



Tinnitus

WHAT IS TINNITUS?

As our daily lives become increasingly noisy, most of us will at some point experience a buzzing or ringing in the ears, especially after exposure to loud noise. Although this is a temporary problem for most people, nearly 5 million people in the UK live with these noises, known as tinnitus, to varying degrees. In some cases, symptoms can be severe and permanent, causing acute anxiety and distress.

The way people experience tinnitus varies enormously – the perceived loudness can be anything from a whisper to a roar; it can be either constant or intermittent and may be experienced in one or both ears.

Although a relatively small percentage of the population is aware of tinnitus, head noises are actually thought to be experienced by nearly everyone. In the early 1950s a series of experiments were carried out into tinnitus involving 80 people with normal hearing. After being placed in a soundproofed room for five minutes, 93% reported hearing tinnitus sounds, although none had previously complained of tinnitus.

So what is it which makes these sounds so prominent for tinnitus sufferers?

Although scientists disagree over the exact nature of tinnitus, the problem is believed to involve processes in both the ear and the brain. It is also known that symptoms can be exacerbated by environmental factors such as stress, depression and tiredness. Given that tinnitus itself can lead to anxiety, sleep deprivation and stress, those experiencing tinnitus can find themselves trapped in a vicious circle.

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

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 being increasingly attributed to 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 leading to 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 hair cells will have been 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 (except for the music and entertainment sectors who will continue to use the 1989 regulations until 6 April 2008) 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 towards 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.

WHAT ARE THE OTHER CAUSES OF 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 tiny hearing cells in the inner ear, or to the fact that our brains do not process sound as effectively as we get older.

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

Tinnitus may also be caused by an allergy, diabetes, surgery, thyroid problems, blood circulation problems or injury to the head or neck. These conditions and middle ear infections may require treatments not described in this factsheet and anyone who thinks their tinnitus may be linked to one of these conditions should always consult their family doctor.

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 (see below for further information) where drugs can aggravate or even be toxic to the hearing system which can result in deafness and tinnitus. Aspirin and alcohol can also aggravate tinnitus. Caffeine has a reputation for worsening tinnitus symptoms, and Deafness Research UK is currently conducting research to prove whether this is truly the case.

In addition to the inherent hazards of noisy nightclubs, people who use Ecstasy or other 'club drugs' could face an increased risk of permanent tinnitus. Ecstasy, amphetamines and other similar drugs fuel the need to dance longer, meaning longer exposure to high noise levels.

On rare occasions, tinnitus can be a sign of arterial disease. If this is the case, the sound can pulsate in time with the heartbeat. Anyone suspecting pulsatile tinnitus should be investigated for possible problems with their circulation.

Tinnitus may occasionally be caused by an acoustic neuroma. These are small, 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.

WHAT SUBSTANCES CAN CAUSE TINNITUS?

A wide number of substances have been linked to tinnitus and it is impossible to provide a definitive list. However, it is known that tinnitus can be a side-effect of commonly prescribed drugs such as some of the anti-inflammatories and the anti-malarials. Drugs that damage the ear ('ototoxic' drugs) can also induce tinnitus. These include Cisplatin (anti-cancer) and antibiotics like Gentamycin. Some of the substances which have a suspected tinnitus-link include:

Alcohol	Loop diuretics
Antidepressants (some)	Ergotamine Derivatives
Aspirin	Nicotine
Atropine Sulphate	Quinidine
Carbon Monoxide	Salicylate
Caffeine	Stimulants
Chloroquine	

It is important to remember that people react differently to drugs. A drug that aggravates one person's tinnitus may not aggravate another's. It may also be that the medical condition itself increases the tinnitus symptoms rather than the treatment.

Drugs that are known to cause deafness usually have life-saving qualities and are only prescribed where absolutely necessary. If you are given such a drug, your doctor should discuss possible side effects with you and monitor you carefully while you are taking them.

WHAT ARE THE TREATMENTS FOR TINNITUS?

Anyone whose tinnitus becomes persistent or who suspects their hearing is not as good as it used to be should make an appointment to see their family doctor. Usually, the doctor will refer the patient to an audiologist or Ear, Nose and Throat (ENT) unit at the hospital. Here a specialist will be able to rule out more serious middle ear problems and conduct a hearing test to determine whether the problem is linked to a hearing loss. Although tinnitus has no simple 'cure', there are strategies for reducing its impact.

Sound generators

For most people, tinnitus is no more than a slight annoyance while there is sufficient background noise. For those with mild tinnitus, everyday sounds may mask the tinnitus during the daytime, making it either easier to deal with or completely inaudible. However, tinnitus can become a real problem during quiet times of day, such as before sleep. Many people find relief by adding an external competing sound at a constant low level. Radio static, the television or the hum of a fan might all help to distract from the internal sounds of the tinnitus.

Products are also available which will generate white noise specifically to mask the sound of tinnitus, including small speakers which can be placed under the pillow, or bedside models. Behind-the-ear wearable sound generators (similar to hearing aids in appearance) which produce a low-level hissing noise, adjustable specifically to your tinnitus, are also widely used and are available through the NHS.

There is little evidence to suggest that sound generators can actually reduce the perceived level of the tinnitus when they are not in use.

Psychological treatments

Modern imaging techniques have shown that areas of the brain that process information from the ears are more active in tinnitus sufferers than people without the condition.

Research indicates that many people can be helped to reduce the perceived level of their tinnitus sound by retraining the brain to pay less attention to it. Where a person achieves a lower awareness of their tinnitus, it is known as *habituation*. Treatment based on habituation is possible and available in NHS audiology departments and uses a mix of counselling, sound therapy and relaxation therapy.

Tinnitus Retraining Therapy (TRT) is a specific form of habituation based on structured counselling sessions using specially designed counselling sessions combined with sound therapy. It does not offer a 'cure' as such, and results will vary from one person to the next. However, research evidence does show that counselling sessions with an expert trained in tinnitus management can have a positive effect for many people. Although many experts maintain that the use of a sound generator is an integral part of the process, there is evidence to indicate that it is the counselling element of the programme which is the most important.

Hearing aids

Tinnitus is more common in deaf and hard of hearing people than in hearing people, partly due to the damage to the hearing system which is associated with its onset. For those with a hearing impairment, a hearing aid may not only help to make external sounds more audible but may, in some cases, reduce the level of the tinnitus. It is important that hearing aid levels are not set too loud as this can actually worsen the tinnitus in some cases.

Cochlear implants

A cochlear implant is a device fitted surgically which can improve the hearing ability of many profoundly or totally deaf people. Tiny electrodes connect directly into the hearing nerve bypassing the non-functioning hair cells in the inner ear. They electrically stimulate the hearing nerve in response to sounds which are then interpreted by the brain.

Many people fitted with a cochlear implant, find their tinnitus symptoms improve or even disappear. However, in rare cases, tinnitus can actually be worsened as a result of implantation.

Contact the Deafness Research UK Information Service for further information about cochlear implants.

Drug treatments

Although several drugs have been tested in controlled trials, no single drug treatment has yet been developed which can benefit all people with tinnitus.

Tricyclic or SSRI-type anti-depressant medication can form an integral part of a treatment programme for some tinnitus patients. However, whilst such drugs may reduce the anxiety caused by tinnitus (so reducing its perceived level), they do not offer a cure.

Diet and Lifestyle

Improving blood circulation through exercise and a good diet can help reduce tinnitus symptoms for some people. Salt can impair circulation and raise blood pressure so avoid processed food with high salt levels, and adding it to food yourself.

Some people notice a change in their tinnitus according to what they eat or drink. It can help to keep a food diary for a while to see whether an increase in symptoms coincides with the intake of any particular food or drink. Most commonly named aggravators are red wine and other alcoholic drinks, cheese, coffee and tobacco. However, everyone's sensitivity is different and so there is no reason to avoid something without good reason.

Relaxation therapy is a useful approach to breaking the cycle of tinnitus, reducing stress levels and helping to restore a regular sleep pattern. Books and CDs on relaxation are widely available. You could also ask your GP for advice or contact a local college or health centre about courses in your area.

Complementary treatments

A substantial number of people use a variety of complementary treatments to control their tinnitus. The commonest treatments tried include acupuncture, homeopathy and dietary supplements. There is no hard evidence that these treatments are effective, although for some patients they may help to lower anxiety levels and encourage them to feel more in control, thus reducing the perceived level of their tinnitus.

Until recently, the popular herbal supplement, ginkgo biloba was being widely used as a complementary treatment for tinnitus, particularly in cases linked to poor circulation. However, a double blind, placebo controlled trial carried out by the University of Birmingham concluded that ginkgo biloba is not an effective treatment for tinnitus. Despite this, some individuals report that this supplement does reduce their tinnitus.

Some complementary therapies are available through GP surgeries. Alternatively, you should check that your intended therapist has a recognised qualification through the appropriate professional body. Guidance is also available from the Complementary Medical Association:

www.the-cma.org.uk

WHERE CAN I GET SUPPORT FOR MY TINNITUS?

The British Tinnitus Association

Ground Floor, Unit 5
Acorn Business Park
Woodseats Close
Sheffield, S8 0TB

Freephone: 0800 018 0527

Fax: 0114 258 2279

E-mail: info@tinnitus.org.uk

Website: www.tinnitus.org.uk

WHAT RESEARCH IS BEING CONDUCTED INTO TINNITUS?

What is Deafness Research UK's contribution to research?

Scientists are developing a greater understanding of the origins of tinnitus, and the prospects for new treatments are much greater now than they were just a few years ago. Deafness Research UK, the only national charity dedicated to finding cures and developing new treatments for hearing loss and tinnitus, has so far given some £8.8 million in support of research. Finding a cure for tinnitus is a key priority in its research strategy.

Deafness Research UK has supported a number of projects which have contributed to our current understanding of tinnitus. These include:

- In the 1990s, Deafness Research UK funded ground-breaking research leading to the development of Tinnitus Retraining Therapy
- The charity has encouraged new researchers into the field including Dr Carole Hackney at Keele University who discovered that an overproduction of the neurotransmitter, glutamate, can be linked to tinnitus, a finding that could lead to the development of new drug treatments
- Research using the latest brain mapping techniques to identify which parts of the cochlea (inner ear) are involved in tinnitus generation.

What direction is tinnitus research currently taking?

A key focus of research is to study both the brain and the hearing system to clarify how and from where tinnitus can originate:

- Imaging techniques such as functional magnetic resonance imaging (fMRI) and positron emission tomography (PET) are being used to demonstrate tinnitus-related activity in the brains of individuals who are able to alter or modify their tinnitus (known as somatic modulation). This is giving valuable information about how the brain processes information from the ears
- Researchers are investigating evidence to suggest that when the brain lacks signals from the ears (when hair cells in the cochlea aren't working anymore), it creates its own sounds which are heard as tinnitus
- As well as achieving a better understanding of how the tiny hair cells in the inner ear work, scientists are learning more about the supporting cells that surround them. A chemical called ATP which is released by these cells while they are developing in the womb could explain why people experience tinnitus in later life.

Contact the Deafness Research UK Information Service for further information about research into tinnitus.

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).

Freephone: 0808 808 2222

Textphone: 020 7915 1412

E-mail: info@deafnessresearch.org.uk

or click the 'ask question' option from our website homepage:

www.deafnessresearch.org.uk

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