

Today's Topic is

DEAFNESS & AUDIOLOGY

Presented by:

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DEAFNESS

➤ Means impairment of hearing.

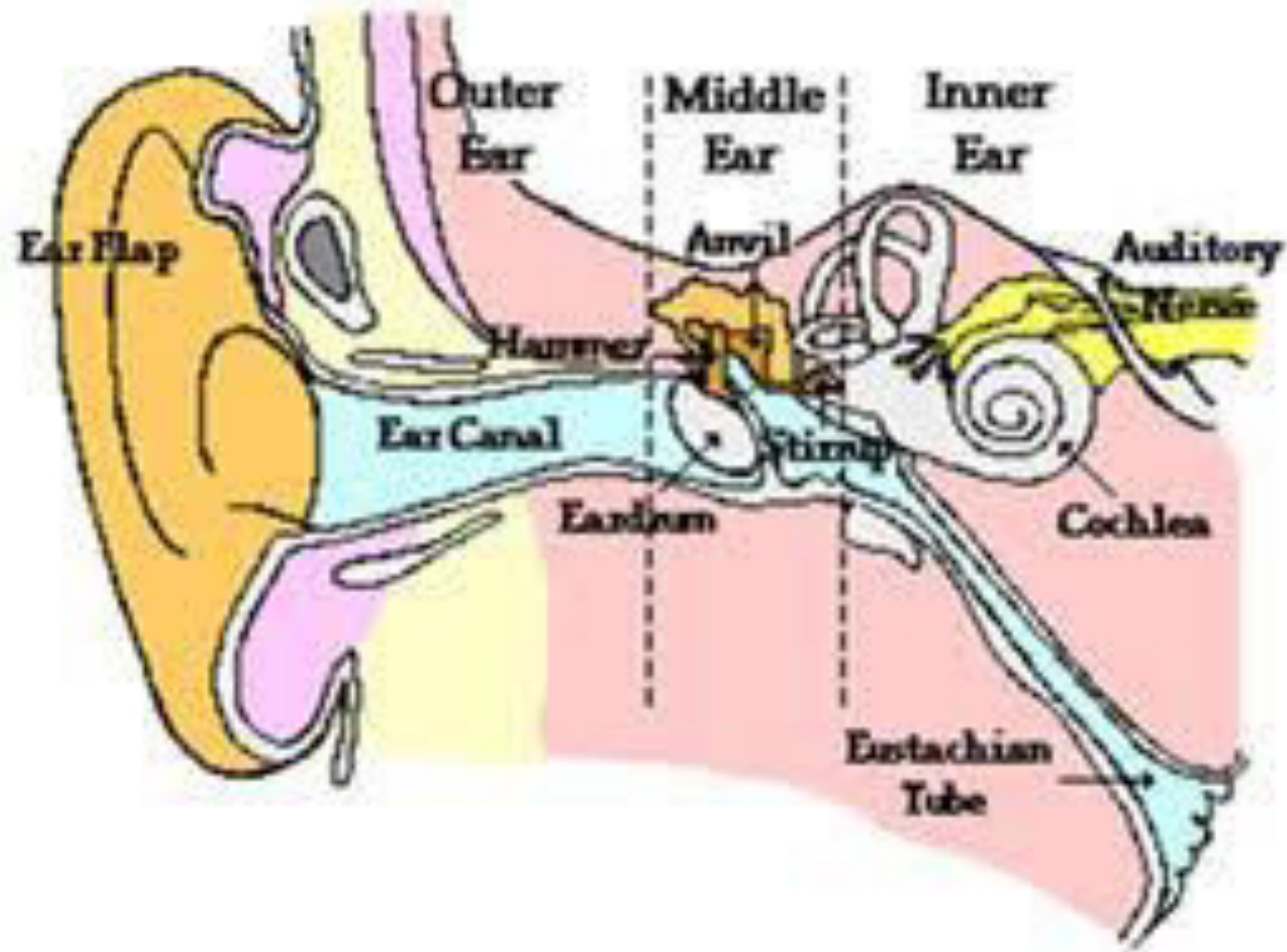
➤ Classification-

a) Organic :

- i. Conductive deafness.
- ii. Sensory neural deafness.
- iii. Mixed deafness.

b) Non-organic :

Psychogenic deafness/malingering.



Conductive Deafness

➤ Causes:

- a) Congenital.
- b) Acquired .

■ a) Congenital causes are:

- Meatal atresia.
- Fixation of stapes footplate.
- Fixation of malleus head
- Ossicular discontinuity.
- Congenital Cholesteatoma

Conductive Deafness (Cont.)

- b) Acquired causes are:

- i. External ear:

Wax, FB, Furuncle, Acute Inflammatory swelling, Benign or Malignant Tumor, Atresia of canal.

- ii. Middle ear:

- | | |
|------------------------------|--|
| a. Perforation of TM- | Traumatic or Infective. |
| b. Fluid in the middle ear- | Acute Otitis Media, Secretory Otitis Media, Haemotympanum. |
| c. Mass in the middle ear- | Benign or Malignant Tumour. |
| d. Disruption of Ossicles- | Due to trauma, CSOM, Cholesteatoma. |
| e. Fixation of the ossicles- | Otosclerosis, Tympanosclerosis
Adhesive Otitis Media. |
| f. Eustachian tube block- | Retracted TM, Serous Otitis Media. |

Conductive Deafness (Cont.)



Conductive Deafness (Cont.)

- Characteristics:

1. Negative Rinne test, $BC > AC$.
2. Weber lateralised to the poorer ear.
3. Normal Absolute Bone Conduction.
4. Audiometry shows bone conduction better than air conduction with air-bone gap.
5. Loss is not more than 60 dB
6. Speech discrimination is good.

Conductive Deafness (Cont.)

➤ Management:

- Most of the conductive deafness can be managed by medical or surgical means.
 1. Removal of canal obstructions.
 2. Removal of fluid.
 3. Removal of mass from middle ear.
 4. Stapedectomy / Stapedotomy.
 5. Tympanoplasty.
 6. Hearing aid.

Sensory Neural Deafness

- Causes:

- a) Congenital.
- b) Acquired .

- Congenital causes:

- Present at birth .
- Due to anomalies of the inner ear or damage to the hearing apparatus by prenatal or perinatal factors.

Sensory Neural Deafness (Cont.)

- b) Acquired causes:

1. Causes in the cochlea or inner ear:

- i) Traumatic- Fracture temporal bone, head injury, blast injury.
- ii) Operative Post stapedectomy, labyrinthectomy, perilymph fistula.
- iii) Infective- Labyrinthitis of bacterial and specific etiology.
- iv) Viral- Measles, mumps, influenza, pox.
- v) Vascular- Spasm, thrombosis.
- vi) Ototoxic drugs- Streptomycin, Gentamycin, quinine etc.
- vii) Degenerative- Senile deafness or presbycusis.
- viii) Noise induced- Acute noise trauma, chronic noise trauma.
- ix) Miscellaneous- Diabetes, hypothyroidism, Meniere's disease, multiplesclerosis, autoimmune disorders, blood dyscrasias etc.

Sensory Neural Deafness (Cont.)

- 2. Causes in the IAC and CP angle:
 - Acoustic nerve tumour.
 - Meningioma.
 - Cholesteatoma.
 - Tuberculoma.
 - Basal meningitis.
- 3. Causes in the CNS:
 - Disseminated sclerosis.
 - Vascular accident.
 - Tumours etc.

Sensory Neural Deafness (Cont.)

- **Characteristics:**

1. A positive Rinne test, $AC > BC$.
2. Weber lateralized to better ear.
3. Bone conduction reduced on ABC test.
4. More often involving high frequencies.
5. No gap between air and bone conduction curve on Audiometry.
6. Loss may exceed 60 dB.
7. Speech discrimination is poor.
8. Difficulty in hearing in the presence of noise.

Sensory Neural Deafness (Cont.)

Management :

- Early detection of SNHL is important
- To stop its progress, reverse it or to start an early rehabilitation programme.

- | | |
|-------------------------------|---|
| ✓ Hypothyroidism- | Thyroxin supplement |
| ✓ Perilymph fistula- | Early surgical correction |
| ✓ Ototoxic drugs- | Should be used with care and discontinued if causing hearing loss. |
| ✓ Noise induced hearing loss- | can be prevented from further deterioration if the person is removed from the noisy surroundings. |

Mixed Hearing Loss

- **Mixed hearing loss** is a combination of both conductive and sensorineural hearing loss at the same time.
- Both the middle and inner ear are involved.
- With mixed hearing loss, the conductive part may be treated, but the sensorineural part is usually permanent.

Mixed Deafness

- Causes:

- i) Blast injury.
- ii) CSOM.
- iii) Presbycusis.
- iv) Otosclerosis in advanced cases.

Deafness

Onset:

- **Sudden** Impacted wax, Vascular or Viral deafness, Acoustic trauma
- **Gradual:** Presbycusis, Acoustic neuroma, Otosclerosis, Noise-induced hearing loss.
- **Unilateral:** CSOM, ASOM, Mumps, Herpes zoster oticus, Acoustic neuroma.
- **Bilateral:** CSOM, Presbycusis, Meniere's disease, Otosclerosis, , Noise-induced hearing loss.
- **Progressive:** Meniere's disease, Presbycusis, Otosclerosis, Acoustic trauma
- **Fluctuating:** Meniere's disease, Perilymph leak.

Deafness

- Degree of hearing loss: (WHO classification)
 1. Mild- 26- 40 dB
 2. Moderate- 41- 55 dB
 3. Moderately severe- 56- 70 dB
 4. Severe- 71- 91 dB
 5. Profound- More than 91 dB
 6. Total.

Early Warning Signs of Hearing Loss

- You can hear but not understand.
- You have to ask for repetition a lot.
- You need the TV up louder than others.
- You avoid group meetings, social occasions.
- You don't hear the phone or door bell ring and even family gatherings.
- You have head noises, such as buzzing or ringing sounds (tinnitus).

AUDIOLOGY

- Is the study of science of hearing.
- Purpose of this study is:
 1. To measure the degree of hearing loss.
 2. To determine the type of hearing loss.
 3. To determine the site of hearing loss.
 4. To asses the impact of hearing loss on speech development and rehabilitation.

ASSESSMENT OF HEARING

A. Clinical tests of hearing:

- 1. Tuning fork tests - Rinne's test.
 - Weber test.
 - Absolute bone conduction (ABC) test .
 - Bing test .
 - Gelle's test.
 - Schwabach's test.
 - Stenger test-(non organic hearing test).
 - Chimani-Moos test —(non organic hearing test)
- 2. Speech test.
- 3. Watch test.
- 4. Finger friction test.

ASSESSMENT OF HEARING(Cont.)

B. Audiometric tests:

- 1. Subjective audiometry-(where the response and graphs are individual dependent).
- 2. Objective audiometry-(Where the responses are automatically recorded).

Audiometry

- Subjective Audiometry are:
 1. Pure tone audiometry.
 2. Speech audiometry.
 3. Bekesy audiometry.
 4. Tone decay test.

Audiometry(Cont.)

- Objective audiometry are:
 1. Impedance Audiometry.
 2. Brain-stem evoked response Audiometry.
 3. Cortical evoked response Audiometry.
 4. Otoacoustic Emissions.

Pure Tone Audiometry

- Commonest form of audiometry performed.
- AC and BC hearing are tested by pure tone through an audiometer.
- Intensity of sound is increased or decreased for each frequencies from 0 dB to 100 dB.
- The threshold of hearing at each frequency in AC and BC is plotted on a graph called audiogram.

Pure Tone Audiometry (Cont.)

- **Applied importance:**
 - i. Diagnosis of hearing threshold and degree of deafness.
 - ii. Diagnosis of conductive deafness with air-bone gap.
 - iii. Diagnosis of sensory neural deafness.
 - iv. Diagnosis and confirmation of clinical otosclerosis
(A-B gap with Carhart's notch at 2000 in BC)
 - vi. Diagnosis of acoustic trauma- sudden dip at 4000 of both
BC and AC tracing.

Pure Tone Audiometer



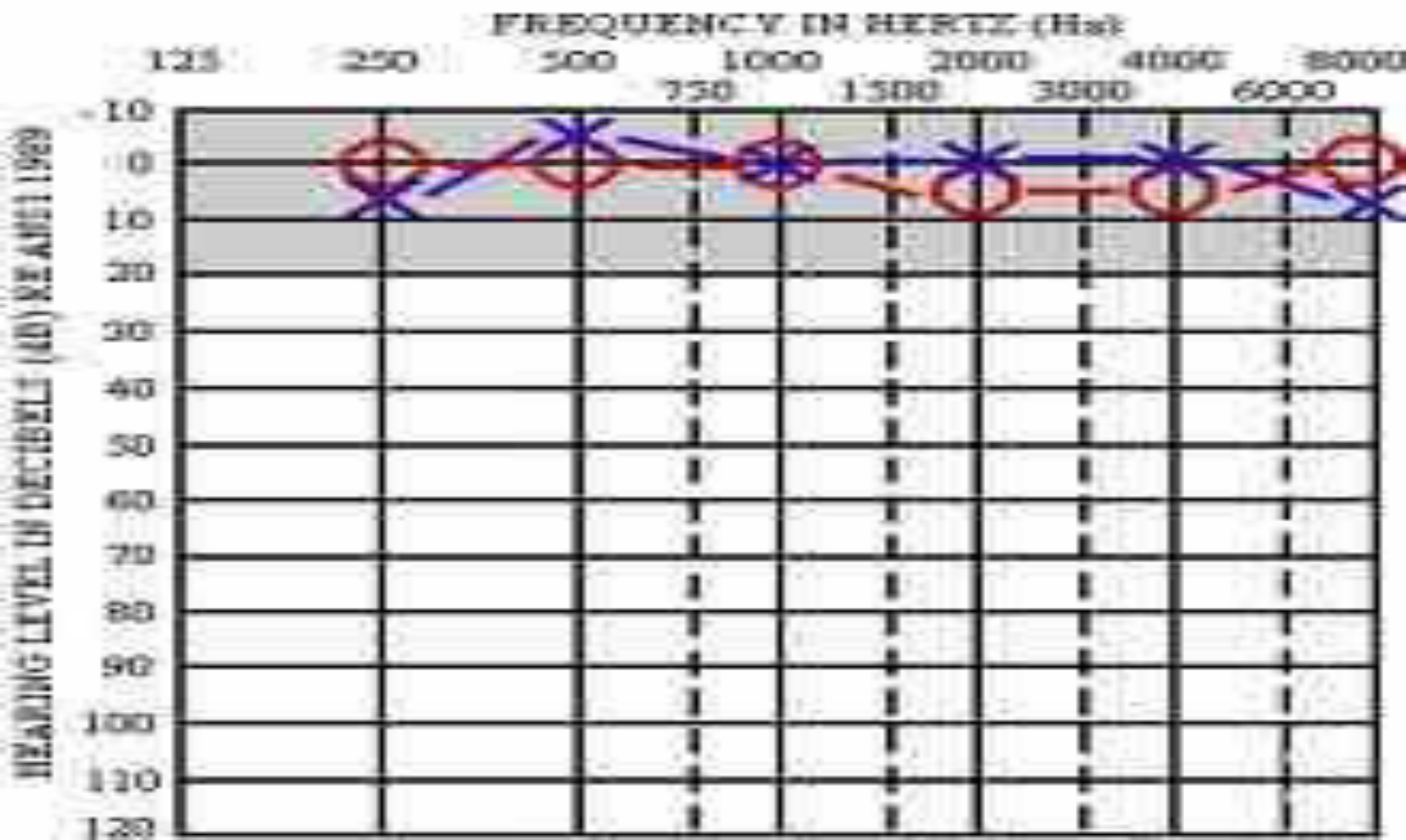
Portable PTA & Tympanometer



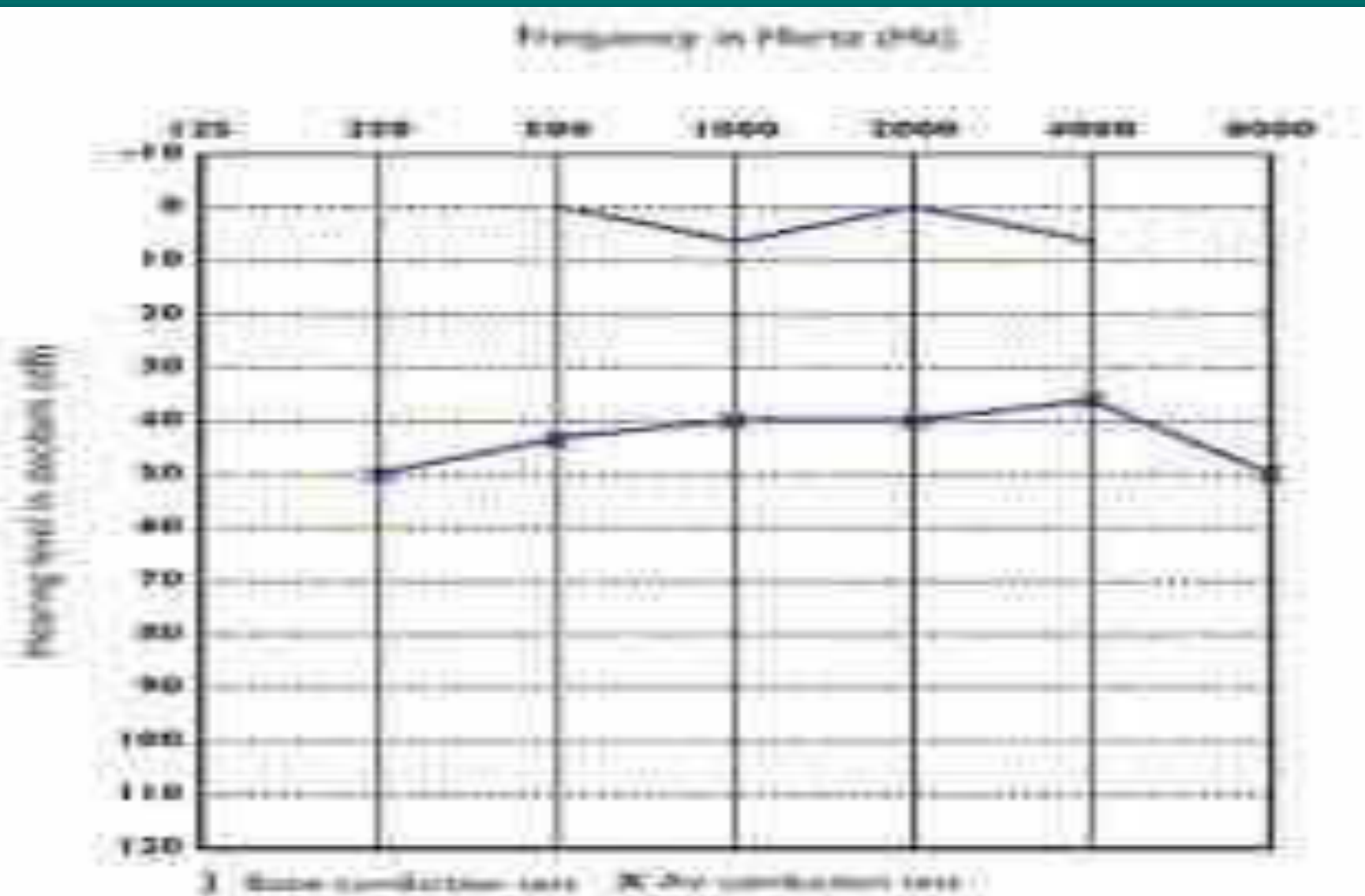
Pure Tone Audiometer (Cont.)



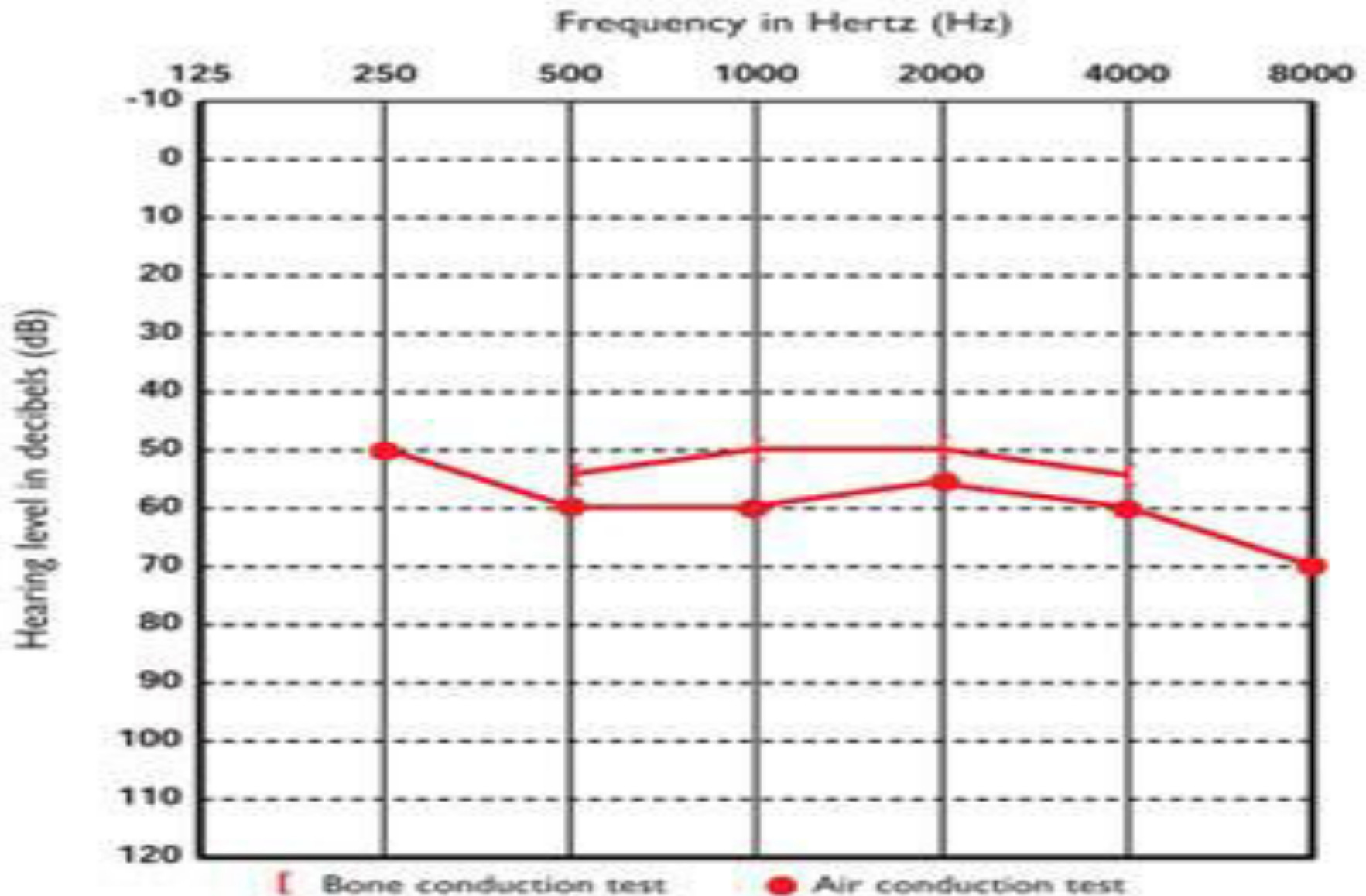
Normal Audiogram



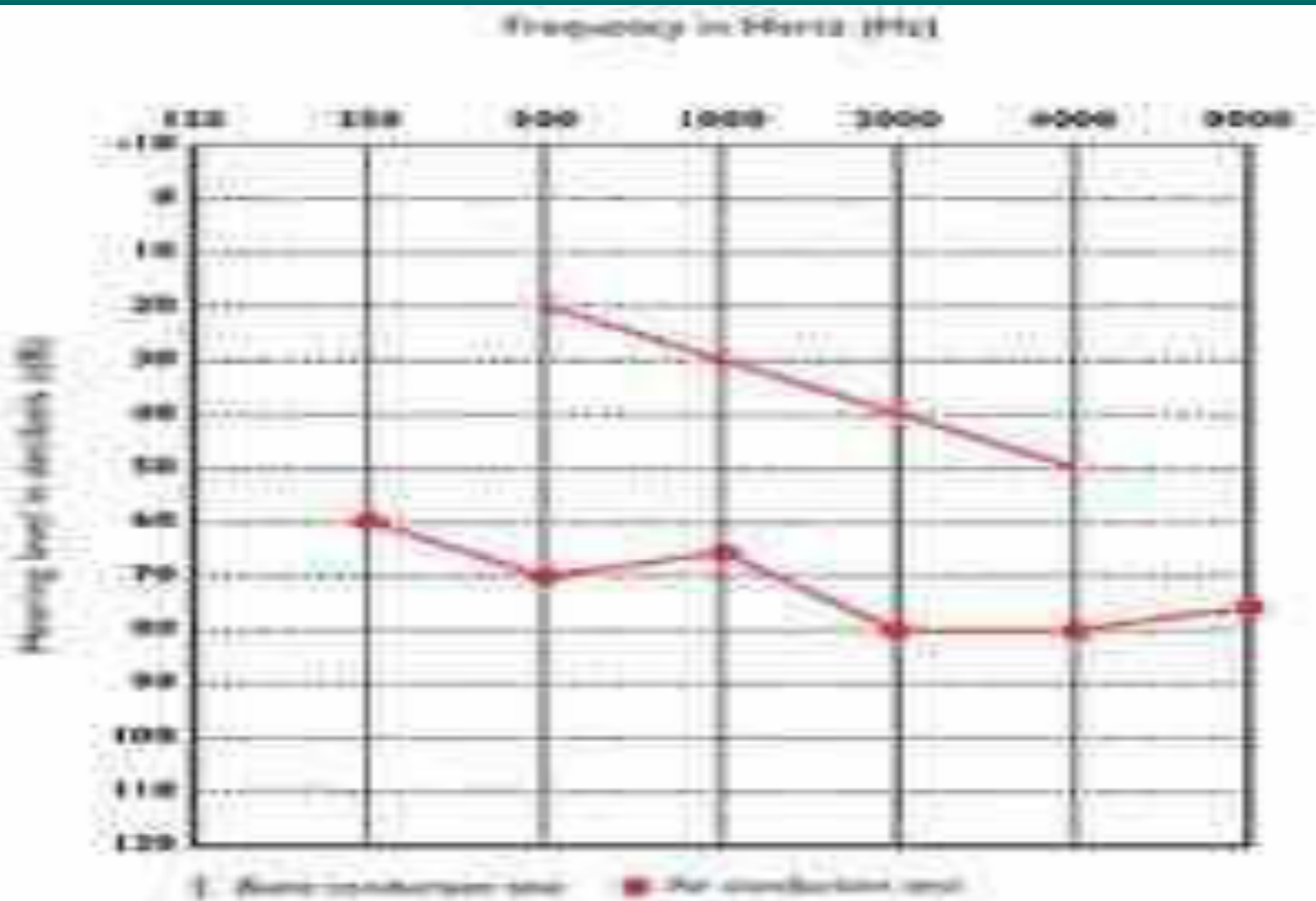
Conductive Hearing Loss



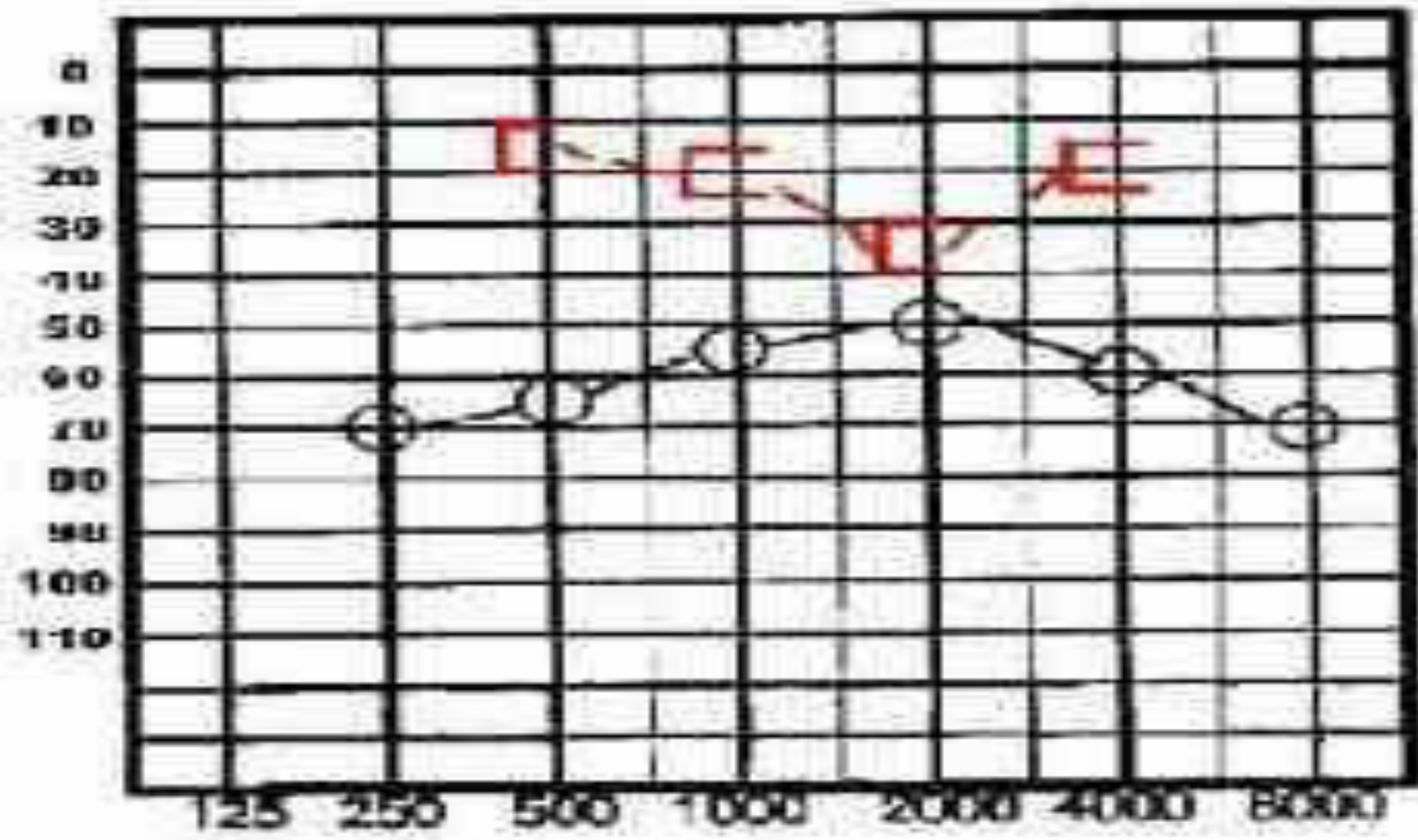
Sensory Neural Hearing Loss



Mixed Hearing Loss



Charhart's notch



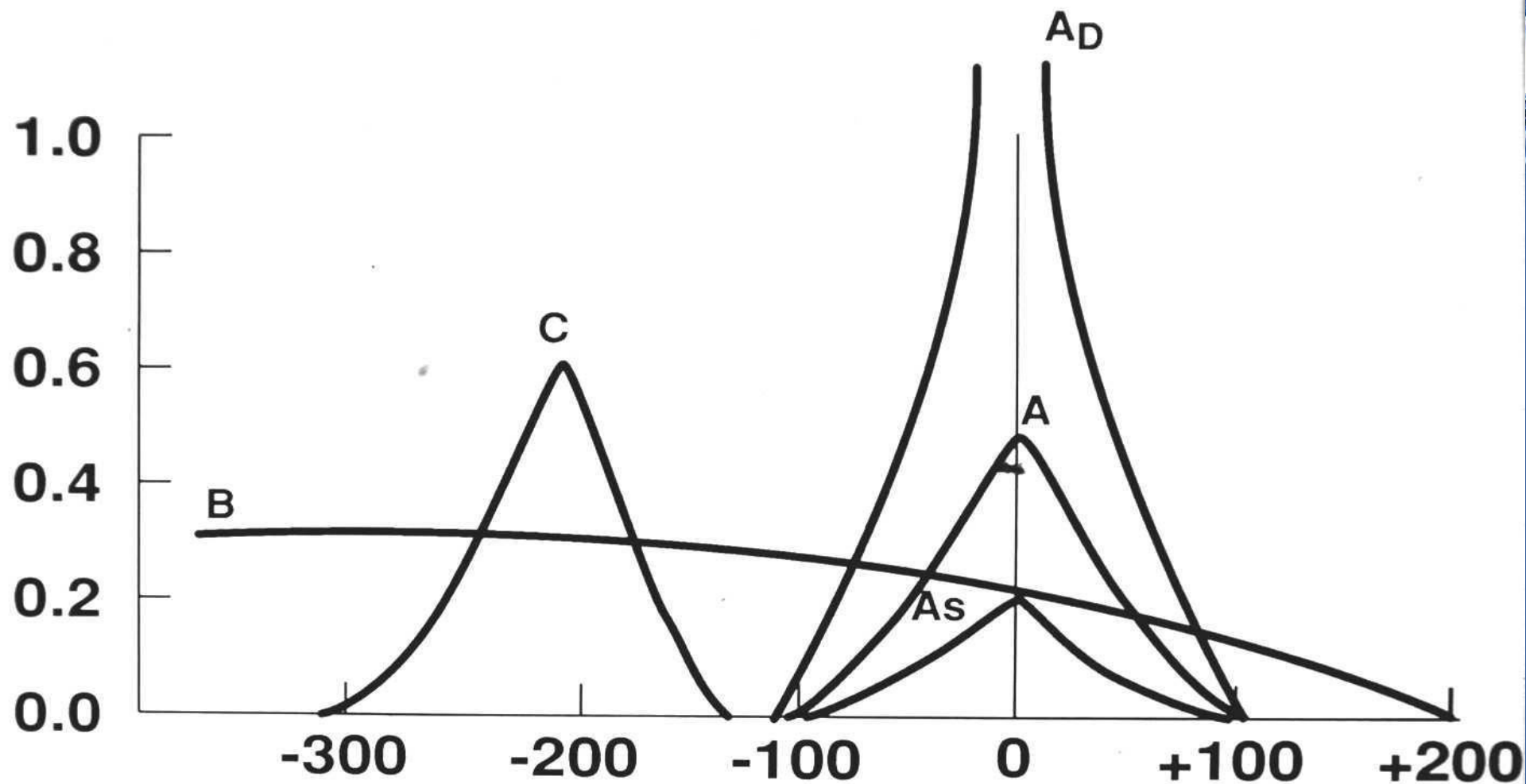
Objective Audiometry

- Where the responses are automatically recorded.
- Impedance audiometry.
 - i. Tympanogram is the graphic representation of the relative compliance and impedance of the tympano-ossicular system with air pressure changes.
 - ii. Applied importance- 4 classical tracings.

Impedance Audiometry

- **Type A:** Normal tympanogram (Otosclerosis)
- **Type B:** Flat or dome shaped Graph (OME)
- **Type C:** Maximum compliance at negative pressure (Eustachian tube dysfunction)
- **Type D:** Increased compliance at normal pressure (Ossicular chain disruption)

Impedance Audiogram



THANK
YOU

A 3D graphic of the words 'THANK YOU' in a bold, blue, sans-serif font. The letters are thick and have a slight shadow, giving them a three-dimensional appearance. They are set against a black rectangular background that is tilted slightly to the right. The overall style is clean and modern.

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