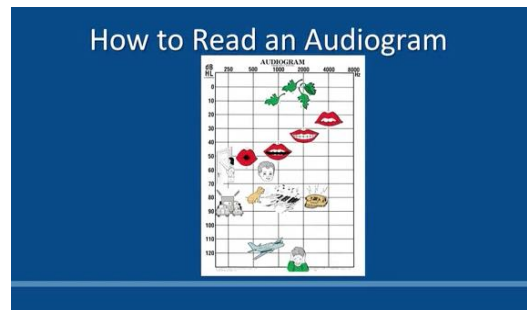


Module 2: Understanding Hearing: How the Ear Works and How to Test Hearing in Infants

Section: How to Read an Audiogram



Activity 2.4: Guiding Families in Understanding Their Child’s Audiogram and How It Impacts Their Child’s Access to Speech and Language

A. Have families become familiar with the various components of an audiogram, including:

- red O for right ear, blue X for left ear;
- terminology (e.g., decibels/dB, intensity, pitch, frequency, Hertz);
- different levels of hearing (i.e., mild, moderate, moderately severe, severe, profound); and
- different types of hearing loss. (See section of this module on “Types of Hearing Loss.”)

B. Discuss the following concepts related to the audiogram:

- The sounds above the line are not accessible to the child without amplification. The sounds below the line are accessible to the child but are not as loud as they are to a child with typical hearing.

- The levels where the Xs and Os are marked indicate the decibel level where the child is JUST barely able to hear a sound. It does not mean that the child can easily hear that sound.
- Just because the child can “hear” a sound, it does not indicate that he or she can understand sounds/speech.
- The sounds plotted on the chart are estimates and averages; some people speak louder than others, sounds are louder when closer to the child, and so on. However, this gives an idea of what the child can hear.
- Speech sounds have energy in different parts of the frequency range. For example, vowels have most of their energy in the low pitches, while many consonants have energy in the higher pitches. In general, consonants provide more important information for speech understanding than vowels. The more a child can hear in the higher pitches, the easier it is for them to perceive speech and develop auditory language skills.
- There are different patterns of hearing that impact what a child can hear and understand:
 - Flat (can hear both the low and high pitches at the same level)—With a flat pattern, a child can hear all speech sounds. This makes it easier to understand speech than when a child cannot hear all the pitches.
 - Sloping (can hear more in the low pitches than in the high pitches)—The child may miss many of the consonant sounds critical to understanding speech. For example, a child may miss sounds such as “s” and “d” which are important to distinguishing plural and past tense.
 - U-shaped (or cookie bite)—A child can hear more in the low and high pitches than in the middle pitches. With this pattern, the child can often fill in the gaps and understand spoken language because he or she hears both the high- and the low-pitched speech sounds.
 - Rising (can hear more in the higher pitches than the lower pitches)—This provides the child with many of the consonant sounds beneficial to speech understanding. Even without fully hearing the low pitched vowels, access to most consonants facilitates the ability to understand spoken language.

- C. Use a Familiar Sounds audiogram to plot a child's hearing levels without hearing aids or cochlear implants (<http://firstyears.org/lib/speechbanana.pdf> is one of many versions available on the Internet):
- Ask the parents to describe their child's hearing using this audiogram. Have them discuss their child's hearing levels. Have a parent explain their child's hearing levels on an audiogram to extended family members or friends.
 - Use the appropriate handout from *Supporting Success for Children with Hearing Loss: Relationship of Hearing Loss to Listening and Learning Needs* to describe to parents the possible impact of a child's hearing level on language, social, and educational aspects of life. Though the impact of hearing loss on a child's language is an obvious connection, the relationship with social and educational challenges may be more difficult to see.
- D. Use hearing loss simulations available on the Internet to provide the family with the opportunity to listen with various hearing levels:
- *What Hearing Loss Sounds Like* (Starkey)
 - *Hearing Loss Simulator App* (Starkey-using prerecorded messages or your own voice)
 - *Demonstrations: Simulated Listening with Hearing Loss and Devices* (Success for Children with Hearing Loss)
 - *Hearing Loss Simulator: Mild and Moderate Hearing Loss* (Phonak)

While these simulations can be helpful, emphasize the following:

- This is not a direct representation of what their child may hear.
 - Individuals who are listening to these simulations bring an existing knowledge of English.
 - These simulations can only go so far in filtering sound to represent hearing levels.
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