

## CAUSES OF HEARING LOSS

There are many conditions that can cause hearing loss. The following are some of the more common causes.

### The Outer Ear

1. Ear wax (cerumen buildup).
2. Infection (external otitis or "swimmer's ear"): This can cause swelling, pain, itching and rawness of the ear canal.
3. Foreign body.
4. Narrowing, or stenosis, of the ear canal.

### The Middle Ear

1. A hole or perforation of the eardrum.
2. Infection of the middle ear (otitis media) causing middle ear fluid buildup.
3. Cyst (cholesteatoma) blocking movement of the ear bones.
4. Otosclerosis: This condition prevents movement of the stapes bone. It is caused by excessive bone growth around the stapes.
5. Injuries to the head that damage or disconnect the middle ear bones.
6. Improper development or fixation of the middle ear bones.

### The Inner Ear

1. The aging process may cause a gradual decline in hearing. This is known as presbycusis.
2. Sudden or prolonged exposure to very loud sounds such as the firing of a gun, or exposure to "rock" concert music.
3. Gradual exposure over months or years to damaging, but less intense sounds such as factory noise, or continued use of portable radios.
4. Congenital or hereditary hearing loss.
5. Illness with very high fevers.
6. Injuries to the head that damage the inner ear, hearing nerve or brain.
7. Rarely, brain tumors may damage the hearing nerve.

## FACTS

- 500 million people in the world suffer from a hearing loss.
- 25 million people in the United States suffer from a hearing loss.
- 15-20% may benefit from a procedure to improve their hearing.
- 15% currently use hearing aids with benefit.

## TREATMENT OF HEARING IMPAIRMENT

The treatment of hearing impairment depends on knowledge of both the cause and the type of hearing loss. Treatment begins with a thorough physical examination by a physician in order to determine the cause of the hearing loss. The type of hearing loss may then be determined by performing a hearing evaluation (audiogram). (Remember, many of the older myths concerning treatment plans simply are not true in the 2000s!)

Three types of hearing impairments exist: conductive, sensorineural ("nerve"), and mixed hearing impairment, which is a combination of both a conductive and sensorineural hearing loss.

### Conductive Hearing Loss

This type of loss is due to an outer ear or middle ear problem. The following is a list of the more common causes of conductive hearing loss with treatment options.

#### The Outer Ear

1. Earwax (**Removal by a physician**).
2. External otitis or "swimmer's ear" (**Antibiotic eardrop**).
3. A birth defect of the ear canal (**Surgical widening of ear canal**).

#### The Middle Ear

1. A hole or perforation of eardrum (**Surgical repair**).
2. Otitis Media (**Antibiotic or placement of a small tube in the eardrum**).
3. Cyst or cholesteatoma (**Surgical removal**).
4. Otosclerosis (**Surgical placement of the stapes bone with a prosthesis and/or use a hearing aid**).
5. Injuries to the head which damage or disconnect the middle ear bone(s) (**Replacement of the ear bone(s) with a prosthesis**).

### Sensorineural or "Nerve" Hearing Loss

This type of loss is due to an inner ear or hearing nerve problem. Sensorineural or "nerve" hearing loss is best treated with a hearing aid.

In persons who are totally deaf, a **cochlear implant** is a possible treatment option. A **cochlear implant** is an electronic device surgically implanted into the inner ear. It bypasses damaged parts of the inner ear and electronically stimulates the hearing nerve.

### Mixed Hearing Loss

This type of hearing loss is a combination of a conductive and a sensorineural hearing loss. Treatment depends on the severity of the conductive and sensorineural portions of the hearing loss.

### BALANCE

Head movements, either side to side or forward and back, cause movement of fluid in the balance chamber. These movements are sent to the brain along the balance (vestibular) nerve as an electrical impulse and are interpreted as the sensation of motion.

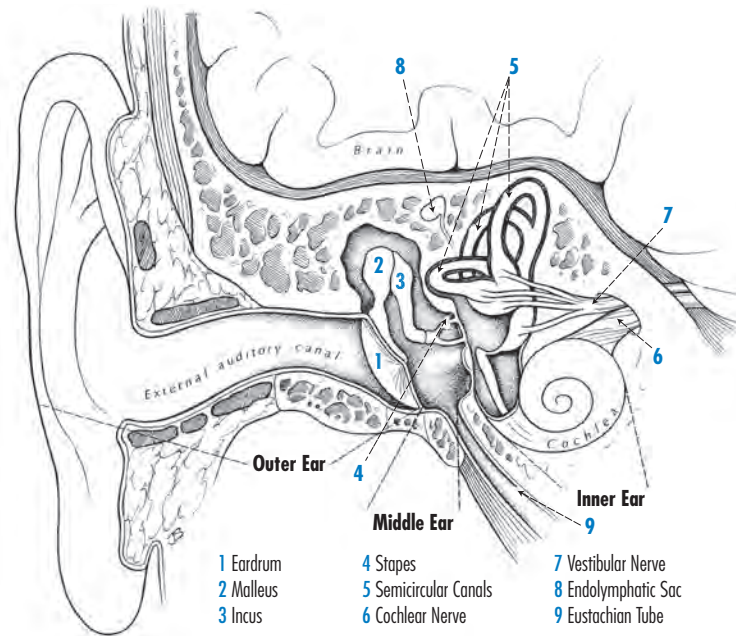
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## How We Hear

- Hearing
- Balance
- Facial Nerve



## NORMAL EAR ANATOMY



### Structure and Function of the Ear

The ear consists of three main parts: the outer, the middle ear, and the inner ear.

#### The Outer Ear

The outer ear consists of the portion that is visible, plus the ear canal. At the end of the ear canal is a tightly stretched membrane, the eardrum. The eardrum separates the outer ear from the middle ear.

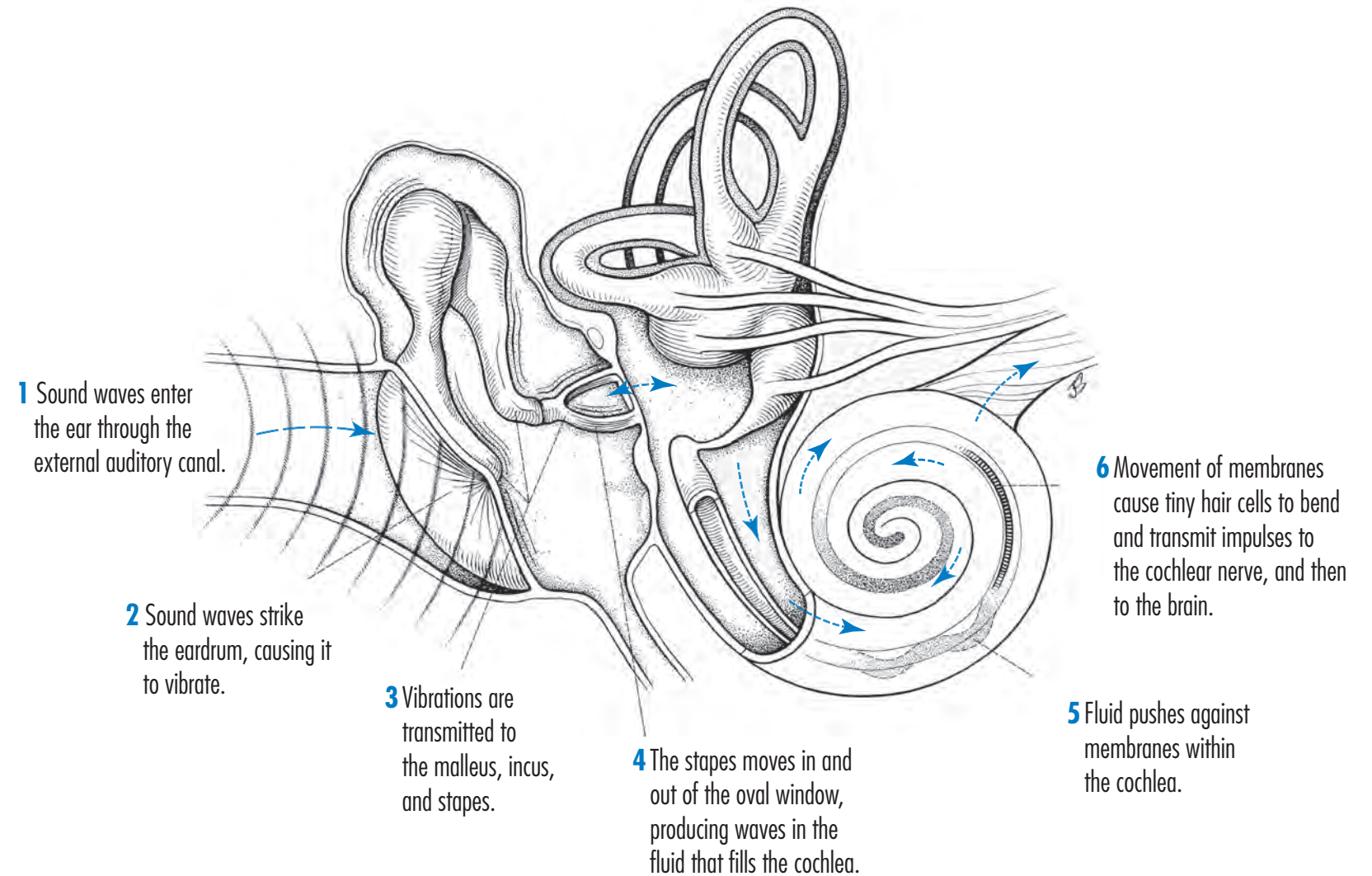
#### The Middle Ear

The middle ear consists of the space behind the eardrum and is continuous with the eustachian tube and the mastoid air cells. Three small bones called the malleus, the incus and the stapes connect the eardrum to the inner ear.

#### The Inner Ear

The inner ear is encased in bone and consists of the cochlea, which is for hearing, and the semicircular canals, which are for balance. The organs within the ear are bathed in fluid and contain the delicate nerve endings of balance and hearing.

## HOW THE EAR WORKS



Hearing is a principal tool for communication with all those around us. In children, hearing is essential for speech and language development. At any age, the ability to hear can be a source of pleasure and enjoyment.

This booklet is designed to provide the reader with an understanding of the function of the ear, and discuss treatment options of the more common causes of hearing loss. It is hoped that, through understanding, those with a hearing impairment will realize that hearing loss is a problem that can be solved.