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Middle Ear Infections

A Close Look at the Ear

Next to the common cold, ear infections are the most commonly diagnosed childhood illness in the United States. More than 3 out of 4 kids have had at least one ear infection by the time they reach 3 years of age.

To understand how ear infections develop, let's review how the ear works.

Think about how you can feel speakers vibrate as you listen to your favorite CD in the car or how you feel your throat vibrate when you speak. Sound, which is made up of invisible waves of energy, causes these vibrations. Every time you hear a sound, the various structures of the ear have to work together to make sure the information gets to the brain.

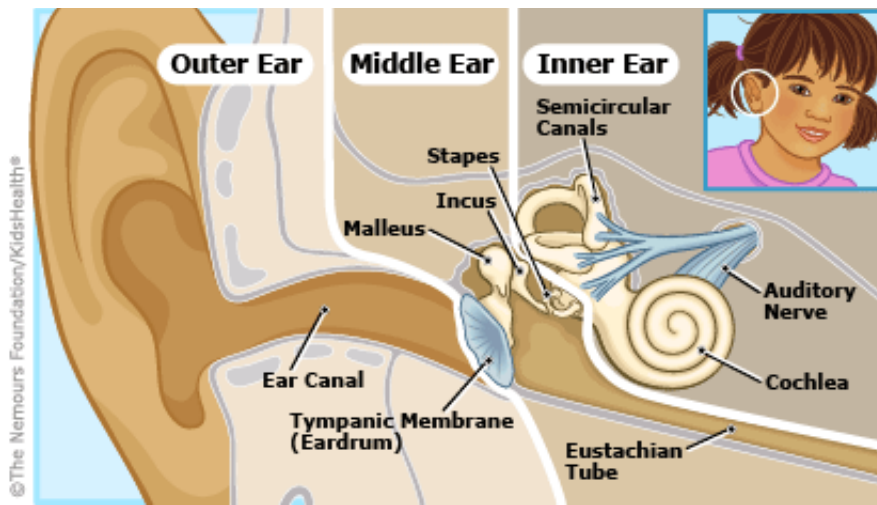
The ear is responsible for hearing and balance and is made up of three parts — the outer ear, middle ear, and inner ear. Hearing begins when sound waves that travel through the air reach the outer ear, or pinna, which is the part of the ear that's visible. The sound waves then travel from the pinna through the ear canal to the middle ear, which includes the eardrum (a thin layer of tissue) and three tiny bones called ossicles. When the eardrum vibrates, the ossicles amplify these vibrations and carry them to the inner ear.

The inner ear translates the vibrations into electric signals and sends them to the auditory nerve, which connects to the brain. When these nerve impulses reach the brain, they're interpreted as sound.

The Eustachian Tube

To function properly, the middle ear must be at the same pressure as the outside world. This is taken care of by the eustachian tube, a small passage that connects the middle ear to the back of the throat behind the nose.

By letting air reach the middle ear, the eustachian tube equalizes the air pressure in the middle ear to the outside air pressure. (When your ears "pop" while yawning or swallowing, the eustachian tubes are adjusting the air pressure in your middle ears.) The eustachian tube also allows for drainage of mucus from the middle ear into the throat.



Sometimes, the eustachian tube may malfunction. For example, when someone has a cold or an allergy affecting the nasal passages, the eustachian tube may become blocked by congestion in its lining or by mucus within the tube. This blockage will allow fluid to build up within the normally air-filled middle ear.

Bacteria or viruses that have entered the middle ear through the eustachian tube also can get trapped in this way. These germs can breed in the trapped fluid, eventually leading to an ear infection.

About Middle Ear Infections

Inflammation in the middle ear area is known as otitis media. When referring to an ear infection, doctors most likely mean "acute otitis media" rather than the common ear infection called swimmer's ear, or otitis externa.

Acute otitis media is the presence of fluid, typically pus, in the middle ear with symptoms of pain, redness of the eardrum, and possible fever.

Other forms of otitis media are either more chronic (fluid is in the middle ear for 6 or more weeks) or the fluid in the middle ear is temporary and not necessarily infected (called otitis media with effusion).

Doctors try to distinguish between the different forms of otitis because this affects treatment options. Not all forms of otitis need to be treated with antibiotics.

Causes

Kids develop ear infections more frequently in the first 2 to 4 years of life for several reasons:

- Their eustachian tubes are shorter and more horizontal than those of adults, which allows bacteria and viruses to find their way into the middle ear more easily. Their tubes are also narrower and less stiff, which makes them more prone to blockage.
- The adenoids, which are gland-like structures located in the back of the upper throat near the eustachian tubes, are large in children and can interfere with the opening of the eustachian tubes.

A number of other factors can contribute to kids getting ear infections, such as exposure to cigarette smoke, bottle-feeding, and day-care attendance.

Ear infections also occur more commonly in boys than girls, in kids whose families have a history of ear infections, and during the winter season when upper respiratory tract infections or colds are frequent.

Signs and Symptoms

The signs and symptoms of acute otitis media may range from very mild to severe:

- The fluid in the middle ear may push on the eardrum, causing ear pain. An older child may complain of an earache, but a younger child may tug at the ear or simply act irritable and cry more than usual.
- Lying down, chewing, and sucking can also cause painful pressure changes in the middle ear, so a child may eat less than normal or have trouble sleeping.
- If the pressure from the fluid buildup is high enough, it can cause the eardrum to rupture, resulting in drainage of fluid from the ear. This releases the pressure behind the eardrum, usually bringing relief from the pain.

Signs of Hearing Difficulties

Fluid buildup in the middle ear also blocks sound, which can lead to temporary hearing difficulties. A child may:

- not respond to soft sounds
- turn up the television or radio
- talk louder
- appear to be inattentive at school

Other symptoms of acute otitis media can include:

- fever
- nausea
- vomiting
- dizziness

However, otitis media with effusion often has no symptoms. In some kids, the fluid that's in the middle ear may create a sensation of ear fullness or "popping." As with acute otitis media, the fluid behind the eardrum can block sound, so mild temporary hearing loss can happen, but might not be obvious.

Ear infections are also frequently associated with upper respiratory tract infections and, therefore, with their common signs and symptoms, such as a runny or stuffy nose or a cough.

Contagiousness

Ear infections are *not contagious*, though the cold that may lead to one can be.

Duration

Middle ear infections often go away on their own within 2 or 3 days, even without any specific treatment. If your doctor decides to prescribe antibiotics, a 10-day course is usually recommended.

For kids 6 years of age and older with a mild to moderate infection, a shortened course of antibiotics (5 to 7 days) may be appropriate.

But even after antibiotic treatment for an episode of acute otitis media, fluid may remain in the middle ear for up to several months.

Diagnosis and Treatment

A child who might have an ear infection should visit a doctor, who should be able to make a diagnosis by taking a medical history and doing a physical exam.

To examine the ear, doctors use an otoscope, a small instrument similar to a flashlight, through which they can see the eardrum.

There's no single best approach for treating all middle ear infections. In deciding how to manage your child's ear infection, a doctor will consider many factors, including:

- the type and severity of the ear infection
- how often your child has ear infections
- how long this infection has lasted
- your child's age
- risk factors your child may have
- whether the infection affects your child's hearing

The fact that most ear infections can clear on their own has led a number of physician associations to recommend a "wait-and-see" approach, which involves giving the child pain relief without antibiotics for a few days.

Another important reason to consider this type of approach are the limitations of antibiotics, which:

- won't help an infection caused by a virus
- won't eliminate middle ear fluid
- may cause side effects
- typically do not relieve pain in the first 24 hours and have only a minimal effect after that

Also, frequent use of antibiotics can lead to the development of antibiotic-resistant bacteria, which can be much more difficult to treat.

When Antibiotics Are Required

However, kids who get a lot of ear infections may be prescribed daily antibiotics by their doctor to help prevent future infections. And younger children or those with more severe illness may require antibiotics right from the start.

The "wait-and-see" approach also might not apply to children with other concerns, such as cleft palate, genetic conditions such as Down syndrome, underlying illnesses such as

immune system disorders, or a history of recurrent acute otitis media.

Kids with persistent otitis media with effusion (lasting longer than 3 months) should be reexamined periodically (every 3 to 6 months) by their doctors. Often, though, even these kids won't require treatment.

Whether or not the choice is made to treat with antibiotics, you can help to reduce the discomfort of an ear infection by using acetaminophen or ibuprofen for pain and fever as needed. Your doctor may also recommend using pain-relieving eardrops as long as the eardrum hasn't ruptured.

But certain children, such as those with persistent hearing loss or speech delay, may require ear tube surgery. In some cases, an ear, nose, and throat doctor will suggest surgically inserting tubes (called tympanostomy tubes) in the tympanic membrane. This allows fluid to drain from the middle ear and helps equalize the pressure in the ear because the eustachian tube is unable to.

Prevention

Some factors associated with the development of ear infections can't be changed (such as family history of frequent ear infections), but certain lifestyle choices can minimize the risk for kids:

- breastfeed infants for at least 6 months to help to prevent the development of early episodes of ear infections. If a child is bottle-fed, hold the infant at an angle rather than allowing the child to lie down with the bottle.
- prevent exposure to secondhand smoke, which can increase the frequency and severity of ear infections
- reduce exposure, if possible, to large groups of other kids, such as in child-care centers. Because multiple upper respiratory infections may also lead to frequent ear infections, limiting exposure may result in less frequent colds early on and, therefore, fewer ear infections.
- both parents and kids should practice good hand washing. This is one of the most important ways to decrease person-to-person transmission of the germs that can cause colds and, therefore, ear infections.
- keep children's immunizations up-to-date, because certain vaccines can help prevent ear infections

Also be aware that research has shown that cold and allergy medications, such as antihistamines and decongestants, aren't helpful in preventing ear infections.

When to Call the Doctor

Although quite rare, ear infections that don't go away or severe repeated middle ear infections can lead to complications, including spread of the infection to nearby bones. So kids with an earache or a sense of fullness in the ear, especially when combined with fever, should be evaluated by their doctors if they aren't improving.

Other conditions can also result in earaches, such as teething, a foreign object in the ear, or hard earwax. Consult your doctor to help determine the cause of the discomfort and how to treat it.

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