

Guildford Hard of Hearing Group

28th January 2019

HEARING AIDS

FROM AN AUDIOLOGISTS
PERSPECTIVE

Dr Anna Pepler
Deputy Head of Audiology
and Adult Clinical Service Lead



Caring together

Learning together

Continuously improving

Excelling together

Presentation Summary

- What will I be covering:
 - Phonak versus Oticon – is there any difference?
 - Frequency compression – what is it?
 - How do audiologists fit hearing aids?
 - What can hearing aids achieve in noise?
 - What can hearing aids achieve with television?
 - What can hearing aids achieve with music?
 - What devices can my hearing aids work with?

Caring together

Learning together

Continuously improving

Excelling together

Getting to know you

- Sony TV or Panasonic TV?
- Costa or Starbucks?
- Fiat 500 or Mini Cooper?
- Oticon or Phonak?

Phonak versus Oticon

- Oticon or Phonak?
 - Phonak and Oticon both provide mid range hearing aid technology for the NHS market.
 - They both have similar capabilities as each other. From an audiologist view point, one hearing aid range isn't seen as better than the other, they are just different.
 - As you probably do when you buy a new television, a coffee or a new car the differences can be subtle. We looked at what we did and didn't like about each of them and for our contract at present, Phonak provided the best overall package

Caring together

Learning together

Continuously improving

Excelling together

Phonak versus Oticon

- Both manufacturers offer similar technology, comprehensive software and a comparable range of connecting devices.
- But why do we have some patients that say they only like Phonak or they only like Oticon?
- There are many factors that can influence this and I am going to explore some of the most significant.

Phonak versus Oticon

1) What are you used to?

As with my earlier example, if you are used to a Costa or Sony TV, trying a Starbucks or Panasonic TV can take a lot of getting used to.

In the same way if you have been using a certain hearing aid manufacturer for 10 years, getting used to a new hearing aid manufacturer can take many months.

This is the same as analogue aids, if you are used to hearing aids with no fancy features, a digital aid can seem quiet and too refined.

We aren't always able to keep the exact hearing aid a patient is used to as they become obsolete, but as with a TV, one Sony TV will be much more similar to another Sony TV than buying another brand.

*Consider that this doesn't always mean the hearing aid you are used to is the best hearing aid for you.
This may be why an audiologist may suggest you try and get used to a different hearing aid.*

Caring together

Learning together

Continuously improving

Excelling together

Phonak versus Oticon

2) Does your hearing loss suit one manufacturer more than the other?

Personal experience has shown that in a small number of cases one type of hearing loss may benefit from one manufacturer more than another – this is why we continue to have a supply of Oticon aids along with our Phonak range to provide flexibility

e.g. Many patients with steeply sloping high frequency hearing losses have gained more benefit from Phonak aids than Oticon aids, although this isn't always the case

e.g. Some patients with profound hearing loss may prefer the Oticon hearing aids

N.B. There is not always a clear trend, a patient with a steeply sloping hearing loss may much prefer an Oticon hearing aid

Caring together

Learning together

Continuously improving

Excelling together

Phonak versus Oticon

3) Specific features of the hearing aids that you may like?

What is the same?

- Both manufacturers provide hearing aids that:
 - can be fitted to earmoulds or thin tubes
 - Patients with a mild hearing loss are generally suitable for the thin tubes
 - If a patient has a moderate hearing loss they will not generally be suitable for thin tubes as the hearing aids will whistle and not provide enough sound
 - are water resistant but not water proof
 - have the capability of wireless features
 - bluetooth enabled – i.e. will work with bluetooth through a linking device

Only private aids at present can link directly using bluetooth without a linking device

Phonak versus Oticon

3) Specific features of the hearing aids that you may like?

What is the same?

Both manufacturers provide hearing aids that have:

- noise management – the techniques vary but both reduce noise as much as is possible with current technology
- a form of high frequency sound compression (I will explain this in more detail)
- feedback manager options to reduce the risk of hearing aids whistling
- microphone directionality adjustment
- capacity for 4 programmes including loop, speech in noise, music
- the option for volume control

Phonak versus Oticon

3) Specific features of the hearing aids that you may like?

What is different?

- The Phonak software is generally more user friendly than Oticon from our team's perspective.
- The Phonak software provides more adjustable settings than Oticon – this can be a good and bad thing!
- Generally we find that our patients prefer the programme button and volume control set up on the Phonak more than Oticon.
- The Phonak corda tubes tend to get less blocked due to their design.
- The Phonak hearing aids provide a bigger volume range than the Oticon range.
- The Phonak sales and marketing support is generally more accessible and of higher quality than Oticon.

Overall there really isn't much difference between Oticon or Phonak.

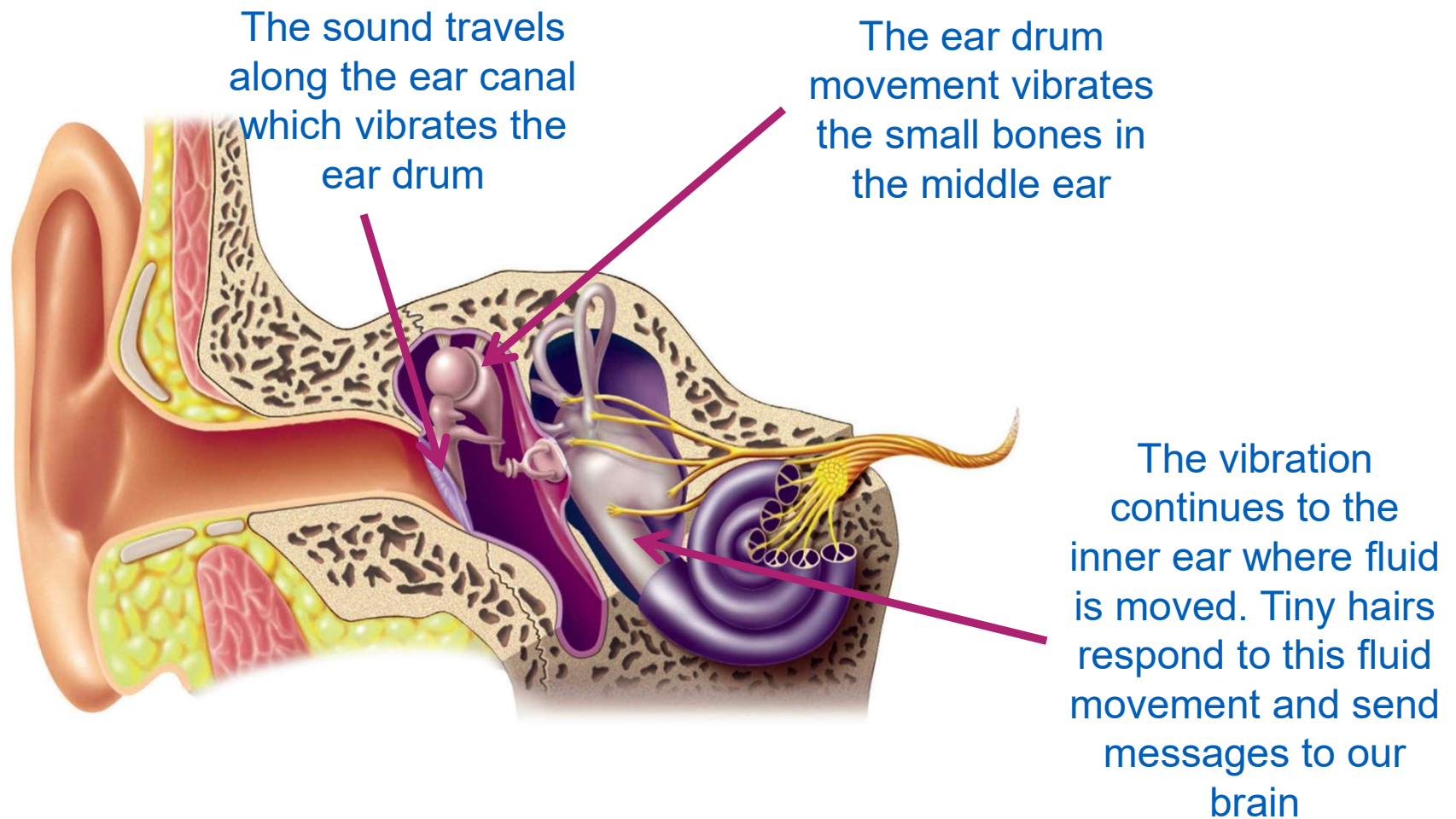
Caring together

Learning together

Continuously improving

Excelling together

Frequency Compression



Caring together

Learning together

Continuously improving

Excelling together

Frequency Compression



Each of the hairs in the inner ear respond to a different frequency of sound.

Very similar to a piano keyboard

If all the hairs are working whatever key we press we will hear the sound

Caring together

Learning together

Continuously improving

Excelling together

Frequency Compression



If you have an inner ear (sensorineural) hearing loss you will most likely have areas where the hairs have either fallen over or been damaged so they are no longer able to respond to the moving fluid.

So in my piano keyboard case I show where we have some damaged hairs



Caring together

Learning together

Continuously improving

Excelling together

Frequency Compression



If we press one of the keys in the area where the hairs are damaged nothing happens as the hairs are struggling to respond

So what do we do?
We press the key harder and harder as we want to make it work

If the hair is damaged it will respond to a much louder sound – this is where hearing aids come in they make the sound louder to help the hair pick up the response

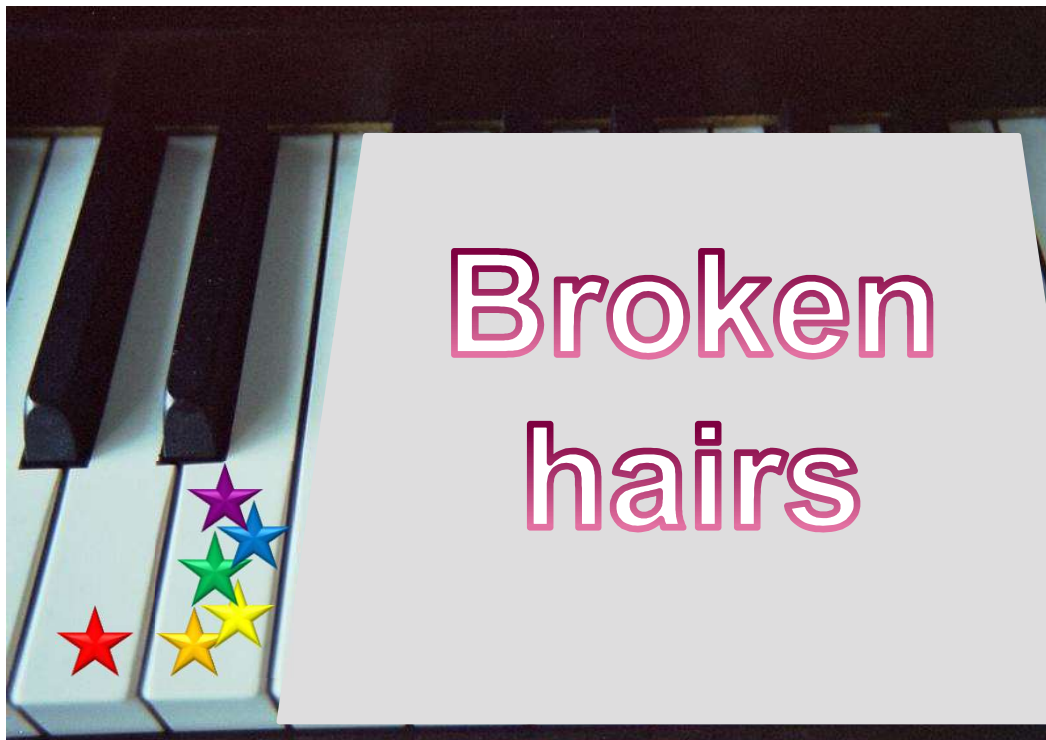
Caring together

Learning together

Continuously improving

Excelling together

Frequency Compression



In some people their hairs are so badly damaged the hairs won't pick up a sound however loud it is.

Even if we turn the hearing aids up the hairs are never going to respond.

In this case the sound is so loud, nearby hair will vibrate and respond to these sounds.

However, the sound won't be of very good quality as these hairs aren't designed to respond to these sounds.

Caring together

Learning together

Continuously improving

Excelling together

Frequency Compression



What can we do?

This is where frequency compression comes in:

Phonak call this sound recover
Oticon call this speech rescue

Sounds that were going to be processed where the hairs aren't working are shifted to areas where the hairs are working.



Caring together

Learning together

Continuously improving

Excelling together

Frequency Compression



Advantages of frequency compression

You can hear sounds that you otherwise would not hear

This can in turn improve your ability to hear



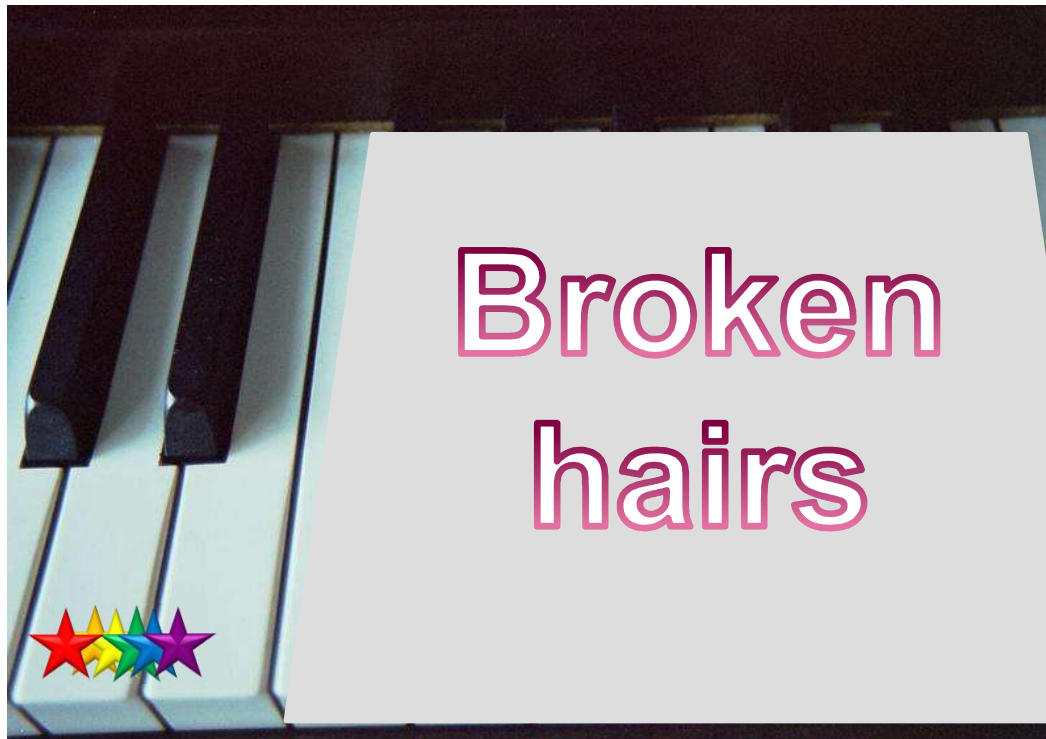
Caring together

Learning together

Continuously improving

Excelling together

Frequency Compression



Disadvantages of frequency compression

It has to be set up so it is not too strong or too weak, and this can be difficult to determine

If too strong

a) the sounds will be processed in the same place and sound too similar

b) The sounds will be processed by hairs too far from the broken hairs and this can increase distortion

Caring together

Learning together

Continuously improving

Excelling together

Frequency Compression



Disadvantages of frequency compression

If too weak

a) the sounds will still be processed in the area of broken hairs so the sounds will still not be heard very well

N.B In some people the area of broken hairs is so large frequency compression even at its strongest setting is too weak



Caring together

Learning together

Continuously improving

Excelling together

How do we fit hearing aids?

It isn't just about the technical aspects...

1) History

a) Patients difficulties

We ask a range of questions regarding the difficulties patients have with 1-1 conversation, noise, TV, telephone, groups. This is really important as we need to know how much the hearing loss is affecting them.

Hearing loss impacts each person very differently. Two patients can have exactly the same hearing loss and have very different amounts and types of difficulties.

So as an audiologist we need to determine if and when a patient would like our help.

Caring together

Learning together

Continuously improving

Excelling together

How do we fit hearing aids?

1) History

b) Medical History

We ask patients a range of questions on their medical history.

This is because:

in some cases, we need to refer to a medical professional for their input as we are not medically trained.

we might need to refer to a specialist audiologist; for example if the patient reports bothersome tinnitus we will offer the patient to see the tinnitus team.

certain factors such as a pace makers, dexterity, allergies can influence what type of hearing aid we suggest the patient tries.

How do we fit hearing aids?

2) Patient Specific Needs

To ensure we provide patient centred care we ask the patient for up to 3 specific needs. These will be areas they want to improve on.

We give the patient examples and these can be anything from hearing better in to feeling less isolated.

We review the patients progress with these specific needs at the end of their treatment plan, to see if we have been successful in what we have achieved.

Caring together

Learning together

Continuously improving

Excelling together

How do we fit hearing aids?

3) Hearing Test

We complete a hearing test (pure tone audiometry) to assess the patients hearing difficulties.

Why do we use pure tone audiometry?

It is currently the only test that allows

- 1) direct comparison between patients**
- 2) a record of changes in hearing over time**
- 3) frequency specific information required to programme hearing aids**

This is due to the test being completed in very controlled conditions.

Speech testing in quiet and noise can be useful but is not frequency specific and the conditions are not standardised so cannot be compared over time so easily

How do we fit hearing aids?

4) Hearing aid prescription

Once we have completed the hearing test we use this to set up a prescription.

The prescription determines how much sound should be provided by the hearing aid at each sound frequency.

But, everyone's ears are slightly different shapes and sizes, and the prescription cannot take account for this.

How do we fit hearing aids?

5) Real Ear Measurements

This is a measurement that allows us to take account of the patients ear shape and size so we can make sure the hearing aid is set up as accurately as possible not only to the hearing aid prescription but to that individual.

This is the measurement some of you may have had completed where we put a tickly tube in your ear. The tickly tube is essentially a microphone and therefore it picks up exactly what sound you are receiving close to the ear drum.

This is the most accurate way for us to determine what your hearing aid is doing.

In some cases we can't do this measurement for example if there is too much wax or an ear infection, hence why we ask our patients to ensure their ears are free of wax before their appointment.

Caring together

Learning together

Continuously improving

Excelling together

How do we fit hearing aids?

6) Subjective Responses

Once we have checked the hearing aid is providing the correct amount of sound based on the prescription we will check that the sound quality is reasonable for the individual.

Audiologists all understand it is not easy to determine how well the hearing aid is working in the clinic room as this environment is not typical of day to day life. Due to this, we tend to make some basic adjustments and then arrange a review either face to face or through a questionnaire in due course.

Caring together

Learning together

Continuously improving

Excelling together

How do we fit hearing aids?

7) Individualisation

We can make specific adjustments to the hearing aid features depending on the individuals needs.

This may include:

- Volume Control (on/off or range provided)
- Beeps (For VC, programmes, battery low warning)
- Start up melody
- Programmes – The frequently used ones are loop, speech in noise, music

But, how useful are these different programmes?

Caring together

Learning together

Continuously improving

Excelling together

What can hearing aids achieve?

Speech in Noise

One of the most frequent questions I am asked as an audiologist is ‘Why cannot I hear well in noise’?. So what realistically should you expect to hear in noise when wearing hearing aids?

- It all comes down to physics
- The hearing aids rely on directional microphones to allow you to hear in noise
- But, these microphones only work well over a short distance (often called near field listening)
- Near field listening covers at most an area of 2 metres, therefore if you wish to hear anything further than 2 metres away the directional microphone will be of no help

To hear in noise (more than 2 metres away) hearing aids are limited and therefore this is when assistive listening devices can be useful

What can hearing aids achieve?

Speech in Noise

The last slide also assumes your ears are able to process speech in noise at 100%

But, this is often not the case...

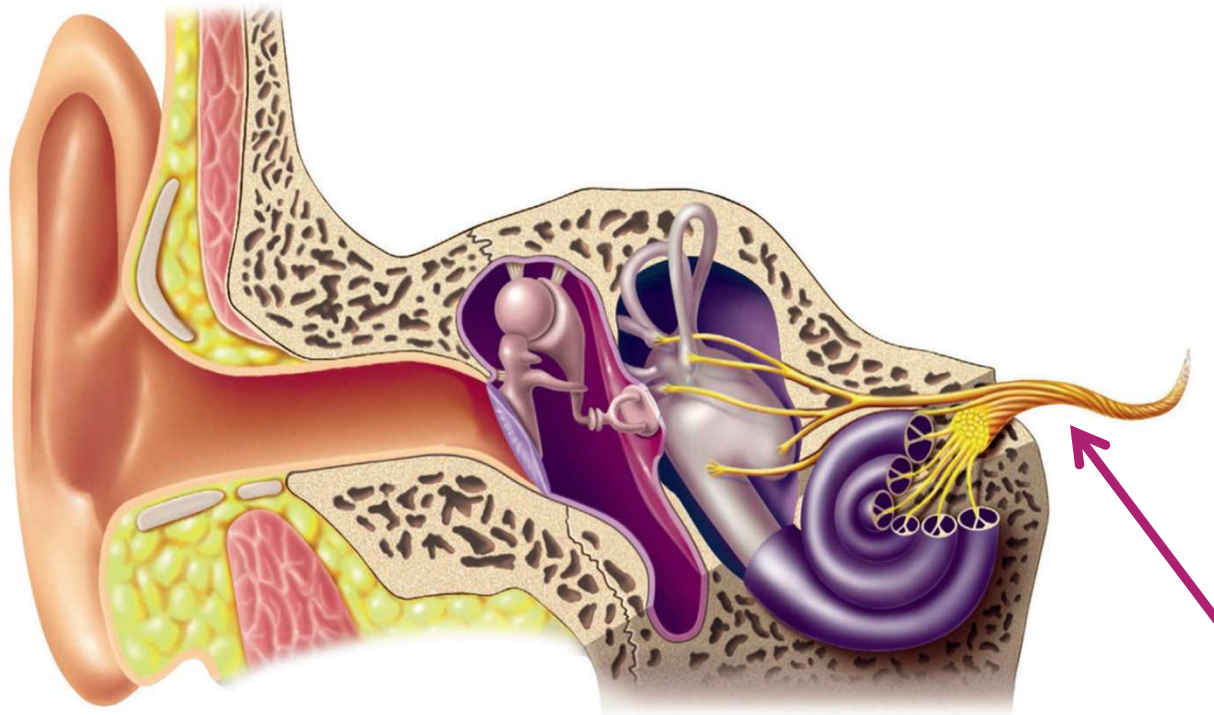
Caring together

Learning together

Continuously improving

Excelling together

What can hearing aids achieve?



All sounds are processed by our ears and messages sent to our brain

Caring together

Learning together

Continuously improving

Excelling together

What can hearing aids achieve?

Speech in Noise

In some cases the nerve that transports sounds from the ear to the brain becomes damaged.

- This means that even the best sound produced by the hearing aid has to run along a damaged nerve.
- I liken a damaged nerve to a faulty telephone connection.

Therefore to hear well in noise you need both the hearing aids and your ears to be working at their optimum:

- 1) For hearing aids, this is listening in noise with 2 metres of the speaker
- 2) For your ears, the hearing nerve needs to be working well

What can hearing aids achieve?

Television

Why can it be difficult to hear speech on the television when wearing hearing aids?

- Small speakers – these cannot cope with the multi-audio channel recordings
- Flat screens – speakers are often pointing down or to the back this reduces sound quality to the front
- Compression and mixing of sounds – the hearing aid will struggle with processing these complex, poor quality sounds

To hear television better you can:

- **Make sure you have a TV with good sound quality**
(Panasonic is always regarded the best by Action on Hearing Loss)
- **Use a sound bar to increase sound distribution to the front of the television**
- **Purchase assistive listening device which will allow for direct audio in to your hearing aids**

Caring together

Learning together

Continuously improving

Excelling together

What can hearing aids achieve?

Music

Why can it be difficult to hear music when wearing hearing aids?

- Music is a complex mix of sounds and very different to speech – hearing aids are used to reducing noise and often will recognise music as a noise and try to suppress it
- Music is low frequency whilst speech is high frequency – most hearing aids focus on providing high frequency sound
- Live music is typically loud so hearing aids should not be used and even if they are the sound with distort as the hearing aids cannot cope with the level of this sound

To hear music better you can:

- **turn the volume of the music down, turn your hearing aids up, making the hearing aid input lower**
- **have the music programme added which essentially means all the clever features of the hearing aid are switched off. This is because the ‘clever features’ such as noise management can alter music.**

Caring together

Learning together

Continuously improving

Excelling together

What devices can work with my hearing aid?

You can buy devices which work in the following scenarios:

- **Conversations over distance**

You can buy a microphone that is clipped on to the clothing of the person you wish to hear. The sound from this speaker is then transmitted via wireless signals to the hear aid (they typically have a range of 15-20 metres)

e.g. Oticon ConnectLine or Phonak Remote Mic

What devices can work with my hearing aid?

You can buy devices which work in the following scenarios:

- **Conversations in noisy situations or meetings**

There are a range of microphones that can be placed on a table or clipped on to the speakers clothing.

Some of the more recent technology allows you to select a specific conversation you wish to focus on.

e.g. Oticon ConnectLine or Phonak Roger technology

What devices can work with my hearing aid?

You can buy devices which work in the following scenarios:

- **Listening to television**

It is possible to purchase a device which allows the sound from the television to be sent wirelessly to your hearing aids (this can work up to 30 metres away from the TV)

e.g. Oticon ConnectLine TV Adapter or Phonak TV Link

What devices can work with my hearing aid?

You can buy devices which work in the following scenarios:

- **Using the telephone**

There is a telephone and devices which are compatible with certain hearing aids. This allows the sound from the telephone to be sent directly to the hearing aid.

Devices:

e.g. Oticon ConnectLine Phone Adapter or Phonak Easy Call

Phones:

e.g. Phonak Dect Cordless Phone

What devices can work with my hearing aid?

You can buy devices which work in the following scenarios:

- **Direct link from hearing aid to sound source (streaming devices)**

A neck-worn device can be used to send sounds from mobile phones, music players or computers. This allows you to hear sound from all these sources straight in to your hear aid

e.g. Oticon ConnectLine StreamerPro or Phonak ComPilot

Caring together

Learning together

Continuously improving

Excelling together

What devices can work with my hearing aid?

You can buy devices which work in the following scenarios:

- **Remote Controls**

Remote controls are available for a range of different hearing aids. They can be used to adjust the programmes and volume.

What devices can work with my hearing aid?

You can buy devices which work in the following scenarios:

- **Smartphone Apps**

Apps are available which allow you to control the volume or programmes on your hearing aids using your phone.

Currently none of our NHS hearing aids connect directly to smartphone apps. To connect to these Apps you would need to purchase a streaming device.

Summary

- 1) Phonak and Oticon hearing aids are similar
- 2) Frequency compression of high frequency sounds can be useful for people with poor hearing in the high pitches
- 3) We have a step by step process for fitting hearing aids
- 4) Hearing aids and our ears are limited in what they can achieve in noisy situations, television and music
- 5) There are a number of devices that can be purchased to help in more tricky listening situations