York and Scarborough Teaching Hospitals
NHS Foundation Trust

Hyperacusis and other forms of sound intolerance

Information for patients, relatives and carers

ⓘ For more information, please contact:

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What is hyperacusis?

Most people will have a maximum tolerance level for sound, and they will be uncomfortable or feel pain if this is breached. A common example may be a passing ambulance or a plane flying low overhead.

As well as having a maximum comfortable sound level, most people have particular sounds they find unpleasant whatever the volume. Common examples include fingernails on a chalkboard, a tap dripping, or a pen being tapped against a desk. Experiencing these things does not necessarily mean you have hyperacusis.

Hyperacusis is a condition where people experience everyday sounds as intrusively loud, uncomfortable, or sometimes even painful.

The term hyperacusis is used to refer to all types of sound intolerance. There are also other words that may be used to describe specific types of hearing sensitivity, including:

- **Misophonia**: a strong dislike to environmental sounds which, often generated by other people, regardless of their volume such as someone eating or sniffing.
- **Phonophobia**: a fear or adverse emotional response to certain sounds such as a public hand drier or fireworks.
- **Recruitment**: a specific form of sound intolerance associated with hearing loss.

Without the appropriate advice, hyperacusis can have a significant impact on peoples' quality of life, relationships, and their ability to go about normal daily duties.

What causes hyperacusis?

The reason or cause for hyperacusis is not well understood. It is common for people to notice an increase in sensitivity to sound after a significant life event (such as a bereavement) or trauma (such as a sudden exposure to very loud noise), however for many people there is no clear reason behind the onset of their hyperacusis.

Although the specific mechanisms that underlie hyperacusis are not known, theories usually suggest that increased sensitivity within the auditory system can be influenced by mood or emotional response. Hyperacusis can be in one ear only but is more commonly perceived in both ears. It can develop suddenly, or it can gradually develop over time.

Effects of hyperacusis

Hyperacusis affects people in different ways. Often people are more sensitive to sounds they're not in control of or cannot predict are going to happen. For others the hyperacusis may be related to specific sounds, individuals, or environments.

For some, hyperacusis is only a minor irritation but for others it can have a significant impact on their day-to-day life. Hyperacusis can make it harder for people to concentrate or they may avoid environments that trigger their hyperacusis.

Feelings of fear or anxiety relating to discomfort of sound can cause a change in behaviours, often causing people to withdraw and isolate themselves from daily activities and social environments. Some people may resort to using ear plugs or noise cancelling headphones.

Whilst this provides them with temporary relief from their hyperacusis, it is important to understand that this avoidance behaviour can lead to further heightening of the auditory system's sensitivity, essentially making the problem worse.

Associated risk factors

Various environmental and medical factors are known to be associated with the onset of hyperacusis:

- Exposure to sudden loud noise such as fireworks, a gunshot, or attending a loud music concert.
- Work-related noise exposure
- Hearing loss (sudden or long-standing)
- Tinnitus
- Tonic tensor tympani syndrome (TTTS)
- Ototoxic drugs (medications that can damage the ear or hearing)
- Conditions such as Ménière's disease, Lyme disease, William's syndrome, and Bell's palsy
- Temporomandibular joint (TMJ) problems
- Head injury
- Migraine
- People who find it difficult to process sensory information e.g., those with autism or intellectual disabilities.

Other triggers surrounding the onset of hyperacusis can include people who suffer a negative or traumatic life event or a prolonged period of increased stress. Hyperacusis can also be associated with conditions associated with emotional wellbeing, such as anxiety and depression.

Impact of our emotional systems

When processing sound, we use two subconscious systems that help us to understand what we have heard and to deal with it.

Our emotional system (called the limbic system) registers every positive and negative interaction we have with sound. This then helps us to know what to expect and how to feel when we encounter that sound again in the future.

This is why certain sounds can make us feel relaxed such as the sound of the sea or birdsong, and why hearing your favourite song can instantly lift your mood on a bad day.

It is also why some sounds can make us feel anxious, like hearing an ambulance siren whilst driving, or why we anticipate something scary is going to happen if we hear dramatic background music when watching a horror film.

The way we feel, and the context of our surroundings also affect how well we might tolerate sound. For example, if you work in a nursery, you might be used to the sound of screaming children, however, might get quite upset or angry about a crying baby on a flight if you are trying to sleep. In both cases the sound is the same, but the situation and your tolerance level is different.

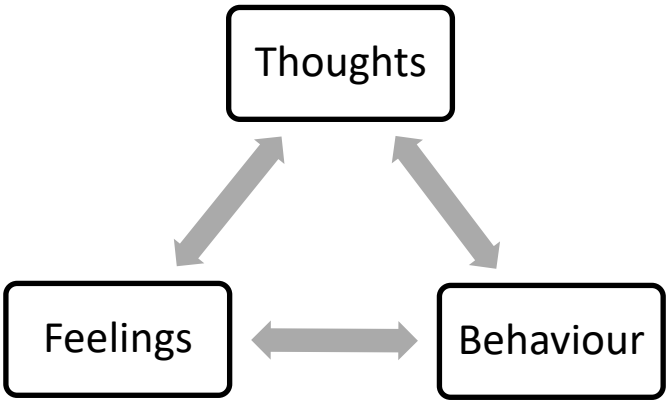
When we have a strong emotional response to a sound, it stimulates our autonomic ‘fight or flight’ system which helps us deal with potentially dangerous events. This reaction results in our body secreting the hormone adrenaline into our blood stream.

Adrenaline effects our body in different ways:

- It makes you breathe faster.
- increases your heart rate.
- sends blood to your muscles to give them a boost of energy.
- makes you sweat.
- it will enhance our senses, particularly sight, hearing and touch.
- you are more likely to be irritated and jumpy to sounds that you would not normally be reactive to.

Increased sensitivity to sound will further add to your annoyance and distress. This results in a continuous production of excessive adrenaline due to the constant distress.

If our thoughts and feelings towards a particular sound are affected by this ‘fight or flight’ response, it can alter our reaction to that sound in future and lead to a fear of pain or discomfort when the sound is heard. This can lead to the development of avoidance behaviour as a protective mechanism to the sound.



With hyperacusis, the more negative experiences we have with a particular sound, the stronger this reaction becomes. This then results in our brain recognising the sound as an enormous threat, forcing us to pay far too much attention to the sound, making it impossible for us to focus on anything else until the ‘threat’ is removed.

Hyperacusis and tinnitus

Tinnitus is generally regarded as a perception of sound that has no external source. Tinnitus is reportedly one of the most common symptoms to affect humanity with around one in seven of the adult population aware of a constant tinnitus. Tinnitus can be intermittent or continuous and people with tinnitus report hearing a multitude of sounds such as low to high pitch ringing, buzzing, or hissing. It can even beat in time with your heart. People often report tinnitus to be most noticeable when in quiet environments.

It is suggested that up to 40% of people who have tinnitus will experience sensitivity to sound or hyperacusis and those with hyperacusis may also develop tinnitus. However, both conditions can be independent of each other. It does not mean that if you have either one, you are going to develop the other. The emotional response to tinnitus can be like that of hyperacusis, however the troublesome sounds are internal rather than external.

Hyperacusis and hearing loss

Sudden hearing loss can be caused by things such as noise exposure or a virus and can lead to damage to the delicate hair cells inside the hearing organ. This can sometimes result in sensitivity of the remaining hair cells and hyperacusis symptoms.
However, hyperacusis can also occur in people who have more long-term hearing loss. Hearing loss distorts our natural perception of loudness, so we can sometimes incorrectly assume something is louder than it actually is. This is called recruitment. Hearing aids can help to restore this normal loudness perception and can help to reduce the symptoms of recruitment.

Hyperacusis and tonic tensor tympani syndrome

The tensor tympani muscle, from which TTTS gets its name, is one of two tiny muscles in the middle ear. Its main function is to protect the delicate inner ear structures from noise damage by stiffening when there is a sudden loud sound. This mechanism is called the ‘startle reflex’. This ‘startle reflex’ can be made worse if you are particularly stressed or anxious.

The tensor tympani muscle also has other roles. For example, it contracts (tenses) immediately before people begin talking or when chewing food to prevent the sound of your own voice or chewing sounds being “deafening”.

For most people they aren’t aware this is happening and the tensor tympani muscles function automatically. However, when something disturbs their normal functions, some people may become aware of their existence.

TTTS is an involuntary, anxiety-based condition where the reflex threshold for tensor tympani muscle activity is reduced, thus causing frequent spasms. Since TTTS is an involuntary reaction, some people with hyperacusis don’t even need to hear a loud sound to send their tensor tympani muscles into spasms. This can happen even by just thinking about a specific sound to which they have an aversion. Other associated symptoms of TTTS include pain, ear fullness, a fluttering sensation in the ear, tinnitus, or temporary reduced hearing.

Treatment of hyperacusis

For many, hyperacusis is not troublesome. Often, with information and reassurance surrounding the condition they will be able to successfully manage it independently.

For those who find their hyperacusis intrusive or bothersome, they can be referred for therapy. This is usually provided by their local Audiology department, with a clinician who specialises in tinnitus and hyperacusis management. For those whose hyperacusis is related to a medical condition this should be treated in conjunction.

Due to hyperacusis affecting each person differently, the more information you can provide about how hyperacusis affects your day-to-day life, the better the clinician is able to tailor their discussion and management to your individual lifestyle and needs.

One common feature of people with sound intolerance is that they try and avoid loud sounds. Although this may seem like a common-sense precaution, it can actually be counterproductive and can even exacerbate the condition. As people avoid sound, their environment becomes quieter. Due to the lack of sound input from external environments the auditory system becomes even more sensitive and can make the hyperacusis even worse. For that reason, ear plugs and noise cancelling headphones are generally not recommended for day-to-day use for people with hyperacusis.

Sound enrichment

Rather than avoiding sounds, it is generally advised to reintroduce sound slowly and gently into the person's life in an environment they are comfortable and at ease in (controlled exposure to sound). This is called 'sound enrichment' or 'sound therapy'. The aim is to try and create positive relationships with sound, so that the brain gets out of its 'threat response' habit and starts to filter sounds out rather than focus on them.
Common types of sound used for sound therapy are usually broadband sounds such as white or pink noise (e.g., a desktop fan). Natural sounds such as ocean or rain sounds can also be used if they help with relaxation.

Sound enrichment devices

The sounds we find relaxing tend to be very individual, so the same thing does not work for everyone. It is best to try out a few and see what works for you.
If you have access to the internet, desktop noise generators can usually be purchased via online retail websites such as Amazon.

Bone conduction headphones are a good alternative if you are unable to have sounds on in the external environment. Bone conduction headphones allow you to hear sounds without anything being in your ear, via vibration of the skull. This allows you to still hear environmental sounds whilst listening to your sound enrichment sounds.

YouTube has lots to choose from with options of sound only or added video which can add an extra visual distraction to aid relaxation.

- We recommend '*Babu's relax TV*'

There are lots of apps available for most smart devices (mobile phones, tablets, and smart speakers). These offer a variety of different sounds which can be used as sound enrichment and are often free to download. Apps can be downloaded via the Apple app store (iPhone) or google play store (Android).

Below are a few sound apps we recommend:

- Atmosphere
- Oto
- Tinnibot
- Calm
- Resound Tinnitus Relief
- Sleep Sounds
- Headspace (see section on mindfulness)

You can also try telling your smart speaker to play different sounds such as white noise, rain or ocean sounds.
Your audiologist may also be able to offer you an ear-level sound enrichment device.

Relaxation

Being able to relax is important in managing the stress often associated with hyperacusis as it can help to release any physical anxiety response and refocus attention away from the intrusive sounds. There are various techniques which can be taught, including controlled breathing and muscle relaxing exercises.

Psychological therapies, such as Cognitive Behavioural Therapy (CBT) and mindfulness meditation can help in the management of hyperacusis.

CBT examines the links between thoughts and emotions and their impact on our behaviour. It focuses on dealing with the feelings associated with sound sensitivity and moving towards accepting the sounds and reducing the stress surrounding them.

Ear protection

Where possible, ear protection should **not** be used during normal daily activities, such as when emptying a dishwasher or driving a car as this will not help with learning to manage hyperacusis in the long term. However, it is advised to use ear protection methods when doing something really noisy such as using DIY tools or heavy machinery, or when going to a music concert.

The use of ‘sound softening’ or filtered ear plugs are also **not** recommended as this has the same effect as ear protection and creates an unrealistic perception of the sounds around us in our daily life. Someone who has become used to wearing ear protection at inappropriate times should consult their therapist about measures for reducing their usage.

Where can I obtain further information?

If you think you have hyperacusis or any other altered sound tolerance it is advised you see your GP and request a referral to Audiology for a hearing test and further advice on how to manage it, if required.
The Hyperacusis Network: www.hyperacusis.net

British Tinnitus Association Helpline: 0800 018 0527
www.tinnitus.org.uk

References

Living with Tinnitus and Hyperacusis; (2010) McKenna, L. Baguley, D. McFerran, D. p108.

Tell us what you think of this leaflet

We hope that you found this leaflet helpful. If you would like to tell us what you think, please contact: Audiology department, York Hospital, Wigginton Road, York, YO31 8HE, Telephone 01904 726741 or email yhs-tr.AudiologyAdmin@nhs.net.

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