Canadian Academy of Audiology
Academie Canadienne d'audiologie

CAA FAST FACTS FOR PRIMARY CARE

Tinnitus

1. What is Tinnitus?

Tinnitus is defined as a perception of sound in the ears or head without any external auditory stimulus. It is commonly described as ringing, buzzing, hissing, or whistling, though the specific perception varies. In Canada, approximately 9.2 million adults (37% of the population) reported experiencing tinnitus in 2019, with 7% of cases causing significant disturbances in mood, sleep, and concentration.[1]

2. What are the Causes of Tinnitus?

Although the exact tinnitus mechanism is not completely defined, common causes include hearing loss, noise-induced hearing loss,noise exposure, ear infections, medications, earwax buildup, and trauma (e.g., head or neck injuries). Less frequently, it can be associated with conditions such as Ménière's disease, vestibular schwannoma (acoustic neuroma), blood vessel anomalies, thyroid disorders, migraine, and autoimmune diseases like lupus or multiple sclerosis.[2]

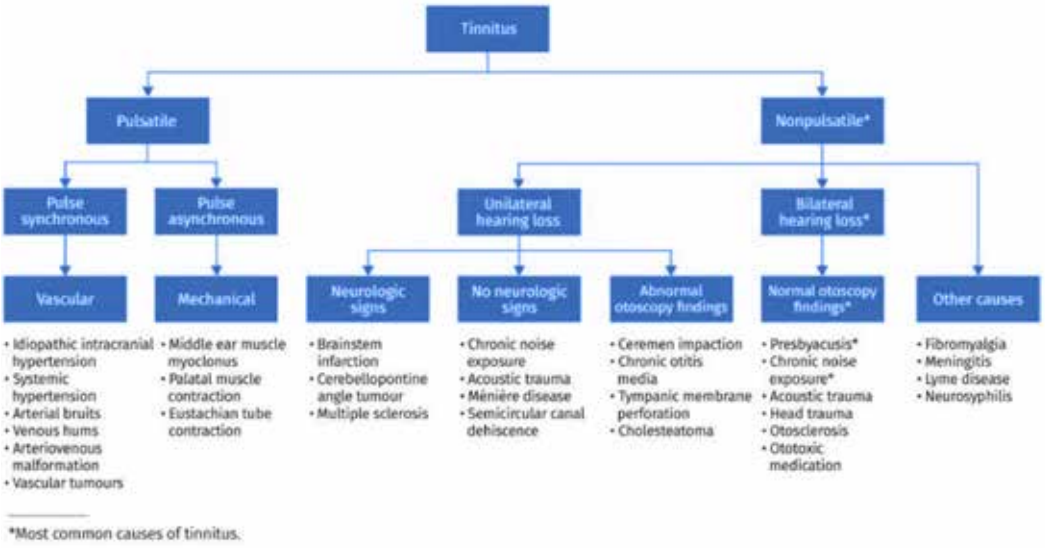


Figure 1:

Approach to the differential diagnosis of tinnitus symptoms

Tinnitus Symptoms Differential Diagnosis Flowchart (Journal of the College of Family Physicians of Canada, 2018)[3]

3. Where Does Tinnitus Occur in the Auditory System?

Tinnitus is theorized to originate in the auditory cortex, where decreased input from cochlea demage results in neural reorganization. This disruption triggers abnormal neural activity, including hyperactivity and synchronization of neural firing, which is perceived as sound despite the absence of external stimuli.[4]

4. How Does Tinnitus Develop?

Tinnitus is primarily a consequence of auditory system damage, leading to disrupted sound processing in the brain. This can create a cycle of increased auditory neural activity, exacerbated by psychological factors such as stress, anxiety, and depression. The autonomic nervous system's response to tinnitus,especially if perceived as a threat, can further intensify the condition. The limbic system's emotional response contributes to a vicious cycle of distress. Tinnitus can significantly impair quality of life, affecting sleep, concentration, social interactions, and overall mental health. [5]

5. Symptoms and Warning Signs

Most people with chronic tinnitus, defined as lasting over six months, are not too botherd by it. Howevere, for the remaining 20% their tinnitus is bothersome, and it is less likely to resolve spontaneously.[6] Psychiatric comorbidities such as depression (48%-60% prevalence) and anxiety are common in individuals with bothersome tinnitus. Sudden sensorineural hearing loss (SNHL) may occur alongside tinnitus and should prompt immediate audiological evaluation, ideally within two weeks of onset.[7]

6. Prevention Strategies

Noise exposure: the development of tinnius is strongly correlated with loud noise exposure. Protective measures, such as earplugs or earmuffs, should be used in noisy environments (e.g., construction sites, concerts, or when using power tools). Limiting headphone use and ensuring safe listening volumes can prevent noise-induced damage.

Medications: Certain ototoxic drugs such as aminoglycoside antibiotic, aspirin (high doses), some diuretics, can trigger tinnitus or exacerbate symptoms. Monitoring medication use and its side effects is crucial.

7. Treatment and Management

Since 80% of tinnitus patients also experience some form of hearing loss, audiological assessment is recommended to detect coexisting hearing impairments. 8 Comprehensive audiological evaluation allows for the identification of undiagnosed conditions or asymmetric hearing loss that may suggest more severe underlying pathology. If hearing loss is present, hearing aids can offer some improvement in the functional effect of tinnitus. [9]

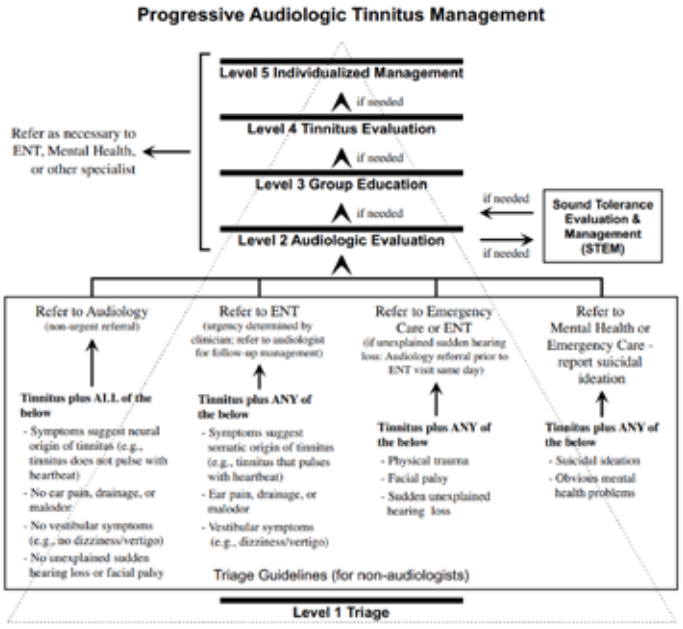
Management options include:

Sound therapy (hearing aids, sound generators, tinnitus maskers): this can help mask the tinnitus sound and/or reduce the perceived intensity.

Tinnitus counseling therapy: TRT (tinnitus retraining therapy), a form of habituation therapy aimed at reducing tinnitus distress and improving the patient's ability to cope; TAT (Tinnitus Activities Therapy), a pictured based tinnitus therapy that aim reducing tinnitus distress and improving the patient's ability to cope.

Cognitive-behavioral therapy (CBT): Can be beneficial for addressing the emotional and psychological components of tinnitus.

https://www.asha.org/siteassets/articles/progressive-audiologic-tinnitus-management-flowchart.pdf



8. Role of Audiologists

The management of tinnitus benefits from a multidisciplinary approach, with audiologists playing a pivotal role. Early diagnosis and intervention by an audiologist are essential to mitigate symptoms, assess hearing impairments, and tailor appropriate treatment strategies, including hearing aids, sound therapy and tinnitus counseling. Prompt management can help prevent tinnitus from becoming chronic and reduce the psychological impact, ultimately improving patient's quality of life and treatment outcome.

9. Additional Resources

1. https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2021077-eng.htm
2. https://www.nidcd.nih.gov/health/tinnitus#2
3. https://pmc.ncbi.nlm.nih.gov/articles/PMC6042678/
4. Kaltenbach JA (2011). Tinnitus: Models and mechanisms Hear Res. June; 276 (1-2):52-60
5. Jastreboff PJ (1990). Phantom auditory perception (tinnitus): mechanisms of generation and perception. Neurosci Res, 8:221-25
6. Henry, J.A., et al, Tinnitus:an epidemologic perspective. Otolaryngology Clinics of North America 2020. 53(4):p.481-499; Dobie,R.A.,Overview:suffering from tinnitus, in Tinnitus:Theory and Management,J.B.Snow, Editor.2004, BC Decker Inc. p. 1-7
7. Tunkel DE, Bauer CA, Sun GH, et al. Clinical Practice Guideline: Tinnitus. Otolaryngology–Head and Neck Surgery. 2014;151(2_suppl):S1-S40. doi:10.1177/0194599814545325
8. (Davis A, El Refaie A, 2000, Epidemiology of Tinnitus in Tyler RS, Tinnitus Handbook)
9. Henry JA, McMillan G, Dann S, Bennett K, Griest S. Theodoroff S, Silverman S, Whichard S, Saunders G. Tinnitua Management: Randomized controlled trial comparing, extended-wear hearing aids, conventional hearing aids, and combination instruments. Journal of the American Academy of Audiology, 28(6):546-561,2017

https://www.ata.org/
https://www.tinnitus.org.uk/

Books:

Tinnitus: Theory and Management by James B. Hall; Tinnitus Retraining Therapy by Pawel Jastreboff; The Tinnitus Treatment Toolbox by Brian P. Flax; Tinnitus: A Multidisciplinary Approach" by James B. Hall.