



Help with Hearing



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Help with Hearing



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Introduction

Good hearing is vital to the overall well being of your child. Hearing loss is a common birth defect found in newborns, even in babies without cleft lip or palate. About three in 1000 babies are born with a significant hearing loss, and many more are born with milder hearing problems.

In the past, children's hearing could only be tested by observing their behavior in response to sounds. Today's technology, however, allows even a sleeping baby to be evaluated. Many hospitals now screen newborns' hearing before they even leave the hospital. Keep in mind, however, that newborn screening is designed to identify all babies who may have any type of hearing loss; many babies fail the screening without having any long-term problems. If your baby fails an early screening, he/she will need follow-up tests to see if ear or hearing problems actually exist.

How Young Children's Hearing and Ears are Evaluated

The first two tests on this list can be performed on babies, even when they are asleep. They require no response from your baby and are not painful or uncomfortable.

ABR (Auditory Brainstem Response): Sounds are played through earphones while the baby rests quietly. Small electrodes are taped on the baby's head, and they measure the brain's response to these sounds. The results are recorded by a computer.

OAE (Otoacoustic Emissions): A small probe is inserted into the baby's ear. It measures the function of the inner ear (cochlea). This screening usually results in a "pass" or "fail," but does not diagnose the severity of a possible hearing loss.

Behavioral Testing: These types of tests are used with children who are old enough to turn their heads or raise their hands in response to sounds. They are like games. They determine the quietest sounds your child can hear and your child's ability to understand words.

Acoustic Impedance (Tympanometry): This test helps to identify problems in the space just behind the eardrum (middle ear), such as the presence of fluid and the movement of the eardrum, through a simple computerized technique. It can be performed on children of any age, but it is not often useful for very young infants. This test studies the middle ear but is not a true hearing test.

Types of Hearing Loss

There are two main types of hearing loss: sensorineural (nerve problems) and conductive (ear canal and middle ear problems). A sensorineural hearing loss means that the nerves that allow a person to hear do not work correctly. On the other hand, a conductive hearing loss generally means that wax in the ear canal or fluid in the middle ear is temporarily keeping a child from hearing sounds clearly. Ear infections in particular can cause a conductive hearing loss. In addition, the tiny bones of the inner ear may be deformed due to a birth defect or may not move correctly as a result of injury or infection. These problems can also cause a conductive hearing loss. Although children with cleft palate are at greater risk for sensorineural hearing loss, most children with cleft palate have conductive hearing loss, which is easily corrected.

Even children with mild to moderate hearing loss may miss up to 50% of classroom discussions. Unmanaged hearing loss in children can affect their speech and language, educational development, and self-image. It is important that your child be followed closely by a medical team to protect his or her hearing. The professionals who specialize in treating ear and hearing problems are the otolaryngologist (sometimes called the ear, nose, and throat or ENT doctor), the audiologist (a specialist who evaluates hearing), and the speech-language pathologist (a specialist who treats speech and language problems).

Cleft Palate and Middle Ear Disease

The ear has several parts: the outer ear that you can see, the ear canal (the tunnel that goes from the outer ear down to the ear drum), the middle ear, and the inner ear (Figure 1). The middle ear is usually filled with air, and the tiny bones there connect the ear drum to the inner ear. The inner ear contains nerve endings that carry sound into the brain for processing and understanding. The middle

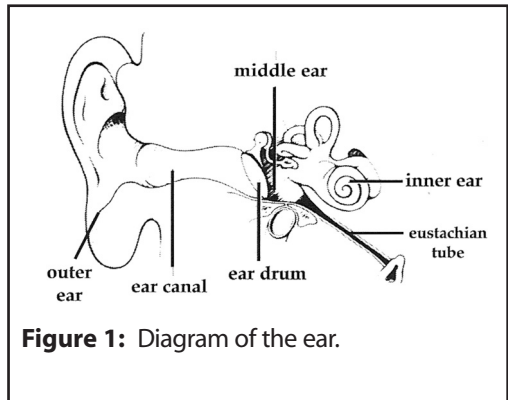


Figure 1: Diagram of the ear.

ear is connected to the back of the throat by the eustachian (auditory) tube, which opens and shuts when you yawn or swallow. When your ears “pop” on an airplane, you know that your eustachian tubes are working.

Why are Children with Cleft Palate More Likely to Have Ear Infections?

In children born with cleft lip only, we expect no more ear problems than in children without clefts. However, children born with cleft palate do experience more ear problems. Here’s why:

When the eustachian tube opens, it allows outside air into the middle ear. This equalizes the pressure in the middle ear space with the outside air pressure, or effectively “ventilates” the middle ear space. When the middle ear space is not adequately ventilated, fluid can accumulate, which can lead to an ear infection. Muscles of the soft palate are responsible for correct opening of the eustachian tube (See Figure 2). However, in children with cleft palate, these muscles do not work properly to open the tube for ventilation of the middle ear. In some cases, their palate muscles don’t even reach the eustachian tubes. Because cleft palate interferes with how the eustachian tube works, children born with cleft palate are more likely to accumulate ear fluid and get ear infections (“otitis media”). Even after palate repair, these muscles still may not function normally. That is why some children continue to have ear problems even into adult life.

Ear infections are very common in children with cleft palate. Studies in the United States have shown that nearly all children born with cleft palate will have problems with their ears at some time. About half of those children will have recurring ear infections before they are one year old. Ear infections can be very uncomfortable and may cause a child to eat poorly, sleep poorly, pull at his/her

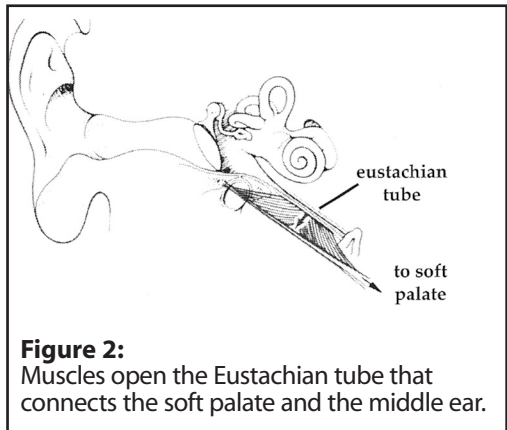


Figure 2: Muscles open the Eustachian tube that connects the soft palate and the middle ear.

ear, and show irritability, fever, or ear drainage. Your child’s primary care doctor can diagnose an ear infection and treat it with an antibiotic.

If your child has fluid in his/her ears that is not infected, antibiotics are probably not necessary. Occasionally this fluid may be uncomfortable, but it does not usually produce any symptoms like an ear infection does. You may not even notice the mild or moderate hearing loss that the fluid can cause. However, fluid in the middle ear distorts what the child is hearing and may contribute to speech difficulties.

Ear Infections and Hearing

Children with middle ear fluid often fail early hearing tests. If your child fails a hearing test, it does not necessarily mean that he/she is deaf. Though there is a higher risk of a nerve-type hearing loss in children with cleft palate, most children just have a temporary hearing loss from fluid in the ear. (See **Types of Hearing Loss** above.) The good news is that they are treatable!

If your infant fails an early screening, you will be referred for follow-up hearing testing with an audiologist and an evaluation by an otolaryngologist to check for middle ear fluid. It is best to have these appointments before six months of age. If your child needs a hearing aid, it may be placed early to help speech and language development. If your child needs “tubes” (see below), they can be put in place during palate repair, or sometimes earlier if he/she is experiencing constant ear infections.

Because your child will be susceptible to ear infections and fluid, close evaluation of the ears is necessary throughout childhood. Some school-aged children still have ear infections, so it is very important to have your child’s ears checked at least annually during this period. More frequent evaluations may be necessary if problems are found. As children get older, they tend to outgrow ear problems. However, some people will still have these problems into adult life.

Tubes

The most common treatment for middle ear problems, if medication alone is not successful, is the placement of “Pressure Equalizing (PE)” tubes, most often referred to simply as tubes. This surgical procedure can be done at the same time as any other surgery your child

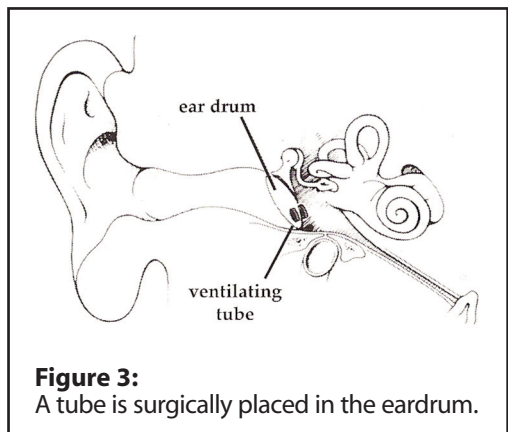


Figure 3:
A tube is surgically placed in the eardrum.

may be having. It is done in an operating room under general anesthesia using a microscope so that the otolaryngologist can see into your child's ear (Figure 3).

The surgeon will make a small hole in the eardrum and drain any fluid from the middle ear space. This small hole would close on its own except that the doctor places a tube there to keep the hole open. The tube allows air to ventilate the middle ear to help prevent fluid build-up and infections. Healthy ears have a dry, well-ventilated middle ear space. If your child's own eustachian tubes don't do this adequately, then the surgical placement of tubes is an excellent alternative. Your doctor will also talk with you about post-operative care of your child's ears. Specifically, your child may need to wear ear plugs at times when water could get into his/her ears.

Tubes come in many varieties, shapes, and sizes. Some will stay in place a long time, and others a very short time. Your otolaryngologist will make the decision on which would be the best type of tube for your child. Some doctors choose to place tubes in the ears of all children with cleft palate as a preventive measure because almost all children born with cleft palate will have problems with ear fluid and infections.

Some children, even after receiving tubes, will have drainage from their ears. This drainage is a sign of infection. In many cases, ear drops will clear the infection without the need for oral antibiotics. If the infection is not cleared quickly by the ear drops, then an oral antibiotic may be required. Those children who have tubes and cleft palate are probably more likely to get ear infections than those without cleft palate. As mentioned, this is because the eustachian tube muscles may not be working properly.

Most tubes generally come out by themselves and rarely need to be removed. When the tube comes out, there is a possibility of a hole remaining in the eardrum for a time. This hole usually heals closed by itself but sometimes may need to be repaired. There is also the small possibility of skin growing into the middle ear (cholesteatoma) when a hole remains in the eardrum. This problem is rare, however, and can be prevented with regular monitoring and care of the middle ears. The risk of these complications is higher in a child with cleft palate. Even so, the benefits of tubes on a child's hearing usually outweigh these risks.

Some children may need to have multiple sets of tubes during childhood. Fortunately, most children will outgrow ear infections by the time they are 8 to 10 years old. It is important to follow children well into adult life, however, because some will continue to have ear problems including infections, fluid, and perhaps more serious problems.

Speech and Language Development

Hearing loss is one possible cause of speech and language problems for children born with cleft palate or other craniofacial conditions. A speech-language pathologist is a specialist who is trained to evaluate speech and language development and advise you of any treatment that might be helpful. There is probably one on your cleft palate team and one at school. Your speech-language pathologist should work closely with your audiologist and otolaryngologist if they diagnose your child with a hearing loss. The speech-language pathologist will be able to help you answer the following questions:

- *Is my child's speech and/or language delayed?*
- *What specific problems is my child having?*
- *Could this delay be related to any type of hearing loss?*
- *What type of treatment plan will be appropriate for my child?*

As you have already learned, children born with cleft palate are more likely to have fluid in their middle ears. This fluid can cause a conductive hearing loss. It is important to remember that if there is fluid in his/her ears, your child may not have the best possible hearing. This problem can make it more difficult to learn speech sounds and language correctly.

Take a moment to try and understand what it may sound like to have fluid in your ears. Turn on the TV or radio at a normal volume. Take your index fingers and plug your ears. This may be how your child is hearing. See how difficult it is to hear words correctly? Some children have a "fluctuating" hearing loss, especially children with fluid in their ears. "Fluctuating" means that your child hears sounds correctly only part of the time, also referred to as "intermittent" hearing loss.

Language refers to the words that your child is using. For example, does your child use a variety of words to describe objects? If your child is older, does he/she put together words to make sentences? Is your child's use of words typical of other children his/her age? Your speech-language pathologist can help answer these questions.

Common Speech Disorders Related to Persistent Ear Infections

Because persistent ear fluid prevents the best possible hearing, it may be difficult for children with this problem to learn speech sounds correctly. When children do not hear sounds well, they may learn to repeat them as they hear them. This problem is called an articulation error. For example, if your child is having difficulty hearing high frequency sounds, such as /s/ and /f/ (which is common in children with fluid in their ears), he/she may hear the word "sun" as "dun" and then begin producing the word that way. Your child may also be having trouble hearing other sounds, not just ones that are high frequency.

Phonological process problems occur when children use a specific "pattern" in their speech. For example, instead of saying the sound /t/, your child may always substitute the sound /k/. The words "toy" and "truck" then come out as "kay" and "kuck." There are many variations of these disorders, and your speech-language pathologist will be able to evaluate whether these problems may be related to hearing.

Common Language Disorders Related to Persistent Ear Infections

The main way that children learn language is by imitation. If children aren't hearing words correctly, they will not repeat them correctly. A child may leave off the beginning or ending of a word that is difficult to hear. For example, he/she may say "eat" rather than "eating." In addition, if a child is having a difficult time hearing, he/she may only understand some of the words you are saying. Although this may be normal development, a speech-language pathologist will be able to tell you if your child is delayed in any way.

Some research also shows that if children are having an extremely difficult time hearing and understanding language, they may start to ignore conversation altogether. This "tuning out" may contribute to problems with language comprehension. In addition, parents may think their child is purposefully refusing to listen, when the reality is the child is not hearing correctly. This misunderstanding between parent and child can lead to behavior problems. It may also be mistaken for a problem with the child's attention.

Speech and Language Treatment

First and foremost, your audiologist and otolaryngologist should evaluate your child for medical treatment of ear problems and/or placement of tubes, if needed. After appropriate treatment has established normal hearing for your child, a speech-language pathologist can help to correct your child's speech and language errors.

A speech-language pathologist and audiologist can create an appropriate treatment plan for you and your child. It is important that you stimulate your child's speech and language at home. Start talking to your baby as soon as he/she is born. Speak clearly and at an appropriate volume. If your child is experiencing any hearing loss, point or gesture so he/she starts to understand the meaning of your words.

Early speech therapy may also keep your child from developing bad speech habits that are hard to correct later. You may want to contact your school district or pediatrician about Early Intervention Programs (EIP) in which your child can be seen by a speech-language pathologist and an audiologist. These programs treat children before they start school, and your child's speech can be evaluated as early as age one. The speech-language pathologist on your cleft palate team should also see your child by 18 months of age.

Treatment by a Cleft Palate Team

It is very important that you have your child seen by a team of medical, surgical, dental, speech, and hearing specialists to plan the appropriate treatment for your child. You can contact the Cleft Palate Foundation for help in finding a local cleft palate team. The specialists on the team can also refer you to resources in your local community.

For More Information

Las publicaciones de la Fundación del Paladar Hendido también se ofrecen en español. Favor de llamarnos para recibir copias en español.

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The Cleft Palate Foundation (CPF) maintains a growing collection of booklets and fact sheets that present an introduction to and explanation of many elements of cleft and craniofacial care and treatment. All publications are authored and regularly revised by representatives of professional disciplines serving the field of cleft and craniofacial care and treatment.

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To date, the Cleft Palate Foundation has shared over 7,000 Gund Teddy Bears with repaired cleft lips with children and families all over the world. Please visit www.cleftline.org or call the **Cleftline** for more information about our bears.

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