Hello and welcome back to InterpreterPrep.com!

Today we are going to be talking out the human **EAR** in this presentation and by the way, this is one of the principal organs we use to be able to interpret because the first thing an interpreter needs to do is **LISTEN**. On the other hand, if the patient or doctor is **HARD OF HEARING** it becomes a real challenge to interpret because they can't hear you well. There are also interpreters for patients who are **DEAF** and that type of interpreter is called a **SIGN LANGUAGE INTERPRETER**. They use their hands to communicate with the deaf patient. Now, getting back to the ear let me say the following, just like the eye is divided into 3 layers, the ear is divided into 3 parts (see illustration below):

1) **OUTER EAR**: In the outer ear we find the **PINNA** or **AURICLE** which is made of cartilage and helps funnel the sound waves through the **AUDITORY CANAL** to the

2) **MIDDLE EAR**: separating the outer ear from the middle ear is the **TYMPANIC MEMBRANE** aka **EARDRUM**. The sound waves hit the eardrum making it vibrate. Vibrations are passed on to 3 little bones located in the **TYMPANIC CAVITY** called the **OSSICLES**. Each ossicle has a name: we have the **MALLEUS**, the **INCUS** and the **STAPES** and are **connected to each other**. The malleus is **embedded in the eardrum** so when sound makes the eardrum vibrate, the ossicles also vibrate, **amplifying** these vibrations which are passed on to the fluids of the inner ear creating a “ripple effect.”

3) **INNER EAR**: This “ripple effect” stimulates the hair cells of the **ORGAN OF CORTI** (organ of hearing) located in the **COCHLEA**, giving way to nerve impulses that will travel through the **COCHLEAR NERVE** to the cerebral cortex where the impulses are interpreted as sound. Let me also mention that there are **3 fluid filled loops** in the inner ear called the **SEMICIRCULAR DUCTS** which don't have to do with hearing but which transmit nerve impulses to the brain through the **VESTIBULAR NERVE** to help maintain one's **balance**.
The middle and inner ear are located inside the **TEMPORAL BONE**.
IN SUMMARY, we can say that:

- the **outer ear** directs the sound waves to the auditory canal
- the **middle ear** amplifies the sound waves
- the **inner ear** converts sound waves into vibration originating nerve impulses at the cochlea
- the semicircular ducts, are also in the inner ear but involved in the process of balance.

I also want to mention that there is a **tube that connects the middle ear with the pharynx** called the **EUSTACHIAN TUBE** (not to be confused with the **FALOPIAN TUBE** of the uterus please!) The purpose of the Eustachian tube is to **equalize pressure** in the middle ear to that of atmospheric pressure as it opens when you swallow or yawn.

**SOME SIGNS OF DISEASE**

1) **DIFFICULTY HEARING (HYPOACUSIS)**
2) **EARACHE (OTALGIA)**
3) **SECRETIONS (OTORRHEA)**
4) **ITCHING**
5) **BLEEDING**
6) **DIZZINESS**: is a term used to describe a sensation **unsteadiness or loss of balance**
7) **VERTIGO**: is a feeling that your **surroundings are moving or spinning**
8) **TINNITUS**: is **humming in the ears**

**SOME DISEASES**

1) **OTITIS EXTERNA**: generally refers to the **inflammation of the ear canal**, aka “swimmer's ear” because it is seen more frequently in swimmers. The ear canal becomes swollen and tender. Due to an **infection or eczema** of the ear canal.

2) **OTITIS MEDIA**: is the **inflammation of middle ear**, usually due to a **bacterial infection**. Very frequent in **children**. If left untreated it **can give way to complications** like:
   - **MASTOIDITIS**: which is an infection of the bone behind the ear or a
   - **RUPTURED EARDRUM** where the **tympanic membrane** becomes **perforated** with blood or purulent discharge from the ear
   - **MENINGITIS**

3) **LABYRINTHITIS**: is the inflammation of the **inner ear**. It causes **vertigo** and may cause difficulty hearing.

4) **TUMORS**:
   - **ACOUSTIC NEUROMA**: slow growing benign tumor of the acoustic nerve.

5) **OTOSCLEROSIS**: **hearing loss** due to **calcification of the** inner most bone of hearing: the **stapes**, which stiffens and does not move well. The other ossicles may also be affected.

6) **DEAFNESS**: we have **2 types of deafness**:
   - **CONDUCTIVE DEAFNESS**: due to a **mechanical problem** is in the structures of the **outer or middle ear** with breakdown of the transmission of sound waves.
• **SENSORINEURAL aka NERVE DEAFNESS**: the problem is in the **inner ear** (cochlea or the cochlear nerve) and although the sound waves are being transmitted, no nerve impulse is reaching the brain.

7) **ACOUSTIC TRAUMA**: refers to injury to the hearing mechanisms of the **inner ear** caused by **loud noises** (an explosion, gunshot, working in a noisy environment). Acoustic trauma is a cause of **permanent** hearing loss.

8) **IMPACTED CERUMEN**: an excessive accumulation of wax-like secretions from the glands in the **ear canal** which clog up the canal. May cause difficulty hearing.

9) **MÉNIÈRE'S DISEASE**: chronic disease due to **too much fluid in the inner ear** with difficulty hearing and dizziness.

10) **PRESBYACUSIS**: age-related hearing loss

11) **CHOLESTEATOMA**: abnormal growth of skin located in the **middle ear**. These growths shed away layers of old skin inside the middle ear and **grow invading the ossicles** leading to **hearing loss**. Must be surgically removed.

**SOME DIAGNOSTIC PROCEDURES**

1) **OTOSCOPY**: where using an **otoscope**, the doctor takes a peek at the **ear drum**.

2) **SALPINGOSCOPY**: endoscopic procedure to **view the Eustachian tube**. The same name is given to the endoscopic procedure to view the Fallopian tube in gynecology.

3) **TUNING FORK TESTS**: like **Rinne's test** and **Weber's test** which are used to **assess a patient's hearing** and help to know whether the patient has a **conductive or sensorineural hearing loss**.

4) **AUDIOMETRY**: test where a patient puts on headphones and listens to sounds at different frequencies. It's used to **assess and document hearing loss** (**AUDIOGRAM**).

5) **TYMPANOMETRY**: is a test that is done to **evaluate the function of the middle ear**. A hand held probe is placed in the ear canal. The probe changes pressures in the ear and emits a tone and at the same time **measures the response of the eardrum to that tone**. This information is then displayed in the form of a graph called a **TYMPANOGRAM**. Any disease that affects the middle ear will reflect on the way the eardrum vibrates (like otosclerosis or the presence of fluid in the middle ear for example) and this will **show up on the tympanogram**.

**SOME TREATMENTS**

1) **PREVENTIVE TREATMENT**: **EARPLUGS & EARMUFFS** are used to **prevent hearing loss** from occurring.

2) **EAR WASH / LAVAGE**: act of **flushing the ear canal** with warm water to **remove excess wax**.
3) **EAR SURGERY:**

- **MYRINGOTOMY:** surgical procedure consisting in a *tiny incision in the eardrum* to insert a small *ventilation tube* to *drain fluid or pus from the middle ear* to relieve pressure and pain in the ear.

- **MYRINGOPLASTY:** is the *surgical closure of an ear drum perforation*. Done using a *graft* taken from the sheath that covers one of the patient's own head muscles.

- **STAPEDECTOMY:** as we had mentioned in *otosclerosis*, the stapes is not moving well so this surgery done to *remove the stapes and replace it with a micro-prosthesis* to reestablish the transmission of sound to the inner ear.

4) **HEARING AID:** small electronic device worn in or behind the ear that *amplifies sound* helping improve hearing for patients with hearing loss.

5) **COCHLEAR IMPLANT (BIONIC EAR):** is a *surgically implanted device* indicated for patients with severe hearing loss which *works by directly stimulating the auditory nerve*. It *does not restore hearing* but can enable sufficient hearing for a better understanding of speech.

The medical doctors who *specialize in diseases of the ear* are called **OTOLOGISTS**. **OTOLOGY** is a subspecialty of **OTOLARYNGOLOGY**. Other *non-medical professionals* who work in this field are the **AUDIOLOGISTS** who *perform audiometry and tympanometry* to check for ear problems and dispense hearing aids.

**TERMINOLOGY REVIEW**

1) **EAR:** oído  
2) **LISTEN:** escuchar  
3) **HEAR:** oír  
4) **HARD OF HEARING:** medio sordo  
5) **DEAF:** sordo  
6) **SIGN LANGUAGE:** lengua de señas  
7) **OUTER EAR:** oído externo, oreja  
8) **PINNA or AURICLE:** pabellón auricular, oreja  
9) **AUDITORY CANAL:** conducto auditivo  
10) **MIDDLE EAR:** oído medio  
11) **TYMPANIC MEMBRANE/ EARDRUM:** membrana timpánica, tímpano  
12) **OSSICLES:** huesecillos del oído  
13) **MALLEUS:** martillo  
14) **INCUS:** yunque  
15) **STAPES:** estribo  
16) **INNER EAR:** oído interno  
17) **COCHLEA:** cóclea  
18) **ORGAN OF CORTI:** órgano de Corti  
19) **SEMICIRCULAR DUCTS:** conductos semicirculares  
20) **EUSTACHIAN TUBE:** trompa de Eustaquio  
21) **HYPOACUSIS:** hipoacusia
In this presentation we have gone over many terms related to **OTOLOGY** while we discussed the anatomy and physiology of the **EAR AND HEARING**. Signs and symptoms of sickness, diseases, diagnostic procedures and some treatments were also discussed. At the end of the presentation a list of **59** related terms were provided in English and the target language for you to review. I hope you've enjoyed this lesson and come away with a better understanding of the field of **OTOLOGY** and the terms related to this field of medicine.

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