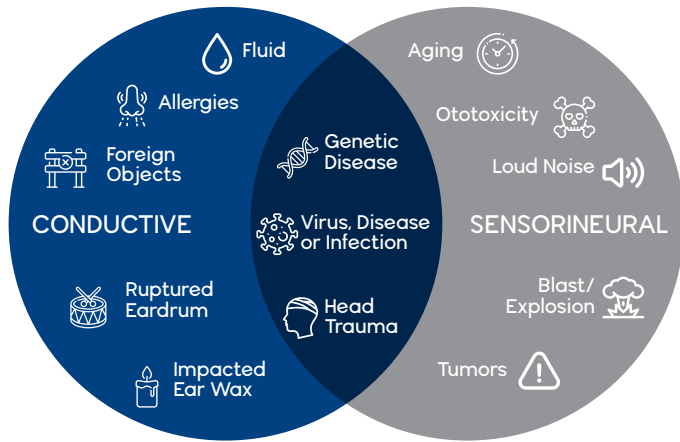


Types of Hearing Loss

Hearing loss is a result of a compromised auditory pathway anywhere in the outer/middle/inner ear or auditory nerve. The three types of hearing loss are sensorineural, conductive or mixed (a mixture of the two). Below are example aetiologies and audiograms

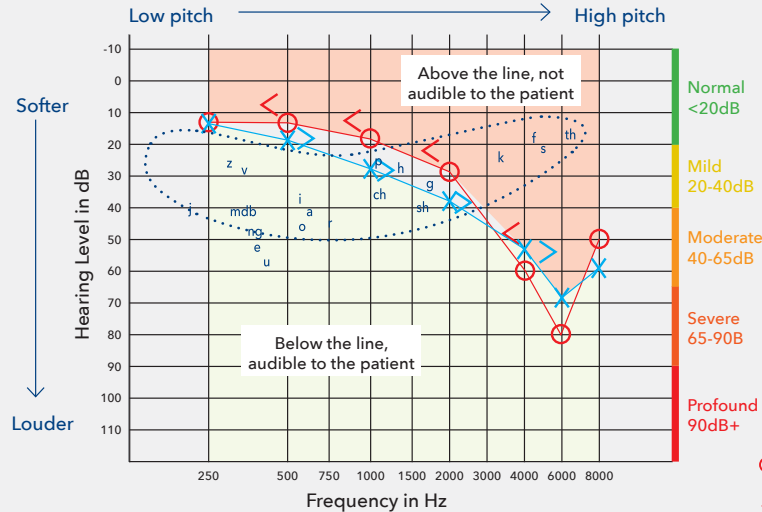


Understanding Audiology Reports

What is an audiogram?

An audiogram is a graphical representation of a person's hearing ability. It is a diagnostic tool used to illustrate how well an individual can hear different frequencies and intensities of sound.

Figure 1: Mild sloping to severe high frequency sensorineural hearing loss bilaterally



Components of an audiogram

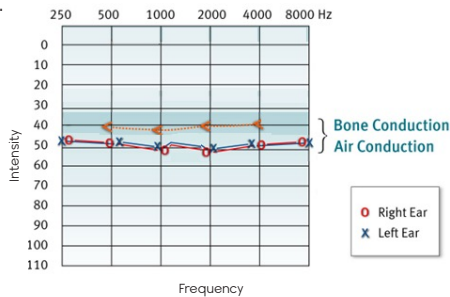
Frequency
The horizontal axis represents the frequency, or pitch, measured in Hertz (Hz), with the low pitch on the left to the high pitch on the right. Each vertical line represents a different frequency being tested.

Intensity
The vertical axis represents the intensity (loudness) of tones that are presented during a hearing test, measured in decibels(dB). The softest sounds are at the top of the chart and the loudest sounds are at the bottom.

- Right ear air conduction
- ✕ Left ear air conduction
- < Right bone conduction
- > Left bone conduction

Sensorineural hearing loss

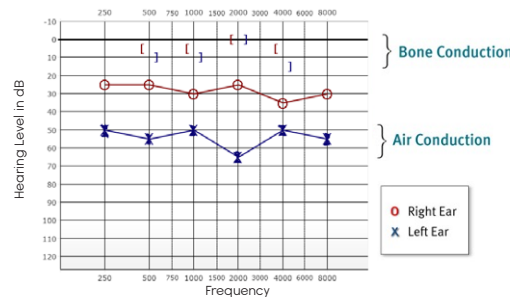
Sensorineural hearing loss occurs in the inner ear when the hair cells in the cochlea are damaged. This can be caused by, but not limited to, age, noise damage, ototoxic medication. Hearing devices are likely to be appropriate in these circumstances as the hearing cannot be regenerated. Success of hearing aid amplification is determined by the individual's speech discrimination of the auditory nerve.



Moderate sensorineural hearing loss bilaterally

Conductive hearing loss

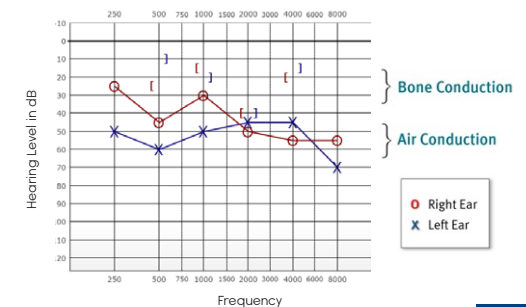
Conductive hearing loss is when something physical in the outer or middle ear is preventing the sound from reaching the inner ear. This could be an obstruction such as earwax or malformation of the outer ear; fluid or tumour in the middle ear; damaged ossicles (middle ear bones) or a perforation of the tympanic membrane (eardrum). Conductive hearing losses can usually be treated medically or surgically.



Mild conductive hearing loss in the right ear and a moderate conductive hearing loss in the left ear.

Mixed hearing loss

Mixed hearing loss is a mixture of both a conductive and sensorineural hearing loss. ie. there is damage to both the outer/middle and inner ear. The outer and/or middle ear cannot conduct the sound properly to the inner ear and the inner ear cannot process the sound to be sent to the brain. Mixed hearing losses can be treated either medically, surgically and/or with amplification.



Mild to moderate mixed hearing loss in the right ear and a moderate-severe mixed hearing loss in the left ear.



Tympanometry

Tympanometry is an essential component of a hearing evaluation. It assesses the status of the middle ear and mobility of the eardrum and middle ear bones. This quick test is performed by inserting a probe into the ear canal that changes the air pressure in the ear, produces a pure tone and measures the middle ear's response. Results are displayed graphically on a tympanogram.

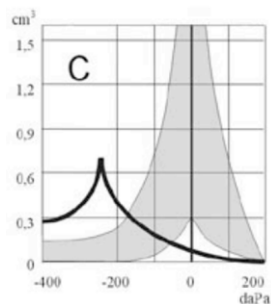
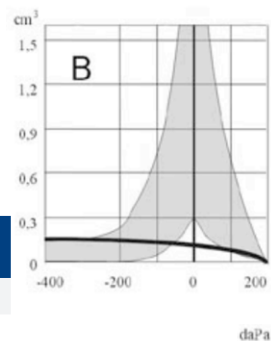
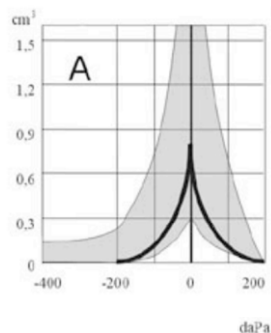
Type A: Normal ear

In a normal ear compliance of the eardrum is optimal and the pressure in the ear canal and middle ear are equal, indicating there is air in the middle ear space.

The peak of a Type A tympanogram falls within 0.3 to 1.6cc compliance and -100 to +100daPa pressure.

A **deep** Type A tympanogram has a peak greater than 1.6cc and indicates a highly mobile middle ear system, often from a previous TM perforation or an ossicular chain dislocation.

A **shallow** Type A tympanogram has a peak less than 0.3cc and indicates a stiffened middle ear system, often due to otosclerosis.



Type B: Middle ear pathology

When a middle ear is either full of fluid or the eardrum has a hole in it, the tympanic membrane will not vibrate well in response to sounds, no matter what pressure is applied. Hence the recording is flat. The size of the ear canal volume will then give a strong indication of the condition. Clinical examination is important to determine the cause.

Ear Canal Volume	Likely cause
Normal	Otitis media with effusion (middle ear fluid)
Low	Wax Occlusion
High	Perforated eardrum (TM) or patent grommet.

Type C: Eustachian Tube Dysfunction

If the Eustachian Tube is not functioning normally / is congested it will create negative pressure in the middle ear. i.e. Less than -100daPa. This will normally resolve within 6-8 weeks, however if persistent, retracted eardrums with subsequent complications may occur.

When to refer to an Audiologist

Sudden Hearing Loss:

Rapid loss in hearing abilities.

Asymmetrical Hearing Loss:

Hearing is much better in one ear.

Speech Understanding Difficulty:

Especially in noisy environments.

Unilateral Hearing Loss:

Blocked /full sensation; facial numbness; tinnitus; hearing loss only in one ear.

Childhood developmental delays:

Speech development concerns or ongoing ear infections.

Sudden Sensorineural Hearing Loss (SSNHL)

This type of hearing loss is considered a medical emergency where the aetiology is unknown and patients experience a very sudden onset of hearing loss across a 24-72 hour time period. SSNHL can be accompanied with complaints of

- Aural fullness / blocked ear
- Tinnitus / ringing in the ear
- Nausea / vomiting
- Vertigo / dizziness / feeling of imbalance
- Distortion of sounds.

This type of sudden loss is best treated quickly and closer to the time of the incident. Steroids such as prednisolone have been shown to increase the probability of hearing recovery if administered within the first 5-7 days.² Continued monitoring of a patient's hearing is required two weeks after the incident and completed course of steroids where recovery is most likely to occur if successful. However, some patients may show a subtle improvement over a 12 month period.³

² Wilson, W.R., Byl, F.M., Laird, N. (1980). The efficacy of steroids in the treatment of idiopathic sudden hearing loss. A double-blind clinical study. Archives of Otolaryngology, 106 (12), 772-776

³ Burton, M., & Harvey, Y. (2007). Idiopathic sudden sensorineural hearing loss. Scott-Brown's Otolaryngology, (131)

Effects of an untreated hearing loss

- Impacts on social, emotional, psychological and physical wellbeing
- Loss of confidence and self-esteem
- Embarrassment
- Feelings of exclusion; isolation; loneliness and depression
- Frustration; irritability; tiredness
- Links to early cognitive decline
- a higher risk of falls.

The benefits of wearing hearing aids

- Increased confidence
- Enhanced social activity
- Improved interpersonal relationships
- Stimulation of the auditory nerve to help maintain long term clarity; speech understanding & communication
- Improved overall health and wellbeing
- Lower incidence of depression
- Feeling less tired
- Improved quality of life
- Lower risk of falls.

Why Victorian Hearing?

- ✓ Independent, locally owned and operated
- ✓ Only employs university trained audiologists
- ✓ Full range of audiological services
- ✓ Government accredited to provide fully-subsidised services to pensioners
- ✓ Services available for children 8 months and older
- ✓ Client choice of hearing solution - not aligned with any one manufacturer
- ✓ Client focused - ZERO commission for staff and NO sales targets
- ✓ Clinician Continuity - Client can see the same audiologist every time they visit
- ✓ Victorian Cochlear Implant Program partner
- ✓ 10 locations around the Melbourne region including Geelong and Mornington

