to-noise ratio, had improved their listening skills. Finally, students whose primary language is not English can benefit greatly from increased signal-to-noise ratio. As they are learning to speak English, clearly hearing their teacher will allow them to learn the language more effectively.

As the evidence suggests, many different populations of children in school settings (not only those with hearing impairment) can benefit from this extra intervention and increased signal-to-noise ratio.

Classroom Modifications

A major issue in classrooms is reflection reverberation. Reverberation can smear and distort important speech sounds in the classroom. The popular notion today is to install a classroom sound distribution system, or a classroom amplification distribution (CAD) system. If we put a CAD in the room, and a sound field speaker in the room, we can make sure that the teacher's voice is raised above the noise floor. However, if you have high ceilings, hard walls, hard floors, windows, then sound is going to reflect as well. This is a fairly inexpensive implementation because it benefits all the students in the class. On the other hand, you do have to be careful that you are not adding a device that, due to the acoustics, makes the situation worse. Phonak’s sound field speakers are adaptive, they are fairly inexpensive and they address some of the issues that we see in the classroom when you cannot change the acoustics.

If you are interested in doing some additional reading on this topic, Acoustical Society of America provides information and resources on classroom acoustic standards. In addition, ASHA is always a wealth of information and offers good information on classroom acoustics.

Reduce Reflective Surfaces

Simply adding a fabric in a room can be very helpful. If the room is not carpeted, add rugs to soften the sound reflection off the floor. Install curtains or create fabric areas. Using stools made of foam provides a soft absorbent material in the room. Drape tables in fabric so that sounds do not reflect off of hard surfaces. Install soft floor tiles to absorb noise. Cover tables with cloth to reduce noise on the table. Add as much softness into the room as possible, to absorb sound and reduce reflection. Include things in the room that will interrupt the reflection and the transfer of sound. Hanging things from the ceiling, such as globes or large paper lanterns, can also be helpful.

Reduce Additional Noise Sources

If possible and prudent, turn off a noisy HVAC or air conditioner unit during key listening sessions. Technology has provided us with many interactive and useful learning tools (smart boards, overhead projectors, computer centers). Although beneficial and fun, all of these tools and activities may add noise to the room that can be quite loud. Adults tend to tune out that noise, but children with developing brains may not have that ability. Adding tennis balls on the bottom of chairs reduces the

noise of chairs scraping the floor. Sometimes we forget that classroom pets can contribute to the noise floor. For example, a squeaky hamster wheel and fish tank bubblers and filters can add noise. If you have a reptile as a classroom pet, there may be a humming noise from the warming lights.

Hallway noise and noise outside the windows can also be an issue. We do not always have control of that, but we can take measures to prevent it from interfering with learning. Keep doors closed. Try not to have core instruction time during the busy times of the day, so that hallway noise does not compete with the lesson. Many of these changes cost nothing, or very little. It is easy to overlook some of these noise sources in the classroom. In an open classroom environment, some of these modifications may be difficult to implement, and you must rely solely on abatement.

As we might expect, the most contaminating noise in a classroom is from the students themselves. Simply the act of breathing in the classroom may add a certain level of noise. Children who cannot sit still fidget may make rustling sounds. There are some classroom management techniques to employ that can help create a respect for the importance of quiet and calm in the classroom. Insist on one speaker at a time in the classroom, by using a “talking stick.” Offer flexible seating with rewards for self initiative. Some students are very shy and not willing to stand out to get into a seat that might provide them with a better hearing opportunity. If we can reward that behavior, we can increase that behavior and look for those opportunities.

Here is an example. Recently, a customer came in with her daughter. This girl was going to be moving into special education because she was not doing well in school. As we talked to her, we found out that she had been seated in the back of all of her classes. The teacher had prearranged seating alphabetically and she always ended up in the back. She knew that was not a good place for her, but it was alphabetical and she did not feel like she should argue with the teacher.

Sound Level Meter

One tool that can be useful in controlling noise levels is a sound level meter. There is an app that I like to use called AudioTools. It costs $19.99. It was the first app of its kind that I found and I absolutely love it. It can be used on an iPad or a smart phone. It has a traffic light and you can set the parameters of that traffic light. For instance, it displays green when the classroom noise environment is at an optimal level. It will turn yellow if the classroom gets a little too loud. Finally, the light will change to red when noise increases beyond desirable levels for the classroom. It helps teach students, in a visual way, the concept of soft, medium and loud. Monitoring the classrooms is helpful as well.

Benefits of Technology

Sometimes, no matter how many noise controlling measures you take in the classroom, you will still have to use hearing assistive technology to help your student get a better signal-to-noise ratio. Phonak Roger provides a digitally modulated (DM) signal. We do still have FM. Some students are coming to school with their own mic systems, which are typically not as sophisticated as DM and FM, and often do not provide the same benefits in adverse noise situations.

With Dynamic FM, when the noise gets to a certain level, the speech also increases, so the speaker's voice is dynamic. It will not over-amplify the room with the voice. It will only raise the volume if it is needed, due to the noise floor, maintaining a +10 SNR. In comparison, Roger is DM technology. The number one characteristic of our DM technology is that there is no circuit noise, so simply by moving to DM, you have lessened the noise for your student.

In 2013, Dr. Linda Thibodeau performed a randomized, blind study at the University of Texas at Dallas, which focused on understanding in varying noise levels with Roger, Dynamic FM and traditional FM. There were 11 participants (age 15 to 78), each using their own BTEs. Her findings demonstrated significant speech understanding benefits at noise levels above 65 dB (Figure 2).

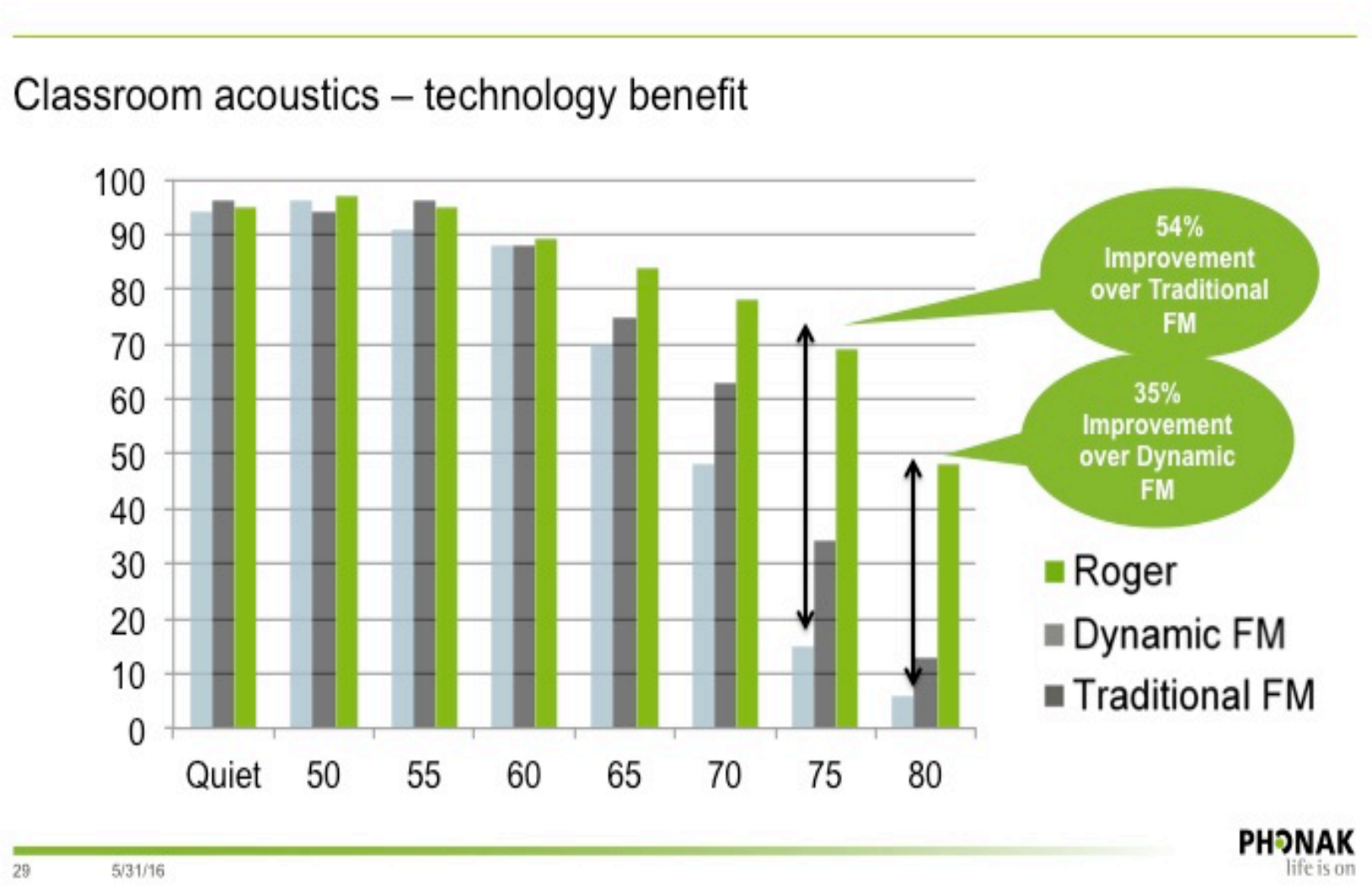

Figure 2. The benefit of Roger (green bars), Dynamic FM (gray bars), and Traditional FM (blue bars), data from Thibodeau, 2013.

In Dr. Thibodeau's study, at 75 dB (-10 SNR), Roger outperformed traditional FM by 54%; at 80 dB SPL (similar to noise levels found in classrooms), Roger outperformed Dynamic FM by 35%. These levels of understanding in noise demonstrate that the Roger is the new standard for some of the highest achievable signal-to-noise ratios.

My take-home point for you is to be cognizant of the different levels of access with different Phonak technologies. These technologies can be found in ear level systems, as well as in sound field systems.

Hearing Assistive Technology (HAT)

For the purposes of this presentation, I will be using the term *hearing assistive technology* (HAT) instead of assistive listening device (ALD). I will also be referring to classroom amplification distribution (CAD) systems.

Classroom Distribution Systems

In 2013, the Acoustical Society of America (ASA) issued a policy statement on CAD systems. They have always emphasized that our goal with CAD is to distribute sound, not to amplify it, in order to make sure that sound is heard throughout the intended environment. What would happen if we simply amplified it? We would just increase the noise floor. In fact, in a setting with very poor acoustics, adding a sound field system or a CAD can be detrimental, as we learned earlier. The ASA found that teachers were not receiving enough training in understanding how and when to use the classroom amplification system. Furthermore, there was not enough documentation to determine whether it was providing the desired benefit. The ASA recommended that we make certain we are distributing sound, not adding sound, and that we have done everything possible to remedy the poor acoustics. In addition, to make sure that teachers receive the proper training, and that validation procedures are conducted to document that the system is providing an appropriate speech-to-noise ratio.

Refer back to the data in Figure 1 that compares speech recognition in normal hearing adults, normal hearing children, and children with hearing loss. All three groups perform worse as noise increases, but the children fare worse than adults do, and the children with hearing loss perform worse than the normal hearing children. This is in a classroom without sound field or dynamic FM; they do not have a CAD or a personal system.

As we review the performance of normal hearing children in soundfield in Figure 3 (Wolfe, 2012), the black bars represent the performance results with no sound field. The white bars represent performance with Phonak's Dynamic SoundField system. The gray bars indicate results achieved with traditional audio enhancement with static volume control, not dynamic. You can see that both systems do well out to 0 SNR. When we get into the SNR of a typical classroom environment, having the dynamic system becomes an advantage.

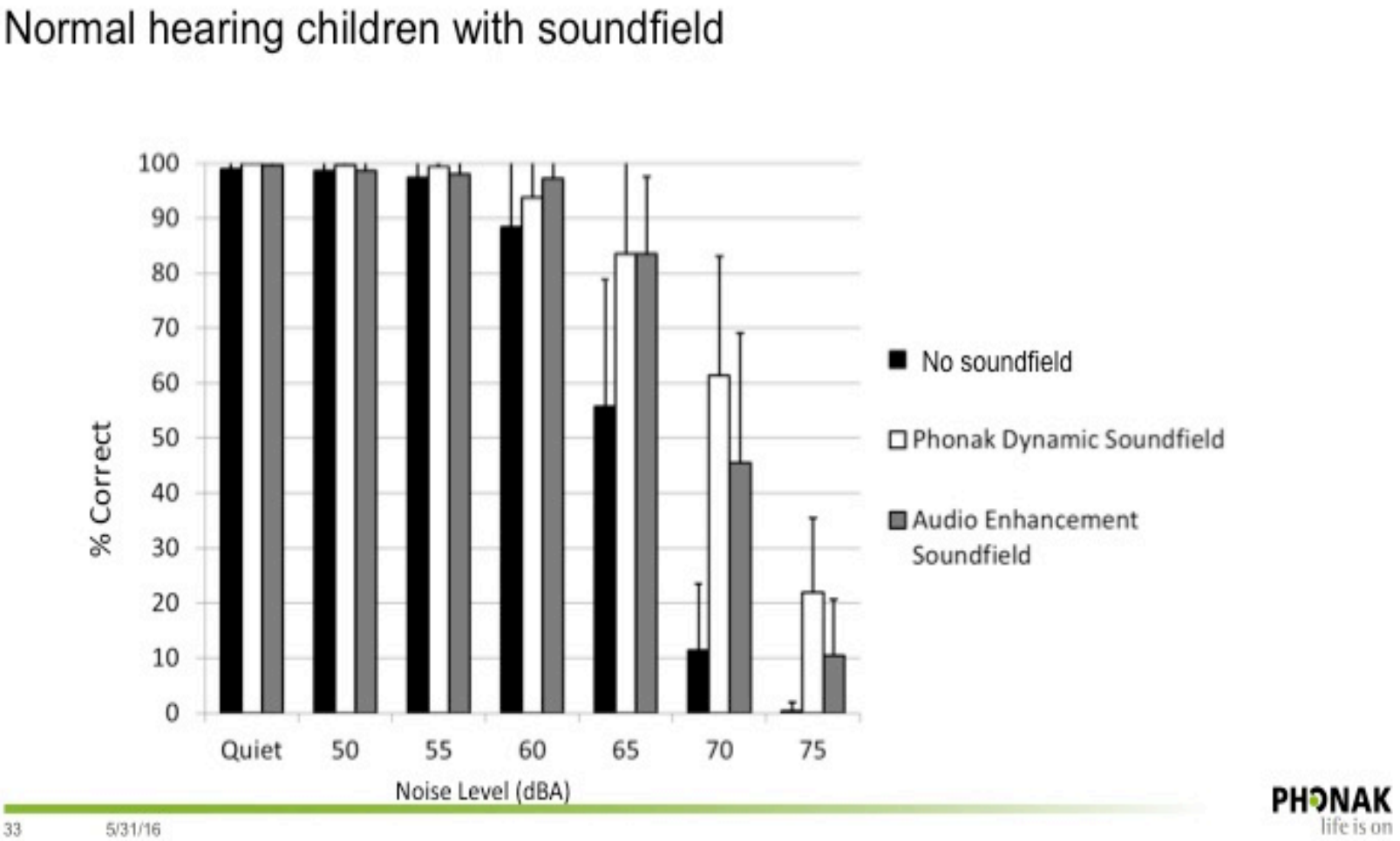

Figure 3. Speech recognition performance of normal hearing children with no soundfield (black bars), Phonak Dynamic SoundField (white bars), and a traditional audio enhancement sounfield system (gray bars). Data from Wolfe, 2012.

At Phonak, our dynamic system is DigiMaster 5000. It is a 12 loudspeaker array, so we are never over-driving any of those speakers. They are arranged in a cylinder so that they are coming out in sort of a pancake response and propagating across the room. Our goal is to provide distribution, not just amplification. As a side note, it can be wall-mounted, or used with a floor stand. Smart boards can connect into the speaker system as well. We offer a couple of different microphone options. It is a classroom amplification distribution system: the teacher wears a microphone; the students are hearing through a speaker system in the classroom.

Figure 4 shows more data from Dr. Wolfe (2012), in this case looking at children with hearing impairment. The black bars represent performance with no sound field or personal FM. In the 65 - 70 dBA range, the children do not perform well in situations with typical classroom noise. If we add a sound field speaker to the classroom (the Phonak Dynamic SoundField or the Roger Dynamic SounField), the children perform quite a bit better, represented by the white bars. However, if the children have one of the listening challenges that we outlined earlier, adding the Dynamic FM receiver or the Dynamic Roger receiver is clearly going to be advantageous. Even in the most adverse listening situations, the children will have access to the teacher's voice. Per pupil, it is an inexpensive option.

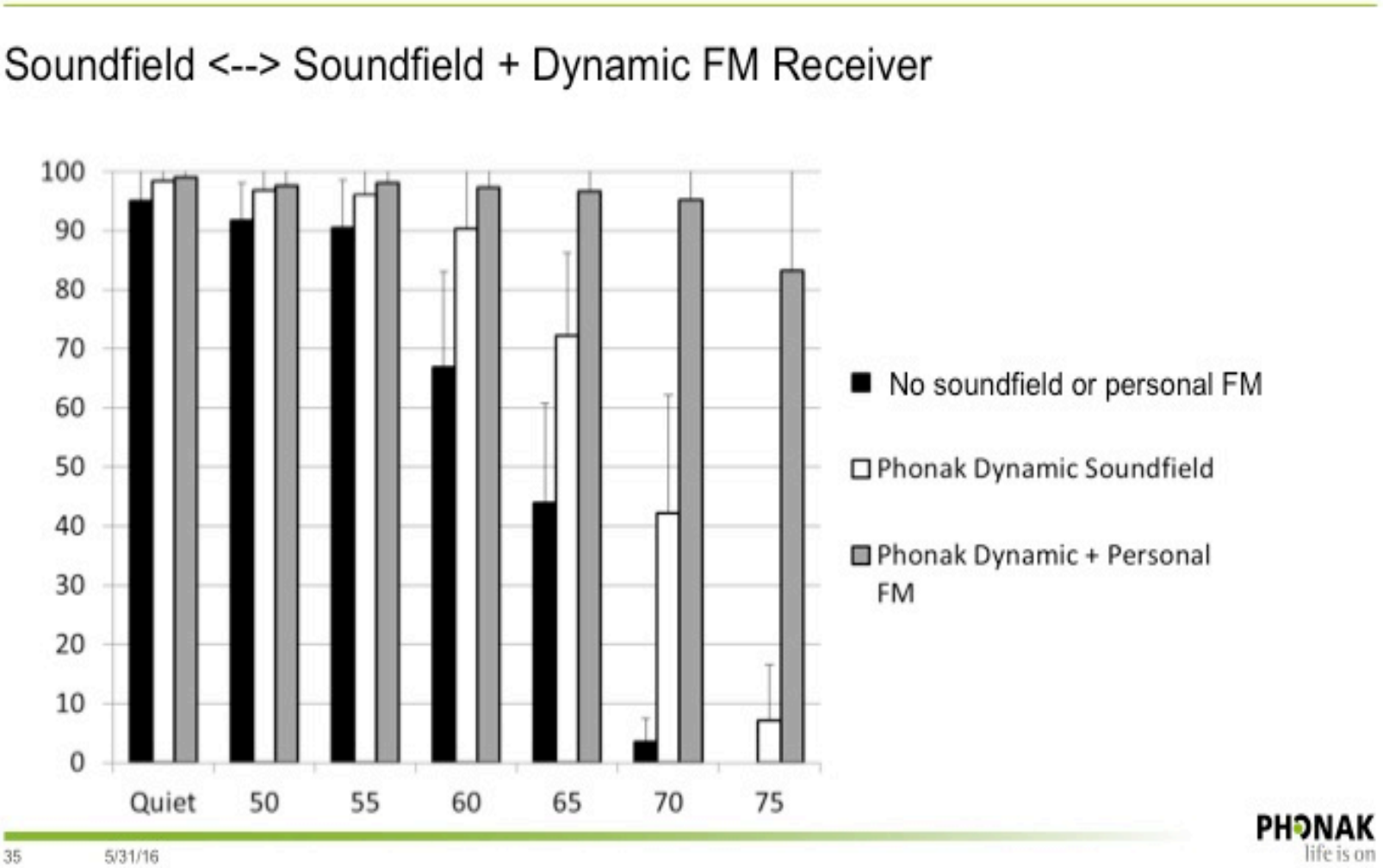

Figure 4. Speech recognition performance (in percentage) of children with hearing loss using no soundfield or personal FM (black bars); Phonak Dynamic SoundField (white bars), and Phonak Dynamic SoundField + Personal FM receiver (from Wolfe, 2012).

Personal Devices

Personal FM devices will vary by manufacturer. A person FM device could be a device attached to the hearing aid or cochlear implant or an ear level device worn for those students with normal hearing. There are many different products available, not all of which provide the same amount of gain or advantage. Children can use personal FM devices in the same classroom where there is a CAD system.

What about students with normal hearing, who have other challenges, such as dyslexia or autism? Certainly, we are not going to put a hearing aid on these children. However, Phonak has a device called the RogerFocus. It resembles a hearing aid, but there is no microphone on it. It is a receiver that picks up speech from the teacher's microphone.

One study, conducted in the Phonak audiology research center, examined the performance of fifteen children (Figure 5). These children all had some listening challenges, but they all had normal or near normal hearing in at least one ear. You can see that some of these children were repeating sentences at a -5 SNR. As indicated by the gray bars, these are their results with no FM or DM device. Children numbers three, nine and thirteen performed fairly well. In contrast, children numbers two, four, seven, twelve and fourteen scored 0% without RogerFocus. These are the students who may have trouble attending, and are at risk for social and academic issues as a result.

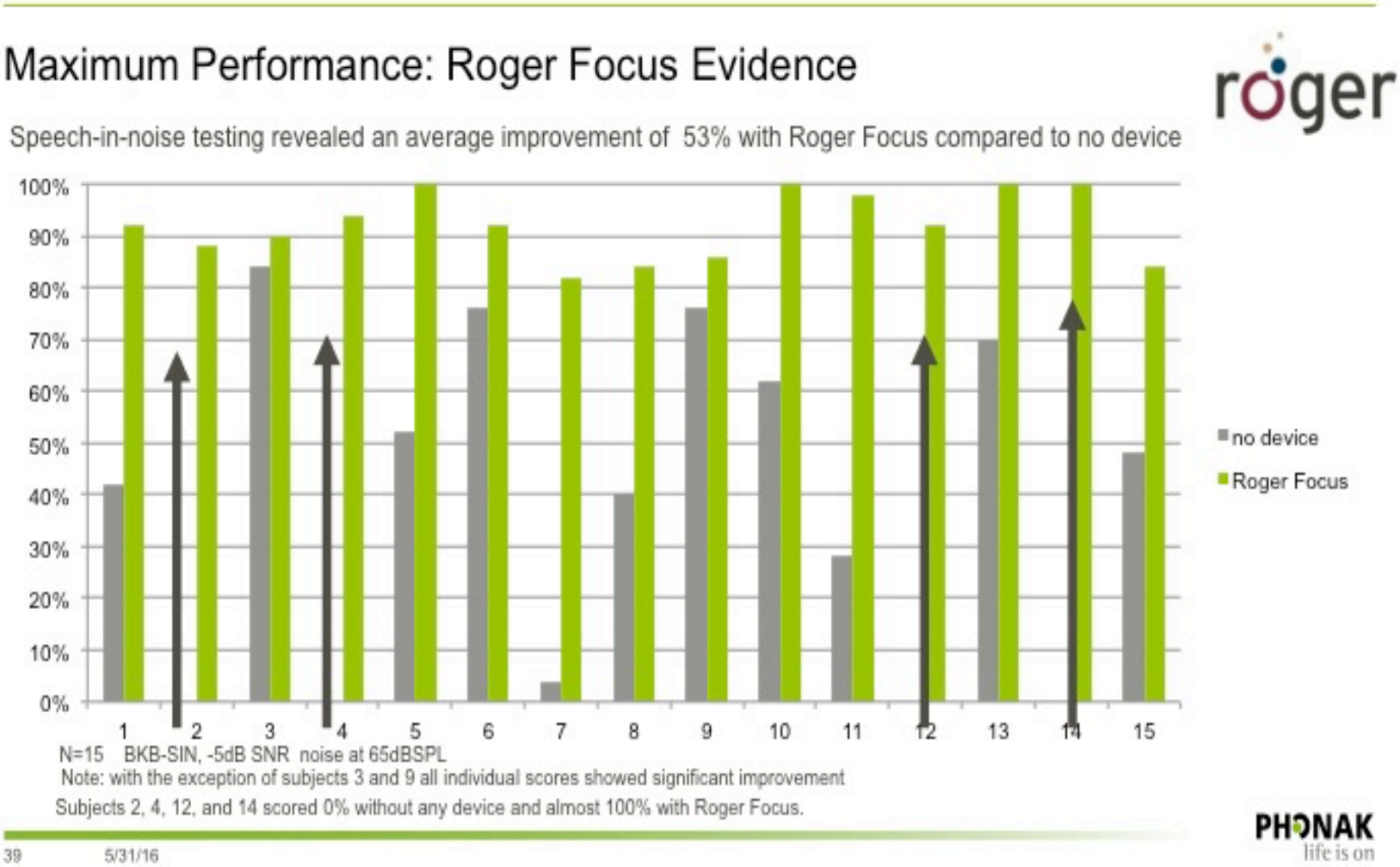

Figure 5. Performance: RogerFocus evidence.

When we give these under-performing children a Roger Focus listening device (the green bars), these children now score above 80%.

HAT – Additional Considerations

A pass-around microphone can be very helpful. With a pass-around mic, if there is a question or a comment from the back of the room, every child can hear it because it is either coming through the sound field system in the classroom or through a personal device. Some of you may be working with Phonak's Roger Pen, which can be pointed at children and they can hear what their classmates are saying. The children love having control in these situations.

Measuring Benefit

Two inventories we can use to measure pre- and post- intervention status are the Functional Listening Evaluation (FLE) and the Listening Inventory for Education – Revised (LIFE-R).

Functional Listening Evaluation (FLE)

The Functional Listening Evaluation (FLE) was first described as a procedure in 1993 (Johnson & Von Almen, 1993) and has become a staple in most school systems. It provides a means to estimate how well a student is able to access verbal instruction, and to what degree speechreading, distance and noise effect performance.

The FLE is designed to simulate the child's listening ability in the actual classroom. With the FLE, we can use a sound level meter in the classroom to make sure that the speaker's voice is reaching the child at a specific decibel level. Then, we can add noise and make very exact measurements about that child's typical listening environment. We make these acoustic measurements in the child's classroom to ensure that the FLE truly represents what is happening in the classroom.

The FLE also addresses the child's performance in various situations (e.g., in quiet and noise, close or at a distance, with or without visual information). It provides an interpretation matrix to enable us to evaluate the parameters of each situation and determine their performance in those situations. For example, we can determine the child's performance when there is no noise, but when the child is at a distance from the speaker and they have visual cues. We can determine performance when they are very close, but it is very loud and they have no visual cues. The FLE only takes twenty to thirty minutes, depending on if you are using words or sentences as your testing material. It does not have to be performed by an audiologist - it can be performed by the deaf educator or the speech language pathologist. I like it because I find satisfaction in knowing a child's exact measurements, and having objective data.

Karen Anderson's website, successforkidswithhearingloss.com, is an excellent resource where you can find the FLE itself.

As part of the Child's Hearing Assessment Toolkit on our website, www.phonakpro.com we also have the CHAT assessment tool in the Resources section, under Counseling Tools – Pediatric.

Listening Inventory for Education Revised (LIFE-R)

The LIFE-R (Anderson, Smaldino, & Spangler, 2011) consists of six questions that can be asked before you conduct the actual classroom listening situation inventory. There are 15 questions that comprise the inventory itself. Finally, there are six questions that you ask the child after they have completed the inventory.

The main questions are intended to determine the child's attitude about their situation, about using the device and self-advocacy. Each question has a point value. As an example, the first question is: *The teacher is talking in front of the class. The kids are quiet. Everyone is watching and listening to the teacher. How well can you hear and understand the words the teacher is saying?*

The child's options to answer the questions are as follows:

Always Easy = 10 points

Mostly Easy = 7 points

Sometimes Difficult = 5 points

Mostly Difficult = 2 points

Always Difficult = 0 points

The child can complete the inventory, provide the intervention (whether it is technology or simple classroom modifications). Using this inventory, it is possible to see changes occurring. These inventories are used to show benefit and to help kids be more successful.

The LIFE-R can be found on Karen Anderson's website:
http://www.successforkidswithhearingloss.com/

Pros and cons. The LIFE-R is very easy to understand and administer. There are a lot of categories in the revised version that the students get to rate. Another positive is there is no measuring of acoustics - only the sound level meter is required. The cons are the time and attention it takes to read it, fill it in, and talk with the student. In my opinion, it is also a con that the measurement of acoustics is not required in this test, although you could certainly do it.

Summary and Conclusion

I hope that from this session, you are aware of what children are at risk. You may not be responsible for children without hearing impairment, but we can certainly advocate for all children and educate others about available solutions. If you are a deaf educator or an audiologist, it is likely that people are already turning to you about noise and room acoustics. It is beneficial to keep up-to-date on what can be done. Read the literature, visit the websites and become familiar with hearing assistive technology, both on a classroom level (CAD), and an individual levels via personal devices. We can employ these tools and make a difference for kids. It is our duty to demonstrate to school administrators that there is measurable benefit to these solutions.

Questions and Answers

By Dynamic Plus Personal FM, do you mean ear level and sound field?

Yes. in Dr. Wolfe's work, the dynamic system used was the Dynamic SoundField, as opposed to the traditional sound field with a personal FM, which is ear level.

What are the differences between the Roger Focus and the iSense and EduLink?

Number one, the Roger Focus includes digitally modulated technology. It is clean and clear; it is simply better technology. It has a volume control, it can be used with a slim tube and a dome, or ear hook with an earmold. It comes in all kinds of fun colors. It looks like a BTE, so teachers are very familiar with changing the battery. With the iSense and the EduLink, it was a receiver in-the-canal which could get covered with wax.

What desktop listening systems are available?

Phonak no longer makes desktop systems. Dr. Erin Schafer at UNT has done a meta-analysis of the literature on all the benefit of different types of devices (classroom sound field, desktop, or ear level) and ear level wins every time. I know it is not always the cheapest solution and sometimes you have to go with a more portable, cost-effective solution. I am not sure what is available today. My opinion is, if I'm not going to go with a Phonak product, I think Lightspeed has one.

Are the benefits consistent over time? I'm wondering if students become used to the amplification and the benefits decrease.

There is some longitudinal data out there, but more research needs to be done in that regard. If you relate this to hearing aids, parents will commonly say, “I don't want my child to have a crutch.” Well, they have to hear. Hearing is required to develop the brain so that we can do harder tasks as we get into middle school and high school.

So many teachers are playing soft music in their classrooms to set a calming tone for their classrooms. How does the background noise affect our students with hearing loss?

It is true that there is a lot of research about the importance of music in setting a calming tone. However, if the teacher is going to give instructions, the music should be turned off; we should never be yelling over music. Certain children with hearing loss are going to have a hard time, either due to their lack of auditory system maturity or an auditory processing disorder, and they cannot ignore the noise. It is not a calming tone for them. The teacher’s intent is to provide relaxation in the classroom, in a beneficial way. Unfortunately, for some students, it is a source of stress. That is an area where we can educate others.

At what age have you seen children using the Roger Pen successfully?

I have seen an eight-year-old using the Roger Pen successfully, although not all 8-year-olds will be able to use it successfully. I think it is a game-changer for older children, because it gives them control and keeps them in technology at a time that maybe they would reject it. It is a pretty important time, especially if they are college bound. Or, if they will be entering vocational training, or working at any job in general, it is important that they know that there are devices to help them be successful in the workforce. That said, children are good with technology. If you have a child who is savvy, you might find that the Roger Pen works well for them. I will add that Phonak usually introduces new equipment in the spring and in the fall, so keep an eye open for future technology developments in this area.

What do you recommend for an unaided unilateral student?

If I had to make a blanket statement on that, not taking cost into consideration, I would say the Roger Focus. It depends on what their strengths and weaknesses are. Is this a child who is struggling in the classroom? Definitely a Roger Focus. If it is a child that maybe just needs a little bit more intervention, then I might go with the CAD, because it can impact the entire class.

References

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Further references are listed in the handout.

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