

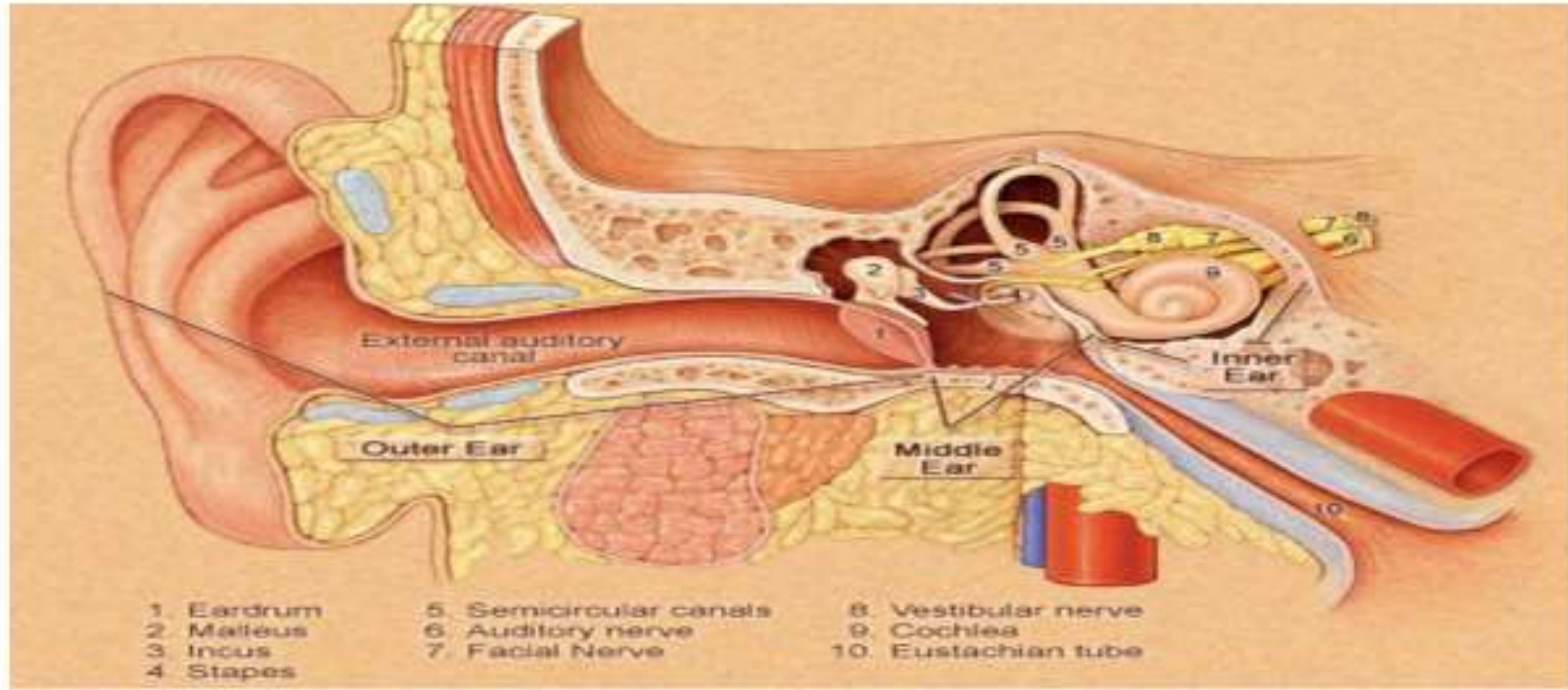
# HEARING LOSS (DEAFNESS)

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# Objectives

- Know the types of hearing defect.
- Causes of each type.
- Describe the issue in detail particularly in:  
( Otosclerosis, Meniere's disease, Presbycusis, Ototoxicity ).

It refers to the inability to hear things either totally or partially



## Types

1. **Conductive hearing loss** - when hearing loss is due to problems with the ear canal, tympanic membrane, or middle ear and its ossicles (the malleus, incus, and stapes).
2. **Sensorineural hearing loss (SNHL)** - when hearing loss is due to problems of the inner ear (cochlea and auditory nerve).
3. **Mixed hearing loss** - refers to a combination of conductive and sensorineural hearing loss. This means that there may be damage in the outer / middle and inner ear.

## Degrees

1. **Mild** (problems understanding speech, especially if there is a lot of noise around), so patient can only detect sounds from between 25 to 39 decibels
2. **Moderate** (can only detect sounds from between 40dB and 69dB, so may need a hearing aid)
3. **Severe** (can only hear sounds above 70dB to 89dB, so may depend on lip-reading when communicating with others)
4. **Profound** (cannot hear a sound below 90dB, so cannot hear anything at all, at any level of decibels. Communication is done with sign language and/or lip-reading or hearing aids).

## Conductive Hearing Loss

### Causes:

**Malformation** of outer ear, ear canal, or middle ear structures

**Impacted earwax**

**Obstructed foreign body in the ear**

**Ear infection** as; otitis externa (occluded external auditory canal) , otitis media - (Acute or Chronic), adhesive otitis media

**Fluid in the middle ear (OME)**

**Poor Eustachian tube function**

**Tympanic membrane perforation.**

**Benign or malignant tumors in external canal and middle ear**

**Otosclerosis**

**Tympanosclerosis**

**Longitudinal temporal bone “skull base” fracture**

## Sensory neural hearing loss

### Causes:

**Malformation** of the inner ear

Exposure to **loud noise** (noise induced hearing loss, Acoustic trauma).

**Virus or disease of inner ear** : such as Chicken pox, ,Mumps, Meningitis, Sickle cell diseaseAIDS , Syphilis ,Lyme disease , Diabetes,

Autoimmune disease

**Ototoxic drugs**

**Aging** (presbycusis)

**Meniere’s Disease**

**Tumors of inner ear**

**Transverse temporal bone “skull base” fracture**

## OTOSCLEROSIS

**Otosclerosis** is abnormal bone remodeling of stapes region in which a normal dense endochondral layer of bony otic capsule is replaced by irregularly laid spongy bone.

It is genetically inherited in families as autosomal dominant, mostly affect both ears (70-80%). Female>male, generally limited to the white population. The exact cause is unknown. Measles virus RNA may be implicated.

### Clinical features

Symptoms:

Hearing loss is the most frequent symptom “adult long standing” Often, first notice that they cannot hear low-pitched sounds or whispers. However, some times they hear better in noisy place (hyperacusis willissi).

It can usually conductive (80-90%), but some times may be sensorineural (8%) or both (2%). Less frequently tinnitus, imbalance.

Sign

Otoscopy usually shows no findings, except in few severe cases where cochlear involvement result in hyperaemia of cochlear promontory (Schwartz sign)

### Investigations

Pure-tone audiogram: Most common is conductive deafness (air-bone gap) with decrease bone conduction “carhart notch” at 2000 Hz.

Tympanometry: Type As curve, no acoustics reflexes.

CT scan : Sclerotic changes in otic capsule.

### Treatment

1. “Hearing aid” amplification of sound
2. “Stapedectomy” most usual surgery
3. “Fluoride” medical therapy, it stabilizes but dose not improve hearing, so its effects is controversy
4. Cochlear implant

# Meniere's Disease

## (Idiopathic endolymphatic hydrops)

set of episodic symptoms including vertigo typically last from 20 minutes up to 4 hours, fluctuant sensory neural hearing loss (mainly involves the **lower** frequency, but over time this often affects tones of all frequencies), tinnitus and ear fullness.

Mostly **unilateral, adults, male=female**.

The cause isn't well understood. It appears to be the result of the **abnormal volume or composition of “endolymph”** fluid in the inner ear.

### Diagnosis

#### 1-History

2-**Hearing tests** ( PTA) indicates low frequency tone sensory type of hearing loss.

Poor Speech discrimination.

#### 3-Balance

2-An **ENG** (electronystagmogram) with **caloric test**.

#### 4-Other tests

2-Electrocochleography (**ECoG**), auditory brain stem response (**ABR**), computed tomography (**CT**), or magnetic resonance imaging (**MRI**) may be needed to rule out a brain tumor

### Treatment

Although there is no cure, it may includes:

1. **Low salt diet and a diuretic**
2. **Anti-vertigo medications (betahisten hydrochroide as “Betaserc”)**
3. **Intratympanic injection with either gentamicin or dexamethasone**
4. **Surgery**

# Presbycusis

**Age-related hearing loss**, It is a progressive bilateral symmetrical, age-related sensorineural hearing loss.

The hearing loss is most marked at **higher** frequencies.

There are **4 types** :

1. **Sensory**: characterized by degeneration of organ of corti, most common.
2. **Neural**: characterized by degeneration of cells of spiral ganglion.
3. **Strial**: characterized by atrophy of stria vascularis in all turns of cochlea.
- 4, **Cochlear conductive**: due to stiffening of basilar membrane thus affecting its movement.

**Treatment:**

Devices like **hearing aids** and **cochlear implants** already help improve hearing of many elderly.



## Definition

# Ototoxicity

Ototoxicity is damage to the hearing or balance functions of the inner ear by drugs or chemicals.

- The extent varies with drug type, dose, and other conditions. In some cases, there is **full recovery** after drug has been discontinued. In other cases, the extent of damage is **limited and may even be too small to be noticed**, severe cases there may be **permanent and complete deafness**.

“High frequency hearing loss”

## Drugs

- **Antibiotics** as: Amikacin (Amikin), Streptomycin, Neomycin, Gentamicin , Tobramycin
- **Anti-cancer** as: Cisplatin, Bleomycin, Vincristine
- **Diuretics** as: Acetazolamide, Furosemide
- **Aspirin, Antimalarial** drugs quinine and chloroquine, **Environmental chemicals** as tin, lead, mercury, carbon monoxide, and carbon disulfide.

## Treatment

1. There are no current treatments to reverse the effects of ototoxicity.
2. Permanent hearing loss may elect to use hearing aids, or, when appropriate, receive a cochlear implant.
3. Balance problems, “physical therapy”.

**THANK YOU**