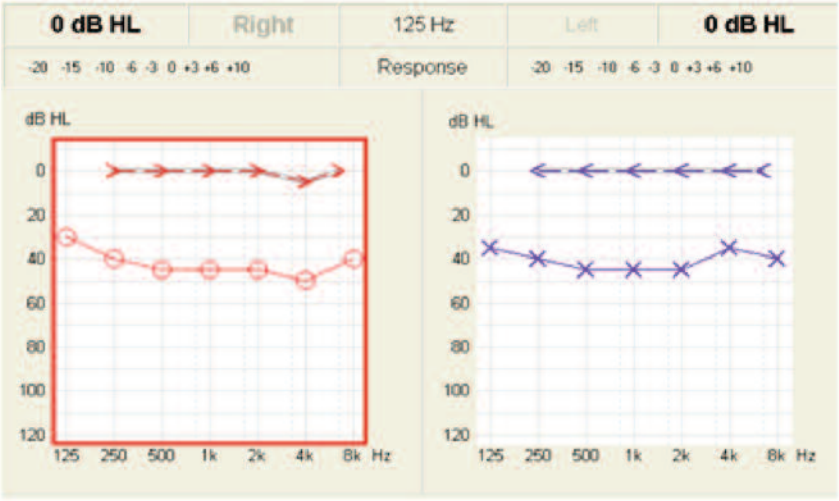
Conductive Hearing Loss



Conductive hearing loss occurs when the outer or middle ear is dysplastic or does not work properly. Consequently, sound waves cannot be conducted to the inner ear. In case of a temporary dysfunction, it is often possible to correct conductive hearing loss with surgery and/or treatment with medication. Common causes of conductive hearing loss include:

- Injury of the outer ear itself
- Blockage of the ear canal due to cerumen or other small objects like food, beads or insects
- Infections of the outer or middle ear, often with effusion
- Perforation of the tympanic membrane
- Congenital deformities (e.g., Down Syndrome, Franceschetti Syndrome, Treacher Collins Syndrome or Achondroplasia (dwarfism)

The audiogram above demonstrates conductive hearing loss. In this example, the inner ear works properly but something inhibits sound getting through the outer/middle ear to the inner ear.

Particularly when mild to moderate conductive hearing loss is detected in children, it is often caused or aggravated by middle ear inflammations. Such conductive hearing loss can usually be treated by medication or a small surgery. However, if an inflammation/effusion of the middle ear becomes a chronic process and lasts for more than just a few days or weeks, hearing instruments may be prescribed to avoid delays in the child's language development.

The hearing loss displayed above ranges from 30 to 50 dB HL in the right ear and between 35 and 45 dB in the left ear. This individual would only be able to perceive fragments of normal speech, which has a loudness level of about 65 dB. The difference of about 45 dB must be amplified. The necessary amplification is usually provided by:

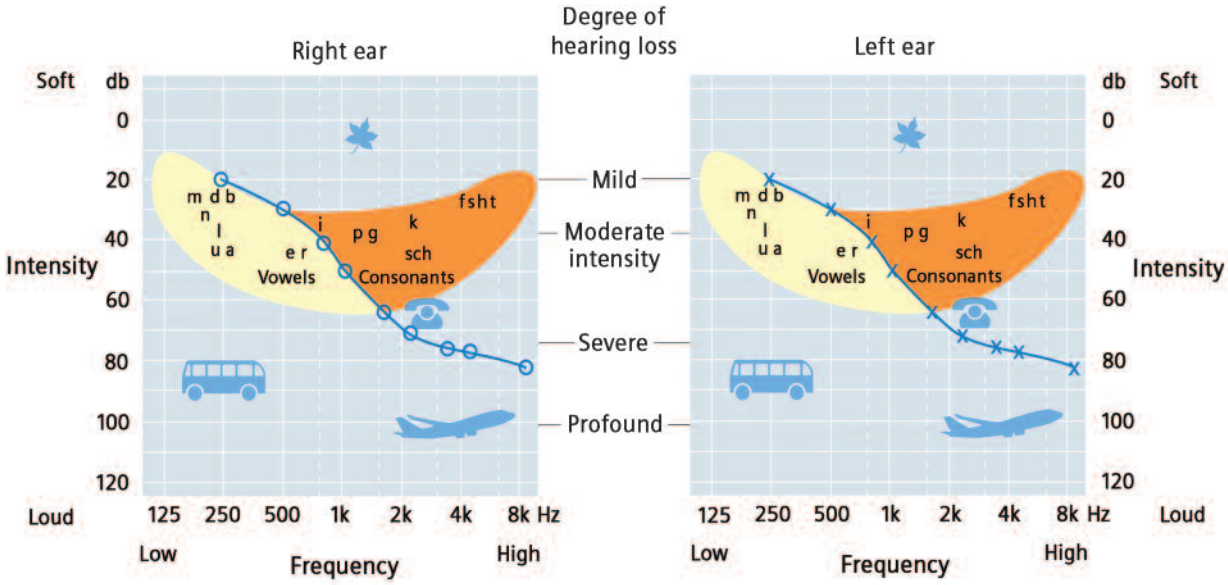
- Bone conduction hearing instruments: Behind-the-ear shell with a vibrating transducer, placed on the skull using a headband or retainer

- Bone-anchored hearing instruments: A vibrating hearing solution which is attached to the skull using a screw which is implanted behind the ear; only applicable for older children with muscular control of the head and a persisting hearing loss

- Conventional hearing instruments

If the inner ear is unimpaired, bone conduction hearing solutions do not deliver any amplification. Their task is only to make sounds audible by an adequate vibration of the skull, which transfers the sound information directly to the inner ear. Starting from there, the hearing process continues normally.

How to Read an Audiogram



Different levels of hearing loss are referred to as degrees, depending on the severity of impairment.

Degree of hearing loss	Hearing threshold (in decibels, dB)	Ability to hear speech
None	0–25 dB	No perceptible difficulty.
Mild	26–40 dB	Difficulty hearing soft speech and conversations, but can understand in quiet environments.
Moderate	41–55 dB	Difficulty understanding speech, especially in the presence of background noise. Higher volume levels are needed for hearing TV or radio.
Moderate to severe	56–70 dB	Clarity of speech is considerably affected. Speech must be loud and possible difficulty in group conversations
Severe	71–90 dB	Normal speech is inaudible. Either difficulty with loud speech or comprehension only through shouted or amplified speech.
Profound	91+ dB	Even amplified speech is unclear.

An audiogram is a chart a hearing test is marked on. The degree of hearing loss is measured in db/HL for defined key frequencies. The frequency is measured in Hertz. Curves displayed in dB HL generally describe the individual hearing threshold of a person compared to the normal hearing average, which is always related to 0 dB. Due to inter-individual differences, all thresholds up to 20 dB HL are considered as normal.

Symbols are placed on the audiogram that show the person's air conduction and bone conduction thresholds for each key frequencies. The audiogram shows the softest level at which a sound is perceived. This is also referred to as the hearing threshold. Different symbols are used to distinguish between air conduction and bone conduction measurements as well as the side the measurement refers to.

You can see the level and frequencies of different sounds in the speech-banana. Vowels are low frequency sounds with a higher volume than consonants which are soft high frequency sounds. The vowels carry the loudness impression of speech whereas the consonants carry the meaning: e.g., house or mouse.

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