Checking For Audibility in School

By Jane Madell, PhD

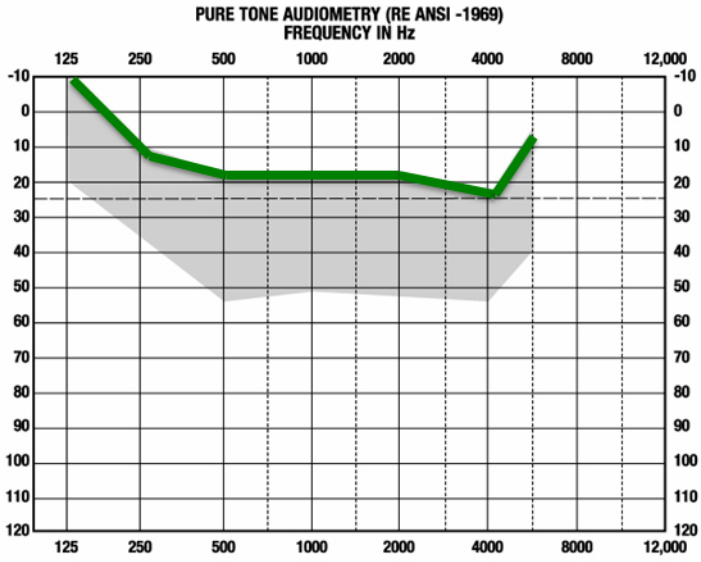
A major responsibility of Teachers of Children who are Deaf and Hard of Hearing is to monitor how well the child is hearing in school. It is not possible to exaggerate how important this responsibility is. Children who are being educated in mainstream settings rely on audition to learn. They need to hear the teacher, they need to hear comments from other students, and they need to hear on the playground and in the lunch room. If they are not hearing well, we expect significant delays in academics, literacy and social skills.

The Audiologist's Job

Monitoring audibility is a team effort. Obviously, the child's audiologist has the primary responsibility for making sure technology is providing a child with sufficient auditory access to learn. The audiologist should verify the fitting of the hearing aids using real ear measures, and validate the fitting using behavioral measures. Validation should include aided thresholds with technology for each ear separately as well as speech perception measures.

While real ear measures are important, they do not tell us what sound is reaching the brain – only what is reaching the eardrum. Testing thresholds with each ear separately is important to assure that both pieces of technology are providing sufficient information. If we test both hearing aids together, we will not know if one hearing aid is not working well.

We are all familiar with the concept of the speech banana. The speech banana gives information about where speech sounds fall in general conversation. Looking at aided threshold on a speech banana gives you some information about what sounds a child will not hear. For example, if a child is not hearing high frequencies with his hearing aids, we expect that he will have trouble hearing sibilants and fricatives which are high frequency speech sounds. This audiogram shows the speech banana with the Speech String Bean superimposed. The concept of the speech string bean is to remind us that our goal is not to hear just anywhere within the speech banana, but at the top – at the string bean. If a child is not hearing at the string bean we can expect that she will have trouble hearing in the classroom.



Speech perception testing

The real goal of hearing with technology is to hear and understand speech. The only way to really know what a child is hearing is to test. Hearing with technology should be tested at normal conversational levels, and also at soft conversational levels, in both quiet and in competing noise. The following table shows some test results for a child with hearing loss. We can see that this child is perceiving speech with average accuracy (90%+) at normal the conversational level of 50 dBHL but is not hearing well for soft speech (35 dBHL) and when there is competing noise. Test results for soft speech indicate to us that this child will have difficult hearing the teacher if she is not using an FM system, and will have problems hearing comments from other students in answer to questions and during group interactions. Poor speech perception in competing noise indicates that the child will have difficulty hearing in many classroom situations and confirms the need for an FM system.

	Right Aid	Left Aid	Binaural Aids	FM
50 dBHL Quiet	94%	90%	94%	94%
35 dBHL- Quiet	72%	68%	74%	88%
50 dBHL +5SNR	56%	52%	52%	76%

What Should The Teacher Of The Deaf/Hard of Hearing Do To Monitor Audibility?

Reviewing the audiologic test results

The teacher of the deaf/hard of hearing needs to understand the audiological test results. If the school does not have a copy of the audiological revaluation, the TOD should request a copy. The audiologist will need to have written parent consent to release this information to the school

- Does the evaluation have aided thresholds?
- Are they at the level of the Speech String Bean?
- Has speech perception testing included testing at normal and soft conversational levels in quiet and in noise?
- What do the test results indicate about how the child will hear in the classroom?

If thresholds are not at the level of the Speech String Bean, we can expect that kids will struggle. If testing is incomplete, the TOD should contact the audiologist and ask for the additional information explaining that the information is critical to assist in educational planning. Feel free to share this article with your request to the parent and audiologist.

Monitoring hearing in the classroom

Any test results are a demonstration of how the child is hearing at one moment in time in a very controlled situation. At any time a child's hearing may change or technology may break. As a result, it is ESSENTIAL that hearing with technology be monitored each and every day. Parents should check the equipment before the child leaves home in the morning checking each piece of equipment separately. Someone at school needs to check each morning that equipment is working. When the child arrives at school, someone needs to do a quick check, and for young children, checking may need to be repeated two or more times during the day. The Listening Check might be accomplished by the classroom teacher, the teacher of the deaf, the school nurse, or some other school personnel. Children need to be directly involved in hearing monitoring taught hearing monitoring and troubleshooting skills with increasing responsibility over time.

The Ling 6 sound test

The Ling 6 sound test is a good way to start routine hearing monitoring. With the child's back turned, the tester can repeat the Ling sounds (ah, ee, oo, mm, sh, ss) in random order using a

normal voice level, standing 3 feet away, and again at 10 feet. We want to know what the child hears. It is not enough to record if the child repeated the correct sound. If he made an error, we should record the error and share that information with the audiologist who can use that information to make changes in technology to improve listening. The table below describes test results for one child. It is clear that this child is having difficulty hearing high frequency sounds at 3 feet and even more difficult at 10 feet. We can expect him to have difficulty hearing plurals, possessives and some other significant grammatical markers. I would want the audiologist to know about these difficulties so she can make adjustments in the technology.

Name Bobby R. Date 10/4/14 Tester M. Smith School Birchwood

Ling Sound Check	3 feet	10 feet
aa	√	√
ee	aa	---
oo	√	√
mm	√	√
sh	√	---
ss	sh	---

Karen Anderson has developed a form called the *ELFLing* which can be found at http://successforkidswithhearingloss.com/tests. It provides a useful format and is excellent for use as an evaluation but the shorter version of this concept as shown, may be easier for schools to use on a daily basis.

Asking questions

In addition to the Ling test, it is useful to ask the child to repeat sentences or answer questions. Questions should not be able to be anticipated and should vary daily. Asking something like *"What color is my shirt?"* or "*How many people are wearing green shirts today?"* requires that the child both hear and think about the question before answering.

Using The Monitoring Information

We are not monitoring hearing for an exercise. It is critical information for planning management. If a child is not hearing well with technology, we need to refer the child back to the audiologist to see if something can be done to improve listening. (99% of the time there is something that can be done – changing HA settings, changing hearing aids, considering a cochlear implant.) Sending data describing specific speech perception errors and discussing how long they have been present is very helpful in talking with audiologists who are data driven.

If nothing can be done to improve technology, or until changes are made, the classroom teacher needs to understand that classroom seating is critical. Teachers need to understand that it is necessary to check that the child with hearing loss understands what is happening and to provide clarification if the child does not understand. Teaching the child specific communication repair skills and self-advocacy strategies is also very important as they will encounter various challenging listening situations throughout school and life. All school personnel need to understand the effect of hearing loss on this particular child and what they can do to improve classroom performance. Everyone needs to understand why children with hearing loss need to use an FM system in school. It is the only way we can assure that children are able to keep up on verbal instruction.

By working as a team, we can really help children with hearing loss be successful in school. Everyone has a significant part to play.

About the Author

Dr. Madell is an audiologist, speech-language pathologist, and LSLS auditory verbal therapist. Her clinical and research interests include hearing in infants and children, management severe/profound hearing loss, including HAs, CIs, FMs, and auditory processing disorders. She has published 5 books, numerous book chapters, and articles. She writes the *Hearing and Kids* section of the HearingHealthMatters.com blog. Until December 2009, she was Director of the Hearing and Learning Center and Co-Director of the Cochlear Implant Center at Beth Israel - New York Eye and Ear Infirmary. Dr. Madell presents nationally and internationally on topics related to hearing loss in children.

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