



Independent Hearing Care Services

Hearability information sheet DIGITAL HEARING AIDS

Traditionally the National Health Service (NHS) has provided analogue hearing aids for children and adults alike. With the emergence of digital hearing aids, the NHS had to make a choice of which type of technology to supply. For the most part, the NHS continued to issue analogue hearing aids supplemented by digital aids if they would benefit a patient. In the 1990's digital aids became more widely available particularly for children, but this left many adults unable to get them on the NHS. Currently Digital hearing aids are available to all via the NHS however the waiting times are growing with a typical waiting time being in excess of 2 years. Private hearing aids can be fitted within 2 weeks in most cases.

The technology of digital hearing aids has developed very quickly over the last ten years and the range of aids and types of hearing loss they can help has likewise grown. Today there is a digital hearing aid to suit almost every one including many people who are considered profoundly deaf. There are several types of aid available including the Behind The Ear (BTE), In The Ear (ITE), In The Canal (ITC) and the Completely In The Canal (CIC).

So how do analogue and digital aids differ?

There is often nothing on the outside of a hearing aid that will give you any clue to what type it is, but inside it is a different world.

Digital hearing aids have a miniature computer chip inside them that has its own memory and essentially controls them. This chip is able to monitor the sounds coming into the hearing aid and adjust them according to a pre-determined set of instructions. These instructions are known as the 'programme' and that is why digital aids are referred to as 'digital programmable' or 'digital signal processing' (DSP) aids.

Analogue hearing aids are normally adjusted by an audiology technician at the hearing aid clinic, using a set of miniature screwdrivers. Each control on an analogue aid has to be manually adjusted until it performs best for the patient.

Digital hearing aids are 'programmed' by being connected to a computer which automatically match the settings on the aid to the requirements of the patients' audiogram. The computer stores the programme for each patient, making reprogramming the hearing aids or making adjustments a straightforward process.

Digital hearing aids are also more sophisticated in how they deal with sound and have automatic functions that are way beyond any analogue hearing aid. These include multi-programme, feedback cancellation, directional and adaptive directional microphones, adaptive noise suppression/reduction, multi channel compression, automatic programme switching, spectral enhancement and transient enhancement.

So, how do these complex digital functions help?

Multi-Programme allows the wearer to choose different amplification strategies to match listening environmental conditions, e.g. quiet, noise, telephone, outside, car, 'T' loop, music, etc.

Feedback (squeaking) cancellation allows the hearing aid to measure how much sound is leaking back to the microphone from the ear and cancel this out. The hearing aid produces an equal but opposite sound cancelling out feedback and stopping the aid whistling.

Directional and adaptive directional microphones allow the hearing aid to focus its amplification on particular sounds and reduce the invasion of unwanted sounds. They are particularly helpful when the sound you are trying to focus on is being masked by a louder sound from another direction.

Adaptive noise suppression allows the hearing aid to sense the characteristics of background noise and adjust the tone controls accordingly. For example, traffic noise is mainly low frequency noise and so in such an environment the hearing aid decreases low frequency amplification.

Multi-channel compression enables digital aids to amplify incoming sounds at different levels depending on the input volume and frequency. Thus quiet wanted sounds get greater amplification than loud unwanted sounds. This is particularly helpful with loud background noise and where a patient has a reduced tolerance of loud sounds (recruitment) Compression ratios of 4:1 are possible.

Spectral enhancement is a technology that enables the hearing aid to listen for frequency shapes that are in the sound of speech (formants). This is done automatically and once detected, these frequencies are amplified.

Transient enhancement enables a hearing aid to respond to and emphasise sounds that change rapidly in speech. The sounds that change rapidly in speech include p,b,t,d,k,g, but there are others.

So, where do digital hearing aids fit in today?

After reaching crisis point in the 1990's, hearing aid services were set for a complete overhaul. In 2000 the Department of Health launched a modernisation programme.

The project 'Modernising Hearing Aid Services' (MHAS) is set to bring the NHS back up to scratch after many years of under performance. The aim is to have modernised all hearing aid service by 2005. This will give hearing aid users access to both a modern audiology service and the latest digital hearing aids. The whole process began as an £11 million pilot study to see if the NHS could provide both digital hearing aids and quality aftercare. The result was that digital hearing aids could be provided on the NHS and offered patients **significant benefits** over traditional analogue aids.

Since then over 100,000 people have received digital hearing aids under the MHAS programme. On the downside, the considerable attention on this project has generated increased demand on NHS audiology services for digital aids. As the process of prescribing and dispensing digital hearing aids aid takes far longer and requires extensive re-education of staff + new technology, NHS services are now under increasing pressure to deliver hearing care services. The net result is that waiting times have increased to as much as 4 ½ years and is frequently 2 years.

As part of the MHAS, there are two other significant changes. Firstly, to ease pressure on the NHS, a Public / Private Partnership (PPP) has been developed. This will use some private hearing aid dispensers to fit digital hearing aids and provide aftercare. The NHS will still retain clinical responsibility, however access this system requires an NHS referral and is therefore affected by the current waiting times.

Secondly, the NHS telephone helpline 'Hearing Direct' will provide patient rehabilitation and aftercare on a patient led basis.

The continuous improvements of new technologies will directly benefit patients. Hopefully, all adults diagnosed with a hearing loss will receive the latest hearing aids and quality aftercare with all the linked benefits, weather privately or publicly.

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