

Hearing Assessment

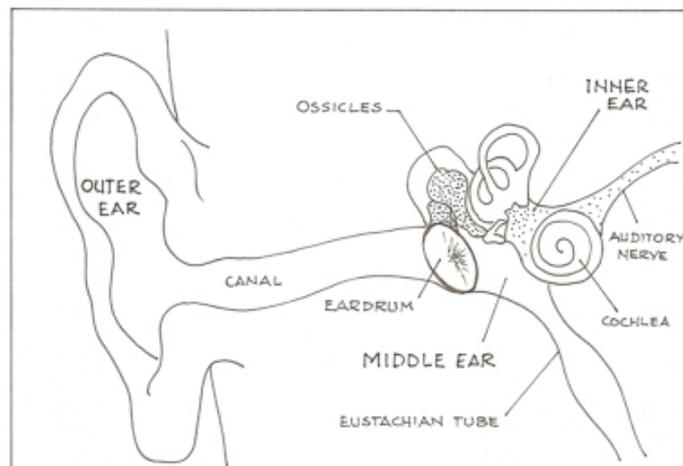
Hearing Assessment

To determine an individual's level of hearing or investigate hearing loss, an assessment needs to take place. There are several types of hearing tests that focus on different aspects of the hearing mechanism. The type of assessment you receive will depend on a number of factors:

- Your age - adult, child, new born etc
- Symptoms - sudden loss, illness, head injury etc
- Patient history - previous hearing loss, genetic disorder etc
- Reason for test - routine, exploratory, diagnostic etc

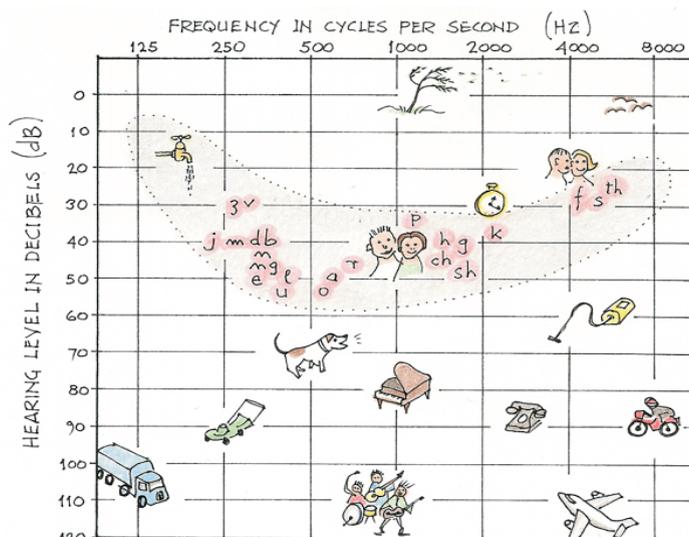


Tests can be divided into two types - screening and diagnostic. As the titles suggest, screening identifies if there is a problem, and diagnostic identifies what the problem is. Measuring auditory function can either be done subjectively (the individual gives behavioural responses to auditory stimuli given by the tester), or objectively (the individual cooperates while the tester measures physiological responses to auditory stimuli).





The diagram on the right represents an audiogram and shows the noise level and frequency of many familiar sounds. As we can see from the diagram, rock bands and jet aeroplanes are very loud, producing sounds at around the 120 decibel level, while a dripping tap and whispering is around the 20-30 decibel level. The shaded area is sometimes called the “Speech Banana”. Normally spoken speech sounds fall within the banana shaped area.

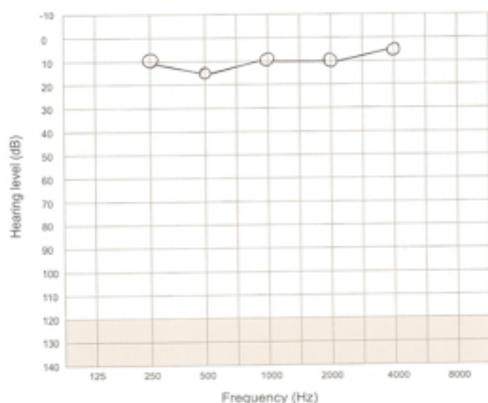


The “Speech Banana”

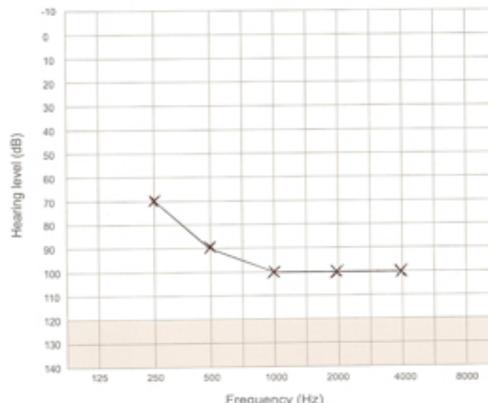
Normal conversational speech is spoken at around 40-60 decibel level, with individual sounds varying in frequency. For instance, an “m” sound is much lower in frequency than an “s” sound. This is important to be aware of, because certain forms or degrees of hearing impairment can have a greater or lesser effect on the perception of certain sounds.

The most common subjective measure of hearing is pure tone audiometry, which tests both air and bone conduction. The results are plotted on an audiogram and this gives a visual indication of the hearing ability of each ear. Often, the ear will be able to distinguish some sound frequencies better than others.

The audiograms below show the air conduction thresholds for a right and left ear. There is normal hearing in the right ear and an impairment of hearing in the left ear. The test on the right ear shows that this person can hear very quiet sounds (around 10dB) across a range of frequencies. However, their left ear shows thresholds that can only distinguish sounds at around the 70dB level and this decreases as the sounds increase in frequency.



Right Ear



Left Ear



There are other specific tests for the middle ear and tests for the inner ear and auditory pathways. It may take a couple of different tests to exactly pinpoint the true cause of a hearing impairment.

Middle ear testing

Tympanometry or acoustic reflex measures are procedures to measure the functioning of the middle ear. Tympanometry measures the feedback from sounds put into the ear, and reflex measurements focus on the movements of the muscles in the middle ear in response to sound.

Sensori-neural testing

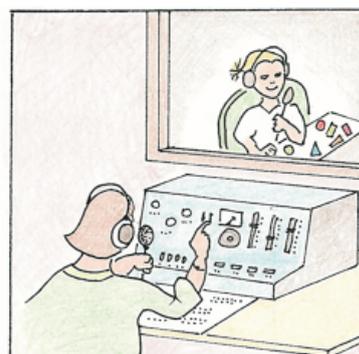
There are several objective measurements for testing sensorineural impairments:

Auditory brainstem response (ABR) measures the response along the auditory pathway by taking measurements from electrodes on the head.

Auditory Steady State Response (ASSR) is relatively new test and is often done in conjunction with ABR test. This test also measures the brain's response to sound.

Evoked Otoacoustic Emissions are a measurement of the low-intensity sound energy that is generated by the cochlea when it responds to sound. This is measured by sending sound into the ear and placing a microphone in the ear canal to measure the cochlea's response.

These tests are commonly performed on newborn babies or infants to assess for hearing loss. Along with these tests, a behavioural, or play audiometry assessment can be tried where the audiologist produces sounds and observes the baby's behaviour or response to sounds.





There are a range of hearing tests which measure different parts of the hearing mechanism. It is likely most adults and older children will begin with a standard Audiometry assessment where the individual is played a series of sounds (high and low frequencies) to see what they can hear and to determine the hearing thresholds.



Following a consultation and hearing test with an Audiologist, the fitting of some form of amplification may be suggested if the audiologist feels it would be beneficial. The Audiologist should reassure the individual by describing the benefits of hearing aids and advising on the range of aids available. It may be a good idea to focus on what the individual wants from an aid e.g. to hear conversations in meetings at work, or to converse with his spouse more easily etc. This can help encourage the individual if they can see the potential benefits. These actions may also help reduce the negative social perceptions some people have about wearing a hearing aid.

Following the fitting of the hearing aid the audiologist should provide some orientation sessions. These sessions will focus not just on hearing aid care and trouble-shooting, but also adjusting amplification, discussing hearing aid use in different environments, and communication strategies.

For more information about hearing impairment, hearing aids, cochlear implants and strategies to facilitate communication go to www.icommunicatetherapy.com



To learn more about hearing impairment, hearing aids and strategies to enhance communication, you can read about and purchase books on our website www.icommunicatetherapy.com. Click this link to see our online Resource Centre.

Suggested Reading

Suggested reading:

The Praeger Guide to Hearing and Hearing Loss: Assessment, Treatment, and Prevention by Susan Dalebout

Handbook of Clinical Audiology (Point (Lippincott Williams & Wilkins)) by Jack Katz

Audiology: The Fundamentals by Fred H. Bess and Larry E. Humes

Introduction to Audiology by Frederick H. Martin and John Greer Clark

Cochlear Implants: Auditory Protheses and Electric Hearing by Fan-Gang Zeng, Arthur N. Popper, and Richard R. Fay

Cochlear Implant Rehabilitation in Children and Adults by Dianne Allum

Cochlear Implants by Susan B., Ph.D. Waltzman and J. Roland

Cochlear Implants: A Practical Guide by Huw Cooper and Louise Craddock

With Cochlear Implants by Patricia M. Chute and Mary Ellen Nevins

Hearing AIDS by Harvey Dillon

Hearing Aid Handbook: 2008-2009 by Jeffrey J. DiGiovanni

The Hearing Aid Decision: Answers to Your Many Questions by Randall D. Smith, Jerome G. Alpiner, and Megan Mulvey

Digital Hearing Aids by Arthur Schaub

Assistive Technology for the Hearing-impaired, Deaf and Deafblind
by C. Andersson, D. Campbell, A. Farquharson, and S. Furner

Overcoming Hearing Aid Fears: The Road to Better Hearing by John M. Burkey

Hearing Aids - Can Be Your Best Friend: Learning More About Your Hearing Aid & Improve your Hearing and Word Understanding by Lindsay Pratt

Assistive Devices for Persons With Hearing Impairment by Richard S. Tyler and Donald J. Schum

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