

# Ear Infection and Hearing Loss

## WHAT IS OTITIS MEDIA AND EAR INFECTION?

Otitis media refers to inflammation of the middle ear. When an abrupt infection occurs, the condition is called "acute otitis media." Acute otitis media occurs when a cold, allergy, and the presence of bacteria or viruses lead to the accumulation of pus and mucus behind the eardrum, blocking the Eustachian tube. This can cause earache and fever.

When fluid sits in the middle ear for weeks, the condition is known as "otitis media with effusion." This occurs in a recovering ear infection. Fluid can remain in the ear for weeks to many months. If not treated, chronic ear infections have potentially serious consequences such as temporary hearing loss. Why do children have more ear infections than adults?

To understand earaches, and ear infections, you must first know about the Eustachian tube, a narrow channel connecting the inside of the ear to the back of the throat, just above the soft palate and uvula. The tube allows drainage of fluid from the middle ear, which prevents it from building up and bursting the thin ear drum. In a healthy ear, the fluid drains down the tube, assisted by tiny hair cells, and is swallowed.

The tube maintains middle ear pressure equal to the air outside the ear, enabling free eardrum movement. Normally, the tube is collapsed most of the time in order to prevent the many germs residing in the nose and mouth from entering the middle ear. Infection occurs when the Eustachian tube fails to do its job. When the tube becomes partially blocked, fluid accumulates in the middle ear, trapping bacteria already present, which then multiply. Additionally, as the air in the middle ear space escapes into the bloodstream, a partial vacuum is formed that absorbs more bacteria from the nose and mouth into the ear.

Children have Eustachian tubes that are shorter, more horizontal, and straighter than those of adults. These factors make the journey for the bacteria quick and relatively easy. It also makes it harder for the ears to clear the fluid, since it cannot drain with the help of gravity. A child's tube is also floppier, with a smaller opening that easily clogs.

## HOW DOES OTITIS MEDIA AFFECT HEARING?

Most people with middle ear infection or fluid have some degree of hearing loss. The average hearing loss in ears with fluid is 24 decibels...equivalent to wearing ear plugs. (Twenty-four decibels is about the level of the very softest of whispers.) Thicker fluid can cause much more loss, up to 45 decibels (the range of conversational speech).

Suspect hearing loss if one is unable to understand certain words and speaks louder than normal.

## TYPES OF HEARING LOSS

Conductive hearing loss is a form of hearing impairment where the transmission of sound from the environment to the inner ear is impaired, usually from an abnormality of the external auditory canal or middle ear. This form of hearing loss can be temporary or permanent. Untreated chronic ear infections can lead to conductive hearing loss. If fluid is filling the middle ear, hearing loss can be treated by draining the middle ear and inserting a tympanostomy tube. The other form of hearing loss is sensorineural hearing loss, hearing loss due to abnormalities of the inner ear or the auditory division of the 8th cranial nerve. Historically, this condition can occur at all ages, and is usually permanent.

### **WHEN SHOULD A HEARING TEST BE PERFORMED RELATED TO FREQUENT INFECTIONS OR FLUID?**

A hearing test should be performed for children who have frequent ear infections, hearing loss that lasts more than six weeks, or fluid in the middle ear for more than three months. There are a wide range of medical devices now available to test a child's hearing, Eustachian tube function, and flexibility of the ear drum. They include the otoscopy, tympanometer, and audiometer.

### **DO PEOPLE LOSE THEIR HEARING FOR REASONS OTHER THAN CHRONIC OTITIS MEDIA?**

Children and adults can incur temporary hearing loss for other reasons than chronic middle ear infection and Eustachian tube dysfunction. They include:

- **Cerumen impaction** (compressed earwax)
- **Otitis externa:** Inflammation of the external auditory canal, also called swimmer's ear.
- **Cholesteatoma:** A mass of horn shaped squamous cell epithelium and cholesterol in the middle ear, usually resulting from chronic otitis media.
- **Otosclerosis:** This is a disease of the otic capsule (bony labyrinth) in the ear, which is more prevalent in adults and characterized by formation of soft, vascular bone leading to progressive conductive hearing loss. It occurs due to fixation of the stapes (bones in the ear). Sensorineural hearing loss may result because of involvement of the cochlear duct.
- **Trauma:** A trauma to the ear or head may cause temporary or permanent hearing loss.