deafness research uk

Tinnitus-possible causes

Tinnitus is noise heard in the ears or the head. It may be experienced as a buzzing or ringing and as our lives become increasingly noisy, most of us will at some point experience it after exposure to loud noise. Indeed head noises are thought to be experienced by everyone. In the 1950's a series of tinnitus experiments involving 80 people with normal hearing found that after spending five minutes in a soundproofed room, 94% reported hearing sounds such as humming, buzzing or ringing, although none had previously complained of tinnitus.

While tinnitus is a temporary experience for most people; nearly 5 million people in the UK live with these noises to varying degrees. So what is it which makes these sounds so prominent for tinnitus sufferers?

Although scientists disagree over the exact nature of tinnitus, it is believed to involve processes in both the ear and the brain.

Its development can be associated with a number of factors, including middle ear infection, use of some prescription drugs as well as exposure to loud noise. Some people are aware of tinnitus symptoms as they get older and it can often precede or coincide with the development of hearing problems. However, many people are unable to attribute the onset of tinnitus to anything specific.

It is also known that the symptom can be exacerbated by environmental factors such as stress, depression and tiredness. As tinnitus itself can lead to anxiety, stress and sleep deprivation, this can create the feeling of being trapped in a vicious circle.

Tinnitus is rarely a symptom of a more serious problem. However, anyone becoming aware of a problem with tinnitus should see their family doctor to check that it is not associated with any other medical condition.

HOW CAN LOUD NOISE CAUSE TINNITUS?

Long-term exposure to loud noise is increasingly held responsible for the development of tinnitus.

The exact process by which noise damages the hearing mechanism is not yet fully understood, though scientists believe that the metabolism of the inner ear sensory cells is disturbed by over-stimulation. What is clear is that repeated exposure to high intensity sounds can lead to a weakening of the delicate hair cells in the inner ear, resulting in their eventual breakdown. This means that, at first, any damage is temporary. However, if the noise exposure continues, or if the ear is not given

enough time to recover, the hearing damage becomes permanent and irreversible.

Up to 30 per cent of the ear's 15,000 special 'hair' cells are destroyed before an individual becomes aware of hearing loss. The development of tinnitus can be a first sign that damage has occurred.

Whether as a precaution or to avoid the worsening of tinnitus symptoms, it is advisable to avoid excessive noise. But how loud is too loud?

As examples of noise levels in everyday life, an average conversation will reach around 60 dBA while a busy street can peak at 80-90 dB. 120 dB is louder than a pneumatic drill and a noise level that can be reached in nightclubs. Exposure to a noise level of 140 dB causes immediate injury to an unprotected ear (although exposure to noise at this level is unusual).

There is a danger of hearing damage including tinnitus where people are regularly exposed to levels of noise of generally 80 dBA or more.

Legislation covers many sources of noise we encounter in everyday life. Employers have to abide by The Control of Noise at Work Regulations 2005 which since the 6th April 2008 has also included the music and entertainment industry, while products on sale to the public are covered by British and European Safety Standards.

Ultimately we have to take responsibility for protecting our own ears against tinnitus and hearing loss. It is important to remember too that no two people will have an identical tolerance to noise, with research suggesting that a genetic predisposition to noise induced hearing loss is an important factor.

Contact the Deafness Research UK Information Service for further information about the impact of noise, including noise at work, noise in everyday life and noise and the younger generation.

HOW MIGHT AGEING CAUSE TINNITUS?

Many people notice the onset of tinnitus as they get older, but cannot link it to anything specific. More than half the population will experience age-related hearing loss, and tinnitus will often occur as well. Many experts believe that tinnitus could be linked to wear and tear of the delicate sensory cells, called 'hair' cells in the inner ear, or to the fact that our brains do not process sound as effectively as we get older.

WHAT ARE OTHER MEDICAL CAUSES OF TINNITUS?

Common triggers of tinnitus can be a build up of wax in the ear canal or an infection within the middle ear and your GP should examine your ears to check for these possible causes. In both cases, tinnitus may just be a temporary symptom of the problem and will normally clear up with treatment.

There are also particular ear conditions that may feature tinnitus as a symptom such as Meniere's disease and otosclerosis. For information about either of these conditions, please ask for the factsheets on these topics.

Tinnitus may also be caused by an allergy, diabetes, surgery, thyroid problems, blood circulation problems or injury to the head or neck. Anyone who thinks their tinnitus may be linked to one of these conditions should consult their family doctor.

Tinnitus may occasionally be caused by a vestibular schwannoma (more commonly known as an acoustic neuroma). These are rare, slow-growing benign tumours which press against and interfere with the auditory nerve. Although they are removable by surgery, there is an associated risk of hearing loss.

Pulsatile tinnitus

Sometimes tinnitus may be experienced as a rhythmical noise which pulsates in time with the heartbeat. It can be caused by a change in blood flow near the ear as may occur, for example, with vigorous exercise, or a change in awareness of the blood flow. An increased awareness of internal body sounds can be due to a middle ear, conductive hearing loss caused by perforated eardrums or glue ear.

On rare occasions pulsatile tinnitus can be a sign of arterial disease so anyone suspecting pulsatile tinnitus should be investigated for possible problems with their circulation.

WHAT SUBSTANCES CAN CAUSE TINNITUS?

In some cases, tinnitus may be caused or exacerbated by a change in the body's chemistry. This might be from taking certain prescribed medications where drugs can aggravate or even be toxic to the hearing system, leading to hearing loss and tinnitus.

Drugs that are damaging to the ear are called ototoxic drugs. These can cause hearing loss, balance problems and tinnitus. Some of these are given in the treatment of life-threatening illnesses. These include Cisplatin (an anti-cancer drug) and a group of antibiotics called aminoglycosides such as Gentamicin although the use of these antibiotics is falling as other safer antibiotics are developed.

Some drugs that are damaging to the ear and can cause tinnitus are usually only when taken in larger doses and often the effects are reversible. These include salicylates such as aspirin which is generally prescribed in small doses, for example, in the prevention of heart attacks and strokes and some anti-malarials such as quinine, which is prescribed in small doses for night cramps but in larger doses as a treatment for malaria. Other drugs in this group include some other non-steroidal anti-inflammatory drugs (NSAIDs) and loop diuretics such as furosemide. Where such drugs need to be prescribed, a patient should be checked to see if they could be at particular risk from ototoxic drugs and monitored carefully while taking them.

Other substances which have a suspected tinnitus link include:

Alcohol	Carbon Monoxide	Quinidine
Antidepressants (some)	Ergotamine Derivatives	Stimulants
Atropine Sulphate	Nicotine	

There are some drugs that are not ototoxic but may be linked to tinnitus. However, in such cases it is difficult to prove that they cause tinnitus because drugs are given for illness which in itself can be a trigger for tinnitus. Also, different people react differently to drugs, so while one person may react to a drug, the vast majority will not.

In the same way some foods are suspected to have a tinnitus link. Caffeine also has a reputation for worsening tinnitus symptoms, however a Deafness Research UK funded study has recently provided the first experimental evidence to challenge this theory. The research has found that giving up caffeine does not relieve tinnitus and acute caffeine withdrawal might add to the problem.

FURTHER INFORMATION

If any of your questions concerning tinnitus 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 much more effective treatments for tinnitus and that a cure for some forms of deafness is not only possible but likely within the next few years. Deafness Research UK is at the forefront of this work.

You can support us by making a donation or joining the Deafness Research UK League of Friends. For more information please call 0207 833 1733 or write to: Deafness Research UK, 330-332 Gray's Inn Rd, London WC1X 8EE

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