



In the Test Booth: The Hearing Test

There are many different ways to test a child's hearing. In most cases, the accurate diagnosis of hearing loss in young children may require more than one type of hearing test.

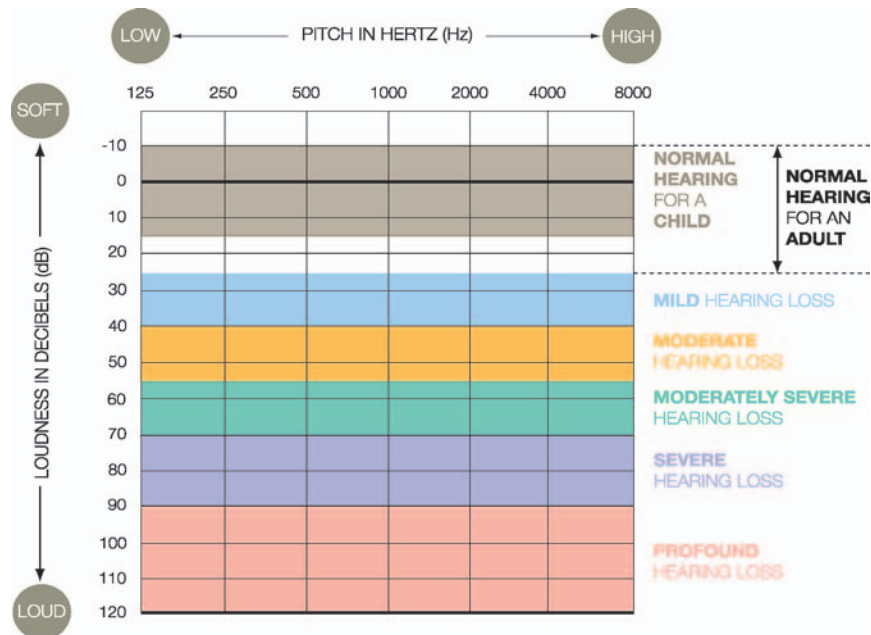
“When I first walked in the test booth, I didn't know what to expect. My child's pediatric audiologist put me at ease, and, before I knew it, I had a much better understanding of my child's hearing loss.”

— Tom, father of newborn

Understanding the Audiogram

The first step to understanding a child's hearing is to take the child for a complete hearing evaluation by an audiologist. An audiologist will present sounds in a sound-proof room and will record the reaction to the sounds on a chart called an audiogram.

Regardless of the type of hearing testing used, an audiogram will display the degree and type of hearing loss.



What to know:

- ▶ A circle represents the right ear. An X represents the left ear. You may also see brackets when the test used is bone conduction, which helps to differentiate between sensorineural hearing losses and conductive hearing losses.
- ▶ The numbers going across the top refer to frequency or pitch of sounds presented (think of the low notes and high notes of a piano).
- ▶ The numbers down the left side refer to loudness – from the softest sound the ear can hear to very loud sounds. Sound is measured in decibels; the larger the number, the louder the sound.
- ▶ Every hearing loss is unique. Make sure to ask your audiologist to explain the audiogram to you.

Hearing Testing

Testing the hearing of young children is both a science and an art. Young children cannot be expected to raise their hand when they hear a sound during a hearing evaluation. Instead, highly skilled pediatric audiologists use a variety of behavioral and electrophysiological testing methods to obtain an accurate diagnosis. The age, health, and developmental level of a child determine the types of tests that are used to measure how a child hears. In most cases, the accurate diagnosis of hearing loss in young children may require more than one type of hearing test. For parents who suspect a hearing loss, the testing process can be both frightening and stressful. Although these tests may seem daunting or “scary,” they are safe and scientific and will not hurt your child in any way. Pediatric audiologists will create a warm and friendly environment and be available to answer all of your questions.

Behavioral Testing

All behavioral testing requires that the child in some way participate and cooperate for testing.

Behavioral Observation Audiometry (BOA)

This test involves observation of a young infant while a variety of speech and calibrated sounds are presented at different loudness levels and at different pitches.

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Sounds are either presented while the baby is wearing small earplugs (to test each ear separately) or while sounds are coming from a speaker near where the baby is being held or is seated. This is the only type of behavioral test that can be used

to measure the hearing of an infant younger than 5 months of age. An experienced pediatric audiologist can gain valuable information from this test procedure. However, it is recommended that when this is the only type of behavioral test that can be conducted, that hearing levels be confirmed with electrophysiological test measures (e.g. ABR or ASSR).

Visual Reinforcement Audiometry (VRA)

This type of hearing test is typically conducted on infants beginning at about 5 to 6 months and used until they are about 2 to 2 ½ years old. It involves training an infant or toddler to turn toward tones and speech in an audiology test booth. The sounds can be presented through a loudspeaker or headphones. When the child turns toward the sound, he/she is rewarded with an animated toy, flashing light, or cartoon loop on a video monitor. After several presentations, the child learns that when there is a sound, and he/she turns toward it, they get to see the toy. They also learn that if they turn when there is no sound, they do not get to see the toy. Once the child learns this task, through careful observation of the child and varying the levels of the sounds presented, the pediatric audiologist can accurately determine the softest levels of sound the child can hear.



Play Audiometry

Using headphones or small earplugs, a child will be asked to listen to sounds at different loudness levels and at different pitches. The child is trained to respond each time he/she hears a sound by playing a game such as dropping a block in a box. Children from the age of 2 to 3 can usually be taught to perform this task. Children of this age will also typically be tested using speech audiometric procedures which may involve having the child point to pictures or repeat words to measure the levels at which speech is heard, and how well it is understood.

Standard Audiometry

Using headphones or small earplugs, a child will be asked to listen to sounds at different loudness levels and at different pitches. Children respond each time a sound is heard by raising their hand; this can typically be done with children who are entering kindergarten. Children of this age will also be tested using speech audiometric procedures which may involve having the child point to pictures or repeat words to measure the levels at which speech is heard, and how well it is understood.

Electrophysiological Testing

Electrophysiological testing is objective testing which does not require the child to pay attention or participate in testing. There are several types of electrophysiological testing, all of which require the child to be very quiet or asleep.

Auditory Brainstem Response Test (ABR) or Brainstem Evoked Response Test (BAER)

This test assesses hearing by measuring the brain's response to sound and is critically important when testing the hearing of infants younger than 6 months of age. It can typically be performed without sedation for infants under 4 months of age. For infants and children over 4 months, sedation is commonly required for accurate test results. For this test, sounds are presented to the child through small soft earplugs in both ears and/or through a small oscillator behind the ear. A few soft electrodes are placed on their skin. Sounds at different loudness levels, and sometimes at several different pitches, are presented, and the electrodes measure the brain's response to the sounds. A computer analyzes the responses, which are interpreted by the audiologist in order to diagnose the hearing loss.



Automated Steady State Response (ASSR)

This test procedure is very similar to the ABR test; however, this test allows for the presentation of both louder sounds and more frequencies than conventional ABR testing. It can be very helpful in determining the degree of hearing loss more precisely for children with severe to profound hearing loss.

Immittance

This test measures how the middle ear is working and requires placement of a small ear tip into the ear canal. One part of this test is tympanometry, which measures the movement of the eardrum. The other part of this test measures the ear's reflex to loud sounds. While this is not a hearing test, it provides valuable information in the diagnosis of the type and degree of hearing loss.

Otoacoustic Emissions Testing (OAE)

This test, commonly used for newborn hearing screening, measures how the inner ear is working and requires placement of a small, soft probe tip into the baby's ear canal. The normal hearing ear typically produces a sound of its own (an "echo") in response to sounds presented to it. The tip that is placed within the baby's ear canal contains a tiny loudspeaker that presents a sound to the baby's inner ear, as well as a tiny microphone that measures the "echo" back from the ear. When the "echo" is not received, a hearing loss may be present, and additional testing is recommended.



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