Simple Clear Advice on Hearing Aids

THE LITTLE BOOK OF HEARING AIDS

By Geoffrey Cooling
# Table of Contents

Table of Contents

Table of Contents.................................................................2

Introduction...............................................................5

Hearing Aid Types, an introduction.................................6

MODERN HEARING AID TYPES.........................................................6

Best Advice........................................................................6

What Are The Hearing Aid Types?.......................................6

Bluetooth Hearing Aids, Wireless Versus Non Wireless Hearing Aids...........................................................7

RIC Receiver in Canal Hearing Aids....................................8

RIC / RITE Hearing Aids.....................................................8

DISCREET BEHIND THE EAR DEVICES...............................8

THE PROS & CONS OF RIC HEARING AIDS.............................9

Discreet..............................................................................9

Easy Change Receivers....................................................9

Receiver Issues in RICs/RITEs.............................................9

Maybe Too Small! .............................................................10

Contra-indications To Wearing RICs / RITEs.......................10

In Finishing.......................................................................10

ITE In The Ear Hearing Aids.............................................11

Custom Hearing Aids.......................................................11

ITE, CIC, IIC HEARING AIDS...............................................11

CUSTOM HEARING AID TYPES..................................................12

Invisible Hearing Aids.......................................................12

Completely In Canal Hearing Aids / Mini In Canal.................12

Full Shell & Half Shell Hearing Aids....................................13

THE PROS & CONS OF CUSTOM HEARING AIDS....................13

What Are The Advantages Of Custom Hearing Devices? .......13

Discreet............................................................................13

Easy To Handle................................................................13

What Are The Disadvantages of Custom Hearing Devices? ...13

Receiver Issues, Microphone Issues....................................13

Dirt and Wax, a Nightmare For Hearing Aids........................13

Good Clean and Care.......................................................14

Maybe Too Small! ............................................................14
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contra-indications To Wearing Custom Hearing Aids</td>
<td>14</td>
</tr>
<tr>
<td>BTE Behind The Ear Hearing Aids</td>
<td>15</td>
</tr>
<tr>
<td>Behind The Ear Hearing Aids</td>
<td>15</td>
</tr>
<tr>
<td>BTE HEARING AIDS</td>
<td>15</td>
</tr>
<tr>
<td>THE PROS &amp; CONS OF BTE HEARING AIDS</td>
<td>16</td>
</tr>
<tr>
<td>What Are The Advantages Of BTE Hearing Devices</td>
<td>16</td>
</tr>
<tr>
<td>Fully Functional Hearing Solutions</td>
<td>16</td>
</tr>
<tr>
<td>Extremely Reliable Hearing Aids</td>
<td>16</td>
</tr>
<tr>
<td>Easy To Use</td>
<td>16</td>
</tr>
<tr>
<td>What Are The Disadvantages of BTE Hearing Devices</td>
<td>16</td>
</tr>
<tr>
<td>Haven't a Clue</td>
<td>16</td>
</tr>
<tr>
<td>Contra-indications To Wearing BTEs</td>
<td>17</td>
</tr>
<tr>
<td>Wireless Hearing Aids</td>
<td>18</td>
</tr>
<tr>
<td>Made For iPhone Hearing Aids</td>
<td>18</td>
</tr>
<tr>
<td>The Problem With Bluetooth</td>
<td>18</td>
</tr>
<tr>
<td>Rechargeable Hearing Aids</td>
<td>20</td>
</tr>
<tr>
<td>What's Changed?</td>
<td>20</td>
</tr>
<tr>
<td>Why will this change everything?</td>
<td>20</td>
</tr>
<tr>
<td>Probably only BTE for the moment</td>
<td>20</td>
</tr>
<tr>
<td>Phonak</td>
<td>21</td>
</tr>
<tr>
<td>Signia Formerly Siemens</td>
<td>21</td>
</tr>
<tr>
<td>Hearing Aid Technology Levels</td>
<td>22</td>
</tr>
<tr>
<td>LET'S TALK HEARING AID TECHNOLOGY</td>
<td>22</td>
</tr>
<tr>
<td>The Life of a Hearing Aid</td>
<td>22</td>
</tr>
<tr>
<td>How Hearing Aids Work</td>
<td>23</td>
</tr>
<tr>
<td>Basic technology hearing aids</td>
<td>23</td>
</tr>
<tr>
<td>Lifestyle help from basic hearing aid technology</td>
<td>23</td>
</tr>
<tr>
<td>Standard technology hearing aids</td>
<td>24</td>
</tr>
<tr>
<td>Lifestyle help from standard hearing aid technology</td>
<td>24</td>
</tr>
<tr>
<td>Advanced technology hearing aids</td>
<td>24</td>
</tr>
<tr>
<td>Lifestyle help from advanced hearing aid technology</td>
<td>25</td>
</tr>
<tr>
<td>Premium level hearing aids</td>
<td>25</td>
</tr>
<tr>
<td>Lifestyle help from premium hearing aids</td>
<td>25</td>
</tr>
<tr>
<td>Hearing Aid Features</td>
<td>27</td>
</tr>
<tr>
<td>Let's Talk Hearing Aid Features</td>
<td>27</td>
</tr>
<tr>
<td>What are the real world benefits of hearing aid features?</td>
<td>27</td>
</tr>
<tr>
<td>Audible indicators in hearing aids</td>
<td>27</td>
</tr>
<tr>
<td>What's the advantages for you?</td>
<td>27</td>
</tr>
<tr>
<td>Listening programmes in hearing aids</td>
<td>28</td>
</tr>
<tr>
<td>What's the advantages to you?</td>
<td>28</td>
</tr>
<tr>
<td>Automatic programmes in hearing aids</td>
<td>28</td>
</tr>
<tr>
<td>What's the advantages to you?</td>
<td>29</td>
</tr>
<tr>
<td>Binaural synchronisation</td>
<td>29</td>
</tr>
<tr>
<td>What's the advantages to you?</td>
<td>29</td>
</tr>
<tr>
<td>Binaural Compression</td>
<td>29</td>
</tr>
<tr>
<td>What's the advantages to you?</td>
<td>30</td>
</tr>
</tbody>
</table>
Compression channels ...................................................................................................30
  What's the advantages to you? ..................................................................................30
Data logging..................................................................................................................30
  What's the advantage to you? ..................................................................................31
Feedback cancellation in hearing aids ........................................................................31
  What's the advantages to you? ................................................................................31
Adaptive feedback cancellation ....................................................................................31
Directional microphones .............................................................................................31
  What's the advantages to you? ................................................................................32
Adaptive directional microphones .................................................................................32
  What is the advantage to you? .................................................................................32
Automatic directional microphones .............................................................................32
  What's the benefit to you? .......................................................................................32
Frequency bands in hearing aids ................................................................................32
  What's the advantage to you? ................................................................................33
Hearing aid noise reduction .........................................................................................33
  What's the advantages for you? ...............................................................................33
Speech enhancement ....................................................................................................34
  What's the advantages for you? ...............................................................................34
Transient noise reduction ............................................................................................34
  What's the benefit for you? .....................................................................................34
Wind noise reduction ..................................................................................................34
  What's the benefit for you.......................................................................................34
Clean and Care of Hearing Aids ....................................................................................35
Avoid hearing aid repairs .............................................................................................35
  Hearing Aid care and maintenance .........................................................................35
Cleaning of hearing aids and cleaning tools ..............................................................36
When do wax guards need to be changed? ...............................................................36
Cleaning and maintenance of an ITE and RIC hearing aid .........................................37
Cleaning & Maintenance of BTE hearing aids ............................................................38
Drying out hearing aids ..............................................................................................39
  Hearing aid dryers ..................................................................................................39
  Hearing aid drying cups and tablets .......................................................................39
  Electronic hearing aid dryers ................................................................................39
In Finishing ..................................................................................................................41
Introduction

I have been involved with hearing aids for over ten years and they continue to fascinate me. I was in private practice as a hearing aid audiologist initially, before moving to work for a major hearing aid manufacturer.

Now, I collaborate with a guy to bring clear honest advice to consumers centered around hearing aids and the people who provide them. I like to talk straight, laugh at gobshites (Irish technical term) and my sense of humour may well get on top of me. However, bear with me and I should be able to translate the gobbledygook.

This is the first of a series of books that we plan to provide and it centers on hearing aids themselves. Privately provided hearing aids are a big investment, we want to give you the knowledge to make that investment with confidence. Let's set the scene: We are pretty sure we know the feeling.

You are in the middle of trying to decide which hearing aids might be for you but the gobbledygook is almost thicker than fog.

Which one is for you? What type is the best? What the hell are directional microphones? Even when you get an answer it can be more confusing.

So we have set out to detail all the details (see what we did there) however, we are going to try our best to give it to you in clear and plain English. What follows is a high level look at hearing aids, their technology levels, their pros and cons and the features inside.

We will talk about them in a generic fashion, not focusing on any manufacturers specific name for them. We think that this will give you the complete grounding in the subject that you need to make educated decisions.

This is perhaps the most exciting time I remember in hearing aids, it seems that innovation has massively sped up within the space. The hearing aids themselves work exceptionally well, far better than once was the case.

Now we have new innovations it seems every month, the introduction of hearing aids connected to the internet, the introduction of rechargeable hearing aids that can be relied on, the introduction of remote fine tuning and fitting of hearing aids.

It seems like the list just goes on and on, the future of hearing aids and what they can deliver for users seems to be exceptionally bright. We at Hearing Aid Know will do our best to continue to bring you news and explanations of the technology as it evolves. You can read more about hearing aids and the people who provide them on our website at Hearing Aid Know
Hearing Aid Types, an introduction

MODERN HEARING AID TYPES
Modern hearing aids have evolved exponentially in the last five years, they really are outstanding at what they do. One thing we will say though is that they are just an aid to hearing, they will not replace the natural hearing ability that you have lost. That warning should not put you off, it is just given so that you can manage your expectations. It is also given so that you can appreciate what you are going to get. Our best advice, is that you should buy the best set of hearing aids you can afford. The key is that you buy them from someone who is going to do their level best to help you succeed with them.

Best Advice
Because, if you have a hearing loss, you need to treat it. The growing evidence in relation to the consequences of untreated hearing loss is worrying. We are seeing stronger links between untreated hearing loss and cognitive issues. We are also seeing solid evidence that hearing aids have a beneficial effect on cognitive ability. We as a population are generally living longer, it appears that treating hearing loss will keep you sharper, more active and generally healthier as you age. There is clear evidence that shows that wearing hearing aids when needed will contribute to good general health, so what's not to like?

Be realistic with your expectations of the hearing aids that you purchase, the different levels of technology make a big difference to the benefit delivered within different sound environments. We will explain them clearly a little later in the book. While there are a vast range of hearing aids available they normally fall within just a few overall general types. Each type has different strengths and weaknesses and differing suitability for different people. Let's explore the different types including the pros and cons of each one.

What Are The Hearing Aid Types?
There are three hearing aid types that are most spoken about, they are as follows: BTE Hearing Aids; These devices are worn with the hearing aid on top of and behind the ear. All of the parts are in the case at the back of the ear and they are joined to the ear canal with a sound tube and a custom mold or tip.

ITE Hearing Aids: These are custom made devices, all of the electronics sit in a device that fits in your ear, they come in many sizes including CIC (completely in Canal) and IIC (Invisible in Canal).

RIC RITE Hearing Aids: These devices are similar in concept to BTE hearing aids, with the exception that the receiver (the speaker) has been removed from the case that sits at
the back of the ear. It is fitted in your ear canal or ear and connected to the case of the hearing aid with a thin wire.

**Bluetooth Hearing Aids, Wireless Versus Non Wireless Hearing Aids**

Before we delve a little deeper into the different types of hearing aids it is important to discuss a new type that has become commonly known to the general public as Bluetooth hearing aids, but to us in the profession as wireless hearing aids. All of the hearing device manufacturers have introduced wireless hearing aids over the last few years.

Some have even introduced Made For iPhone hearing aids which we will discuss later. While some of them work with Bluetooth connections, they aren't exactly Bluetooth. However, just recently most of the hearing aid manufacturers have signed up to the single Bluetooth protocol so a standardised method is coming.

Most of the manufacturers have designed their own flavour of wireless signal. Wireless communication between hearing aids and between hearing aids and other accessory devices has really been a game changer for people who wear hearing aids.

Not just has it made it easier for people to enjoy their TV, phone calls and group situations, the wireless communication has also enabled jaw dropping features (at least for us nerds) in the hearing aids that deliver a much better experience for their users. As you can probably tell, I like wireless hearing aids.

Some people choose discretion over wireless communications when choosing custom hearing aids. Honestly, and that is what this book is about, honesty, I think they are quite mad. Perhaps, certifiable. So in finishing, go wireless and you will never go back.
RIC Receiver in Canal Hearing Aids
RIC/RITE hearing aids, sometimes called speaker in ear, are powerful but discreet hearing aids. Let's take a deeper look at them.

RIC / RITE Hearing Aids
DISCREET BEHIND THE EAR DEVICES

RIC (Receiver in Canal) / RITE (Receiver in The Ear) are relatively recent additions to the hearing aid world introduced around 2008 as far as I can remember. In an effort to produce ever smaller but more powerful Behind The Ear type hearing aids, manufacturers moved the receiver (the speaker part) out of the body of the hearing aid and placed it at the end of a wire that went into the ear canal. Hence, receiver in canal or receiver in the ear.
The devices have become hugely popular both within the profession and with buyers, because they are massively versatile fitting many types of hearing losses and very
discreet. In some cases they are more discreet than in the ear hearing aids. They do however have their pros and cons, let's take a deeper look at them.

THE PROS & CONS OF RIC HEARING AIDS
As with many things in life there are pros and cons with RIC hearing aids, let's take a deeper look at those. First let's take a look at the advantages of RIC devices.

What Are The Advantages Of RIC Devices?

Discreet
They are highly discreet devices, although the body of the hearing aid sits behind the ear they are normally very small and discreet. Unless some one is actually checking they invariably go unnoticed.
The wire that leads from the body of the hearing aid into the ear canal is tiny and should sit along the crease of your face at the ear, hence, it is almost unnoticeable as well. Because of these two facts these are among the most discreet hearing aids available.

Easy Change Receivers
Because the receiver is easily interchangeable these hearing aids can cover varied hearing losses from mild all the way through to severe to profound. It also means that if the receiver fails, which happens, it is easily changed out for a new one. This means that the hearing aid does not have to go away for repair for a receiver change, it can be done instantly in the office if the hearing professional has spare receivers. This is a big plus, being without your hearing aid once you are used to wearing it is excruciating.
The simple joy of being able to hear well without huge levels of concentration and straining is only something you appreciate after you have a problem with your hearing.

What Are The Disadvantages of RIC Devices

Receiver Issues in RICs/RITEs
The fact that the receiver is placed in the canal or the ear is both a blessing and curse. This placement exposes it to the hostile environment that the ear is for electronics. Your ear canal is wet warm and oily, all of the things that electronics tend not to like. The manufacturers take great pains to protect the receivers with nano coating materials, enclosed casings and wax guard protectors. However, unless you take good care of the receivers, changing your wax guards when you should, (you probably won't) inevitably wax gets into them.
At best, this can just block the sound outlet, at worst, it can ingress into the receiver itself and destroy it. Wax and moisture is the kiss of death for receivers. Thankfully, the receivers are easily replaced by your hearing professional, however, after the manufacturer's warranty is up you may have to pay for them.
While they vary in cost, they are not expensive, however, if you are replacing them regularly, the cost adds up. I don't want to put you off this device types, they are
exceptionally versatile and I really like them. If you are recommended this type of device just be aware of the receiver issues.

Many of the hearing healthcare professionals we partner with can arrange a five year manufacturer's warranty to cover repairs. Some may charge, some may actually offer it for free.

If you are considering buying RICs, ask about an extended manufacturers warranty.

Maybe Too Small!

As I said, RICs / RITEs are very small and discreet devices, normally the smaller they are, the smaller the battery they use. Both the size of the hearing aid and the size of the battery can cause difficulties for people with dexterity issues. The whole idea of acquiring hearing aids is so that you can wear them and enjoy the very real benefits of hearing better.

If you have difficulty handling them to put them in, what should be a joy, can easily turn into a frustrating task at best.

The same has to be said about the batteries, small batteries can be a nightmare for people with vision or dexterity issues. Many of the hearing aid manufacturers offer RIC / RITE hearing aids in a variety of sizes and battery sizes, for instance Phonak offer the Audeo V range in a size 10 battery, a size 312 battery and a size 13 battery. The only caveat is the bigger the battery, the bigger the hearing aid case.

Contra-indications To Wearing RICs / RITEs

There are some people who shouldn't wear these type of devices. If you have permanent perforations in your ears or you have had a mastoid operation these hearing devices aren't really for you.

As you will know if you have these problems there is an increased risk of middle ear infections and fluid release. Either will destroy the receivers of the hearing aids, because of the nature of your ears with these conditions receiver failures would be an ongoing problem rather than an occasional frustration.

The same can be said for people who suffer with wet ears or produce a large amount of earwax, either conditions will cause issues for the receivers.

In Finishing

Great devices, pros and cons, good care will lead to fewer problems.
ITE In The Ear Hearing Aids

In The Ear or custom hearing aids are discreet and popular hearing aids for consumers, let's take a deeper look at them.

Custom Hearing Aids

ITE, CIC, IIC HEARING AIDS

Custom hearing aids or in the ear hearing aids come in many shapes and sizes, from quite visible Full Shell hearing aids to the so called hidden hearing aids, the Invisible In Canal or IICs.

Custom hearing aids have been around for a very long time, as I said they come in many shapes and sizes that deliver different levels of power and functionality. They were hugely popular devices but when RIC / RITE devices were introduced their popularity waned some what.

With the introduction of the so called "Invisible hearing aids" several years ago there has been a resurgence in their popularity. Hearing aid manufacturers are also
overcoming some of the technical challenges that reduced the functionality of the very small custom device types in the recent past. This has made the devices a better choice for people who need more help in tougher environments but want a very discreet package. Many of the manufacturers now offer small completely in canal devices that are wireless enabled which eliminates the traditional trade off between discretion and functionality. Let's talk about the types.

CUSTOM HEARING AID TYPES

Invisible Hearing Aids

So called invisible hearing aids or hidden hearing aids have been with us for a while, however, initially they actually weren’t that hidden. That has changed though over the last five years. The manufacturers cracked the difficulties that precluded them from making really invisible hearing aids. Since then every manufacturer has introduced a truly invisible in the canal hearing aid range. They fit deeply in the ear canal and the faceplate can not be seen easily. They are truly discreet hearing devices and they have been well received. There are of course disadvantages, the IIC hearing aids are often too small to be wireless. However, in the recent past, some of the manufacturers, Starkey, Siemens and Oticon in particular, have delivered wireless IIC devices. For some the trade off between discretion and wireless functionality is an easy choice. They forgo wireless capability for the discretion, however, I believe there is a lot to be said for wireless capability. I think wireless accessories are outstanding solutions and used well they have changed the lives of hard of hearing people dramatically for the better. But hey, that's just me. Invisible hearing aids are not suitable for everyone for several reasons, some reasons I will discuss later when talking about the overall pros and cons of custom hearing aids. However, there is one that is particular to invisible hearing aids, canal size and shape. If your canal is not the right shape or size, you are out of luck.

Completely In Canal Hearing Aids / Mini In Canal

Completely in canal or CIC hearing aids are pretty discreet devices that will go unnoticed except by the keenest eye. Up to recently they were predominantly non wireless, however in just the recent past many manufacturers have released wireless enabled CICs. I think that this is a fantastic break through, however, wireless enabled devices are slightly bigger than non wireless CICs so you need to consider that before you go ahead if complete discretion is your objective. What is hugely interesting is that some manufacturers have managed to fit directional microphones on CICs, this again is a recent break through. Directional microphones give real assistance in noisy environments, however this is the first time they have been on CICs so it will be interesting to see the effect they have. Early reports indicate that they deliver better speech clarity in group and noisy situations.
Again though, directional mics make the CIC slightly larger, I believe though, that like wireless, the functionality is well worth the trade off. Mini in canal hearing aids are all of the above except slightly larger, most mini in canals would come with wireless functionality and directional microphones.

**Full Shell & Half Shell Hearing Aids**

They are as they sound, larger custom hearing aids that sit in the concha or bowl of the ear. The half shell basically fills half the concha and the full shell fills the whole concha. The traditional benefit of these devices has been more features, more power and physical controls like programme button and volume controls.

In the recent past with the introduction of wireless capability and more powerful solutions at CIC level those benefits have all but become negated. However, these devices still have advantages, they usually have bigger battery sizes which allows them to work longer between changes and they are easier to handle for people with dexterity and vision problems.

**THE PROS & CONS OF CUSTOM HEARING AIDS**

Yes you guessed it, there are most definitely advantages and disadvantages to custom hearing aids. Let’s take a deeper look at what they are.

**What Are The Advantages Of Custom Hearing Devices?**

**Discreet**

The smaller devices are highly discreet and the invisible hearing aids are in fact, invisible. The larger devices are of course not as discreet.

**Easy To Handle**

Because the devices are all in one units they can be easy to handle and to place in the ear especially the larger hearing aids.

**What Are The Disadvantages of Custom Hearing Devices?**

**Receiver Issues, Microphone Issues**

Like RIC / RITE devices, the receiver is placed in the ear canal, however, it is better protected than the receivers in RICs. Again this placement exposes not just the receiver but all of the electronic components including the microphones to the hostile environment that the ear.

The manufacturers take great pains to protect both the receivers and the microphones. However, unless you take good care of your hearing aids, changing your wax guards when you should and cleaning the microphones, you are looking at possible failures.

**Dirt and Wax, a Nightmare For Hearing Aids**

At best, wax or dirt can just block the sound outlet or microphone inlet, at worst, it can make its way into the components itself and destroy them. As we said wax and moisture is the kiss of death for electronics. The manufacturers have done a good job of protecting those sensitive components in most cases.
It is very rare for anything other than the microphone or receiver to fail, chipset failures are that rare that they are remarked upon with surprise. In the case of custom hearing aids, if there is a failure they will have to be sent off for repair which can take varying amount of time. If the failure is within warranty it will be repaired free of charge, if not, you will have to pay a fee. If you are having them repaired regularly, the cost adds up.

**Good Clean and Care**

The key to success with these hearing aid types is a good clean and care routine that involves drying. The better you take care of these hearing aids, the better they will perform. Again, I don't want to put you off this device types, they are fantastic devices and I really like them. If you are recommended this type of device just be aware of the inherent issues.

As we said, many of the hearing healthcare professionals we partner with can arrange a five year manufacturer's warranty to cover repairs. Some may charge, some may actually offer it for free. If you are considering buying custom hearing aids, ask about an extended manufacturers warranty.

**Maybe Too Small!**

Some of the custom hearing aids are very small and discreet devices, as with RIC / RITE devices, the smaller the device, the smaller the battery they use. With the smaller custom devices, the size of the hearing aid and the size of the battery can cause difficulties for people with dexterity issues.

If you have difficulty handling the hearing aids or putting the batteries in, what should be a joy can easily turn into a frustrating task. The larger custom devices are easier to handle and use larger batteries that are easier to handle.

**Contra-indications To Wearing Custom Hearing Aids**

As with RICs and RITE devices, there are some people who shouldn't wear these type of devices. It is pretty much the same as RICs, if you have permanent perforations in your ears or you have had a mastoid operation these hearing devices aren't really for you. The same can be said for people who suffer with wet ears or produce a large amount of earwax, either conditions will cause issues for the hearing aids. Even though the power output has been increased greatly with these type of hearing aids, they still might not be suitable for your hearing loss.

If they aren't, don't let vanity win, get a hearing aid that is suitable for your hearing loss. That will translate into better hearing which will help you lead a better life.

**In Finishing**

Again these are great devices generally, they are quite reliable, but they do need care and attention to ensure they keep on keeping on.
BTE Behind The Ear Hearing Aids
We love BTE hearing aids, probably the most reliable hearing devices you can buy. Let’s take a deeper look at them.

Behind The Ear Hearing Aids
BTE HEARING AIDS
Behind The Ear or BTE hearing aids have been around for a very long time. In the recent past they have got smaller, more versatile and more powerful. Behind the ear hearing
aids are self contained units with all of the components in the case. Over recent years they have gotten much smaller than they once were. They are hugely versatile devices and they will fit nearly every hearing loss.

Normally the manufacturers will make different styles for differing losses, one for most losses from mild to severe and one usually labelled a super power for profound hearing loss. Even the super power devices have become quite small in comparison to the older styles.

The hearing aid is connected to the ear through a coupling, in some cases it is via a tube and ear mold, in the case of the hearing aids to the left it is with a thin tube and instant fit tip. The actual fittings are varied and usually based on hearing loss.

THE PROS & CONS OF BTE HEARING AIDS

We are finding it hard to think of disadvantages really, but we will give it the old college try. Let's take a look at what you can expect from BTE devices.

What Are The Advantages Of BTE Hearing Devices

Fully Functional Hearing Solutions

BTE hearing aids nearly always have a full load of hardware including volume controls, programme buttons and telecoils. The telecoil is a useful addition if you want access to loop systems in public buildings like churches, conference centres, the post office. In fact many taxis in London are fitted with loop systems. Even though wireless communication systems in hearing aids is now the norm, the telecoil is still a good thing to have. The only issues that occur in relation to it is how well the loop system is working or how well it has been fitted. This can affect the audio quality.

Extremely Reliable Hearing Aids

BTE hearing aids are probably the most reliable of hearing aids, they very seldom fail. Because all of the components are encased in the hearing aid and the hearing aid is worn at the back of the ear, very little or no wax or moisture can get at them. When something goes wrong with a BTE it tends to be either the physical controls or the microphones. Nearly all of the manufacturers have introduced new types of microphone covers that almost completely enclose the microphones. So even microphone failure maybe a thing of the past.

Easy To Use

BTE hearing aids tend to be easy to handle and place in the ear, so for people with dexterity or vision issues they are a good choice.

What Are The Disadvantages of BTE Hearing Devices

Haven't a Clue

We are wracking our brains here and really can't think of anything, maybe discretion? Even that isn't really true, a small BTE with a thin tube is a very discreet hearing aid to wear. It would be almost as discreet as many of the RIC / RITE devices.
Okay the larger BTEs are not the most discreet, but personally I would always go for long term reliability every time. A hearing aid is of no use to you if it is broke and BTEs very rarely break.

**Contra-indications To Wearing BTEs**

Sorry again we are stuck for any here really.
Wireless Hearing Aids

I spoke earlier about wireless hearing aids, they really have made a huge difference to the function of hearing aids and the benefit provided to users. There are two different types of devices that fall under the term wireless devices. There are hearing aids that are designed to connect to a series of accessory devices supplied by a manufacturer. And there are hearing aids that are designed to connect to a series of devices supplied by a manufacturer and designed to connect directly to other devices with a Bluetooth connection.

The first category of wireless hearing aids still makes up the bulk of wireless hearing aids. They are generally great devices and the connection to their accessories is usually excellent and highly stable. The quality of the audio signal that is streamed has also increased as the systems have developed. The system from Widex is recognised for outstanding audio quality but many of the others are catching up.

The accessories for wireless hearing aids deliver a whole new level of benefit to a user. For instance, remote microphones really deliver fantastic benefit in noisy environments. These type of devices make even low technology hearing aids very powerful devices.

Made For iPhone Hearing Aids

The Linx from GN Resound was the very first device to come onto the market from the second category. That category is generally known as Made For iPhone hearing aids. That is essentially a misnomer because they will also connect to Android Smartphones as well, however, the name has stuck.

The Linx was also designed to connect to GN Resound's Unite wireless accessories, which were designed to connect to phones, audio systems and TVs. What made them different from everything else at the time was that they could connect directly to an iPhone without any intermediary device. They were the very first to have this ability although they were followed quickly by the Halo from Starkey.

At the time of writing, both Oticon and Widex have released devices that will connect directly to iPhones and Android phones without intermediary devices and I would expect every manufacturer to do so.

The Problem With Bluetooth

All of these hearing aids are pretty outstanding devices and the fact that they connect direct without an add on is celebrated by many users. However, they have their issues, generally, those issues are caused by Bluetooth. Although Bluetooth technology has gotten better, it is still a finicky technology which occasionally just does it's own thing. Like dropping the connection for no reason and then refusing to find the device it was just connected to. Believe me, I use Bluetooth every day for information transfer purposes and it can be infuriating. It often works exceptionally well for weeks at a time then it doesn't, for no apparent reason.
Unfortunately, the hearing aid manufacturers can't control this, it is just a function of Bluetooth. Again, I wouldn't let this hold you back, just be aware of the problem when you are making a decision.
**Rechargeable Hearing Aids**

Rechargeable hearing aids have been with us for a while, both Siemens and Hansaton have provided rechargeable hearing aids for many years. Up to now though, they have not been hugely popular. I believe this is going to change, let me first tell you why they weren't popular and then explain what will change that forever.

The main issue with rechargeable hearing aids to date has been battery technology. The batteries simply could not be trusted to power modern hearing aids and the demands of streaming audio for a full day without interruption.

Not just that, the life of rechargeable batteries tended to be about a year. After that they did not continue to hold their charge well and needed to be replaced. For most hearing aid providers it made little sense to recommend them to prospective users. In essence they were perceived to be a novelty and never gained traction.

**What's Changed?**

The battery technology has dramatically evolved, Phonak have just introduced their first ever rechargeable hearing aid range and it is powered by Lithium-ion batteries. Lithium-ion as a power source is more capable and a far better option for hearing aid use.

The Lithium-ion technology in the new Phonak range will deliver a full 24 hours of use on a single three hour charge. The use time will also include streaming audio time, so if you use your hearing aids as wireless headphones for music, tv or phone connection, you will still get 24 hours of use.

Lithium-ion is also capable of far more charge-recharge cycles, which means the batteries should last the lifetime of the hearing aids.

**Why will this change everything?**

For two reasons, firstly the hearing aid industry is like an arms race, if one does something particularly innovative and well received the others will be quick to follow. Secondly and probably most importantly, consumers want it, in fact they want it badly. If you are an experienced user you will probably know what I mean, if you aren't, let me explain. Most experienced users have a giant size pain in their arse (Irish technical term) with disposable hearing aid batteries. They are fiddly, easy to drop and generally irritating, not just that they are also an ongoing cost. Generally the cost is negligible, however, they are still an ongoing cost that many users resent. There is also the whole hassle of making sure you have spare batteries wherever you go. Sounds easy right? Nahhhhh, as most people will tell you, the day they forgot to pack their spare batteries was the day the hearing aids run out unexpectedly.
So we have a congruence of two states of being, Hearing aid providers are more likely to recommend rechargeable hearing aids and the market in general will be exceptionally receptive to them.

Probably only BTE for the moment

At present (as of the 16/10/2016) it appears that this new renaissance of rechargeable will only be available in BTE and RIC models. Making custom hearing aids rechargeable is a complex operation, generally speaking it would not be difficult to make a large custom hearing aid rechargeable (such as a full shell ITE). However, making a small ITE like a CIC rechargeable would be pretty complex.

Two manufacturers have introduced Lithium-ion rechargeable hearing aids, and a recent statement from Starkey seems to point the way to them being next. I will continue to watch events as they move forward and update the book to reflect them.

For the moment the two manufacturers that offer this new type of rechargeable hearing aids are:

**Phonak**

Phonak kick started this new movement with the introduction of their Audeo B-R or Belong-Rechargeable. The device is a Receiver in Canal device and it is available in their top three levels of technology. Interestingly they didn't offer it in their lowest entry level range. The device can handle several levels of receiver so it covers hearing losses from mild to profound.

They say that no matter the level of receiver, the device will last for twenty four hours between charges with up to eighty minutes streaming of audio wirelessly. That is pretty impressive, apparently they have found in field trials that the devices will last for up to fifteen hours with five hours of streaming which is pretty much a full day for most users. That would mean that you would get quite a bit of answering your mobile and watching the television in as well.

The devices will run for six hours after a thirty minute charge and a full charge takes three hours in total.

**Signia Formerly Siemens**

Signia quickly joined the fray with the introduction of their Cellion Primax devices. Again, these are Receiver in Canal devices and again, they can take many levels of receivers. Signia introduced the Cellion in all of its levels of technology. They say that their devices will last 24 hours with limitless streaming. That is exceptionally impressive if it proves true (no reason to doubt them!).

The devices will run an impressive seven hours on a thirty minute charge and a four hour charge will fully charge them.
Hearing Aid Technology Levels

Hearing aid technology levels can be confusing at best, why is one better than the other? Here is what you need to know.

LET'S TALK HEARING AID TECHNOLOGY

Once upon a time there was three hearing aid technology levels, what were known in the profession as low end, mid range and high end. Then most of the hearing aid manufacturers introduced four, loosely they are called, basic, standard, advanced and premium and that is the designations I will use here for clarity.

The Life of a Hearing Aid

We hear many times that a hearing aid has a life of about five years, that isn't really quite true. What is meant by that is hearing aid technology radically moves forward every five years. Hearing aids themselves can last for over a decade with care and attention.

So if you buy one today, you may still be wearing it in ten or twelve years, the available hearing aid technology will have changed dramatically twice in that time. Doesn't mean that there is anything wrong with your hearing aid, it just means that there are things that are radically better available.

Let's take a look at those levels and what you can expect from them in general. Every couple of years a hearing aid manufacturer releases a new product range, once it was every four years but it seems to have accelerated to almost every two years in the recent past.

For clarity purposes, a product range may be referred to as a chipset, a platform or a family by differing people within the profession. Each new product range will have four levels of technology.

We said that there used to be three technology levels in hearing aids but that had changed, we kind of feel what the manufacturers have done in most cases is actually split the mid range into two levels. A lower mid range which is what we are calling standard and a higher mid range which is what we are calling advanced.

Normally within each technology level there will be every hearing aid type that they produce. For instance, widex have introduced their new product range the Unique, the Unique product range is based on the new Unique chipset and it has four levels of technology, the 440 which is top of the range or premium technology, the 330, the 220 and the 110 which is the basic level of technology.

Each of those Widex technology levels have a full family of hearing aids including custom, BTE and RICs. Nearly every manufacturer offers hearing aid products in this manner, some use different names to mark different technology levels but most use some sort of name and numeral combination. Phonak like to confuse everyone by giving their hearing aid types different names, but at least they stick to the numeral using the
number 90 for their premium top of the range devices, 70, 50 and finally 30 for their basic level.

**How Hearing Aids Work**

Before we launch into the different levels of technology, let’s talk quickly about what hearing aids are. Hearing aids have changed dramatically over the last few decades with the advent of digital technology. At their core, hearing aids have always been made of the same four basic parts: a microphone, a processor, a receiver (the speaker), and a power source (the battery).

In simple terms, the microphone picks up the sounds and passes it to the processor. The processor enhances the signal in accordance with it’s programming and delivers it to the receiver which delivers the amplified signal to the ear canal.

The power source delivers the power needed to make the magic happen. The introduction of digital technology transformed hearing aids allowing manufacturers to introduce ever more powerful processors in smaller packages. In modern hearing aids, the signal picked up by the microphone is converted from analog to digital before being processed, this allows for a much deeper manipulation and enhancement of the sound.

This manipulation is how noise reduction and other hearing aid features work. The signal is then converted back from digital to analog before the receiver delivers the enhanced signal into the ear canal. It is nearly impossible to get an analog hearing aid now, it is a special order, virtually all of the hearing aids manufactured in the world are now digital. Okay, let’s take a look at what the tech levels are and more importantly what they can do for you.

**Basic technology hearing aids**

Each manufacturer has a basic level of technology, they may not call it exactly that but for clarity that is the label it is getting. This level of technology is designed to work for people who are relatively sedentary (don’t get out much).

As I have said, this might be the basic level but it will still be on the latest chipset available from the manufacturer. Basic level hearing aids are usually just that, quite basic, they will have features such as directional microphones and maybe even some noise reduction, more on both later, but generally they will be basic and they will be manually controlled.

However, that is beginning to change, Phonak has just introduced their latest Venture platform and the basic hearing aid technology the V30 is an automatic hearing aid. It is limited to only two sound situations, but that is an interesting development none the less.

Other manufacturers will follow suit in their next generation of hearing aids. This is just like an arms race, when one does it, the others have to follow suit.

**Lifestyle help from basic hearing aid technology**

You can expect basic technology to help you in less complex sound situations. That means that you can expect to hear well in one to one conversations, even if the person
is talking to you from another room (within reason, if you own a thirty bedroom mansion, all bets are off). You can also expect them to help you with small groups, family around the kitchen table for instance. They should also help you with TV and Radio, although both can be a little difficult because of the quality of audio from different stations. Depending on the car you drive, this level of technology should also help you with understanding conversation in the car. Well programmed basic hearing aids will help you somewhat in limited noise. If you take the time to learn coping strategies like turning your back to noise and seating yourself in a way that minimises noise. However, once the noise level rises, they will begin to let you down.

This is where our love of wireless accessories comes in, if you use a remote microphone accessory with a basic level of hearing aids it will really help you in noise. It will give you that extra bit of help you need to hear your companion, it will also open up other opportunities to hear better in different situations. In the car you simply hand the remote mic to your passenger and you will be able to hear them quite clearly. Having issues with the TV? Put your remote mic down by the speaker, or use the cable that comes with it to plug into the audio out of the TV. By no means is it a replacement for higher technology hearing aids, but when you are working within a budget it can give you the extra edge you need.

**Standard technology hearing aids**

Again, each manufacturer has a standard level of technology which is second from the bottom. These devices are aimed at people who are a little more active. The features in these hearing aids will be slightly better than the basic features and are designed to help you hear in slightly more challenging sound situations. This level of technology is designed for someone who is more active in their life. This level of technology has dramatically improved over the years, to give you an idea, the current hearing aids at this level would easily be as good as flagship models from five years ago.

**Lifestyle help from standard hearing aid technology**

You can expect all of the help that a basic hearing aid would deliver but better, and on top of that you can expect help in group situations, small meetings, out and about at the shops and in restaurants. Again, this is based on the noise levels present, this level isn't going to help you to hear well in a very noisy restaurant on a Saturday night, think moderate levels of background noise in most situations. Again, wireless hearing aid accessories can make up for any difficulties in different situations and you should also consider them. We believe they are worth the extra expense in most cases.

**Advanced technology hearing aids**

This level of technology is ideal for active people delivering good sound quality and speech clarity in most situations they will find themselves in. This level of technology
has dramatically improved in the last few years, it seems that most of the manufacturers are keeping a lot of their top end technology features in the advanced ranges. They are dumbing them down slightly, but not much, it has been interesting to watch especially over the last year. For instance, the Widex 330 is almost as good as the 440 range and the Phonak V70 is almost as good as the V90 range. There are clear differences between them and there are valid reasons why you would choose the higher end technology but they are close nonetheless.

The main differences between this level and the next up is the binaural processing of hearing aid features. Put simply, hearing aids work exceptionally well when they make decisions as a pair, this extends to the features involved in delivering better hearing. In the flagship models of all brands most of the features are applied by the hearing aids in a combined and consolidated manner because of the communication between both hearing aids. This really does deliver the best and most natural sound and clarity. Advanced technology level hearing aids may have most of the top end features, but they don't work together in that combined way, nevertheless, they are exceptional hearing aids generally.

**Lifestyle help from advanced hearing aid technology**

Again, you can expect all of the help you get from the two previous levels of hearing technology but better. Advanced hearing aid technology can be expected to assist you in even complex sound situations, especially if you use coping strategies well. Usually at this level you can expect real help with hearing better in situations like large auditoriums, open plan buildings like churches. You should be able to hear quite well at the theatre, music should be a far better experience. In general, speech clarity in noisier situations should be pretty good. So if you are an active individual who likes to socialise, goes to some meetings and gets out and about to social events, these may well be the hearing aids for you. We know we are boring you with our obsession with wireless accessories, but hey good honest advice remember? Yes, wireless accessories that are chosen with the situations you really want to hear in mind will help you even more.

**Premium level hearing aids**

This level of technology is where the hearing aid manufacturers deliver all of their very latest features. This level of technology is for people who simply have to hear well in almost every situation. They are designed to handle the most complex sound situations and deliver the best speech clarity and most natural sound. In this level the hearing aids will truly work as a pair, deciding on how the sound is processed to deliver the very best hearing possible. The decision making process and the application of the hearing aid features is undertaken in a binaural manner and because it uses the power of two separate processors these are always the most powerful hearing aids available (in computing power).

**Lifestyle help from premium hearing aids**
Pretty much what you would expect, everything that the rest can do but exceptionally better. Premium hearing aid technology is designed to deliver the very best possible hearing and speech clarity in even complex sound situations. These type of devices are designed for active people who need to hear well everywhere. Remember though, even at this level of technology you will not be delivered super hearing, hearing aids are designed to give you the best experience with your residual level of hearing. They are not designed to, nor can they give you back your normal hearing or better than normal hearing. Oh and yes, wireless accessories are still an option worth thinking about even at this level.
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 smart phone, a smart phone 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 differing 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 employs 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. These 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's 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 preset 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 advantages 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 differing 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 dependant on the manufacturer and the technology level.

**What's the advantages 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 manufacturer's 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 along side 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 advantages to you?**

It is a hugely useful feature that was introduced several years ago. At it's most basic, this feature ensures that the current user settings are synchronised across the two hearing aids. So if you make a change on 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 it's most advanced where it dramatically improves the lives of hearing aid users. Binaural synchronisation at it's 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 were 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 naturally 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 advantages 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 advantages 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 the 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 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 advantages 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 it's performance, 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-round sound to being more focused on a single person or object to the front side or rear.

**What's the advantages 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 feature 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 band width of hearing aids can be very different. What that means is that the amount 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 is 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 a 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 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 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 advantages 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 identify speech signals and enhance or amplify them. It analyses sound signals and, where most noisy maximises the speech signal.

**What’s the advantages 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.
Clean and Care of Hearing Aids

Hearing aids are small, electronic devices that operate in conditions that are both warm and damp. Conditions that most electronics don't like. After making a large investment in being able to hear better, it makes a lot of sense for you to keep them in best shape possible by cleaning and maintaining them at home. The hearing aid manufacturers take great efforts to ensure your hearing aid will keep on keeping on. However, if you don't do your part, those hearing aids will fail. In many cases a failure may well end up needing to be sent away for repair. This could leave you without your hearing aid for up to two weeks depending on how busy the repair centres are. This is a major hassle, in my experience people who have become used to better hearing with their hearing aids hate to be without them. It really upsets them, so the key is to maintain your hearing aids as much as possible to avoid any hassle.

Avoid hearing aid repairs

Hearing aids do fail, it is a fact of life, electronic components can fail, and they certainly will with age and constant use. But you can take steps to avoid that failure for as long as possible. Those steps should be incorporated in a good daily clean and care routine. Most of the time I was in Practice, the failures I saw were receiver (loud speaker part) or microphone failures. It was exceptionally rare to see anything else within a hearing aid fail. Both of these components are the most exposed in every hearing aid. They are the components that need daily attention. Some hearing aid types are more prone to possible failure than others. For instance in the ear hearing aids and receiver in the canal hearing aids have a greater failure rate than behind the ear hearing aids.

Hearing Aid care and maintenance

So let’s get to the meat, how can you best take care of your aids, I will discuss each type of aid and each step that needs to be taken. If I miss anything, let me know. Likewise, if you have some good tips yourself, don’t hesitate to contact us. Before we move on here is some quick tips for hearing aid nirvana:
Follow a daily routine
Clean the hearing aids giving attention to the receivers and microphones
Dry out your hearing aids

Quick tip:

Never use alcohol, solvents or cleaning agents on your hearing
aids. Special care products for cleaning like hearing aid wipes and sprays are available and should be used.

Cleaning of hearing aids and cleaning tools

You should clean your hearing aid every day, every manufacturer supplies a cleaning kit with their hearing aids. It will usually include a wax brush, a wax pick and a cloth. These tools are designed to help you care for your aids and using them properly will help to keep your aids going.

Hearing aid manufacturers have also designed filters to protect receivers in the case of RIC and ITE hearing aids. You will also get at least one pack of these with your hearing aids. **Use Them**, the proper use of wax filters (sometimes called wax caps) will protect your receiver and keep it going longer.

**Quick Tip:**

*Earwax & moisture kills hearing aids, wax guards are there for a reason, use them!*

The biggest cause of failure is wax and moisture getting into the receivers or the microphones of hearing aids. If you change your wax guards when they need to be changed you can avoid much of this problem.

**When do wax guards need to be changed?**
I am sorry, but the honest answer is how long is a piece of string? Each person is different, I have seen Patients who only needed to replace their wax guards once every six months, I have seen other Patients that needed to change them every month. It depends on wax production in the ear canal. Generally as a rule of thumb, if your wax guard is full of wax that doesn't fall out when brushed, it is time to replace it. If you don't, that wax will eventually make it into the sound tube and then the receiver.

**Cleaning and maintenance of an ITE and RIC hearing aid**

ITE hearing aids in particular need daily attention, as do RIC hearing aids. The reason for this is that the receiver lives in the ear in both devices. As I said earlier, these devices are equipped with wax guards that you need to pay special attention to. So let's break down the steps you need to take and when you should take them:

*Quick tip:*

*Many people try to clean their aid at the end of the day, I always recommended doing it in the morning after drying it overnight.*

1. Place your hearing aids in a drying device at the end of the day, this will allow moisture to be removed from both the electronics and any wax or debris gathered on the aid.
2. The next morning, have a good look at the microphone inlets and the receiver end of the hearing aids. Get yourself a magnifying glass if you need to for this. The details and placement of these areas will be in your owner's manual or your hearing professional will show you.
3. Concentrate on cleaning the receiver and microphone ports using the soft-bristle brush that came in the cleaning kit. When you do it in the morning, the wax should be dried out and easy to move especially after drying out over night.
4. To clean off built-up wax, hold the hearing aid and gently clean the openings with the wax brush. The dried debris should be loose enough to be cleaned away.
5. If there is still wax in the ports that hasn't been dis-lodged, you can use your wax pick (again, usually included in your cleaning kit) to clear more stubborn deposits out of the ports. Be careful here, don't jab the pick in, just use it gently.
6. Check your battery compartment and the battery contacts for wax or debris, if there is any brush it off.
7. Finish by wiping the entire hearing aid with the cloth provided. This will remove leftover debris from the hearing aid.
8. Assess your wax guard, if it looks like it needs changing, change it out. If you change your wax guard when needed it will go a long way towards reducing failures.
9. Lastly, give your hearing aids a good visual once over, with ITEs, check the casing and any joins for any signs of cracks or issues. With RIC devices check the receiver wire, make sure there is no kinks or twists that may lead to the failure of the wire.

**Cleaning & Maintenance of BTE hearing aids**

BTE hearing aids are much harder to kill, however, you still need to clean and maintain them. Drying them is as important as it is for ITE and RIC aids. The maintenance is similar but different. So let’s break down the steps you need to take and when you should take them:

**Quick tip:**

*Drying is as important for BTEs as any other hearing aid, especially the tubes.*

10. Place your hearing aids in a drying device at the end of the day, this will allow moisture to be removed from both the electronics and any wax or debris gathered on the aid.

11. Occasionally when needed, remove the earmold and tube (if you have one) from the hook and clean it with soapy water. If your BTE has a thin tube, remove the thin tube and use the supplied wire (like a hair thin pipe cleaner) to push through the tube. This will remove any debris.

12. Use an air blower to force water out of the tube and then place the tubing in the drying kit with your hearing aid to dry overnight.

13. The next morning, have a good look at the microphone inlets of the hearing aids. again a magnifying glass can be helpful. The details and placement of these areas will be in your owner’s manual or your hearing professional will show you.

14. Concentrate on cleaning around the microphone ports and any other user controls like programme buttons or volume controls. Use the soft-bristle brush that came in the cleaning kit. Again, doing this in the morning is the ideal time, the wax should be dried out and easy to move especially after drying out over night.

15. To clean off built-up wax, hold the hearing aid and gently clean it with the wax brush. The dried debris should be loose enough to be cleaned away.

16. If there is still wax in the ports that hasn’t been dislodged, you can use your wax pick (again, usually included in your cleaning kit) to clear more stubborn deposits. Be careful here, don’t jab the pick in, just use it gently.

17. Check your battery compartment and the battery contacts for wax or debris, if there is any brush it off.

18. Finish by wiping the entire hearing aid with the cloth provided. This will remove leftover debris from the hearing aids.
19. Lastly, give your hearing aids a good visual once over, check the casing and any joins for any signs of cracks or issues.

**Drying out hearing aids**

I have spoken several times about drying out your hearing aids in this section, I should explain the process and what you can use to do it.

**Hearing aid dryers**

Hearing aid drying equipment comes in all shapes and sizes from the very cheap to moderately expensive. It is one of the single most important investments you will make if you buy a hearing aid. Moisture build up in hearing aids cause real issues and failures and it is generally easy to avoid.

**Hearing aid drying cups and tablets**

Probably the simplest and cheapest form of hearing aid drying available but still very effective. It is simply a jar / cup with a sealable lid to which you drop a drying tablet into. Every night you screw the lid off, drop your hearing aids in and seal it. The tablets are designed to suck moisture out of the air and your hearing aids. In the morning, take your hearing aids out (don't forget to seal the lid again) and voila, dry hearing aids. It is a simple process, easy to do and will save you real money in repair costs, so why wouldn't you do it?

**Electronic hearing aid dryers**

Yes you guessed it, hearing aid dryers you plug in. They come with different functionality, some will still use drying tablets or bricks, some don’t. Some will dry your hearing aids and disinfect them using UV light, some won’t. Many of them are designed to be portable, so you can bring them with you on trips. Widex introduced a drying station late last year, they call it the Dry N Go. It is a portable electronic drying and
disinfecting station. You can see it to the right. There are several available on the market though.
If you follow a good clean and care routine, your hearing aids will function better for longer. Hearing aid repairs are expensive enough, so take care to avoid them with some simple maintenance.
In Finishing

I like helping people, it is actually one of my things. Don't think this is just some selfless altruistic streak. There is some of that involved but I really get a buzz knowing I helped someone. So it isn't exactly unselfish.

I would ask you to do me a great favour, if you have found this book to be of real use to you, I would ask you to give it a favourable review.

I have covered much here and I hope I have made it clear and easy to read, however, if I have not, or if you are looking for more information, don't hesitate to contact us with your questions on Hearing Aid Know.