

## Tinnitus:

### systematic approach to primary care assessment and management

#### INTRODUCTION

Tinnitus is a symptom in which patients report the perception of sound in the absence of external stimuli.<sup>1</sup> The nature of the sound is variable; it may include buzzing, ringing, humming, or whistling. Tinnitus affects up to 15% of the population.<sup>1-4</sup> It affects all ages but is most common in older people with presbycusis.<sup>2,4</sup> Two per cent are significantly affected, reporting reduced quality of life outcomes.<sup>1,4</sup> A recent international systematic review estimated the cost of tinnitus management to be as high as 7246 Euros (6115 GBP) per patient per year.<sup>1</sup> Despite this disease burden, the pathophysiology of tinnitus remains poorly understood.<sup>2,5</sup> It is thought to be multifactorial in nature, resulting from dysregulated neural activity at any point along the auditory pathway from the cochlea to auditory cortex.<sup>1,2,5</sup> The perception of tinnitus is associated with hearing loss or being in a quiet environment because of a lack of masking by background noise.<sup>1,2,6</sup> Tinnitus may present as an isolated symptom or may be indicative of a range of pathologies from benign conditions to clinical emergencies.<sup>2</sup> It may also pose a significant psychosocial burden on patients and is associated with anxiety and depression.<sup>2,3</sup>

The National Institute for Health and Care Excellence (NICE) released new guidance, *Tinnitus: Assessment and Management* (NG155),<sup>3</sup> in March 2020 aimed at both primary and secondary healthcare professionals. Tinnitus is a common presentation, so an understanding of assessment and classification as well as 'red-flag' features is crucial in decision making when determining management.

#### WHAT ARE THE KEY FEATURES OF THE CLINICAL ASSESSMENT?

Given the range of differential diagnoses (Figure 1), assessment requires focused history taking to establish the presence, or absence, of associated signs, symptoms,

and risk factors as well as thorough clinical examination. It is important to characterise the nature of the sound and to determine whether it is unilateral or bilateral, intermittent or constant, and pulsatile or non-pulsatile.<sup>2,3</sup> Timing of onset, duration of symptoms, and precipitating factors should be established as well as any exacerbating or relieving factors.<sup>2,3</sup> Associated symptoms may include hearing loss, otorrhoea, otalgia, vertigo, aural fullness, temporomandibular joint pain, cranial nerve palsy, or other focal neurological symptoms.<sup>2,3</sup> Risk factors for development of tinnitus include hearing loss, noise exposure, trauma, iatrogenic injury, cardiovascular and metabolic disease, and use of ototoxic medications such as loop diuretics, aspirin, aminoglycoside antibiotics, antimalarials, and cytotoxic agents.<sup>2,3</sup>

Clinical examination is guided by the history but should include otoscopy and neurological examination including cranial nerves. It is important to establish if tinnitus is objective, audible on auscultation, or subjective, heard only by the patient. Subjective tinnitus is the most common.<sup>2,3</sup> Weber and Rinne tuning fork tests can provide important information about the type of hearing loss if present. Examination of the temporomandibular joint and cardiovascular system may also be warranted.<sup>3</sup> NICE advises use of validated questionnaires including the 'Tinnitus Functional Index' and 'Tinnitus Questionnaire' to assess functional and mental health impact.<sup>3</sup>

#### WHEN IS REFERRAL REQUIRED?

The presence of red flags indicates need for timely onward referral (Table 1).<sup>3</sup> Referral to Mental Health Services is required when tinnitus is associated with suicidal ideation or continues to have a detrimental impact despite support.<sup>3</sup> Stroke needs to be excluded in patients presenting with tinnitus that is associated with sudden onset of focal neurology or acute severe

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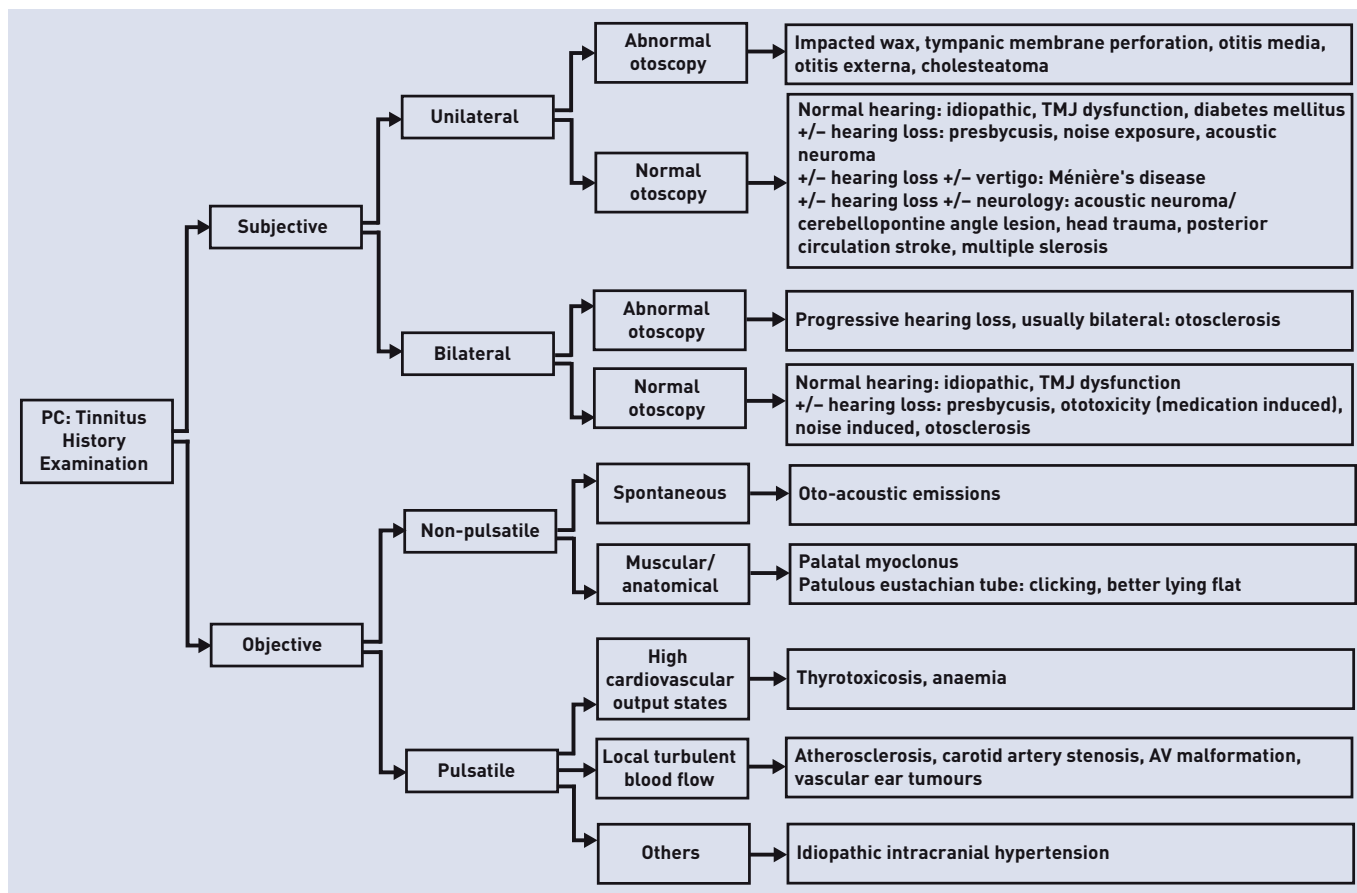


Figure 1. Assessment of tinnitus.  
 PC = presenting complaint.  
 TMJ = temporomandibular joint.

vertigo.<sup>3</sup> Onset of tinnitus following traumatic head or neck injury is concerning for base of skull fracture and should be referred for immediate assessment via the Emergency Department. Similarly, sudden-onset pulsatile tinnitus may be suggestive of progressive vascular abnormalities requiring immediate assessment.<sup>3</sup> Tinnitus, when associated with sudden hearing loss (over 72 hours within last 30 days), requires urgent referral to Ear, Nose, and Throat (ENT).<sup>3</sup>

Sudden-onset sensorineural hearing loss is an otological emergency and high-dose oral corticosteroids should be commenced prior to specialist assessment.<sup>6</sup> Tinnitus associated with rapidly progressive hearing loss, over 4 to 90 days, or sudden hearing loss that occurred over 30 days ago also require ENT review.<sup>3</sup> Routine MRI (magnetic resonance imaging) internal acoustic meatus is indicated because, although rare, acoustic neuromas affect 2 per 100 000 patients per year.<sup>6,7</sup>

ENT referral is also indicated when tinnitus is associated with persistent otalgia or otorrhoea despite adequate medical therapy; this may indicate pathology such as cholesteatoma.<sup>2,3</sup>

#### WHAT MANAGEMENT CAN BE INITIATED IN PRIMARY CARE?

The mainstay of tinnitus management in primary care includes treatment of underlying pathology such as impacted wax or infection, medication review, and patient education.<sup>2,3</sup>

Systemic causes should be considered; thyroid function tests, full blood count, lipid levels, blood glucose, and HbA1c may be performed to exclude endocrine or high-output cardiovascular states that can cause tinnitus.<sup>2,3</sup>

Patients should be reassured that tinnitus is often idiopathic, a common symptom, and not usually indicative of an underlying health condition. Patients should be advised with regards to sound therapy (use of background sounds to distract from tinnitus) and good aural hygiene practice including noise protection, and signposted towards reliable information sources such as the British Tinnitus Association.<sup>2,3</sup>

Clinicians must remain aware of the potential for secondary psychological distress. This should be managed using a step-wise approach that includes digital, group-based, and individual cognitive behavioural therapy.<sup>2,3</sup>

**Table 1. Red flags in tinnitus**

Red flags	Urgency of referral	Referral pathway <sup>a</sup>	Secondary care investigations
Tinnitus with suicidal ideation	Immediate	Mental Health Crisis Team	—
Tinnitus in addition to one of: •sudden onset of focal neurology •acute uncontrolled vestibular symptoms (acute severe vertigo) •suspected stroke	Immediate	Follow local stroke protocol	CT head +/- MRI head
Onset of tinnitus following a head injury	Immediate	Emergency Department	CT head/temporal bone +/- trauma series
Sudden onset of pulsatile tinnitus	Immediate	Emergency Department	MR angiogram +/- MRI head, neck, temporal bone, and IAM
Tinnitus with sudden-onset hearing loss (defined as onset over 72-hour period within last 30 days)	Within 24 hours	ENT	Audiological assessment MRI internal acoustic meatus
Tinnitus causing significant impact upon mental health despite support	Within 2 weeks	Mental Health +/- ENT	—
Tinnitus in addition to one of: •sudden-onset hearing loss that occurred >30 days prior •rapidly progressive hearing loss over 4–90 days	Within 2 weeks	ENT	Audiological assessment MRI internal acoustic meatus

<sup>a</sup>May vary according to local policy. CT = computed tomography. ENT = Ear, Nose, and Throat. IAM = internal auditory meatus. MRI = magnetic resonance imaging.

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Patients with bilateral tinnitus do not require referral. Persistent unilateral or pulsatile tinnitus in the absence of red flags may warrant routine audiogram and tympanometry.<sup>3</sup> This may be arranged in the community where available, or by non-urgent referral to audiology.<sup>3</sup> Additionally, patients with hearing loss may benefit from audiological assessment. While there is no evidence for the use of hearing aids in the management of tinnitus, they are of benefit to those with hearing loss and in these patients may improve tinnitus perception.<sup>3,8</sup>

**CONCLUSION**

Tinnitus is a presentation with multiple aetiologies. A systematic approach to history taking and examination is required to determine the likely cause. Although most cases are benign in nature and amenable to management in primary care, clinicians must remain vigilant to the possibility of underlying pathology requiring urgent referral and investigation as well

as the potential detrimental impact that tinnitus can have on the mental health of those affected.

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**Competing interests**

The authors have declared no competing interests.

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