Introduction on audiometric device used in hearing testing

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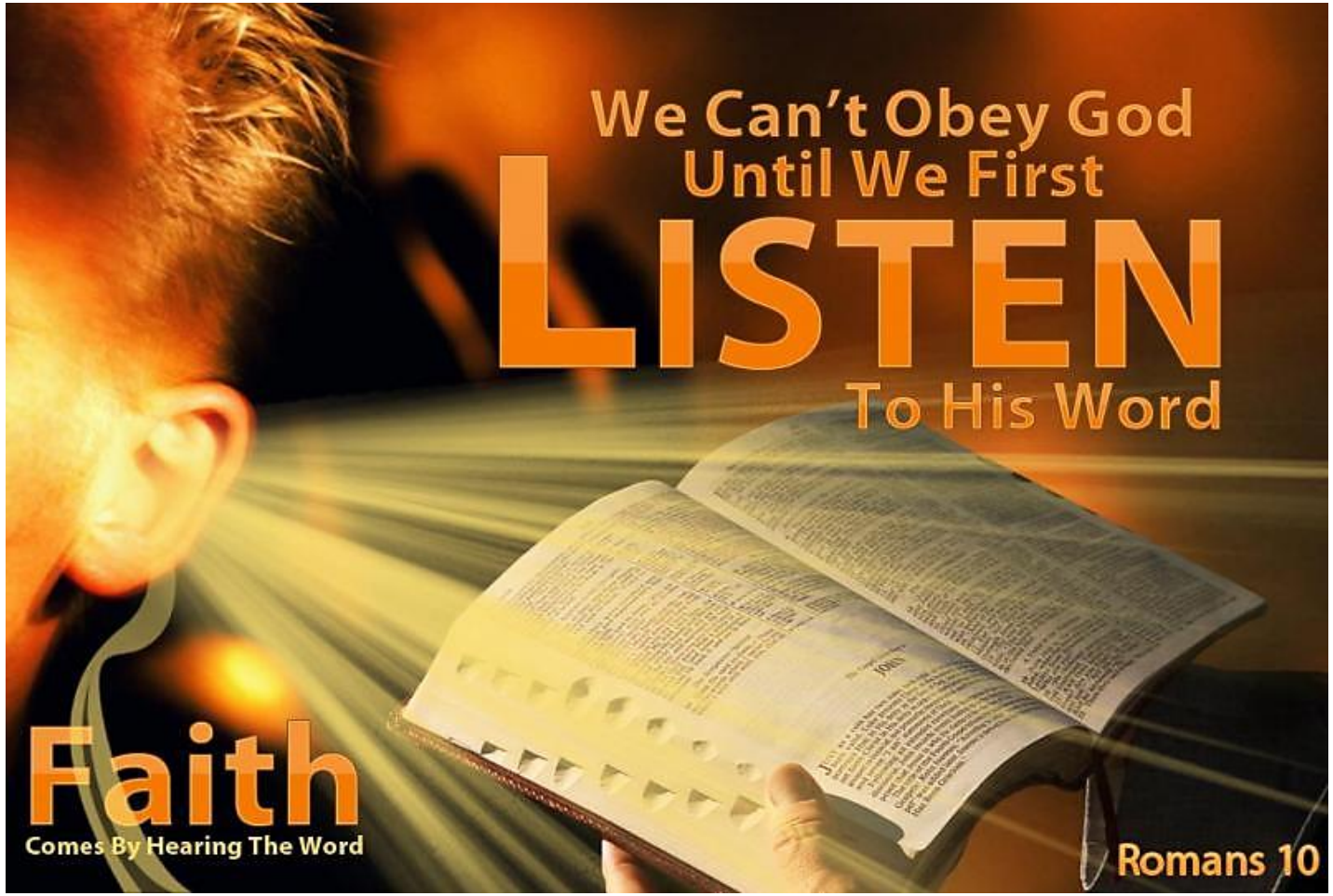
Agenda

- About hearing test
- How we hear
- Anatomy
- Hearing test device introduction
- Q&A

About Hearing Loss



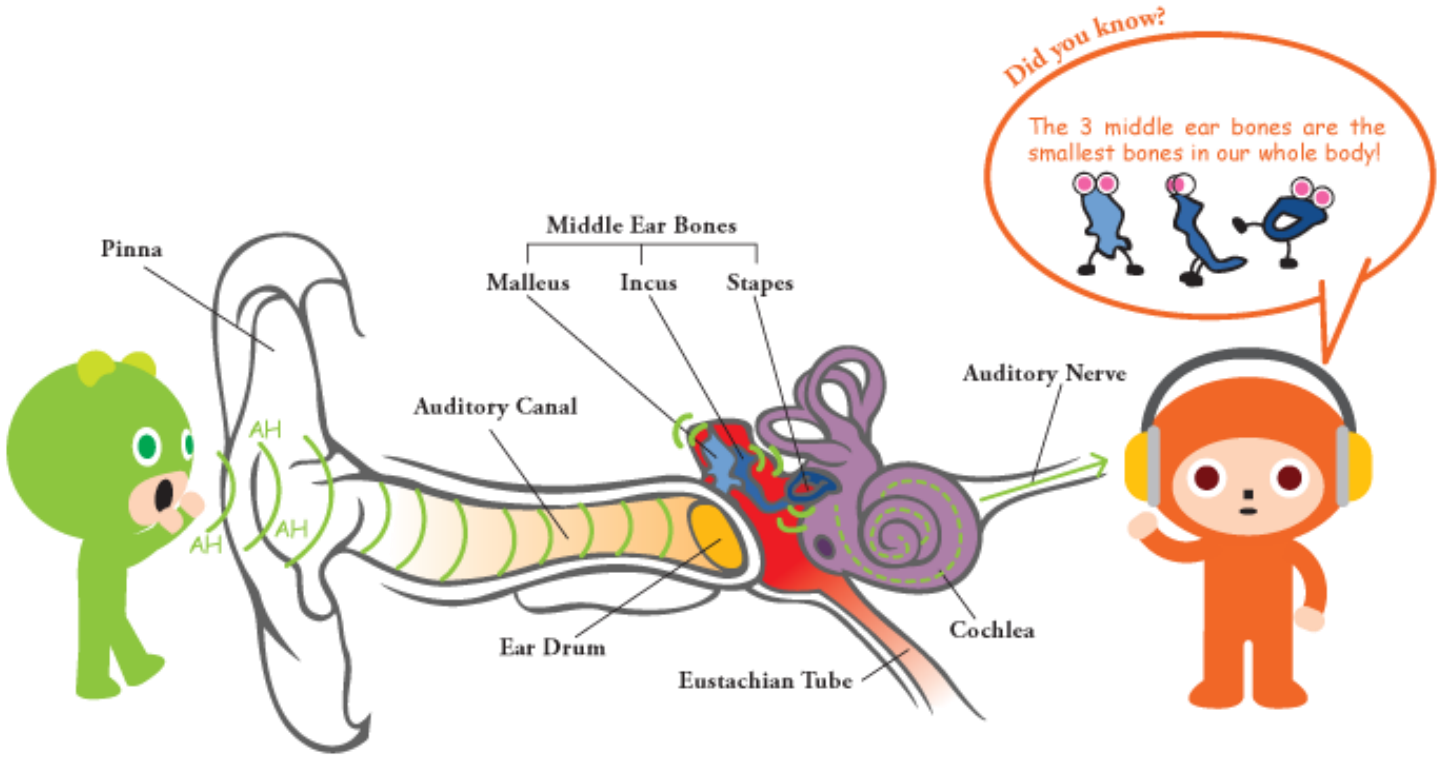
Key facts

- Over **5%** of the world's population – **360** million people – has disabling hearing loss (**328** million adults and **32** million children).
- Hearing loss may result from genetic causes, complications at birth, certain infectious diseases, chronic ear infections, the use of particular drugs, exposure to excessive noise and ageing.
- Approximately one-third of people over 65 years of age are affected by disabling hearing loss.
- Around **50%** of all cases of hearing loss are avoidable through primary prevention.

Data source: WHO official website

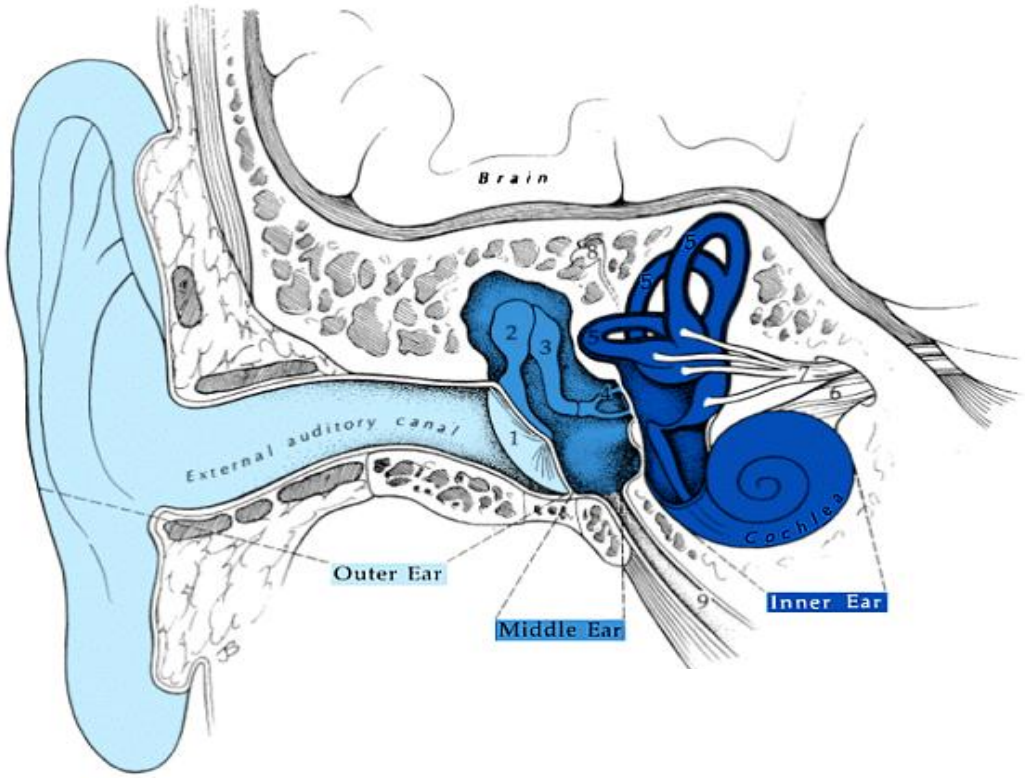
Hearing is one of the most crucial means of survival in the animal world

How we hear

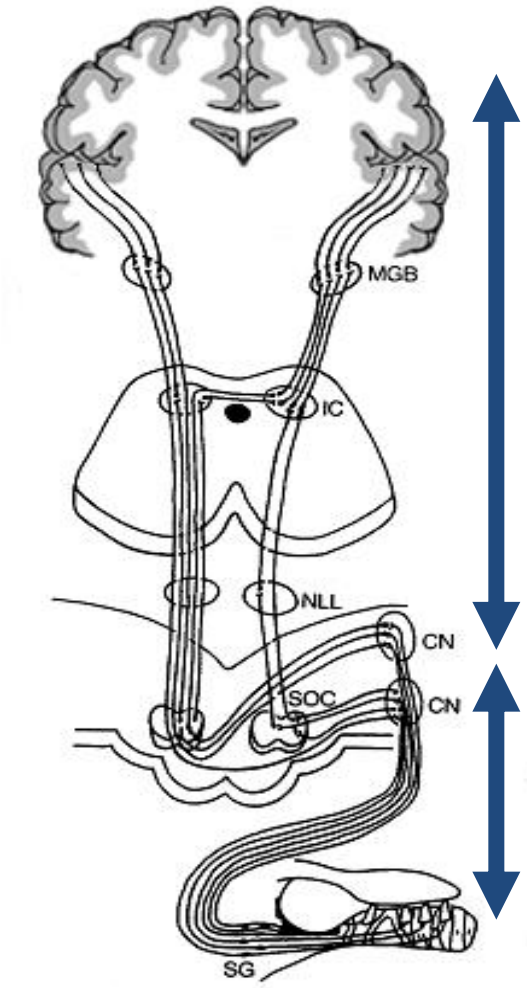


- Sound is a kind of vibration
- Sound waves are collected by pinna and enter your ear canal, travel through the ear canal to your eardrum
- Your eardrum vibrates with the incoming sound and send the vibrations to three tiny bones in your middle ear.
- The bones in the middle ear amplify or limited the sound vibration to your inner ear(cochlea). The sound vibrations activate tiny hair cells in the inner ear. Which in turn release neurochemical messengers
- Your auditory nerve carries this electrical signal to the brain which translate it into a sound you can understand

Anatomy



Peripheral system



Central system

Auditory Cortex

Peripheral

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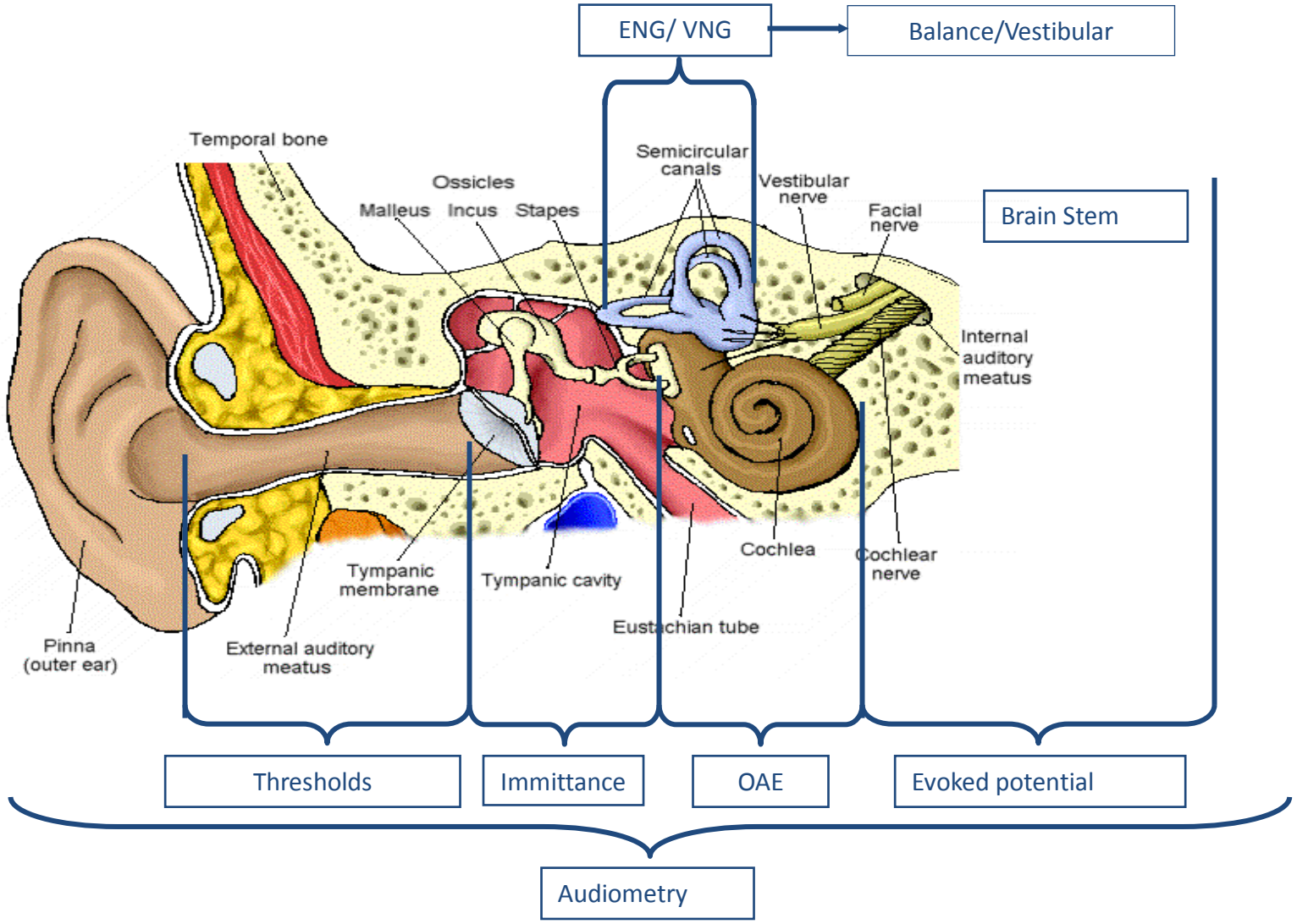
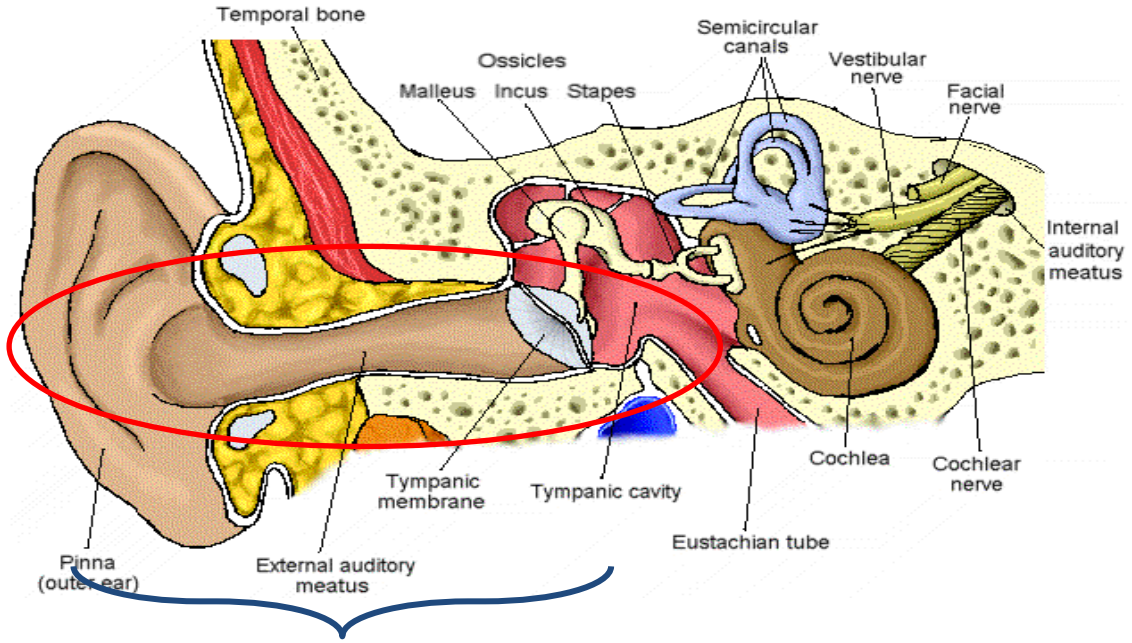
Product Group

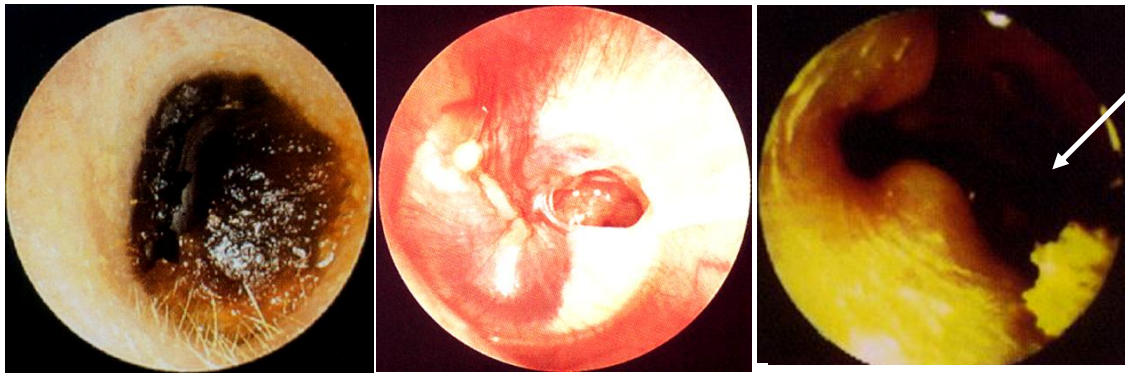


Product group

- Hearing assessment
  - Otoscopy
  - Audiometry
  - Immittance
  - OAE
  - AEP(Evoked potential)
- Screening
  - OAE
  - ABR
- Balance
  - VNG
  - ENG
- Fitting
  - Audiometry
  - PMM
  - RECD

Otoscopy

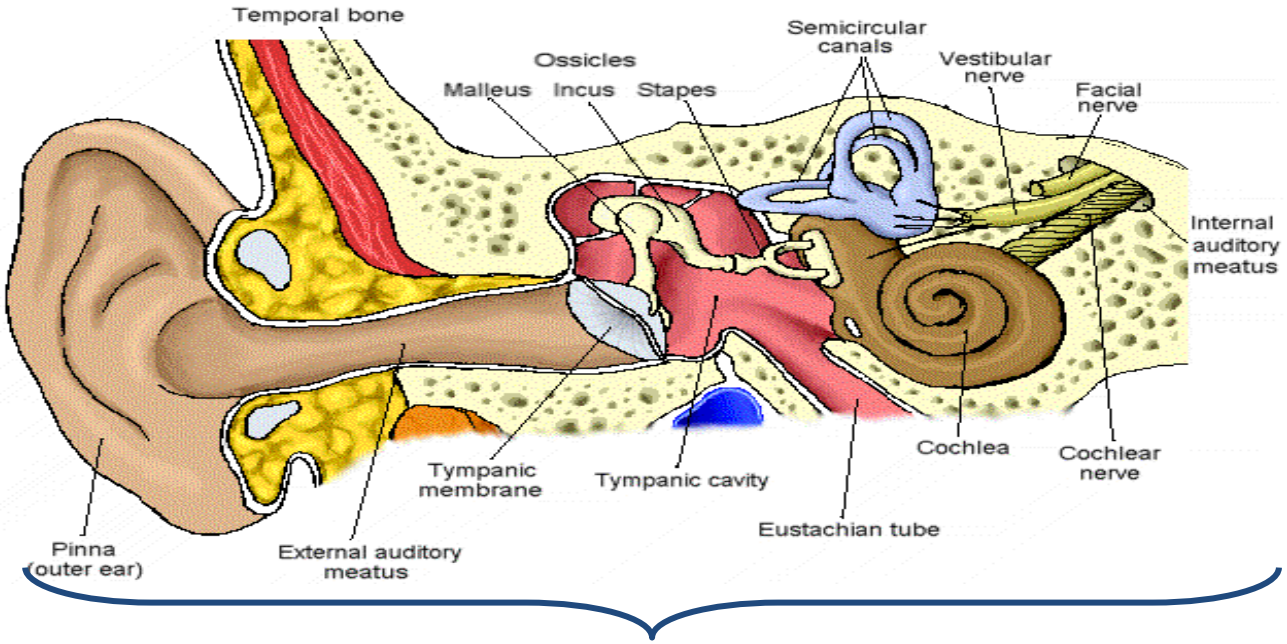


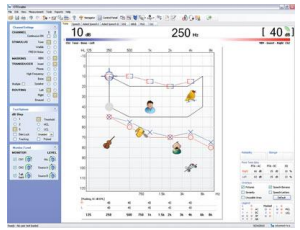


Impacted wax Perforation Exostosis

Audiometry

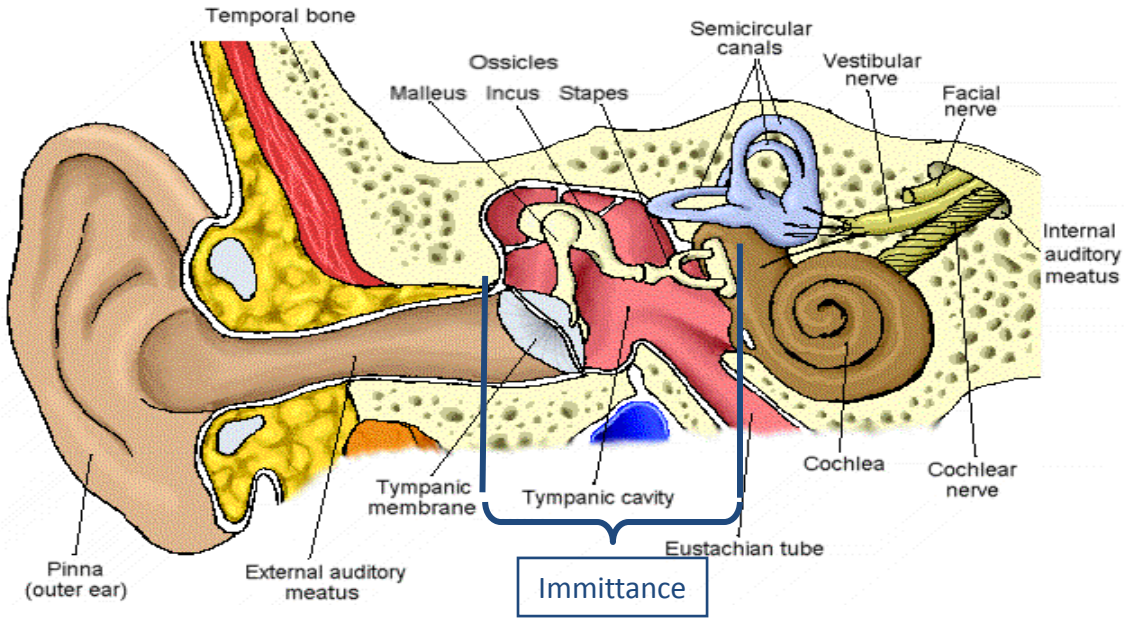
- Hearing Assessment

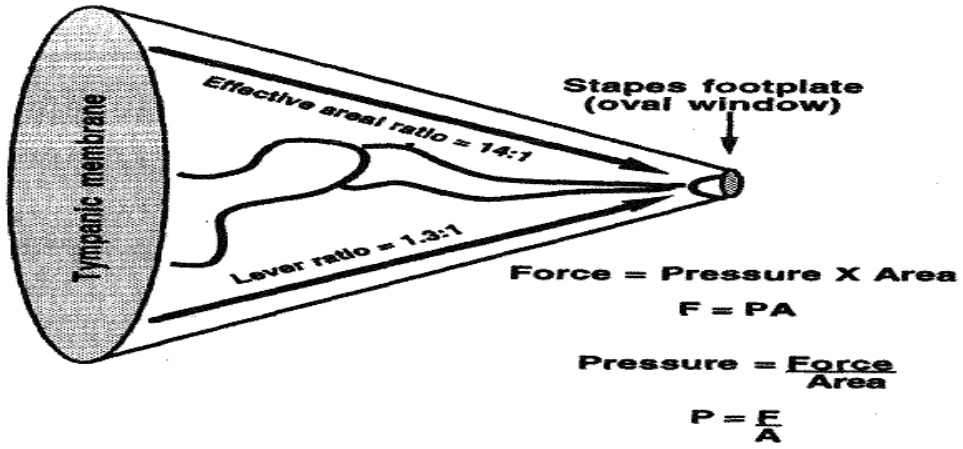




- Subjective testing
- Different kind transducers (Headset/Bone/ Insert Phone/Freefield Speaker)
- Different kind signals(Pure tone, Warble, WN,NBN, speech)
- The different scale – hearing level

Immittance





Getting sound into a different medium

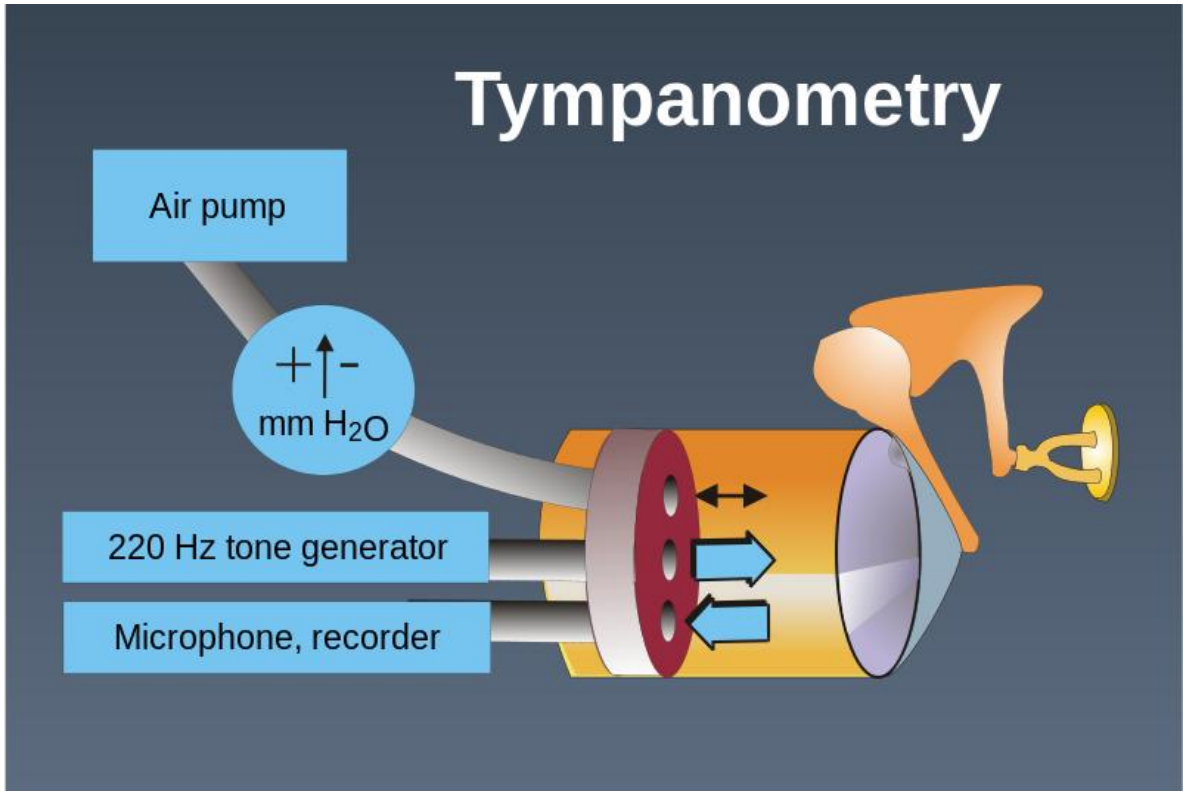
Force is collected over a larger area and focused on a smaller area

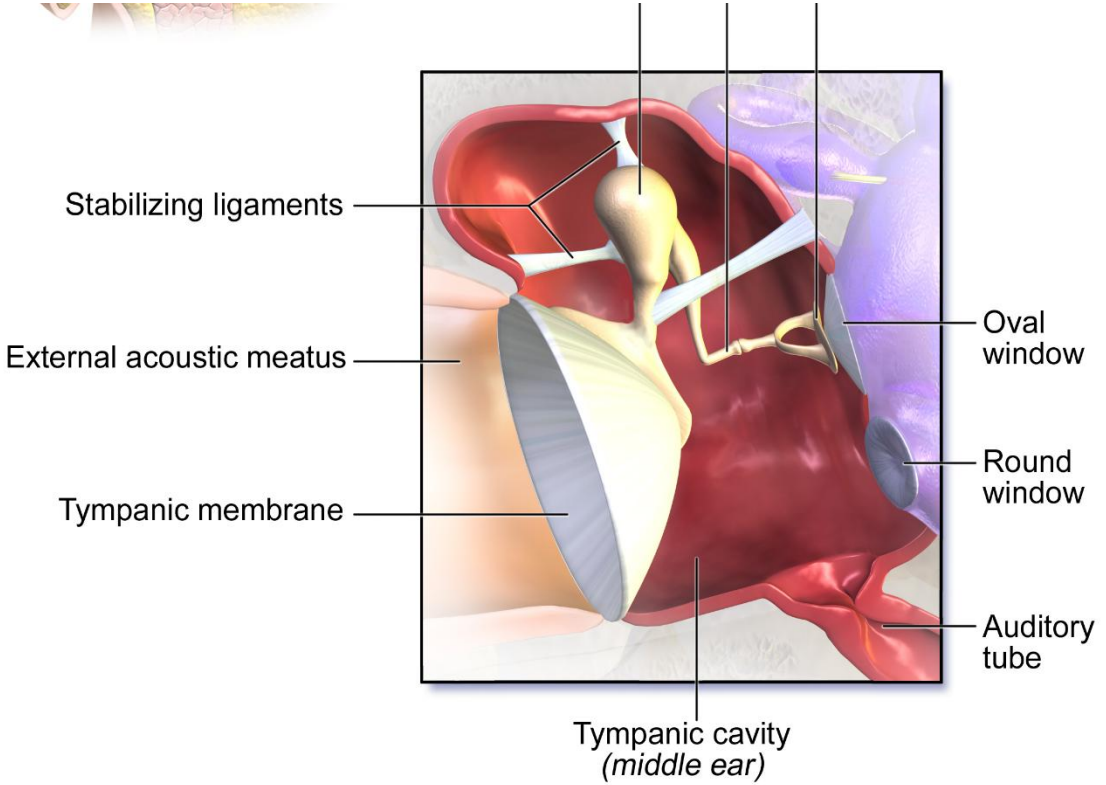
Tympanic cavity testing

Acoustic reflex testing

auditory tube testing

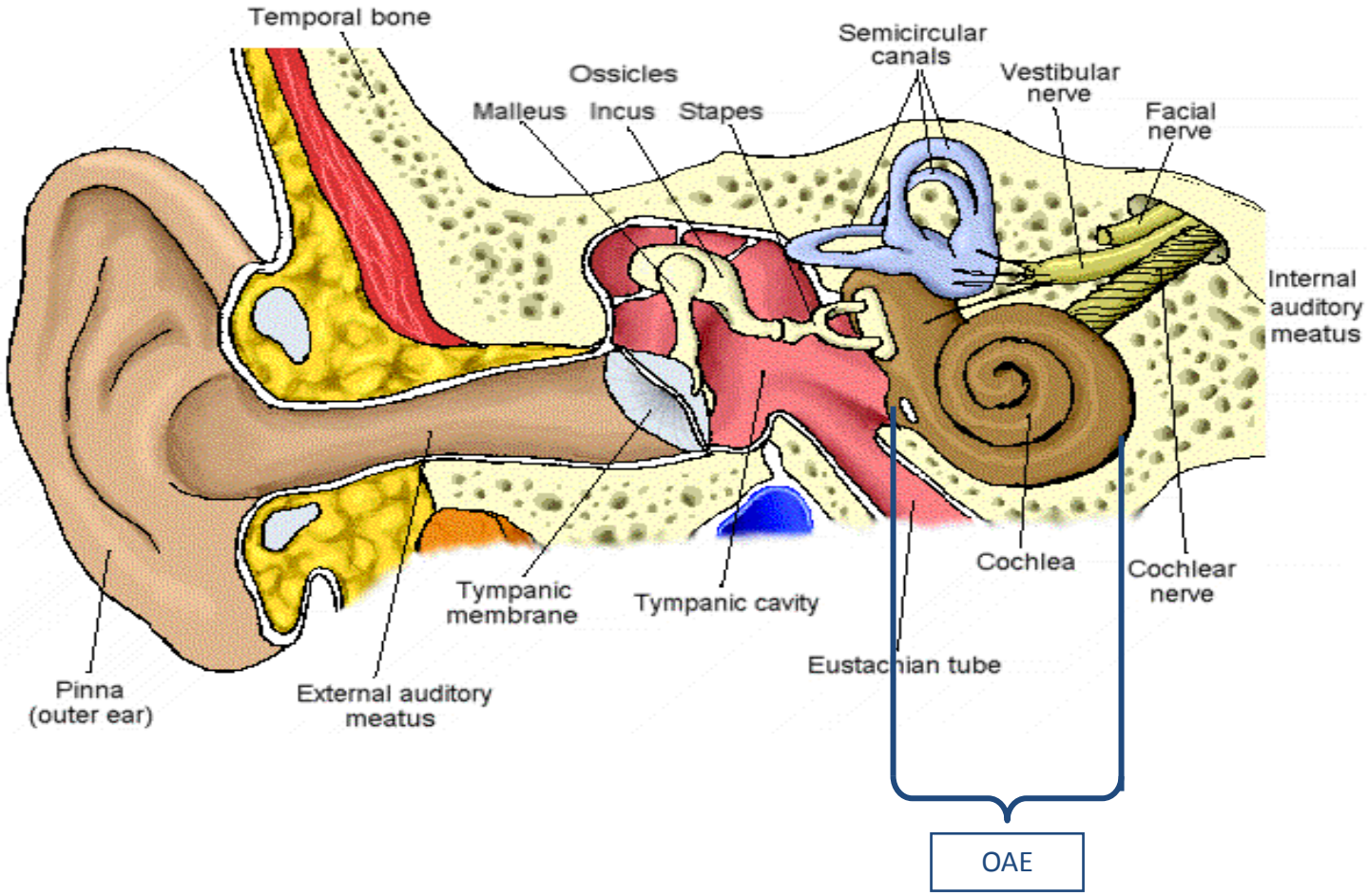
Immittance


Tympanometry
Air pump
+ ↑ -
mm H_2O
220 Hz tone generator
Microphone, recorder

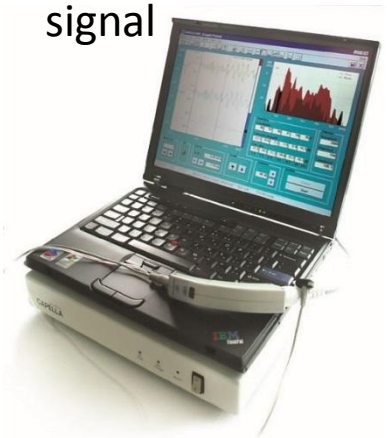

Stabilizing ligaments
External acoustic meatus
Tympanic membrane
Oval window
Round window
Auditory tube
Tympanic cavity
(middle ear)

OAE

Otoacoustic Emission

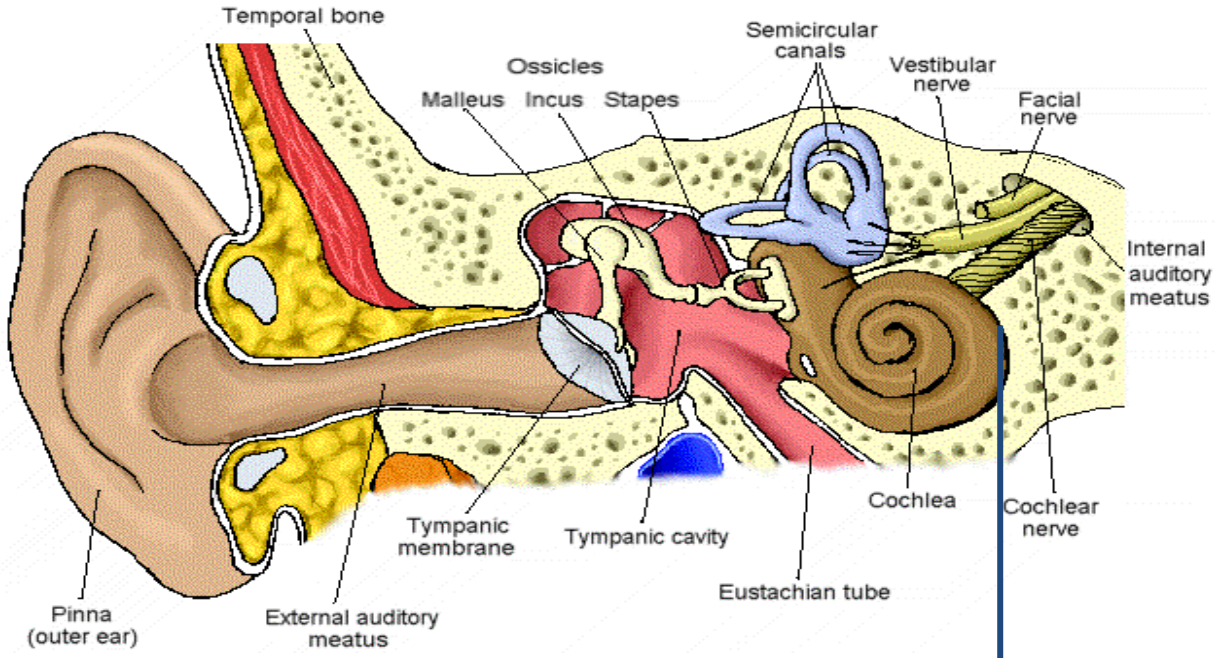


- An otoacoustic emission (OAE) is a sound which is generated from within the inner ear
- Studies have shown that OAEs disappear after the inner ear has been damaged, so OAEs are often used in the laboratory and the clinic as a measure of inner ear health.
- OAEs are considered to be related to the amplification function of the cochlea
- Given a stimulus to the cochlea, and the sensitive microphone will collect the OAE's signal



Evoked potential

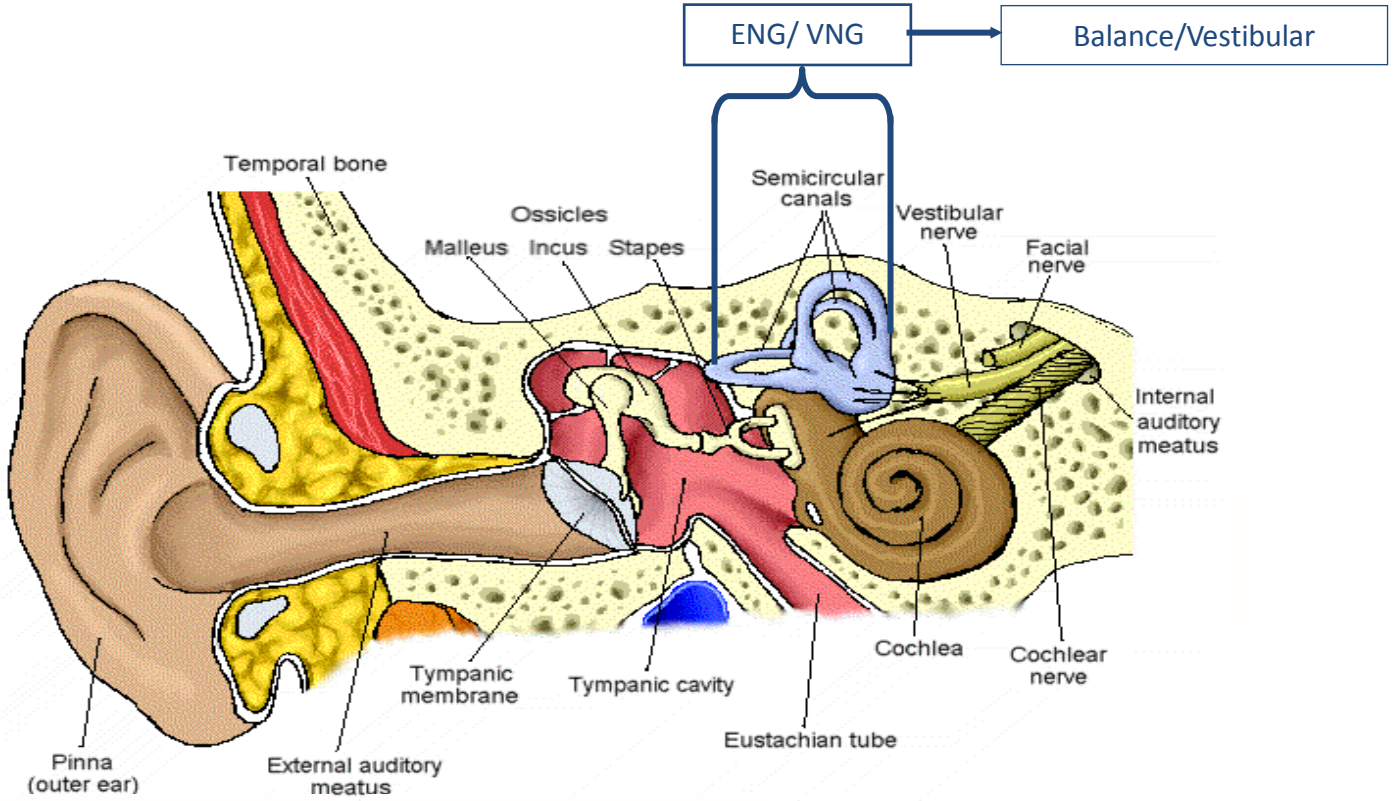
AEP



Evoked potential

- The auditory brainstem response (ABR) is an auditory evoked potential extracted from ongoing electrical activity in the brain and recorded via electrodes placed on the scalp.
- The resulting recording is a series of vertex positive waves of which I through V are evaluated
- Wave I through III – generated by the auditory branch of cranial nerve VIII and lower brainstem
- Wave IV and V – generated by the upper brainstem
- ECohG- Meniere disease
- ASSR
- VEMP

Balance

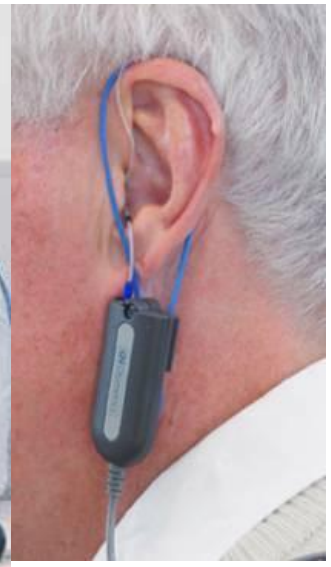


- **Videonystagmography (VNG)** is a technology for testing inner ear and central motor functions, a process known as vestibular assessment
- VNG can determine whether dizziness is caused by inner ear disease, particularly benign paroxysmal positional vertigo (BPPV), as opposed to some other cause such as low blood pressure or anxiety
- Otolith nystagmus
- The device is tracking the nystagmus

Screening

- 3 of 1000 babies are born with sensorineural hearing loss
- 2 in 1000 children will aquire sensorineural hearing loss in early childhood
- OAE
- AABR

Fitting



- It is a total solution for Fitting practitioner
- Audiometry+ Simulator +REM+RECD+hearing aids testing+hearing aids programe
- REM(rear ear measurement
- RECD(Real Ear Coupler Difference)

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