



Hyperacusis

This factsheet has been written for people who have been diagnosed with hyperacusis, or who feel they are unusually sensitive to sound. It may also be useful for professionals (such as support workers or special needs teachers) who encounter people with hyperacusis through their work. The factsheet covers the following topics:

- What is hyperacusis?
- How common is it?
- How can the symptoms be managed?
- What research is being conducted into hyperacusis?

WHAT IS HYPERACUSIS?

Hyperacusis is the medical term used to describe abnormal discomfort caused by sounds that are tolerable to listeners with normal hearing. It is an elusive phenomenon. Because it is a subjective experience it cannot be measured directly and is, consequently, very difficult to study.

Hyperacusis should be distinguished from another, better understood phenomenon called 'recruitment'. Recruitment is commonly associated with hearing loss caused by damage to the sensory cells of the inner ear and occurs because, although weak sounds cannot be heard, louder sounds are perceived at their normal level, causing discomfort and pain. Many people who experience hyperacusis have no detectable hearing loss, although it can be linked with other hearing problems such as tinnitus and Ménière's Disease.

There are probably a number of different causes for hyperacusis, but recent research indicates that one cause may be a reduction in a brain chemical that controls the amount of information arriving at the brain from the sense organs. For this reason it may occur with visual over-sensitivity, or photophobia, as seen in migraine sufferers.

Hyperacusis may follow a blow to the head or exposure to loud noise but, for many people, the onset is sudden and inexplicable.

It may occur independently of any other identifiable disorder. However, hyperacusis is a recognised symptom of several conditions. Aside from tinnitus and Ménière's Disease, hyperacusis is sometimes also associated with post-traumatic stress disorder, migraine, some types of depression, vitamin B6 deficiency, Tay-sach's Disease and post viral fatigue syndrome (or ME).

It is particularly prevalent in people suffering from a genetic disorder known as Williams Syndrome. Other symptoms of this condition are failure to thrive in early life, developmental delay, cardiac problems, small stature and distinctive facial characteristics.

Not all sounds cause adverse reactions in hyperacusis sufferers. It may be a feature of the sound rather than its volume that causes distress. Electrical and machine noises seem to be amongst the sounds least well tolerated. Hyperacusis sufferers may describe the sensation caused by particular sounds as '*painful*', '*startling*' or '*anxiety producing*' but it is still not clear why individual sufferers are disturbed by some sounds while other, often louder sounds, do not cause problems.

Adult sufferers may avoid noisy situations and become socially isolated; for some their condition worsens at night causing extreme sleep disturbance. For children, common sounds such as those from a washing machine or a lawn mower can cause extreme distress. At school, background noise can make concentration very difficult with subsequent poor achievement.

Although children may find that the problem lessens with time, this does not seem to be the case in adults. In fact where sounds have become associated with pain or discomfort, fear or anxiety about these sounds may become established, turning acute hyperacusis into a chronic, debilitating condition.

HOW COMMON IS HYPERACUSIS?

As many as 90 per cent of people with Williams' Syndrome may experience hyperacusis. Aversion to particular sounds can be observed in 40 per cent of those people with communication disorders or autistic features.

A Deafness Research UK study suggests that in childhood, six per cent of the general population may suffer oversensitivity to noise. The prevalence in the general adult population is around seven to eight per cent.

HOW ARE THE SYMPTOMS OF HYPERACUSIS MANAGED?

There are a number of treatment strategies for hyperacusis, but most will involve learning to understand the kind of noise that can trigger pain/anxiety alongside a process of auditory desensitisation.

Noise generators and auditory desensitisation

Noise generators play an important part in the auditory desensitisation process. These small devices look like hearing aids and produce a steady, gentle noise with a volume control, allowing the noise level to be turned up or down.

The aim of using noise generators is to improve a person's ability to tolerate normal exposure to sound, by reducing the sensitivity of the ear. Although wearing the noise generator can mask the adverse sounds, the device is intended to provide long-term, low-level noise exposure whilst maintaining normal exposure to everyday noise. There is no possibility of damage to the hearing through use of a noise generator and benefits have been shown even when the generator is not in use, with longer-term improvements in the person's over-sensitivity to noise. Most adults using a noise generator report that, over a period of use of around one year to eighteen months, hearing sensitivity becomes much more normal.

This is an established method of treating hearing over-sensitivity and is used in many audiology departments in the UK. There should be someone in your local audiology department who is able to advise you on the availability of this technique.

Hyperacusis can be managed most effectively by using noise generators in parallel with a programme aimed at reducing the fear and anxiety associated with sound exposure.

Fitting the devices

Noise generators are worn behind the ear in a similar way to a hearing aid. The sound is fed into the ears through an ear mould which is specifically designed not to block the ear canal, allowing background noise to be heard normally. The ear mould and device must be comfortable and secure so that it is possible to build up the number of daily hours of use over time in comfort. As hearing sensitivity usually occurs in both ears, both ears will usually be fitted.

Setting the volume level

The device has a volume control which should be set so that the noise level is just audible. The sound level should not be intrusive in daily activity and, even if the background sound levels increase to a level that the noise generator can no longer be heard, the volume setting should remain the same. Only if the background noise level is uncomfortable should the volume be increased to cope with the discomfort.

Daily duration of use

The aim is to build up the length of time the device is worn to at least six hours a day. As the wearer becomes accustomed to wearing the device, it may be helpful for him/her to keep a short-term diary of use and its perceived effects. This is not to raise the profile of the hearing sensitivity, but to keep a note of changes in reaction to sounds while the noise generators are being used.

Increasing the volume

When the individual has been using the noise generators quite comfortably for six hours a day without any problems, the level of the noise output should be fractionally increased. The new level should not cause problems, though the patient may need time to adjust to it. Again, when s/he is able to easily tolerate the new level, the sound level should be increased. This gradual increase in output should be used to improve the patient's ability to tolerate different environments in everyday life.

There is no set level that the wearer must reach, but when s/he can tolerate all the typical noise situations with the generators on, there is no need to continue to increase volume levels. At this point, the reliance on using the maskers can be reduced, either by gradually reducing the volume level, or by reducing the hours of masker use.

Only when the patient can clearly cope in all circumstances without their maskers is the process complete and the brain's 'volume control' mechanism reset.

How long will it take?

Typically, after using noise generators for 12 to 18 months most people find a long-term improvement in their sensitivity without the need to use noise generators. Although it is impossible to predict exactly how long the process will take, the desensitisation should still be carried out over a finite period of time which will be set by the consultant or audiologist.

CAN VITAMIN B6 AND MAGNESIUM HELP?

There have been some claims that vitamin B6 and magnesium could help to reduce oversensitivity to noise. These were largely based on the result of treatments for hyperacusis patients with learning disorders in the United States.

The use of vitamin B6 and magnesium for hearing oversensitivity has been largely restricted to those affected by hyperacusis alongside autism (or autistic-like symptoms). The use of vitamin B6 may help regulate the brain chemicals that control sensory information arriving at the brain whilst the magnesium could help the body to use the vitamin B6 effectively.

However, it is important to note that, since hyperacusis is a subjective phenomenon and therefore difficult to identify and study, its causes remain unknown. It is likely that there are a variety of different causes for the condition, and not all will be affected by the use of vitamin B6 and magnesium. There remains no conclusive proof to suggest that vitamin B6 and magnesium can help reduce oversensitivity to noise in the majority of people affected. Also, since side effects may occur if vitamin B6 and magnesium are taken at high doses, it is important to speak to a medical practitioner before considering any course of treatment.

WHAT RESEARCH IS BEING CONDUCTED INTO HYPERACUSIS?

Thanks to the work of Deafness Research UK, we are achieving real breakthroughs in understanding the nature of hyperacusis, raising awareness of the previously unknown scale of this distressing condition. Though its subjective nature makes hyperacusis difficult to quantify, recent research suggests that up to six per cent of all children are affected by the condition. Researchers are now focusing on the possibility of developing new drug-based treatments for hyperacusis.

FURTHER INFORMATION

If any of your questions concerning hyperacusis have not been answered by reading this factsheet, contact the Deafness Research UK Information Service for further assistance. Our Information team will either answer your enquiry directly or refer it to one of our scientific or medical advisers.

Open: 9.00 a.m. to 5.00 p.m., Monday to Friday (a message can be left at other times)

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Deafness Research UK is the only national medical research charity dedicated to helping people with deafness, tinnitus or other hearing problems.

Scientists are now predicting that within the next ten to fifteen years there could be a cure for some forms of deafness and much more effective treatments for tinnitus. Deafness Research UK is at the forefront of this work.

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