

Hearing Aids

How Hearing Aids Work

What is a Hearing Aid?

A hearing aid takes in sounds and makes them louder. It is usually in the form of a small plastic covered electronic device that sits in or behind the ear.

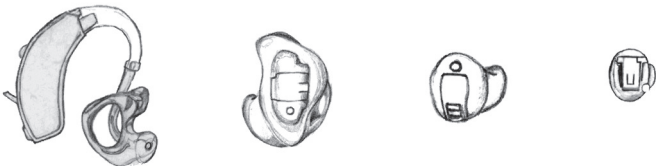
Hearing Aid Electronics

Hearing aids are made of:

1. a microphone, which picks up the sound and converts it into an electrical signal
2. an amplifier, which increases the size of the electrical signal, and
3. a miniature loudspeaker, or receiver, which converts the increased electrical signal back into sound

All hearing aids are powered by a battery. The controls and switches available on hearing aids vary depending on the model and size of the hearing aid. These can include volume controls, program switches and a "T" (telecoil) switch. On some models of hearing aids, the switches can be accessed via a small remote control.

Hearing Aid Styles



From left to right: behind-the-ear, in-the-ear, in-the-canal and completely-in-the-canal hearing aids (Not to size)

Hearing aids come in a range of shapes and sizes. The most common ones are:

The behind-the-ear hearing aid - This type of aid can be successfully fitted to a very wide range of hearing losses. It consists of an ear mould that fits into the ear and is connected to a small plastic casing containing the electronic components. The casing sits behind the ear.

The receiver in the ear canal hearing aid - This type of hearing aid is usually very small and discreet with the microphone and body of the hearing aid behind the ear and a small receiver in the ear connected via wire through plastic tubing.

The in-the-ear hearing aid - This aid consists of a hard acrylic shell that contains all the electronic components. It

sits in the bowl of the ear (concha) and ear canal. The in-the-canal hearing aid - This is a smaller version of the in-the-ear hearing aid. This aid sits in the ear canal and extends partly into the concha.

The completely-in-the-canal hearing aid - This aid sits completely and deeply in the ear canal and once in place, is only just visible when viewed from side-on. As it is smaller, it cannot accommodate some of the features available in the bigger aids such as a volume control. It usually has a little line attached for ease of removal.

The CROS hearing aid - This hearing aid can be helpful for people with poorer hearing in one ear. It consists of a microphone worn on the poorer hearing ear, which picks up sound and sends it to a hearing aid worn on the better hearing ear via an FM signal.

The bone conduction hearing aid - This aid transfers sound into the ear via a vibrating device worn on the bone behind the ear. The vibrating device is usually held in place with a headband. This can be useful for people with chronically discharging ears or malformation of the ear canal.

Other hearing aid styles - Body level hearing aids and spectacle hearing aids are rarely seen now as they have been superseded by the hearing aid styles mentioned above.

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How a Hearing Aid is Selected

Every hearing aid should be electronically tailored, or programmed to suit the person's particular hearing loss.

Hearing aids should only be provided after a careful selection process. This process should include a full hearing test and an assessment of the person's ability to perceive speech. The audiologist should also determine the person's specific communication needs, as this will affect the choice of hearing aid.

The hearing aid fitted will be evaluated and can also be "fine-tuned" over a period of time to meet the individual's needs.

Hearing Aid Technology

In recent years, hearing aid technology has progressed considerably. When considering the purchase of a hearing aid, you are faced with a vast choice of different technologies. In this section, some of these new technologies are described:

Digital hearing aids convert sounds into a series of numbers. Calculations are performed on these numbers before they are converted back into amplified sound. The main advantage of digital hearing aids over the older analogue hearing aids, is that more sophisticated processing of sound is possible, allowing greater flexibility to tailor the hearing aid to meet requirements.

Automatic volume control in hearing aids adjust the amount of amplification depending on the loudness of the incoming sounds. Greater amplification is applied to soft sounds compared to loud sounds. This enables access to soft speech sounds, and ensures loud sounds are comfortable.

Directional microphones in hearing aids can provide an effective form of background noise reduction. Each hearing aid has a number of microphones. The incoming sound from these microphones is electronically manipulated so that speech is enhanced and background noise is reduced. This technology improves speech intelligibility in a noisy environment, especially when you are facing the person who is speaking.

Noise reduction features identify speech from noise signals and process them separately. This allows for enhancement of speech and reduction of noise, making listening in a noisy environment more comfortable.

Feedback reduction features are sophisticated electronic technologies that result in less “whistling” of hearing aids.

Multi program hearing aids allow you to access different hearing aid settings for different environments. For example, one program may be set for quiet areas, another for listening in noisy areas or another for listening to music. These programs can be accessed automatically by the hearing aid or manually by a button.

One or Two Hearing Aids?

Generally, if there is hearing loss in both ears, wearing two hearing aids will result in better hearing. Advantages include “stereo” sound quality, increased clarity of hearing speech in noisy environments, the ability to identify which direction sounds are coming from and the sensation of having balanced hearing. Also, if a hearing loss is severe enough, leaving one ear unaided may result in loss of hearing clarity in that ear over time.

However, issues related to cost, manual dexterity, user preference or prior experience with hearing aids may mean that sometimes one hearing aid is fitted instead of two.

Some Important Points About Hearing Aids

The need to adapt to hearing aid - When a hearing aid is first fitted, the sound may be quite different to what the wearer expects or is used to. It will take some time to get used to the different sound.

Limitations of hearing aids - Even when wearing an effective hearing aid, a hearing impaired person may not be able to hear everything that is said. This is especially the case in noisier environments. It is important to remember that a hearing aid is not a replacement for natural hearing. Rather, it is an aid for impaired hearing. Developing effective communication strategies can help to compensate for the limitations of the hearing aid.

Another way to deal with the limitations of hearing aids is the use of assistive listening devices such as headphones for TV or amplified telephones. Expression Audiology has a wide range of assistive devices on display and can provide information about retail costs and suppliers.

To arrange an appointment to view the assistive devices available, or to obtain more information relating to the communication courses please contact:

Expression Audiology run regular courses designed to help people manage their hearing loss. Family and friends are welcome to attend. These courses are held at various locations. For further details please contact us.



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