

Facts about hearing



How hearing works, how it fades,
and how to assist your hearing

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Hearing is our only sense that is constantly active

Our hearing fully develops while we are still in the womb, and plays an important role from the very first moments of our lives. Because hearing allows children to understand speech, it enables them to understand abstract concepts - and thus develop their brains.

From infancy and throughout our lives, our ears constantly supply us with vital information and enable us to experience emotions. Think of the most powerful movie scene; it will rely on music for its dramatic effect. In the same way, a simple loving comment or the laughter of children are potent audio inputs that elicit emotional reactions.

Our sense of hearing also allows us to recognise danger. Even when we are asleep, our ears remain receptive to unusual or important sounds. Whether it's a fire alarm or a crying child, we can react immediately from the deepest sleep.

Because our hearing is such a precious, valuable sense, it deserves special protection.



Our hearing is multi-talented

Natural hearing

A healthy sense of hearing can recognise both low sounds (like a double-bass) and high sounds (a violin or twittering birds). In technical terms, this means frequencies between 20 and 20,000 Hertz.

What is more, human ears can process very quiet sounds (like the buzzing of a mosquito) and extremely loud sounds (a jet engine starting). This equates to volumes from zero to more than 120 decibels.

Understanding speech

Our hearing is particularly adept at understanding people talking. We can understand speech in all its various facets and in every situation. Whether we are in a cafe, on the phone or in a class, our hearing filters out a flood of irrelevant sounds to concentrate on the ones we need to hear. It is thanks to this ability that we can focus on a single instrument in a symphony orchestra, or have an intimate conversation even in a noisy environment.

Spatial hearing

Healthy ears can differentiate between sound coming from the front or back, and from above or below. In fact, they can detect sound from all 360 degrees around our heads. This enables us to locate a sound's source, and feel how big a room is.

How we hear

The outer ear

The outer ear (pinna) collects sound like a funnel and transmits it through the ear canal to the eardrum.

The middle ear

The middle ear is made up of the eardrum and three tiny bones (ossicles). These are the 'hammer', 'anvil' and 'stirrup'.

The sound from the outer ear causes the thin eardrum to vibrate. This sound energy is concentrated on the smaller area of the stirrup plate by the hammer and anvil. The stirrup then transmits the sound to the fluid-filled inner ear.

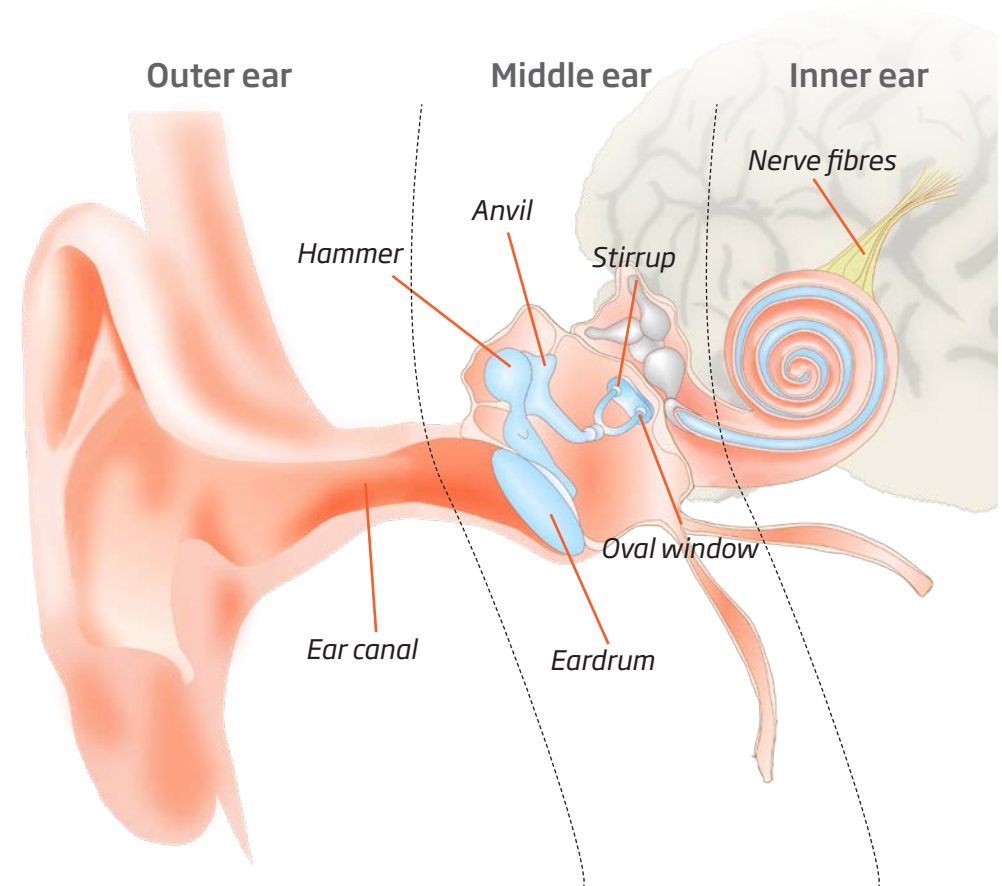
The inner ear

The inner ear begins at the oval window, which is fused to the stirrup bone of the middle ear. The powerful vibrations of the oval window set in motion the fluid that fills the snail-shaped hearing organ: the cochlea.

The waves in the fluid move tiny hairs inside the cochlea. These hairs are sensory cells, and moving them creates electrical pulses that are transmitted to the brain.

The brain

The cochlea's sensory cells transmit electrical pulses through the auditory nerve, which is made up of around 30,000 nerve fibres. This signal is passed to the region of the brain that is responsible for processing, evaluating and interpreting hearing impulses.



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The cochlear transforms physical forces into electrical signals

Hearing loss can happen to anyone, of any age

We live in a loud world, where there are many dangers to our hearing from extreme noise. Other dangers to our hearing include infections, injuries, diseases, drugs, or birth impairments. In addition, hearing slowly deteriorates with age.

Types of hearing loss:

1. Conductive

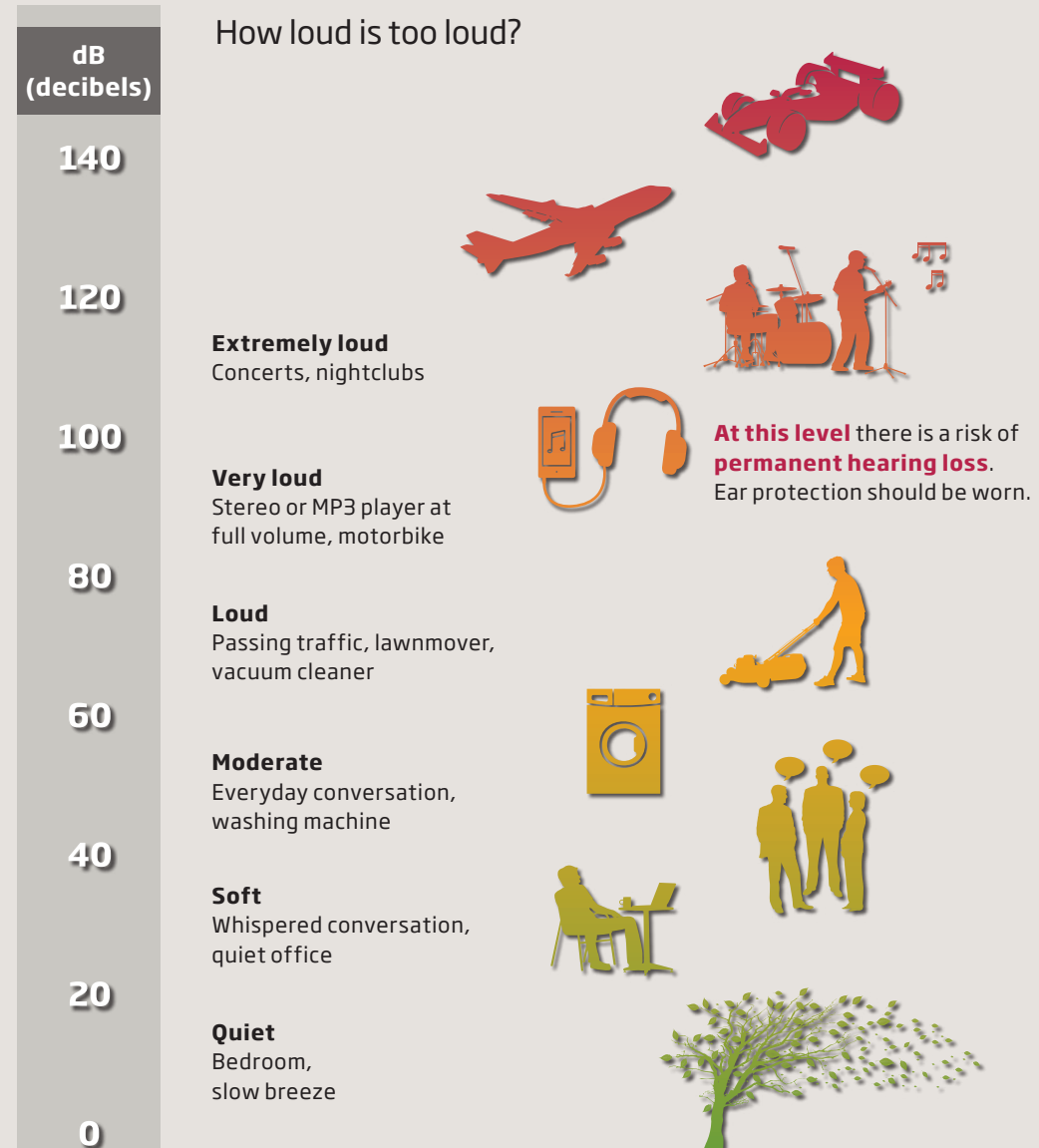
This hearing loss occurs in the outer or middle ear, when the transmission of sound to the inner ear is impaired. Possible causes are a hole in the eardrum, a middle ear infection, fluid in the middle ear, or damaged ossicles. When a conductive hearing loss has been found a referral to the general practitioner is necessary for medical intervention.

2. Sensory

This can occur when the delicate hair cells in the inner ear are irreparably damaged, or when the mechanism for forwarding hearing information to the brain is disrupted. The two most common causes of sensory damage are excessive noise – such as from construction work or loud concerts – and the natural aging process.

When our natural hearing can no longer cope, well-adjusted hearing solutions can help.

Common sources of noise



Keep in mind that individual noise exposure may vary depending on your distance from the noise source, individual characteristics of the noise source and the length of exposure.



You may not initially notice hearing loss, because the process is gradual

Friends, colleagues and relatives are often the first to notice

If you have hearing loss, the people around you may get the impression that you're not listening to them. They might find your TV is too loud. Or they may find conversations with you are slower and more difficult than before.

When someone first notices your hearing problems, they can easily find themselves trying to compensate. This is tiring. Conversations in noisy environments become particularly challenging.

When your hearing begins to get worse, it doesn't mean that everything is suddenly quieter. Often, some noises remain audible and loud while others become faint or disappear. Voices can sound distorted, indistinct and unnatural, so that you can hear but can't understand.

Softer and higher-pitched consonants that are hard to hear like 'f', 's', or 't' can be masked by the louder, low-pitched vowels: a, o and u. This means that when someone says "skate", you can only hear "Sa te" - you have to guess the rest. And by the time you've worked it out, the conversation has probably moved on.

To avoid having to confront such difficult situations, it makes sense to act early on hearing difficulties. Complete the simple self-test on the next page to see whether you might be experiencing hearing loss.

Taking the first step

How good is your hearing?

Answer these questions to get an indication.

	Yes	No
Do people around you seem to mumble?	☐	☐
Do you find it hard to hear someone who speaks from behind you or from another room?	☐	☐
Do you need to look closely at a person to follow a conversation with them?	☐	☐
Do you turn up the volume of the TV or radio?	☐	☐
Do you find it hard to make phone calls?	☐	☐
Can you not hear as well as you used to at the cinema, the theatre, or when you're out for the evening?	☐	☐
Do you find it hard to hear in environments with a lot of background noise, such as on the street or in the car?	☐	☐
Do you feel that your effectiveness at work is compromised by your difficulties in hearing and communicating?	☐	☐
Do your relatives, friends or colleagues ever say that they have to repeat things for you?	☐	☐

If you have answered "yes" to some of these questions, it's time for a professional hearing test

What now?

If you have answered "yes" to some of these questions, it is time to let your local hearing care professional test your hearing.

In the best outcome, your hearing care professional will confirm that your hearing is fine. However, if this is not the case, you should take action as soon as possible.

The fewer sounds that the ear captures and relays to the brain, the more hearing capacity the brain will lose.

If your hearing care professional confirms a hearing loss, take your time and let them advise you about all the possible solutions open to you.

You may find that your health insurance will cover some of the cost of any hearing aids you might need. Call your insurance company or check with a competent advisor.

Please note: If you wait too long before taking action, your brain may lose the ability to process sounds – even with the very best hearing systems.

Prepare for your consultation

People find their first consultation is more effective if they can provide their hearing professional with some useful basic information. Here are some questions to help you. For example, in which situations is your hearing most important to you (with your family, at work, during recreational activities)? When do you most notice that your hearing is not as good as it was?

- In which situations with your family is your hearing most important to you?
- In which situations at work is your hearing most important to you?
- In which situations, when you are doing recreational activities, is your hearing most important to you?
- What disadvantages do you experience as a result of your hearing difficulties?
- How do you feel about the hearing difficulties you are experiencing?
- What advantages do you hope for if your hearing can be improved?
- On a scale of 1 - 10, how important is it for you to improve your current ability to hear?
- What questions do you have now?



For more information on
hearing and hearing loss please visit:
www.oticon.global

Your hearing care professional

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