

Hearing Aid Features, What Do They Do?

Let's Talk Hearing Aid Features

Technology levels and hearing aid features are linked, the better the technology level, the better the feature that is used. The feature set of any hearing aid is dependent on the level of technology of the hearing aid and the manufacturer.

The flagship or highest technology hearing aids from each manufacturer have the best feature set available from them. First of all, when we speak about features in the profession, we are usually not talking about physical features but hearing aid algorithms or mini programmes that run on the processor.

The easiest way to understand is to compare it to a smartphone, a smartphone runs on an overall system like Google's Android or Apple's IOS, however, within that system, there are apps available to you that do different jobs.

Hearing aids and their features are not unlike that concept. Many people get a little snowed under when they try to understand features and we can understand that. Modern digital hearing aids have a ridiculous amount of different features that are designed to deliver different levels of benefit to hearing aid users.

All modern hearing aids will have some mixture of different level of features so we are going to try and investigate them and tell you in plain language what they actually do. Please forgive me in advance, I am a nerd and this stuff excites me.

What are the real world benefits of hearing aid features?

As I discuss the hearing aid features I will try and translate them into real-world benefits for you. Just explaining what they are and what they do is simply not enough. So without further blah, let's have a look.

Audible indicators in hearing aids

Right at the basics, an audible indicator informs you of some sort of change in the hearing aids you are wearing. For instance, if you change the programme, or if the volume control has changed or that your battery is running low.

In most hearing aids these tones are usually a beep or melody type sound. Widex are one of the only manufacturers that employ real speech to announce the programme that you are on and whether your battery is low.

They have even made this feature available in many world languages. This is a clear indication of why Widex is a little different to everyone else, they think clearly about the little details that would help.

They are one of the very few manufacturers to use this feature and it is available across their range of hearing aids no matter what the technology level.

What are the advantages for you?

Audible indicators allow you to know what is happening in your hearing aids at any one time, for instance, you enter your favourite restaurant and it is busy. You know that your hearing health professional has set up programme two for just this very situation, so you switch your hearing aids to it.

You hear the two audible beeps or if you are wearing a Widex it announces the programme name, and you know immediately you are at the right settings. It is still a bit loud though, so you turn down the volume a bit, the sound of the descending beeps let you know it is working. Simply put, audible indicators allow you confidence that you are using the hearing aid properly.

Listening programmes in hearing aids

Many hearing aid manufacturers offer listening programmes in their hearing aids. What they are is a differing number of pre-set listening situations that are programmed into hearing aids. Each listening programme has its settings optimised for different listening conditions/sound environments.

The different listening programmes can then be selected by the user using a switch or push button on the hearing instrument or via a remote control. The listening conditions are usually set as speech, speech in noise, music and acoustic telephone.

What's the advantage to you?

Apart from the obvious one of offering better hearing in differing situations, there are other advantages. For instance, your hearing healthcare professional can make adjustments for just one situation in isolation without making global changes to how the hearing aids work.

This means that they can target changes to help you hear better in the situation you are having a problem with, without affecting the working of the hearing aids in other situations where you are doing fine. In essence, the more programmes, the better the customisation of the hearing aid for you in different situations.

For a real-world instance, you leave the house in the morning with the children in the back of the car, so you change the listening programme to the one that focuses to the back so you can hear them clearly, all though in fairness after you did it, you wish you hadn't!.

After dropping them off you have to meet your friend in the coffee shop, the shop is busy so you use the programme that has been set up for noisy environments so you can hear her clearly. You are really glad you did because she has some great news to share with you and you can hear it clearly. That is the benefit of listening programmes.

Automatic programmes in hearing aids

Many manufacturers offer different levels of automatic programmes, what they do is automatically select the optimum instrument settings without the user having to push a button or use a switch. The management systems of the hearing instruments analyse and identify the current sound environment.

The management system decided what is the best set of parameters for you to hear better in that sound situation and then automatically switches the parameters within the hearing aids to the appropriate settings. The amount of automatic programmes on any hearing aid is dependent on the manufacturer and the technology level.

What's the advantage to you?

Automatic programmes deliver real advantages, in essence, the hearing aids are always working to deliver the best possible sound quality no matter where you are. They do so seamlessly and without any input from you, which means you can just concentrate on getting on with your life.

In most manufacturers' hearing aids, these automatic programmes can also be individually altered or fine-tuned for your preference. Most hearing aid manufacturers would also offer manual listening programmes alongside their automatic function. Again this delivers the benefit that your professional can deliver the exact customised settings you need for just one situation.

Binaural synchronisation

Binaural synchronisation is something that has only recently entered the lexicon of hearing aid terms with the advent of wireless communication between hearing aids. In essence, it means that the hearing aids communicate wirelessly to ensure that the settings are synchronised.

What's the advantage to you?

It is a hugely useful feature that was introduced several years ago. At its most basic, this feature ensures that the current user settings are synchronised across the two hearing aids. So if you make a change in one hearing aid, such as the changing the listening programme or volume control setting by touching the button. It is automatically changed on the other to reflect this. This means that the two devices are always in the same programme and at the same volume level.

However, it is at its most advanced where it dramatically improves the lives of hearing aid users. Binaural synchronisation at its most advanced makes sure that every feature of the hearing aid is working in a combined manner to deliver the very best listening experience.

This really is exciting stuff (god that was so geeky!) because it is responsible for the huge advances in hearing aids in the last few years. It is also the reason why hearing aids have become more natural sounding (told you I was a nerd). When someone speaks about this technology to you, be sure to be clear exactly what it synchronises across the two hearing aids.

Binaural Compression

Again the advent of this feature was enabled because of the advances in wireless communication in hearing aids. Widex was first to introduce it in their flagship Clear hearing aids in 2009. Most of the manufacturers have followed suit in more recent times introducing the feature under differing names.

Hearing aids that use binaural compression work as a combined system to deliver enhanced sound as natural as possible. This is achieved by using both hearing aids to assess the surrounding sound environment. This information is then shared between and used by the hearing aids in a combined manner. This mass of information allows the hearing aids to make decisions on sound output as a true pair or system.

What's the advantage to you?

The system uses natural sound cues such as temporal effects (time differences in sound) and the head shadow effect (differences in sound from one ear to the other) to assess exactly what is going on in the sound environment. It then reproduces those sound cues in the enhanced sound you receive to deliver the most natural sound experience.

All of this happens instantaneously without time lag. Because the natural sound cues are preserved, your brain gets the optimum information possible in order that it can do, what it does naturally. Remember, the ears just carry sound, it is the brain that makes sense of what you are actually hearing.

I really think that this is the most exciting feature that has been released in recent times. As this feature evolves, it will make hearing aids better and better, achieving benefits for most users that were unimaginable even a few short years ago.

Compression channels

Compression channels have kind of fallen out of favour in the recent past as a sexy talked about feature because of two reasons. The first is that they are actually hard to explain without resorting to gobbledygook and the second being that sexier more understandable features have come about.

However, they are still fantastic features and it is worth me trying to explain what they are. Okay, this is pretty technical stuff, but I will give it a go to make it intelligible.

Compression channels are designed to change how different frequencies of sound are amplified. Compression channels are divided into a number of channels that are used to restrict or change differing levels of amplification within one sound frequency.

For instance, you may have problems hearing sounds below 40dB in one channel. However, the amount of amplification we need to deliver to you to hear those sounds clearly is radically different to the amount of amplification that we may have to add to a sound of 65 dB. Compression channels allow us to add varying levels of amplification to varying volume of sounds.

The feature is used to instruct the hearing aid to amplify or reduce the range of noises that you hear. This feature simply allows us to customise the hearing aids to your hearing loss in a better manner. Some hearing aids have more channels/bands than others.

What's the advantage to you?

Simply a better-customised hearing aid which is the foundation that everything else relies upon.

Data logging

Data logging is a feature which records different sets of information during the hearing aid's use. Most hearing aid manufacturers offer data logging of one type or other with differing levels of data captured. This information is available to be analysed by the hearing professional when they connect to the hearing aids. This type of information allows a professional a deeper understanding of your experiences.

What's the advantage to you?

It can assist in the fine-tuning of the aid to your preferences. The data recorded includes the hours of use, the types of listening environments you were in, the listening programmes you used and any volume control changes during that period.

Data logging delivers information that helps the hearing professional to programme the hearing aid to your specific requirements. Anything that helps the programming of your hearing aids to better suit you has to be seen as a good thing.

Feedback cancellation in hearing aids

Feedback is the horrible whistling that is most associated with older hearing aids and used to be one of the biggest complaints of hearing aid users. Feedback is caused by amplified sound being re-processed, in other words, sound emitted from the receiver (speaker) is re-processed through the hearing aids and it shrieks. This is exactly the same thing that happens when a microphone is put too close to a speaker.

The underlying cause of feedback is the escape of sound from the ear canal. There are many reasons for that, it can be due to a poor fitting of an ear mould or in-ear hearing aid, which allows amplified sound to escape.

Earwax blockage is another frequent culprit for hearing aid feedback. Another cause of feedback is the close proximity of the hearing aids to something, for instance, if you place anything over your ear, a hand or hat or a person hugging you.

Feedback cancellation is a feature that identifies and stops feedback, how it does it changes from manufacturer to manufacturer and within technology levels. Suffice to say, each feature identifies the feedback and which frequency or frequencies it is occurring in.

It then removes the feedback from the signal and stops the whistling. Different features do this in different ways, I won't bore you with the technical details, but if you really want to know, drop us a line and we can explain.

What's the advantage to you?

Simply put, your hearing aid doesn't whistle, you don't get embarrassed and your hearing aids work better.

Adaptive feedback cancellation

This is feedback cancellation on steroids, it is able to automatically adapt its speed of operation to improve its performance, and for example, it can change how it works when you are using a telephone, listening to music and suddenly hear alarm beeps.

The telephone needs strong feedback cancellation, the music situation needs very little feedback cancellation because musical notes can sound like feedback and alarm beeps is a similar concept.

Directional microphones

Directional microphones completely changed how hearing aid users can hear in noise. Directional microphone features use the sound information supplied by two microphones, to allow the computer brain of the hearing aid to identify sound that is coming from the rear and sound that is coming from the front.

This allows the processor to reduce the level of sound coming from the rear and concentrate on the sound coming from the front. Modern directional microphone features actually enable you to change the direction of hearing as you require. You can change the focus of the hearing aids from all-around sound to being more focused on a single person or object to the front side or rear.

What's the advantage to you?

Simply put, directional microphones are a proven method for hearing well in noise. So they are an invaluable feature for you to have.

Adaptive directional microphones

Yes, you guessed it, directional microphones on steroids! This feature allows the null of the directional microphones to adapt, the null is where the noise source is. So the microphones detect the location of the strongest noise source and adapt the sound to reduce your perception of that noise.

If the noise source moves, the system adapts to keep that noise source reduced. Most of the modern adaptive systems work in more than one frequency band, meaning that they can help to reduce your perception of several different noises at one time, even if they are all moving at different positions once they are at differing frequencies.

What is the advantage to you?

Bigger, better-proven method to help you hear in noisy environments!

Automatic directional microphones

This is a feature that just automates the directional microphones completely, it allows the processor to select how it will use the directional microphones according to the sound situation you are in. In a quiet situation, they will operate in an Omni-directional mode (taking in sound from all around) and directional mode or adaptive directional mode if available when a noise source is introduced.

What's the benefit to you?

Complete automation of what is an outstanding feature, you get to hear well in every situation without any input. It just happens automatically. Each manufacturer has its own flavour of directionality, where possible we will always explain what it is clearly on our website.

Frequency bands in hearing aids

Again, like compression bands or channels this one is a little bit in depth. Frequencies, as we will discuss them here, are the way that sound is split. The total frequency range of a

hearing instrument is divided into a number of bands or channels in which the gain that is provided can be customised to your hearing loss.

A quick but worthwhile side note here, the frequency bandwidth of hearing aids can be very different. What that means is that the number of sound frequencies that a hearing aid can process can be very different from manufacturer to manufacturer.

Some hearing aids can only process sound frequencies between 200 Hz and 6 KHz; others can process between 100 Hz to 11.5 KHz. Why is this important? I hear you ask, while human speech is normally between 200 Hz and 4 to 6 kHz, for the full and rich enjoyment of music, a much wider bandwidth is more desirable. Hence, if you are an audiophile, you might well appreciate the wider bandwidth.

Back to frequency bands, each manufacturer is different, some hearing aid manufacturers call them bands and some call them channels and some manufacturers offer more than others. The bands allow your professional to programme the hearing aid in a more customised way for your hearing loss. The more frequency bands that the aid has, the finer the programme can be, so you end up with crisper, clearer hearing.

Most features of hearing aids work within the bands, so the more bands there are in the instrument the more bands that the features in the hearing aid work across. How many bands are best? There is a lot of debate about that, but it is generally agreed that any amount between fifteen and twenty is optimal, that's why you will find most flagship hearing aids have numbers of channels or bands in that range.

For instance, Widex flagship hearing aids have fifteen channels, however, GN Resound believe have seventeen channels.

[What's the advantage to you?](#)

The more frequency channels or bands hearing aids have the better, although after twenty the benefit starts to fade. The more channels or bands, the better the customisation and the better experience that other hearing aid features will supply. Simply meaning that you will receive optimal benefit from your hearing aids.

Hearing aid noise reduction

This is probably the feature that drives most interest, it is often discussed as a feature that makes speech clearer in noise. Generally, it actually doesn't quite do that exactly. Only one manufacturer, Widex, have actually ever produced a noise reduction feature that affects the signal to noise ratio.

Signal to noise ratio or SNR to geeks like me is used to measure the ratio of signal (speech) to noise. So the actual measure of any feature that helps you to understand speech should be SNR. What most noise reduction features actually do is to reduce the amplification of non-speech sounds in an effort to allow a better understanding of speech sounds.

This tactic makes it more comfortable for a user in noisy conditions by reducing the background noise, for example in traffic noise in the street, a busy pub or restaurant. There is a lot of evidence that this reduces fatigue, reduces the amount of concentration you have to have and therefore actually does help you hear speech a little clearer.

As with all features, not all noise reduction is the same and the more high-end technology has better strategies to deal with noise.

What's the advantage for you?

A better chance for you to understand speech in noisier environments, in combination with a good directional microphone system it will dramatically improve your experience.

Speech enhancement

Speech enhancement is another feature designed to help you hear speech clearly in noise. It is used in combination with noise reduction to better help you to hear those important speech sounds. The processor in the hearing aids identifies speech signals and enhances or amplifies them. It analyses sound signals and, where most noisy maximises the speech signal.

What's the advantage for you?

In combination with noise reduction and directional microphones, it allows you the best opportunity to hear speech in noisy sound situations.

Transient noise reduction

This is simply a noise reduction feature that concentrates on identifying and suppressing impact or sudden sounds, such as shutting doors, clattering dishes and glass breaking. The feature is designed to do it without affecting the speech clarity. It is known by many names across different hearing aid manufacturers.

No matter what it is called, it allows the hearing aid to process sudden or loud noises in a more comfortable way for the user.

What's the benefit for you?

A much more comfortable listening experience for you as you go about your daily life.

Wind noise reduction

It is exactly what it sounds like, it is a noise reduction system that reduces the sound of wind cavitation on the hearing aid microphones. This feature is particularly useful for people who like to be in the outdoors. So if you are a golfer or a hiker, it is something that you should consider.

What's the benefit for you?

It will make it much easier for you to tolerate being outdoors if you are an outdoorsy type, golf and such things, it is an invaluable feature.

I think this covers the most obvious features available, as I said, different manufacturers call the features different things. But at their core, they are the features that I have discussed here. If I have missed something that you would like to know about, drop us a line on Hearing Aid Know and we will answer your questions.