



HELP WITH HEARING

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A BABY'S HEARING

WHAT IS A NEWBORN SCREENING?

Good hearing is vital to the overall well being of a child. Every baby born in a hospital has a hearing test. A **newborn screening** shows if a baby has any type of hearing loss. The result of this screening is “pass” or “did not pass.”

If a baby does not pass a newborn screening, he or she needs to have more tests. A baby born with cleft palate should see an otolaryngologist (ear, nose, and throat doctor, or ENT) and an audiologist. These specialists will do follow-up tests to see if there is actually a problem. A baby should have these visits before age three months. The coordinator on the child's cleft palate or craniofacial team can help arrange them (see below for more information on team care).

HOW OFTEN DO NEWBORNS HAVE HEARING LOSS?

Hearing loss is common for all newborns. Most is mild and does not last. About three newborns in 1,000 have long-lasting hearing loss.

Cleft lip alone does not affect a baby's ears. A cleft palate can cause hearing problems because the muscles of the palate connect to parts of the ears. These problems need to be treated, but most are correctable and short-lived.

HOW ARE A BABY'S EARS TESTED?

In the past, hearing tests required children to respond to sounds. Today, tests can be performed even when a baby is sleeping. They are not painful or uncomfortable.

There are two common tests for a baby's hearing and ears. An **Otoacoustic Emissions** screening (also called an **OAE**) shows whether a baby has hearing loss. For this screening, a technician places a small probe into the baby's ear. The probe measures how well the inner ear (**cochlea**) functions. This screening usually results in a “pass” or “did not pass.” It shows whether a baby has hearing loss but does not show severity.

An **Auditory Brainstem Response** test (also called an **ABR**), shows how a baby's brain reacts to sounds. For this test, a technician puts headphones on the baby's ears and tapes small electrodes to his or her head. While the baby rests, sounds play through the earphones. The electrodes measure how the baby's brain responds to the sounds.

HOW ARE A YOUNG CHILD'S EARS TESTED?

When a child is old enough to signal a response to sounds, he or she is ready for **behavioral hearing tests**. These tests can be fun for a child. A technician will ask a child to nod the head or raise a hand when certain sounds are played. These tests show how well the child hears soft sounds and understand words.

A young child may also have an **acoustic impedance** test (also called **tympanometry**). This test shows whether a child has problems with the eardrum and the middle ear. How well does the eardrum move? Is there fluid in that area? This test looks at ear function. It is not a true hearing test.

CLEFT PALATE AND HEARING

WHAT ARE THE TYPES OF HEARING LOSS?

There are two types of hearing loss. **Sensorineural hearing loss** occurs because the hearing organ in the inner ear (the **cochlea**) or the nerve to the inner ear (the **8th cranial nerve**) does not work correctly. Most of the time, this type of hearing loss cannot be remedied through surgery or medicine. If a child has sensorineural hearing loss, he or she should have more tests and may need to wear a hearing aid.

Although children born with cleft palate have a higher risk for sensorineural hearing loss than children not born with clefts, it is more common for these children to have conductive hearing loss. Conductive hearing loss occurs because of problems with the ear canal and/or the middle ear. It can be caused by:

- Ear infections
- Wax in the ear canal
- Fluid in the middle ear
- Problems with the tiny bones of the middle ear

Many babies and children born with cleft palate have conductive hearing loss. In most cases, it is caused by ear infections and fluid in the ears. Conductive hearing loss is easily corrected and usually temporary.

WHY IS HEARING LOSS A PROBLEM?

If hearing loss is not treated, several things can happen. A child with mild to moderate hearing loss can miss up to half of the words in a

classroom discussion. This can cause problems with speech and language. Hearing loss can also cause learning delays and affect behavior and self-image.

WHO TREATS HEARING LOSS?

A child born with a cleft palate needs to be followed closely by a **cleft palate** or **craniofacial team**, a group of specialists in surgery, dentistry, speech and language, and hearing. Team members work together to plan the treatment a child.

There are three professionals on a cleft team who specialize in the ears and hearing. The **otolaryngologist** (often called an **ENT**) treats problems with the ear, nose, and throat. The **audiologist** evaluates hearing. The **speech-language pathologist** treats speech and language problems, which relate to hearing.

CLEFT PALATE AND THE MIDDLE EAR

HOW DOES THE EAR WORK?

The ear has several parts. The **outer ear** is the part of the ear that you can see. The **ear canal** is a tunnel that connects the outer ear to the **eardrum**.

Behind the eardrum is the **middle ear**. The middle ear is filled with air. It also contains tiny bones that connect the eardrum to the **inner ear**. The inner ear contains the **cochlea**, the hearing organ. It also holds nerve endings that carry sounds to the brain.



Figure 1: Normal ear showing the eustachian tube and the palatal muscle

The middle ear is connected to the back of the throat by the Eustachian tube. The **Eustachian tube** opens every so often, such as when you yawn or swallow. This action balances the air pressure between the middle ear and the outside of the ear. It also allows outside air into the middle ear. When your ears “pop” on an airplane, your Eustachian tubes are working.



Figure 2a & 2b: A comparison of normal palatal muscles and cleft palatal muscles

WHY DO CHILDREN BORN WITH A CLEFT PALATE HAVE MIDDLE EAR PROBLEMS?

The muscles of the soft palate are responsible for opening the Eustachian tube. When a child is born with a cleft palate, these muscles may not open the tube the way they should. Even after palate-repair surgery, they may not function normally. As a result, if the middle ear is not properly ventilated, fluid can build up, leading to infection (also called **otitis media**) and decreased hearing. Children with fluid in the ears may have **fluctuating** hearing loss, meaning that they may hear sounds correctly only part of the time.

Fluid in the ears and ear infections are very common in children born with cleft palate. Studies show that nearly all children born with cleft palate in the U.S. have problems with their ears at some time. About half will have repeated ear infections before they are one year old.

WHAT CAN BE DONE ABOUT FLUID?

Problems with fluid in the middle ear can be treated. First, a doctor may prescribe medication. If medication does not work, he or she may suggest **ear tubes** (described in the next section) or occasionally, a **hearing aid**. A child who needs a hearing aid should get it before age 6 months, in order to help with speech and language. Ask your doctor what is right for your child.

WILL A CHILD NEED ANTIBIOTICS?

Fluid in the ears may be uncomfortable but does not usually cause pain or fever. If your child has fluid that is not infected, antibiotics are probably not necessary.

Sometimes, the fluid in the middle ear becomes infected. Ear infections can be very uncomfortable. When a child has an ear infection, he or she may eat and sleep poorly, pull at the ear, and seem irritable. The child may also have a fever. Fluid may drain from the ear. A primary care doctor can diagnose an ear infection and may treat it with an antibiotic.

WHY IS IT IMPORTANT TO HAVE A CHILD'S EARS CHECKED?

With regular check-ups, a baby or child can be treated for hearing loss soon after it starts. A child should have ear check-ups at least once a year, and more often if there are problems. As children get older, most tend to outgrow ear problems. A few have issues that continue into adulthood.

EAR TUBES

WHAT ARE EAR TUBES?



Figure 3: A myringotomy (pressure-equalization) tube

The most common treatment for middle ear problems is **pressure-equalizing tubes** (sometimes called **PE tubes** or **tubes**.) A tube is a tiny plastic or metal cylinder that is placed directly into the eardrum surgically. Healthy ears have a dry, air-filled space in the middle ear. The tube allows the middle ear to ventilate. It also helps prevent fluid build-up and infections.

Tubes come in many shapes and sizes. An ENT decides which tube is best for a child.

WHEN DOES A CHILD GET EAR TUBES?

Tubes can be placed at the same time as any other surgery. Palate-repair surgery is a common time. In some cases, a doctor recommends this procedure earlier if a child is having problems.

Sometimes, a doctor suggests PE tubes for a child born with a cleft palate even if the child does not have fluid or infections. Almost every child born with a cleft palate has these problems at some point. Inserting the tubes early can prevent them from happening in the future.



Figure 4: An ear tube in place in the eardrum

HOW IS AN EAR TUBE INSERTED?

The procedure for ear tubes is done in an operating room under general anesthesia. The ENT surgeon uses a microscope to see into the child's ear.

First, the surgeon makes a small hole in the eardrum. This allows fluid to drain from the middle ear space. A small hole like this would normally close on its own. The doctor keeps it open by placing the tube there.

WHAT HAPPENS AFTER A TUBE IS INSERTED?

After getting tubes, most children hear normally and feel no pain in the ears. Sometimes, children have drainage from the ears. Drainage can be a sign of infection. In most cases, antibiotic eardrops will clear the infection without the need for oral antibiotics. If the infection is not cleared by eardrops, the child may need an oral antibiotic.

Tubes are not designed to stay in the eardrum forever. A tube usually falls out after one to three years. While it is in place, an ENT doctor should check it every year.

When a tube falls out, the hole in the eardrum usually heals on its own. In some cases, the hole doesn't heal. If this happens, there is a small chance that skin will grow in the middle ear (called **cholesteatoma**) and will need to be repaired. This problem is rare. It can be prevented with regular check-ups. Doctors usually say that the benefits of tubes for a child's hearing outweigh the risks.

WILL A CHILD NEED TO HAVE TUBES AGAIN?

Some children need several sets of tubes during childhood. Most out-grow problems with fluid and infections by the time they are 8 to 10 years old. In some cases, ear problems persist into the teen years and adulthood. A person born with cleft palate should have check-ups all the way into adulthood.

HEARING AND SPEECH/LANGUAGE

WHAT DOES HEARING HAVE TO DO WITH SPEECH AND LANGUAGE?

Hearing loss can cause problems with speech and language. If a child has fluid in the ears, he or she may not have the best possible hearing. This can make it hard to learn speech sounds and language correctly.

Try this test: Turn on the TV or radio at a normal volume. Take your index fingers and plug your ears. See how difficult it is to hear words correctly? This may be how your child is hearing.

WHAT IS A SPEECH-LANGUAGE PATHOLOGIST?

A **speech-language pathologist** listens to a person's speech and language, and recommends treatment. The speech-language pathologist on a cleft team specializes in issues related to cleft palate. This person works closely with the audiologist and otolaryngologist (ENT) on the team. Speech/language therapy is also available through most public schools until high school graduation or age 21, depending on eligibility criteria. The speech-language pathologist will find out:

- What are the child's problems with speech and language?
- Does the child have a delay with speech and/or language?
- Could this delay be related to hearing loss?
- What treatment plan is best?

WHAT IS THE DIFFERENCE BETWEEN SPEECH AND LANGUAGE?

Speech and **language** are not the same thing. Speech relates to the articulation of the sounds in words and sentences. Are the words clear? Is a child making letter sounds like "p","b","t", and "f"?

When a child is unable to make certain sounds, it is called a **speech error**. Some small children make errors because they have not learned to make certain sounds; these errors are normal. A speech-language pathologist can help you understand the different types of errors.

Language is about the meaning of words and sentences. How well does a child understand and use language? Does a child use a variety of words to describe objects? Does an older child put together words

to make sentences? Is a child's use of words typical of other children of the same age? The speech-language pathologist on the team analyzes a child's understanding of language to answer such questions.

WHAT SPEECH PROBLEMS CAN HAPPEN BECAUSE OF HEARING LOSS?

Most children repeat the sounds that they hear. This is how they learn. If a child does not hear sounds well, he or she may make mistakes with pronunciation. These are called **articulation errors**. When a child has fluid in the ears, he or she will probably have problems hearing certain sounds. One example is **high-frequency sounds**, like "S" and "F" sounds. If a child hears the word "sun" as "dun," he or she may begin producing the word that way.

A child may also have articulation errors related to a cleft palate or **velopharyngeal dysfunction** (problems related to the back of the palate). For example, a child may produce a "t" or "d" sound with a **glottal stop** (near the voice box). He or she may make an "s" or "sh" in the **pharynx** (back of the throat). A child usually makes these errors to compensate for problems related to a cleft palate.

There are other speech sound disorders unrelated to a cleft or velopharyngeal dysfunction. A child may demonstrate a **developmental error** that may or may not be age appropriate. A **phonological process disorder** may also be present, such as **weak syllable deletion**, **final consonant deletion**, or **cluster reduction**. A speech-language pathologist can identify a child's speech disorder and distinguish among issues related to hearing, the cleft condition, or development.

WHAT LANGUAGE PROBLEMS CAN HAPPEN BECAUSE OF HEARING LOSS?

If a child is having a hard time hearing, he or she may understand some words but not others. A child with hearing problems may also leave off the beginning or ending of a word. For example, a child may say, "eat" rather than "eating". Some of these patterns happen in normal development; others happen because of poor hearing. A speech-language pathologist can tell if either is the case for a child.

If hearing loss is severe, sometimes a child stops listening. "Tuning out" can cause problems with language. Also, parents and other adults may

misunderstand the situation. They may think that the child is refusing to listen or has problems with attention when really, he or she can't hear well. This misunderstanding can lead to behavior problems.

WHAT IS THE TREATMENT FOR SPEECH PROBLEMS?

It is extremely important that a child's speech and language development be monitored by a cleft team. Speech and language errors are common in children born with cleft palate. When errors are related directly to hearing, a child should see an **audiologist** and an **otolaryngologist** (ENT). If necessary, the child should get ear tubes or other treatment. Soon, the child should start to hear normally. Then, a speech-language pathologist can evaluate and treat speech and language.

A speech-language pathologist and an audiologist will work together to make a treatment plan for a child. Parents are part of this plan. Parents need to encourage a child's speech and language at home. This starts early with talking to a baby. Adults need to speak clearly and at a natural volume. They also need to make sure that the child understands what she hears.

HOW CAN A TEAM HELP?

A child born with cleft palate should see a speech-language pathologist on a cleft team, ideally before palatal surgery. Bad habits are hard to correct. Early speech therapy can help a child develop good speech habits right from the start.

The specialists on the team can also tell families about resources in the community. **Early Intervention** programs offer services to people born with cleft lip and palate, often for free. These programs treat young children, from babyhood until they start preschool. They include services like speech therapy and audiology.

As stated above, every child born with cleft lip and/or palate needs to be seen by a cleft or craniofacial team. Contact the ACPA for more information on hearing or for help finding a cleft team in your area.

FOR MORE INFORMATION

This booklet and many others have been produced by:

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