

## Tinnitus: a brief overview

Tinnitus sufferers experience sound in the absence of an external source. Sounds 'heard' in tinnitus tend to be buzzing, hissing or ringing rather than fully-formed sounds such as speech or music.<sup>1</sup> The noises can occur in one or both ears, or appear to arise from within the head. They can also vary in loudness, quality and pitch (Table 1). It is important to distinguish the experience of tinnitus from the auditory hallucinations that sometimes happen during bouts of mental illness.

There are several established risk factors for tinnitus.<sup>1</sup>

- Hearing impairment
- Increasing age
- Gender (male)
- Noise exposure

People who suffer tinnitus can be profoundly affected by their condition, with substantial psychological problems arising.<sup>2,3</sup> These are described in more detail on page 2. It is estimated that between 10% and 15% of the worldwide general population suffer tinnitus.<sup>1</sup> This is around 280 million people. The burden of tinnitus is expected to grow in coming years, partly due to two main factors.

1. The elderly population is increasing in number, thereby increasing the number of people at risk of tinnitus
2. Widespread noise exposure in both work and leisure environments

The severity of tinnitus varies considerably. Some people are able to live full lives unaffected by their condition, whereas others experience mild to severe levels of disability that impacts their ability to live a normal life. In 1% to 2% of people, tinnitus is so severe that daily life is substantially impaired.<sup>1</sup>

Noise criteria	Possible features
Onset	Sudden, gradual
Pattern	Pulsatile, intermittent, constant, fluctuating
Site	Right or left ear, both ears, within head
Loudness	Wide range, varying over time
Quality	Pure tone, noise, polyphonic
Pitch	Very high, high, medium, low

Table 1. Features of tinnitus noise

## What causes tinnitus?

Several factors are associated with the onset of tinnitus (Figure 1). These tend to act on the ear directly (e.g. noise trauma) and indirectly (ototoxic drugs). However, it is now recognised that tinnitus arises from changes in the central nervous system that result in the brain generating the phantom noises that make up tinnitus.<sup>1,4</sup>

Other factors are also required for the development and/or persistence of tinnitus.

Hearing loss plays a role in many cases of tinnitus. This is described in more detail on page 3.

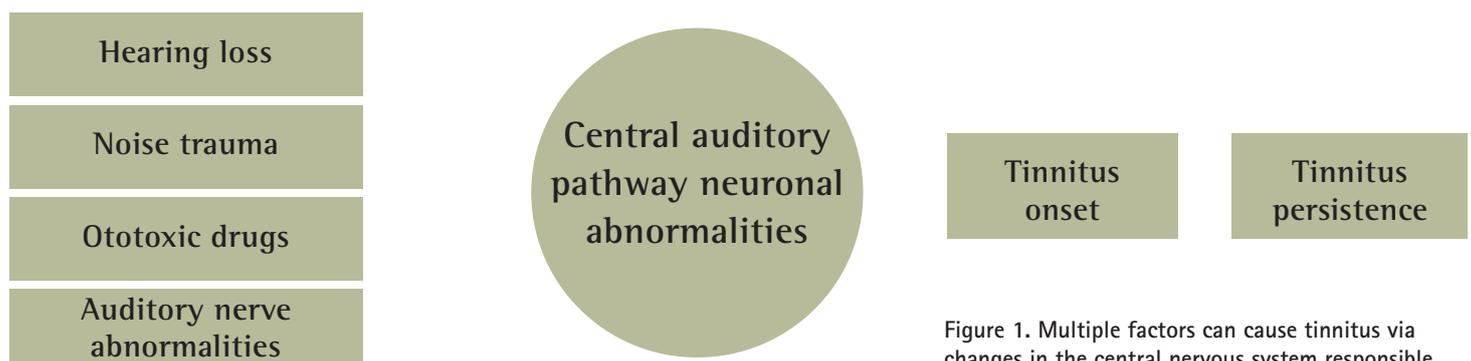


Figure 1. Multiple factors can cause tinnitus via changes in the central nervous system responsible for processing sound

# The psychological impact of tinnitus

"... perceived severity of tinnitus correlates closer to psychological and general health factors, such as pain or insomnia, than to audiometrical parameters ..."<sup>3</sup>

For many people, to hear noises when there is no external cause can be emotionally upsetting. If the condition can be understood, some sufferers are able to moderate their emotional reactions. However, in other cases, an understandable adverse emotional reaction to tinnitus sounds occurs. This can sometimes result in the sounds becoming worse, leading to further negative reactions. Ultimately, this process establishes a vicious cycle of increasing tinnitus severity and heightened distress levels (Figure 2).

Tinnitus is associated with increased levels of psychological problems.<sup>2,3,5</sup> For example, Belli et al report that psychological issues were observed in 26.7% of a group of tinnitus sufferers.<sup>5</sup> This is similar to self-reported rates of sadness, depression and anxiety reported by people with severe age-related hearing loss.<sup>6</sup>

Anxiety, depression, reduced cognitive performance and sleep issues are commonly reported by people with tinnitus (Figure 3). Different studies report different rates of tinnitus-related psychological issues. However, many show that rates of anxiety and/or depression regularly exceed 50%.<sup>2,3,5</sup> Therefore, a reduction in the severity of tinnitus should be attempted to lessen the psychological burden of the disease.

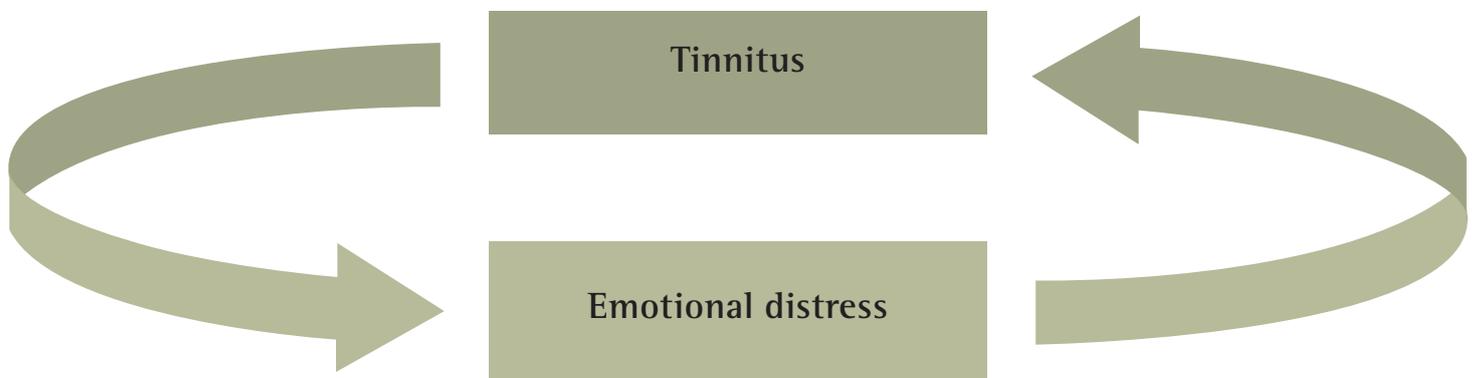


Figure 2. Tinnitus and emotional distress can interact to form a vicious cycle

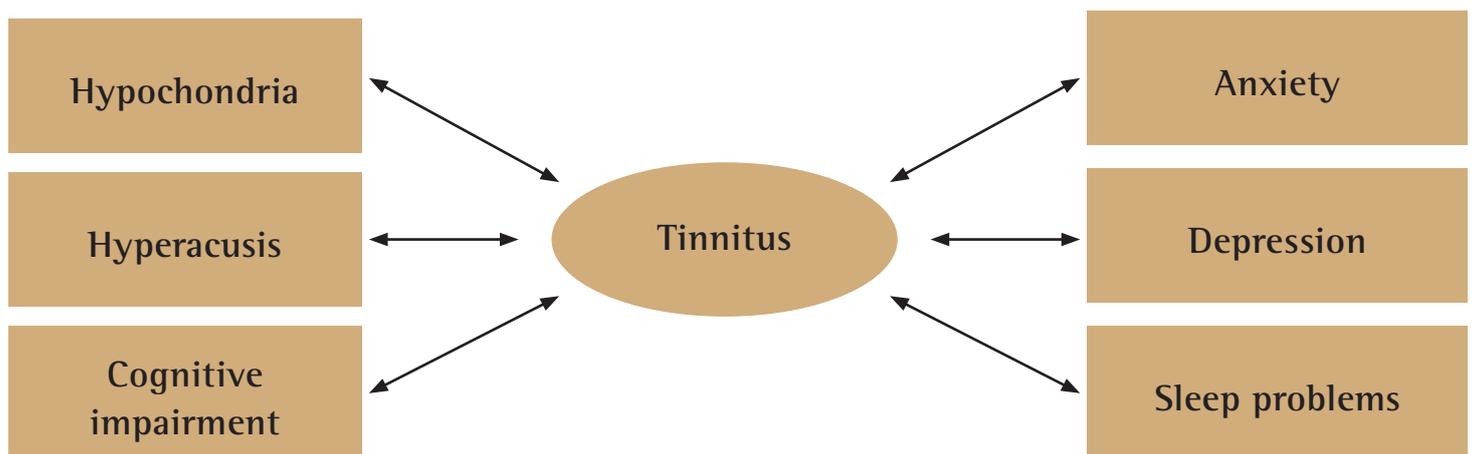


Figure 3. Tinnitus is associated with a variety of conditions that can severely affect daily living

# Tinnitus and hearing loss

"Hearing loss is a hidden disability and to have tinnitus is sort of like a double whammy" (Interviewee reported by Southall et al<sup>7</sup>)

The association between hearing loss and tinnitus is well documented.<sup>1</sup>

- Most patients with tinnitus have some degree of hearing loss.
- 75%–90% of patients with otosclerosis have tinnitus.
- About 80% of patients with idiopathic sensorineural hearing loss have tinnitus.

A recent study showed that simulating hearing loss using ear plugs could result in tinnitus-like experiences within 7 days.<sup>8</sup> Interestingly, on removal of the ear plug, experience of the phantom sounds vanished within a few hours.

It is possible that hearing loss precedes tinnitus in many cases.<sup>4</sup> Where this happens, tinnitus may be due to the brain failing to make compensatory changes resulting from the hearing loss. This presents a strong argument for the early identification and correction of hearing loss.

## Managing tinnitus: the need for multidisciplinary care

Currently, there is no cure for tinnitus. However, there are multiple management options to offer the sufferer of tinnitus (Figure 4). Optimal management should address both physical (e.g. hearing loss) and psychological (e.g. anxiety or depression) components.<sup>1</sup> Counselling or psychotherapy, cognitive behavioural therapy and some psychiatric drugs can all help to reduce the symptom burden and in some cases the severity of tinnitus itself.<sup>1,5</sup>

GPs should consider referring a patient with tinnitus to a hearing care professional or audiologist for hearing tests. Long-term management could involve a multidisciplinary team comprising the GP, an ENT specialist, a psychologist/psychiatrist and a hearing-care professional.

**Patients are 5 times more likely to have a hearing aid if there is a physician recommendation<sup>9</sup>**

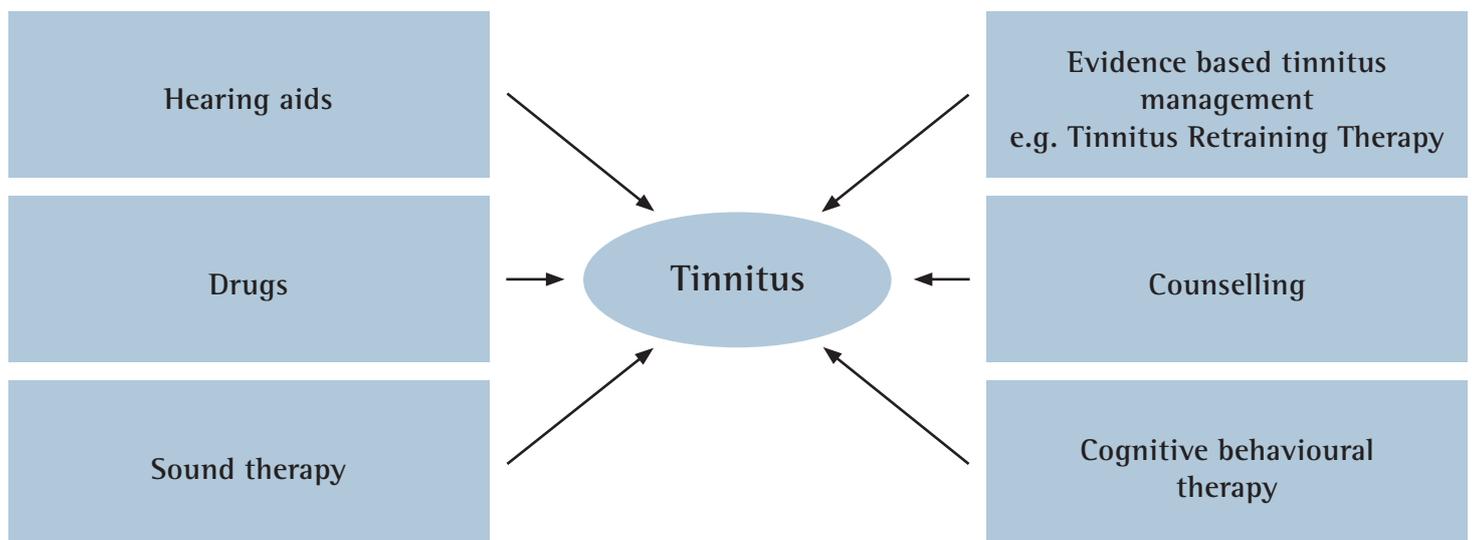


Figure 4. Physical and psychological interventions to help manage tinnitus

# Managing tinnitus: a central role for hearing aids

"The majority of studies reviewed support the use of hearing aids for tinnitus management. Clinicians should feel reassured that some evidence shows support for the use of hearing aids for treating tinnitus ..." <sup>10</sup>

As already mentioned, hearing loss and tinnitus often occur together. Therefore, what impact would hearing aids have on tinnitus symptoms and their severity?

A recent review of the use of hearing aids to help manage tinnitus identified 11 interventional studies.<sup>10</sup> In these studies, one of six tinnitus evaluation questionnaires

was used: THI: Tinnitus Handicap Inventory; THQ: Tinnitus Handicap Questionnaire; TRQ: Tinnitus Reaction Questionnaire; TSI: Tinnitus Severity Index; TQ: Tinnitus Questionnaire; VAS: visual analogue scale (various).

Although there were differences between the studies, 10 out of the 11 trials revealed improvements in tinnitus symptoms following the fitting of hearing aids (Figure 5). Hearing aids resulted in tinnitus severity being reduced by up to 50%, and improvements of at least 10% were observed in 10 of the 11 studies (Figure 5).<sup>10</sup>



Figure 5. Multiple interventional studies show that hearing aids help reduce tinnitus severity<sup>10</sup>



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## Summary

Tinnitus can be a distressing, even disabling, condition that has a major impact on sufferers' lives. It is often caused by the brain's response to auditory deprivation, and has a clear physical cause.

Tinnitus sufferers often experience hearing loss, and management of tinnitus should address both physical components and the psychological consequences.

Fitting a frequency-matched hearing aid can help to reduce the severity of tinnitus and improve quality of life.

You can help your patients who suffer from tinnitus by referring them for a hearing test with your local audiologist.

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## References

1. Langguth B, et al. (2013) Tinnitus: causes and clinical management. *Lancet Neurol.* 12:920-930
2. Geocze L, et al. (2013) Systematic review on the evidence of an association between tinnitus and depression. *Braz J Otorhinolaryngol.* 79:106-111
3. Zöger S et al. (2006) Relationship between tinnitus severity and psychiatric disorders. *Psychosomatics.* 47:282-288.
4. Norena AJ, Farley BJ. (2013) Tinnitus-related neural activity: Theories of generation, propagation, and centralization. *Hearing Res* 295:161-171.
5. Belli H, et al. (2012) Psychopathological dimensions of tinnitus and psychopharmacologic approaches in its treatment. *Gen Hosp Psychiatry.* 34:282-9
6. National Council on Aging. (1999) The consequences of untreated hearing loss in older persons.
7. Southall K et al. (2011) Factors that influence disclosure of hearing loss in the workplace. *Int J Audiol* 50: 699-707
8. Schaette R et al. (2012) Reversible induction of phantom auditory sensations through simulated unilateral hearing loss. *PLoS One* 10.1371/journal.pone.0035238.
9. Kochkin S. (2004) BHI physician program found to increase use of hearing healthcare. *The Hearing Journal* 57: 27-29
10. Shekhawat GS, et al. (2013) Role of hearing aids in tinnitus intervention: a scoping review. *J Am Acad Audiol.* 24:747-762

