

# Tinnitus: a common manageable complaint

Tinnitus is a common symptom with 7% of the UK adult population attending their GP specifically about tinnitus. The prevalence increases with age and hearing loss although it can also be present at any age and with normal hearing. Tinnitus is a symptom of many disorders and, in terms of treatment, what works for one may not necessarily work for another. Therefore, effort should be made to understand the mechanism of each individual's tinnitus to enable us to prescribe the most effective treatment plan. Whilst it can be annoying for some, and there is usually no definitive cure, the symptom can usually be managed effectively with modern treatments.

**Tony Kay**, Senior Chief Audiologist and Head of Audiology Services, Aintree University Hospitals NHS Foundation Trust, Liverpool  
**Email** [tony.kay@aintree.nhs.uk](mailto:tony.kay@aintree.nhs.uk)

The word tinnitus derives from the Latin “tinnire,” which means to ring, although patients will describe their tinnitus as ringing, hissing, whistling, buzzing, etc. It is not uncommon for a patient to describe more than one tinnitus sound. A few may describe musical hallucinations<sup>1</sup> which should be distinguished from auditory hallucinations seen in psychosis.

The simplest definition is noises in the ear or head without an external origin. McFadden<sup>2</sup> suggested that “Tinnitus is the consciousness expression of a sound that originates in an involuntary manner in the head of its owner, or may appear to him to do so.”

Tinnitus is not a disease but it is a common symptom with 10–15% of adults having prolonged spontaneous tinnitus, ie. tinnitus that lasts for more than five minutes in the absence of being exposed to loud noise.

Some will also complain of hyperacusis, which is “an unusual tolerance to ordinary environmental sounds”<sup>3</sup> although hyperacusis may exist without tinnitus being present.

The Medical Research Council Institute of Hearing Research<sup>4</sup> found that 5% of adults in the UK reported moderate or severe tinnitus and 1% found that the tinnitus severely affected their quality of life. Further, 7% of adults had visited their GP specifically about tinnitus but only 2.5% had attended a hospital clinic. Whilst children do complain of tinnitus,<sup>5</sup> the prevalence increases with age and hearing loss. However, it is important to understand that most people who experience tinnitus are not troubled by it but in some the tinnitus may have a marked affect on their lives.

Stephens<sup>6</sup> reviewed the history of tinnitus treatment and

“bewitched ear” was mentioned in the Ebers papyrus in the 16th century BC. Early treatments included inserting certain lotions such as rose oil, vinegar and earthworms boiled in goose grease into the ear canal.

## Mechanisms of tinnitus

Tinnitus is usually a sign of some auditory dysfunction but it can sometimes arise from outside the auditory system and have potentially sinister pathology. It can also occur after a stressful event. The enigma is that not everybody with auditory dysfunction has tinnitus and not everybody with tinnitus finds it annoying. Baguley<sup>7</sup> reviewed the mechanisms of tinnitus in sensorineural hearing loss which includes, amongst others, cochlear models, biochemical models, neurophysiological models, spontaneous activity

in the auditory system, efferent system involvement, somatic modulation<sup>8</sup> (patients reporting changes in their tinnitus causes by certain movements or manipulation of the head and neck) and cortical reorganisation (plasticity). He also discussed analogies of chronic pain with chronic tinnitus. He concluded that there are many potential mechanisms of tinnitus generation and, indeed, no single model will explain tinnitus in all, and many mechanisms may be present in any one individual.

Tinnitus can also occur in other conditions such as conductive hearing loss, vascular lesions, palatomyoclonus, muscle spasms, patulous eustachian tube and idiopathic intracranial hypertension, to name but a few.

It is, however, important to understand that distressing tinnitus will have the physiological mechanism inducing the tinnitus signal and the psychological mechanism causing the tinnitus distress. The distress caused by tinnitus involves links with the limbic and autonomic nervous systems.

Most tinnitus is believed to be due to altered spontaneous activity within the auditory system, and may be due to some simple compensatory changes caused by a mild hearing loss. Serious pathology associated with tinnitus is rare but unilateral tinnitus and pulsatile tinnitus should be investigated. Whilst unlikely, a possible cause of unilateral tinnitus is a vestibular Schwannoma (acoustic neuroma) and pulsatile tinnitus may be caused by a glomus jugular tumour.

## History and examination

In the GP surgery, the characteristics of the tinnitus should be noted, whether the noise is pulsatile or not and whether the noise is in one ear, both ears or in the head, whether the noise is constant or intermittent, and how often it occurs if intermittent. Listen carefully to how troublesome the patient finds the tinnitus and the effects it has on their life. Otoscopic examination of the ears should be performed to exclude wax, infections and otitis media with effusion. Take a history looking particularly for any triggers around the onset of the tinnitus or the onset of when the tinnitus became annoying. This may include noise exposure, head injury, changes in medication or increased levels of stress. A medication review looking at possible ototoxic medication will be useful. Check blood pressure and perform routine bloods if clinically indicated (various metabolic abnormalities may be associated with tinnitus, such as hypo- and hyper- thyroidism, hyperlipidemia, anaemia, vitamin B12 or zinc deficiency). Use a visual analogue scale of 0 to 10 to assess how severe, how annoying and the effect on the patient's life that the tinnitus may have.

Many will just require information and reassurance, especially if the tinnitus is bilateral with no associated symptoms and not troublesome. A simple explanation that tinnitus is very common and reassurance that it usually improves and is unlikely to get worse will be

invaluable. Negative counselling such as "there is nothing that can be done to help you" and "you will just have to learn to live with it" should be avoided because it will worsen the patient's feelings toward their tinnitus and add to their distress.

Offering advice about using sound enrichment especially sounds of nature, relaxation, stress reduction techniques, leisure activities and increase socialisation will be helpful. Ear protection should be advised if the patient is exposing themselves to excessive noise.

Individual judgement about the use of nocturnal sedatives should be made if insomnia is present. Underlying anxiety and depression may also require treatment and screening using the Hospital Anxiety and Depression Scale may prove useful.

The British Tinnitus Association (BTA)<sup>9</sup> has a very useful website and a tinnitus helpline with trained counsellors. A local tinnitus support group may exist in your area.

## Referral to a tinnitus clinic

As previously mentioned, unilateral tinnitus and pulsatile tinnitus should be referred for further investigation. Also, patients with associated hearing loss will benefit from hearing aids and those with vertigo may require medical, surgical or physiotherapy treatment. Any cases with distressing or moderate-severe tinnitus should also be referred for assessment.

Some tinnitus clinics are led by ENT surgeons and others by

### Top Tips

- Tinnitus is common and in most cases not troublesome.
- Examine the ears to check they are clear.
- Assess the impact that the tinnitus is having on the patient's life and refer on to a Tinnitus Clinic if necessary.
- Avoid negative counselling.
- Advise on sound enrichment, relaxation and leisure activities.
- Direct patient to the BTA and local tinnitus support group.
- For those with troublesome tinnitus a tinnitus management plan will be effective.

audio-vestibular physicians or audiologists. At the tinnitus clinic a full tinnitus, medical, noise exposure and drugs history will be taken with emphasis around the time of onset of tinnitus and onset of tinnitus annoyance (sometimes a previous underlying mild tinnitus may be exacerbated by a change in medication, exposure to loud noise or increase in stress). Otoscopy and pure tone audiometry will be the minimum investigations performed together with some form of assessment of the effects of the tinnitus such as the Tinnitus Handicap Inventory,<sup>10</sup> other tinnitus handicap questionnaires and/or visual analogue scales. These are useful as both a method of initial assessment and grading

of the tinnitus and as outcome measures after treatment, but it is generally agreed that there are flaws in such questionnaires and they should not substitute careful dialogue with the patient to help assess the impact that the tinnitus may have on them. Sufficient time should be given for the patient to describe the effects that the tinnitus has on their life. My first two questions are usually "What are your expectations of today's consultation?" and "What are your worries, fears and concerns?" This helps to address any specific concerns of the individual and is useful in the therapy side of the treatment. Tinnitus is then usually graded as mild, moderate, severe or catastrophic.<sup>11</sup>

Cranial nerves may be checked, auscultation of the ears, head and neck, clinical tests of balance performed and tympanometry (a test of middle ear function) depending on the symptomology. Further investigations may include magnetic resonant imaging of the internal auditory meatae and brain, auditory brainstem electric response audiometry, blood tests and vestibular function tests. These tests are performed on an individual basis because not every patient requires the same investigations.

Many Tinnitus Clinics review cases in a multi-disciplinary setting with input from ENT, audio-vestibular medicine, audiology, hearing therapy and possibly psychology.

### Treatment

When the investigations are complete, a probable diagnosis is presented to the patient around the possible mechanisms that

### Red flags

- It is rare for tinnitus to be caused by sinister pathology, but unilateral tinnitus and pulsatile tinnitus should be investigated.
- Refer any patients with symptoms of distress straight away.

have caused their tinnitus. Obviously, any underlying pathology should be treated as per standard good practice. Whilst tinnitus usually eludes a definitive cure in most cases, the aim of the tinnitus specific treatment is to help the patient habituate to the tinnitus and minimise the tinnitus related distress.

I find it useful to explain in detail the hearing test results, show a few diagrams and inform the individual about normal ear function and what may be happening in their auditory system. An explanation about the natural course of tinnitus is usually a period of annoyance whilst they focus their attention on the new symptom, followed by habituation over a period of time is beneficial. I also discuss the prevalence of tinnitus because many feel that it is not a common symptom.

A combination of hearing aids, sound enrichment, relaxation therapy, tinnitus retraining therapy,<sup>12,13</sup> counselling, information and support, and cognitive behavioural therapy will probably help the majority of cases. Careful follow up is needed to monitor progress, ensure

that the patient is following the management plan and to decide whether referral on to psychology is necessary for those that may require additional help.

## Grading the severity of tinnitus

Guidelines<sup>10</sup> suggest five grades of severity. The numbers in brackets related to scores on the self-report Tinnitus Handicap Inventory (THI) questionnaire.

### Grade 1: slight (THI 0–16)

Only heard in quiet environment, very easily masked. No interference with sleep or daily activities. This grading should cover most people who are experiencing but are not troubled by tinnitus.

### Grade 2: mild (THI 18–36)

Easily masked by environmental sound and easily forgotten with activities. May occasionally interfere with sleep but not daily activities.

### Grade 3: moderate (THI 38–56)

May be noticed even in the presence of background or environmental noise although daily activities may still be performed. Less noticeable when concentrating. Not infrequently interferes with sleep and quiet activities. The majority of people suffering tinnitus should fall into grades 2 and 3.

### Grade 4: severe (THI 56–100)

Almost always heard, rarely if ever masked. Leads to disturbed sleep pattern and can interfere with ability to carry out normal daily activities. Quiet activities

adversely affected. Hearing loss is likely to be present. Grading in this group should be uncommon.

### Grade 5: catastrophic (56–100)

All tinnitus symptoms at level of severe or worse. Hearing loss likely to be present. Associated psychological pathology is likely to be found in hospital or GP records. Grading in this group should be extremely rare.

## Further reading

The British Tinnitus Association is focusing Tinnitus Awareness Week 2012 (6th–11th February) on increasing knowledge and targeting better information on tinnitus for primary care practitioners. They have produced a “Top ten tips for GPs” that can be viewed at <http://www.tinnitus.org.uk/booklet>.

Further reading is *Provision of Services for Adults with Tinnitus: A Good Practice Guide*. Department of Health. January 2009.

**Conflict of interest: none declared**

## References

1. Cope TE, Baguley DM. Is musical hallucination an otological phenomenon? – a review of the literature. *Clin Otolaryngol* 2009; **34**: 423–30
2. McFadden D. Tinnitus: Facts, Theories and Treatments. Report of working group 89. Committee on Hearing, Bioacoustics and Biomedics. National Research Council. National Academic Press, 1982
3. Vernon JA. Pathophysiology of tinnitus. A special case – Hyperacusis and a proposed

treatment. *American Journal of Otolology* 1987; **8**, 201–202

4. Davis AC, Rafeae EA. Epidemiology of tinnitus. In: Tyler RS (Ed) *Tinnitus Handbook*. San Diego, CA, Singular, 2000; 1–24
5. Baguley DM, McFerran DJ. Tinnitus in childhood. *International Journal of Paediatric Otorhinolaryngology* 1999; **49**: 99–105
6. Stephens SDG. The treatment of tinnitus – a historical perspective. *Journal of Laryngology and Otolology* 1984; **98**: 963–72
7. Baguley DM. Mechanisms of tinnitus. *British Medical Bulletin* 2002; **63**: 195–212
8. Levine RA. Somatic (craniocervical) tinnitus and the dorsal cochlear nucleus hypothesis. *American Journal of Otolaryngology* 1999; **20**: 351–62.
9. [www.tinnitus.org.uk](http://www.tinnitus.org.uk) Helpline: 0800 018 0527
10. Newman CW et al. Development of the Tinnitus Handicap Inventory. *Arch Otolaryngol Head Neck Surg*. 1999; **122**: 143–48
11. McCombe A, Baguley D, Coles R, et al. British Association of Otolaryngologists, Head and Neck Surgeons. Guidelines for grading of tinnitus severity: the results of a working group commissioned by the British Association of Otolaryngologists, Head and Neck Surgeons, 1999. *Clin Otolaryngol Allied Sci*. 2001; **26**(5). 388–93
12. Jastreboff PJ, Hazell JWP. A neurophysiological approach to tinnitus: clinical implications. *British Journal of Audiology* 1993; **27**: 7–17
13. Jastreboff PJ, Hazell JWP. *Tinnitus Retraining Therapy: Implementing the Neurophysiological Model*. Cambridge University Press, 2004