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## **TINNITUS - a patient's guide**

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### **What is tinnitus?**

Tinnitus is the word used to describe a sensation of sound which is present when there is no external sound source present. It may be a constant sound (cicadas, whistles, etc.) or less commonly a pulsating sound, in time with the pulse.

In most people with tinnitus, the tinnitus is present because of, or at least in association with a hearing loss of some form. The cause of the hearing loss does not seem to matter. Tinnitus is seen in association with aging changes to the ears, industrial deafness, drug toxicity to the ears, ear trauma, infections, and many other causes of hearing loss. In this situation, the centres of awareness in the brain can become alerted to the normal background nerve activity in the hearing "circuits" of the brain, and this nerve activity is perceived as noise.

This normal nerve activity is usually filtered out by parts of the brain before it reaches the centres of awareness, unless a change in hearing results in these filters "opening up" and making the person aware of their own "internal noise". (It is a similar phenomenon to the "phantom limb pain" felt by some amputees - i.e. a kind of "phantom hearing"). Relatively trivial events such as having the ears syringed can occasionally be enough to cause these filters to open.

The filters are also stimulated by other parts of the brain - in particular the parts known as the Limbic System, which is involved with emotion, and the Autonomic Nervous System, which is responsible for our stress response and our "fight/fright/flight" response. The filters can also be voluntarily "opened" by consciously listening for one's tinnitus.

The current concepts of tinnitus suggest that the perception of tinnitus as a noxious or threatening stimulus is the single most important factor in determining whether the tinnitus continues to cause distress, and modern tinnitus management places a lot of emphasis on trying to break this perception of tinnitus as a threatening stimulus.

Tinnitus can occasionally be due to important causes, and people with tinnitus in only one ear may need further tests carried out to exclude a benign tumour of the balance nerve (an acoustic neuroma).

Pulsating tinnitus can be present because a conductive hearing loss is causing someone to hear normal blood-flow in vessels near the ear, or because there is abnormal blood flow due to high blood pressure, inflammation in the ear, or occasionally, certain benign tumours in the ear.

### **Who else has tinnitus?**

Virtually everyone is able to hear their own tinnitus if placed in a quiet enough place (such as a recording studio).

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About 1 in 4 adults regularly hear their own tinnitus in quiet surroundings, especially in bed at night.

Of these about 1% have severely distressing tinnitus.

### **What makes tinnitus worse?**

Almost everyone finds their tinnitus worse if tired or stressed. (A headache is often worse than too).

Quiet surroundings (less other sound to distract the hearing system).

Anything which makes the hearing worse (wax impaction in the ear canals, exposure to high noise levels, ear infections, etc.).

Any inflammation in the neck, jaw joints, teeth or sinuses.

Certain medications. Some consistently make it worse (such as high doses of aspirin or quinine). Others, of which there is a long list, have occasionally been found to have an effect in isolated people. Of course, medications which have a side effect of damaging the cells of the inner ear, such as one family of injected antibiotics (such kanamycin) and certain anti-cancer drugs, can cause permanent tinnitus.

Certain foods. Like medications, there is a huge list of foods which occasionally make tinnitus worse. In particular, any foods which stimulate nerve excitability, such as caffeine in high doses, may make tinnitus seem louder. A full list of foods which have been implicated in some people with tinnitus is available in the information sheets provided by the Tinnitus Association.

For many people, talking about, thinking about and listening for their tinnitus. This is probably why many people with tinnitus notice it less when busy. (Some other people find talking about it very helpful).

The tinnitus spiral. A few people with tinnitus find that they become trapped in a spiral downwards in which their tinnitus makes them upset and depressed, their sleep pattern suffers, the tinnitus gets more noticeable, the mood drops further, their sleep suffers more, their tiredness increases, their tinnitus gets even worse, and so on. In this situation, something has to be done to break the cycle (or spiral).

### **What can be done about tinnitus?**

For most people with tinnitus, unless there is a treatable cause for the hearing loss, they will always be prone to tinnitus. This does not necessarily mean that they will always be distressed by it. Many people, once they have an explanation for their tinnitus, find that they can come to terms with it as part of their "normal" state, following which the perceived loudness gradually decreases, and it ceases to be a problem for them. This does not mean that it has disappeared entirely: one could say that the problem is not so much whether you have tinnitus, but whether your tinnitus is causing annoyance or distress. Many of the

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measures suggested for tinnitus are therefore aimed at reducing the annoyance, rather than abolishing the tinnitus itself.

### **Treatment of the hearing loss:**

In some people, the hearing loss itself can be reversed, such as by repairing a hole in the ear drum, correcting an abnormality in the chain of hearing bones in the middle ear etc. which can result in cessation of any resulting tinnitus.

Even when this is not possible, fitting a carefully-programmed hearing aid or aids can compensate for the hearing loss, and this often has a very beneficial effect on the tinnitus. In some people, the hearing itself may not strictly be poor enough that one might have otherwise considered fitting an aid, but it is done anyway, as a way of helping the tinnitus, as outlined below.

### **Tinnitus retraining therapy:**

It has been found that long periods of exposure to gentle sound can cause the hearing system to become desensitised to their "internal noise", or tinnitus. This is thought to work by helping to close the filters which are normally responsible for removing the "background noise" in the hearing system. It is also effective for people who have become oversensitive to loud sounds ("hyperacusis"). It is carried out in association with counselling to increase the understanding of the reasons why tinnitus is present.

This is carried out in specialised tinnitus clinics, (Dilworth Audiology, Auckland). It involves the wearing of either a carefully programmed hearing aid, or a soft noise generator which looks like a hearing aid, for very long periods (18 months or so, during waking hours). There are now also available special hearing aids incorporating noise-generation circuitry to achieve this further. A significant majority of people with tinnitus find after this that the tinnitus has become hardly noticeable, and no longer causes distress.

Maintaining a sound-rich environment is helpful in desensitising the hearing system to its own "background noise". (This is an extension of the "simple environmental masking" mentioned below.)

### **Tinnitus masking:**

Any other competing sound helps distract the hearing system from the tinnitus. This can be arranged in a number of ways:

Simple environmental masking sounds. Most people with tinnitus have noticed that their tinnitus is less noticeable when there is some other noise around. A radio or television playing in the background is often helpful when the tinnitus is annoying. If trying to get to sleep, the stimulation of a radio program can be annoying in itself. In this situation, a constant sound is often soothing, such as an off-station FM radio. This makes a sound known as "white noise". Like the engines of an aircraft in flight, this becomes hardly noticeable to most people after a few minutes, and can be quite acceptable in the bedroom, even to one's spouse. Some people prefer the sound of running water, rain on a roof, surf on a beach, etc., and choose to purchase relaxation tapes with this type of sound, for use

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when trying to rest. A "Walkman" type of cassette player can be used with tiny earphones which can be worn when lying down, or alternatively one of the pillows incorporating a speaker, available from mail-order firms such as L.V. Martin.

Modern hearing aids with sophisticated compression circuitry are very effective at restoring the general soft environmental sounds around you, without making the louder sounds too loud, as was generally the case with earlier aids. They are therefore much more useful for tinnitus than older aids. These can also be programmed to amplify the soft background noise around you and even to supply a little gentle hum to help desensitise the hearing system to noise which usually helps tinnitus.

Tinnitus maskers. These are devices which look like hearing aids which are designed to generate noise into the ear with tinnitus as a masking sound. These can be either stand-alone masking devices, or can be incorporated into a hearing aid to kill two birds with one stone. A minority of people with tinnitus choose to wear a masker.

### **Aids to relaxation:**

Stress and tiredness are not causes of tinnitus, but in most people who are prone to tinnitus anyway, they can make it worse, or at least more annoying. Almost anything which can be done to reduce either can be very helpful. This can range from simply trying to avoid "burning the candle at both ends", to learning relaxation techniques such as meditation and attending stress management courses.

A specialised relaxation technique known as biofeedback has been studied as a treatment for tinnitus, and can be helpful. This is available in Auckland from Mrs Joan Saunders (President of the NZ. Tinnitus Association)

### **Diet**

As mentioned above, some foods are found by some people to make their tinnitus worse. This does not mean that every person with tinnitus finds that the same foods are involved, nor indeed that there is necessarily any food which makes their own tinnitus worse. To go without all of the foods which have occasionally been reported to make someone's tinnitus worse is neither logical nor effective (and the stress of constantly worrying about your diet may well make things worse rather than better).

My suggestions about diet are as follows:

In general, a healthy balanced diet is good for your health. Anything which improves your state of health will likely reduce your levels of tiredness and general stress, which may well help your tinnitus.

Don't try removing several foods from your diet all at once - if your tinnitus improves (or worsens), you will not be able to tell which food was the culprit. Try abstaining from one food at a time, until you have worked out which ones (if any) seem to make your tinnitus worse.

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If you can identify a food or drink which seems to make your tinnitus worse, you as an intelligent adult have to decide which you think is worse: going without that particular food, or having louder tinnitus. It is not for anyone else to dictate what you should or should not eat.

Good places to start are with caffeine, certain types of alcohol (such as red wine), tonic water (quinine), certain cheeses and very salty foods.

### **Medication:**

In general, tinnitus should not be thought of as something which is usually best treated with pills. However, there are situations in which certain types of medication can be helpful in carefully selected people.

Since tinnitus is believed in many cases to be due to an abnormal firing of the nerve cells in the hearing system, medications which stabilise nerve cell membranes might reasonably be expected to help. The medications which do this are the ones which are used to treat epilepsy (which is due to abnormal firing of another type of nerve cell). This has been confirmed for certain types of tinnitus.

However, the most effective medications are also the ones with the most unpleasant side effects, and for most people with tinnitus, the treatment would be worse than the disease! However, for people with intolerable tinnitus, they can sometimes be very helpful. These powerful drugs (such as Tegretol) are only used after carrying out a special test to see whether an injection of the local anaesthetic Lignocaine abolishes the tinnitus. If Lignocaine has no effect, Tegretol is unlikely to help. There is another anti-epileptic medication, known as Clonazepam, which has a very low incidence of unpleasant side effects, and which can be helpful when used for a short period to break the cycle in tinnitus. It also has a gentle sedative effect which can be useful in helping someone with tinnitus get to sleep. It is also addictive if used for longer periods.

People with severe and distressing tinnitus sometimes understandably find that they become upset and depressed as a result. Occasionally, the depressed mood can make it difficult or even impossible to break out of the tinnitus spiral. If this appears to have happened, sometimes a short course of an antidepressant medication can be all that is required for the mood to come back to normal, the tinnitus cycle to be broken, and for the person to get on with their life.