

Tinnitus

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Tinnitus is a very common and occasionally debilitating symptom. This article is a summary of how to approach a tinnitus patient and treatments currently available.

What is Tinnitus?

Tinnitus is the perception of sound in one or both ears when there is no external stimuli. At one time or another most people would have experienced tinnitus. However, continuous tinnitus affects over 1/3 of people over the age of 50, and of those 5% report their tinnitus as annoying.

Patients often describe a “ringing sound” or cicadas, but other sounds such as beeping, wind, static, distortion, indistinct speech, roaring, ticking, hissing whooshing sounds or pulsations are also common. It often worsens at night (when it’s quiet and the patient is not distracted), with lack of sleep, stress or even certain body movements such as clenching the jaw. It can be intermittent or continuous, unilateral or bilateral and often there is associated hypersensitivity to certain sounds.

Unilateral tinnitus and pulsatile tinnitus almost always warrant further investigation.

What causes tinnitus?

It is often assumed that tinnitus is caused by damage to the inner ear hair cells – this is true, but non-tinnitus patients placed in sound proof room will also hear tinnitus if asked to listen intently. This has led us to believe that there is a baseline electrical firing of the auditory pathway.

Tinnitus is a cascade of events in the auditory pathway, usually initiated by an injury to the peripheral hair cells. The injury causes deprivation or abnormal input to the auditory pathways both in the subcortex and cortex. This then leads to the brain adapting to the new pattern of activity, resulting in the perception of tinnitus. Other networks in the brain not usually associated with the auditory pathway then contribute to or heighten the awareness and severity of the tinnitus. Tinnitus and its severity and annoyance is multifactorial with contributions from the auditory, emotional and attention pathways of the CNS.

Tinnitus is classified as subjective or objective tinnitus or non-pulsatile and pulsatile respectively.

Subjective or non-pulsatile tinnitus is a tinnitus that only the patient can hear and is the most common type of tinnitus. Occasionally there is an underlying

structural lesion such as an acoustic neuroma or Meniere's disease , but for the majority it is due to damage to the cochlear hair cells from noise exposure, ototoxic agents or other insults to the ear.

Objective or pulsatile tinnitus is a tinnitus that can be heard by other people. Pulsatile tinnitus most often originates from the vascular structures of the head and neck such as carotid bruits, AV malformations and vascular tumours. It can also be a common symptom in high cardiac output patients (pregnancy, thyrotoxicosis) or benign intracranial hypertension patients.

Sometimes the pulsatile nature of the tinnitus sounds like a rhythmic click; this usually indicates a muscular structure such as myoclonus of the palate (causing opening and closing of the Eustachian tube), or myoclonus of the tendons attached to the ossicles.

Salient points to ask in the history:

1. Determine whether the tinnitus is pulsatile or non-pulsatile and whether it is unilateral or bilateral. Pulsatile tinnitus or unilateral tinnitus needs to be referred on.
2. Is it associated with any other symptoms such as discharging ears, hearing loss, vertigo, otalgia, or hyperacusis.
3. Medication history is important, as aspirin is a very common ototoxic drug that is associated with tinnitus.
4. Grade the severity of the tinnitus: CHIMPS
 - Concentration – does it interfere with working/ reading?
 - Hearing – does it interfere with hearing conversations/ TV?
 - Insomnia – does it interfere with sleeping
 - Masking – do environmental noise cover the tinnitus?
 - Psychological – does it cause depression/ anxiety?
 - Sensitivity – does it worsen with noise or cause pain?
5. If the patient is presenting with severe tinnitus and unable to cope, DO ask about depression, anxiety, sleep and possible stressors.

What can the patient do to help themselves?

Often the symptoms are mild and do not interfere with their lives. With time the tinnitus can lessen or disappear. Knowledge of this can help patients deal with it.

Most people find that their tinnitus gets louder at night or when it is quiet. Having music or TV on as background noise can help by “masking” the tinnitus. Similarly if the patient has hearing loss, hearing aids can help mask the tinnitus by increasing general auditory input. If a patient has difficulty getting off to sleep because of the tinnitus, they can be advised to have a bedside noise generator to play background noise (such as rain falling or ocean surf) to mask their tinnitus.

Some people find that certain foods set off or worsen their tinnitus. Common culprits are salt, caffeine, MSG, sulphites, artificial sweeteners, alcohol and smoking. Avoidance of these triggers can be beneficial not only to the tinnitus, but to health too.

Treatment options:

This relates to non-pulsatile tinnitus as the treatment for pulsatile tinnitus is specific to the underlying cause and beyond the scope of the article.

There is no cure for subjective/ non-pulsatile tinnitus. The treatments are aimed at reducing or coping with the symptomatic tinnitus that is interfering with quality of life.

1. Wearable Masking Device

Hearing aids are used to amplify ambient noise, which masks the tinnitus. Alternatively Tinnitus Maskers deliver narrow band noise pitched at the tinnitus frequency at low intensity. The results can be quite good, but they are expensive.

2. Transcutaneous electrical stimulation

Can be effective up to 50% of patients; low voltage pulses are delivered to 20 points around the ear and pinna. There is promising research currently being undertaken at the University of Auckland for Transcranial electrical stimulation, but this is still very much in the research phase.

3. Medication

It is important that the patient has good sleep as poor sleep causes a vicious cycle and worsens the tinnitus. Concurrently, the patient's anxiety and depression also has to be addressed. Studies have not shown direct reduction in the severity of the tinnitus with tricyclics or SSRI, however by treating the depression or anxiety and insomnia, patients are able to *cope* with their tinnitus better.

Clonazepam (0.5-1mg/day) or Alprazolam (0.5mg, titrate max 1.5mg/day for 3 months) have been shown to have some benefit in trials. This would be worth trying for particularly anxious patients as it can also help with anxiety.

High dose Betahistine has been found to help tinnitus in Meniere's patients. In the acute setting of Sudden Sensorineural hearing loss either intratympanic or oral steroid may be of benefit.

4. Tinnitus Retraining Therapy

Perhaps the most efficacious of all treatments, this is available at the University of Auckland Hearing and Tinnitus Clinic and at some audiologists as well. In a 2.5 hour appointment where the patient's tinnitus is assessed, explained and treatments offered which include Auditory Habituation Therapy, Counseling and Social support.

<http://www.clinics.auckland.ac.nz/en/about/our-services/hearing-and-tinnitus/ht-our-services/about-tinnitus-appointments.html>

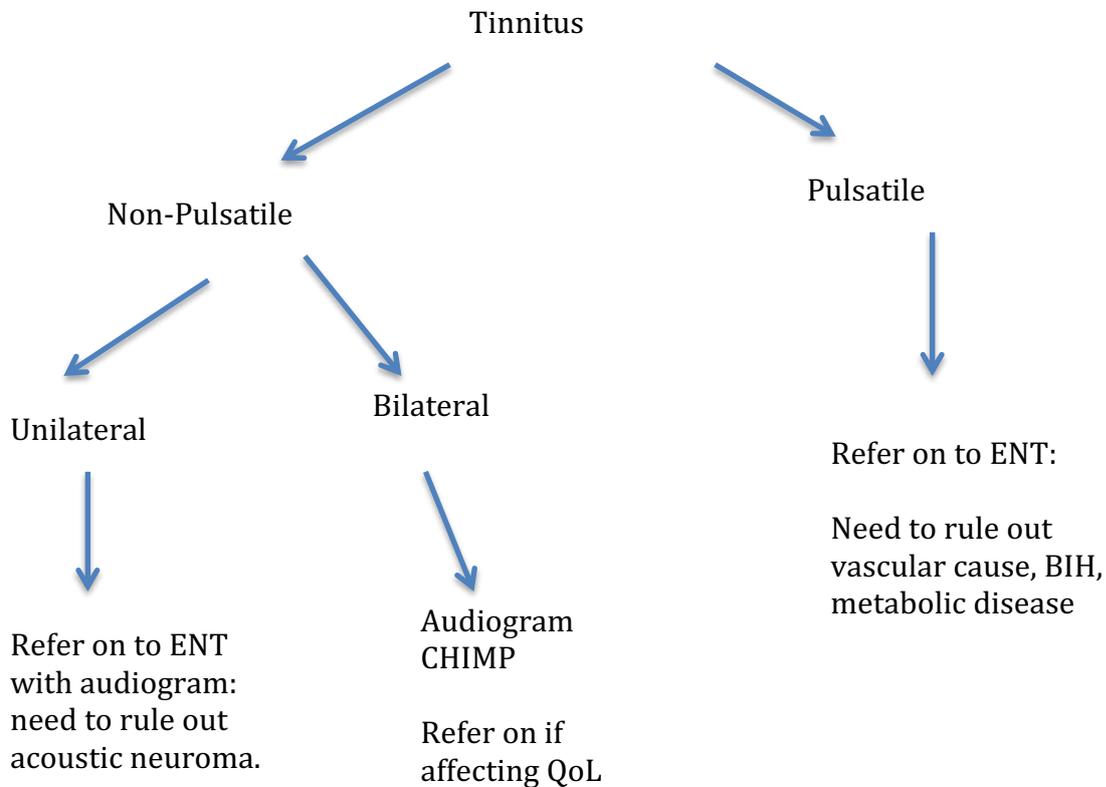
5. Non-proven treatments

Treatments such as ginkgo, zinc, melatonin, misoprostol have not been shown to improve tinnitus in trials.

Prevention of noise induced hearing loss is always the best "treatment" for tinnitus. There is no magic bullet for tinnitus treatment as the cause is

multifactorial, but there is the ability as medical practitioners to assess and help our patients cope with it better.

Diagram to show history taking and decision paradigm



The common causes of tinnitus:

Subjective/ Non-Pulsatile Tinnitus	Objective/ Pulsatile Tinnitus
Acoustic Trauma	Benign Intracranial Hypertension
Head Trauma	Atherosclerotic carotid disease
Ear canal obstruction (wax/ FB/ OE)	AV fistula/ AV malformation
Ototoxic drugs (aspirin)	Glomus tumours
Stimulants (caffeine, smoking)	High metabolic state (pregnancy, thyrotoxicosis)
Infection (AOM, CSOM)	Palatal myoclonus
Presbycusis	Tensor tympani or stapedial tendon myoclonus
Meniere's disease	
Otosclerosis	

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