

# [Tinnitus: causes, effects and treatments](https://assignbuster.com/tinnitus-causes-effects-and-treatments/)

One age-related disease is Tinnitus. Tinnitus is a disease that affects the hearing, it is a chronic ringing in the ears without a sound source. Tinnitus is mainly developed from damage inflicted in the cochlea (Eggermont & Roberts, 2012). The symptoms include ringing in ears, sleep disturbance, anxiety, depression, irritation, concentration disturbances, and hearing loss (Langguth, 2011). There are different forms of tinnitus, such as objective and subjective. Objective tinnitus is caused by sounds within the body traveling to the ear through conduction in body tissue (Møller, 2007). Objective tinnitus is not as common. Subjective tinnitus occurs without any physical sounds reaching the ears, it is when there is abnormal neural activity generated in the ear, the auditory nerve, or the central nervous system (Møller, 2007). Since there are many forms of tinnitus as well as a variety of causes it is hard to find a single cure.

Some causes oftinnitus include otologic causes, which have to do with the anatomy and physiology of the earand include noise-induced hearing loss such as deafening music or sounds, sudden deafness, Meniere’s disease, and other causes of hearing loss (Han etal. 2009). Another cause would be neurologic which includes head injury, whiplash, multiple sclerosis, and other cerebellopontine-angle tumors (Han etal. 2009). Tinnitus can also be caused by infections such as otitis media andsequelae of Lyme disease, meningitis, syphilis, and other infectious orinflammatory processes that affect hearing (Han et al. 2009). Tinnitus is alsoa side effect of some oral medications, nonsteroidal anti-inflammatory drugs, aminoglycoside antibiotics, and chemotherapy agents (Han et al. 2009). Due tothe wide variety of causes that could lead to tinnitus, it is challenging tofind the real root of the disease in an individual, therefore difficult to finda cure that could work for everyone.

However, there are many different types of treatments toalleviate the symptoms of tinnitus. Most treatments aim to directly reduce theintensity of tinnitus or to alleviate the annoyance associated with tinnitussymptoms (Langguth, 2011). These treatments can include pharmacotherapy, cognitive and behavioral therapy, sound therapy, music therapy, tinnitusretraining therapy, massage and stretching, hearing aids, and electricalsuppression (Han et al. 2009). Pharmacotherapy is a therapy usingpharmaceutical drugs and is mainly used to reduce the intensity of tinnitus(Han et al. 2009). Cognitive therapy focuses on how one thinks about tinnitusand on the avoidance of negative thoughts, and behavioral therapy uses thesystematic desensitization approach and tries to make positive associations(Han et al. 2009). Sound therapy uses sounds found in natural settings todecrease the strength of the tinnitus-related neuronal activity within theauditory system (Han et al. 2009). Music therapy is a desensitization methodthat utilizes music that has been modified according to the hearingcharacteristics of each patient to mask tinnitus and to facilitate relaxationat a comfortable listening level (Han et al. 2009). Hearing aids are designedto improve the audibility of speech which distracts from the tinnitus noise andto amplify ambient sounds which mask tinnitus (Han et al. 2009). Tinnitusretraining therapy (TRT) is a form of habituation therapy (Han et al. 2009). TRT uses naturally occurring mechanisms of plasticity in the brain to achievehabituation to the physiological reactions to tinnitus (Han et al. 2009). Electrical stimulation of the cochlea uses trains of pulses at 5, 000 pulses persecond to substantially or entirely suppress tinnitus with either no perceptionor only a transient perception of the stimulus (Han et al. 2009).

Further research on new treatments and therapy fortinnitus are being developed. A treatment that is currently being developed isthe use of neuromodulation techniques which would aim at alternating nerveactivity through a targeted delivery of a stimulus (Peter and Kleinjung, 2018). Studies suggest that individually different brain states and networks areinvolved in the generation and perception of tinnitus (Peter & Kleinjung, 2018). In order for the technique to be effectivesophisticated stimulation regimens and parameters need to be developed to dynamicallystimulate various regions at different frequencies and intensities (Vanneste& Ridder, 2012). Therefore, in the future, individually tailoredneuromodulation strategies could be a promising approach in tinnitus treatmentfor achieving a more substantial and longer lasting improvement (Peter andKleinjung, 2018).

Since there is nocure for tinnitus the best treatment would be a multidisciplinary treatmentapproach using current treatment methods. Using techniques from differentdisciplines would be the best approach mainly because tinnitus has manydifferent symptoms. Tinnitus retraining treatment would be the best treatmentat the moment along with other minor treatments to help with underlying causes such as cognitiveand behavioral therapy, followed by pharmacologic intervention. Thecurrent treatments have the most success in clinical trials and an abundance ofresearch done. Neuromodulation techniques could be a potential option in thefuture but because of the lack of research on how these techniques work and how the brainresponds to neuromodulation, it is a liability at the moment.

### Reference List:

* Eggermont, J. J., & Roberts, L. E. (2012). The neuroscience of tinnitus: understanding abnormal and normal auditory perception. Frontiers in Systems Neuroscience , 6 . https://doi. org/10. 3389/fnsys. 2012. 00053
* Han, B. I., Ho W. L., Tae, Y. K., Jun, S. L., & Kyoung S. S., (2009). Tinnitus: characteristics, causes, mechanisms, and treatments. Journal of Clinical Neurology, 5(1): 11–19. https://doi. org/10. 3988/jcn. 2009. 5. 1. 11
* Langguth, B. (2011)  A review of tinnitus symptoms beyond ‘ ringing in the ears’: a call to action. Current Medical Research and Opinion, 27(8): 1635–1643. doi: 10. 1185/03007995. 2011. 595781
* Møller, A. R. (2007). Tinnitus: presence and future. Tinnitus: Pathophysiology and Treatment Progress in Brain Research , 3-16. doi: 10. 1016/s0079-6123(07)66001-4
* Peter, N., & Kleinjung, T. (2018). Neuromodulation for tinnitus treatment: an overview of invasive and non-invasive techniques. Journal of Zhejiang University-SCIENCE B . doi: 10. 1631/jzus. b1700117
* Vanneste, S., & Ridder, D. D. (2012). Noninvasive and invasive neuromodulation for the treatment of tinnitus: an overview. Neuromodulation: Technology at the Neural Interface, 15 (4), 350-360. doi: 10. 1111/j. 1525-1403. 2012. 00447. x