Audiologists Play Key Role in Classroom Access to Verbal Communication

Clinical audiologists can support school teams in determining when students with hearing loss qualify for special access and supports.

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Increasing numbers of children with hearing loss test out of specialized services (usually in the low-to-average range) when they enter school at ages 3 to 5 (http://www.handsandvoices.org/articles/education/law/auto_elig.html), according to parent and teacher reports. Likely driving this trend are early identification of hearing loss, early intervention services and the availability of sophisticated hearing technology.

However, it appears that children with hearing loss may be under-identified as needing further classroom support services: Only one out of 100 children with IEPs is found to be eligible for services primarily due to the impact of hearing loss (http://on.asha.org/gao-report), according to a 2011 report by the Government Accountability Office. They often receive language-support services provided by speech-language pathologists.

However, when language testing does not show an “adverse educational affect” of the hearing loss, children are often deemed “OK” or “normal.” In actual fact, many of these children could benefit from classroom hearing technology that would significantly bolster their access to classroom instruction. And audiologists can support and work with SLPs and school evaluation teams to help identify such students.
A hidden struggle in the classroom

We know that hearing devices do not restore normal hearing like glasses typically restore normal vision. Even when wearing hearing aids, students with hearing loss do not perceive speech as clearly as their normal hearing peers. Many have hearing losses that are so significant that, even when amplified, at least some of the speech information in soft speech is not audible. Because of this gap, students with hearing loss always have to work harder to clearly perceive what was said, which leaves fewer cognitive resources to actually comprehend the meaning, much less integrate the information into long-term memory.

Many educators may not understand this cognitive load, often believing that hearing aids restore normal hearing. They “know” the students can hear them, if only they would “pay attention.”

The large-group listening situation typical of classrooms presents another challenge for children with hearing loss: keeping pace with learning over time. Even though they may enter school with “normal” receptive and expressive language, this ability does not inoculate them from experiencing a slower rate of learning than they had prior to school entry. The common end result of listening at a distance in typically noisy and reverberant classrooms is eventual learning delays or knowledge gaps. (Use of FM/DM technology, in which teachers use a microphone to transmit their voice directly to the child’s hearing device, is effective for access to the teacher’s voice, but it still does not provide equal access to peer communication for group work, classroom discussion and social learning.)

A November 2014 letter from the U.S. Department of Justice and Department of Education clarified that the Americans With Disabilities Act (ADA) (https://www.ada.gov) requires schools to ensure that communication for students who are deaf and hard of hearing is “as effective as communication for others” (http://on.asha.org/ada-schools) through the provision of appropriate aids and services “affording an equal opportunity to obtain the same result, to gain the same benefit, or to reach the same level of achievement as that provided to others” and “to participate in and enjoy the benefits of the district’s services, programs, and activities” (emphasis added).

These requirements apply to all school-related communications for children ages 3 through high school in public schools, including charter and magnet schools. Therefore, schools must gather information to determine the level of a student’s access and must ensure effective communication for the student across all school communication situations.

The audiologist’s role beyond audiograms

“Students with hearing loss always have to work harder to clearly perceive what was said, which leaves fewer cognitive resources to actually comprehend the meaning, much less integrate the information into long-term memory.”
Although the audiogram is a priceless clinical tool for determining the extent and configuration of hearing loss and for comparing changes in hearing over time, it provides little information about the effects of the hearing loss on communication access in different situations. Only 39 percent of the ability to understand speech in noise can be predicted from hearing thresholds (see sources). We need to identify each child's individual abilities.

Unfortunately, most school districts do not employ educational audiologists. Thus, it often falls to the clinical audiologist to maximize the student's auditory experience—and thereby overall learning experience—in three areas.

1. **Ensure optimal fitting of hearing devices.** A recent study indicated that more than half of children who are hard of hearing have had hearing aid fittings that did not meet prescriptive targets by more than 5 dB, and 35 percent of study participants had below-average audibility because of overall poor hearing aid fit (see sources). The pediatric audiologist's No. 1 responsibility is to ensure an optimal—not conservative—hearing aid fitting. Under-fit hearing aids do not provide audibility of speech that results in effective communication or allows a typical rate of school progress. By all indicators, half of children are not experiencing full exposure to all possible speech opportunities.

2. **Verify audibility by performing an aided audiogram—and share it with the school.** We need to be sure that soft speech is sufficiently loud for students to be able to perceive all of the phonemes under typical listening conditions. To address this requirement, pediatric audiologist Jane Madell has frequently touted the need to fit hearing aids at the level of the "speech string bean" and not the "speech banana" (see sources), meaning striving for an aided audiogram of 20 dB HL.

   To know which phonemes children perceive, it is necessary to obtain aided thresholds separately for each ear. Aided audiogram measures are performed in sound field, using narrow band noise or frequency-specific hearing assessment noise.

3. **Perform relevant speech testing and relate the results to communication access.** Audiologists typically test speech perception to determine the listener's ability under conditions of optimal intensity and clarity. Educationally, both precision listening and functional listening are important to determine at soft speech and louder speech levels (35 dB HL and 50 dB HL).

   Precision listening refers to identifying specific speech sounds the child struggles to perceive under typical listening conditions. Use of nonsense stimuli or the Iowa Medial Consonant Test delineates which phonemes are inaudible or inconsistently audible.

   Functional listening is estimating the overall level of access to verbal communication under typical classroom listening conditions. The Functional Listening Evaluation is a procedure that presents stimuli in quiet and noise, from a close (50 dB HL) and far (35 dB HL) distance, with the student watching and not watching the speaker's face (see sources). It is advisable to use sentences to simulate connected speech to estimate access to typical classroom listening (instead of using single words or phrases) ([http://successforkidswithhearingloss.com/fle-recorded/](http://successforkidswithhearingloss.com/fle-recorded/)).

Research has indicated that typically hearing children ages 3 to 17 perform at 95 percent accuracy or better in quiet and 90 percent or better accuracy in 0 signal-to-noise ratio, even when listening to soft speech (35 dB HL) (see sources). If the student does not respond at levels expected for typically hearing students, then you've found evidence of reduced access to verbal communication in conditions that are comparable to classroom listening.

**Example: Information Typically Included in a Clinical Audiologist's Report**

Audiometric findings indicated that a student, Maria, had a bilateral sensorineural hearing loss ranging from 40 dB HL at 250 Hz sloping to 65 dB HL at 8,000 Hz, thereby meeting the hearing loss criteria for special education. Typically hearing children are able to perceive all phonemes at
soft speech levels (35 dB HL) and respond to sentences with at least 95 percent accuracy in quiet and at least 90 percent accuracy in simulated classroom noise when the speech stimuli is at soft (35 dB HL) or louder conversational levels (50 dB HL).

If Maria were to have full auditory access to verbal communication in the classroom, she would be able to respond during a functional listening evaluation (FLE) the same as a child with typical hearing. When the educational audiologist performed a precision listening test, Maria had difficulty perceiving the phonemes “f,” “s,” “t” and voiceless “th” when presented at soft levels (35 dB HL), even when she wore hearing aids. When an FLE was performed, the results suggested that Maria is not able to fully access classroom communication, even with functional hearing aids when she is fully attentive.

The results indicated that she will miss approximately one-third of speech information from class discussions. Per the Americans with Disabilities Act, the school team needs to ensure equal communication access—in this case in the form of personal FM/DM classroom hearing technology so that Maria has equal access to the teacher’s voice. The school team must also determine further accommodations that ensure Maria’s ability to perceive peer-to-peer communication within all situations as effectively as her class peers.

Sources


