



Information About Tinnitus: General Information and Prevalence

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Tinnitus can be defined as ringing in the ears, or other head noises that occur independent from an external noise source (Yost, 1994). Studies conducted by the National Center for Health Statistics estimate that 32% of the general population is affected by tinnitus. The prevalence of tinnitus increases to 70% to 85% of the hearing impaired population. This indicates that over 80% of the patients who have tinnitus, also have some degree of hearing loss. Of the individuals who suffer from tinnitus, both hearing impaired and not, roughly 75 percent aren't seriously bothered by their tinnitus. However, 25 percent of tinnitus sufferers are bothered enough by their tinnitus to seek medical attention. This relates to approximately 1 million tinnitus sufferers who say that their condition seriously disrupts their lives.

Types Of Tinnitus

Tinnitus can be classified into two categories, **objective** and **subjective** forms. The objective form of tinnitus is less prevalent than subjective tinnitus, and its causes are simpler to ascertain. Objective tinnitus is noise in the ears that can be heard by an observer as well as by the sufferer with special listening devices. These noises are usually caused by inner ear structural defects such as hair cell damage. Objective tinnitus can also be caused by vascular anomalies or repetitive muscle contractions of the muscles in the middle ear. Objective tinnitus sufferers may hear rhythmic rushing noise caused by their own pulse, due to the close proximity of an artery to the middle ear space. This is called *pulsatile tinnitus*. Any structure from the ear canal to the brain can be involved or produce objective tinnitus, or other sensations of noise. This type of tinnitus can usually be medically treated, thus relieving the sufferer of tinnitus, or at least assessing a structure that is likely the cause of the objective tinnitus.

Subjective tinnitus is more common, and is much less understood than the objective form of tinnitus. Subjective tinnitus is a phenomenon in which the sufferer hears noise in the head or ears, which cannot be heard by an outside observer (Hazell, 1987). Subjective tinnitus may be constant and unrelenting, or it may change with respect to frequency or intensity. Subjective tinnitus may be in one or in both ears, and may also come and go. Some tinnitus sufferers report that their tinnitus sounds like a high pitched background squeal, very similar to that emitted by some computer monitors, fluorescent lights and

television sets. Some tinnitus sufferers report that their tinnitus sounds like chirping crickets, hissing steam, bells, breaking glass or even chainsaws (Yost, 1994). The perceptions of the volume, frequency, and handicap caused by tinnitus seem to vary greatly with each sufferer. There is no general agreement about the definition of tinnitus, a classification system for tinnitus or the mechanism of tinnitus production or perception (Goldstein & Shulman, 1999).

Etiology (Causes) of Subjective Tinnitus

Tinnitus is a multifaceted disorder that can affect an individual's hearing, health, emotion, and lifestyle (Kuk, Tyler, Russell & Jordan, 1990). For 43% of tinnitus sufferers there is *no known cause* for their suffering (McFadden, 1982). For other sufferers, tinnitus may be caused in part to noise exposure. Many sufferers who are afflicted with tinnitus have been exposed to loud noise and also suffer from noise induced hearing loss (Kuk, Tyler, Russell & Jordan, 1990). Repeated *exposure to noise* such as firearms, artillery, aircraft, lawn mowers, movie theaters, loud music, heavy construction equipment, etc. can cause noise induced hearing loss. A study of 4000 San Francisco Bay rock musicians, performed by the Hearing Education and Awareness for Rockers (H.E.A.R.) organization, indicated that nearly 50% of those surveyed indicated the presence of tinnitus. At the Nazareth College of Rochester, it was found that significantly more music majors than non-music majors had some form of tinnitus. This increased prevalence of tinnitus among those who are routinely exposed to loud levels of sound indicates that tinnitus may be related to noise exposure, as well as to noise induced hearing loss. It is estimated that 24% of tinnitus sufferers can attribute their tinnitus to noise exposure and noise induced hearing loss (McFadden, 1982; Vernon, Johnson, Schleuning & Mitchell, 1980).

Another of the many potential causes of tinnitus is *cerumen (debris) accumulation* in the ear canal. The sufferer's physician can easily ascertain this cause of tinnitus during an otoscopic examination. If there is excessive cerumen or debris this problem can be remedied by using manual removal, irrigation, suction or cerumenolytics to remove the accumulated debris (Kitahara, 1988). If the tinnitus was caused exclusively by wax accumulation, the removal of the accumulation should completely eradicate the tinnitus.

A more serious cause of tinnitus is *acoustic neuroma*. Acoustic neuromas are small, slow growing benign tumors that press against or invade the auditory nerve (Clark & Yanick, 1984). If the sufferer's tinnitus is unilateral in nature, an acoustic neuroma must first be ruled out as the cause of the tinnitus. The undiagnosed acoustic tumor can eventually interfere with the sufferer's hearing mechanism resulting in hearing impairment or more severe health problems.

Ototoxic drugs are also a common cause of tinnitus. Some analgesics, antiarrhythmics, antidepressants, antiemetics, antihistamines, anti-inflammatory agents, anti-ulcer agents,

sedatives and muscle relaxants can cause hearing loss, and/or tinnitus. The tinnitus may be reduced as the medication dosage is reduced or eliminated. It is important for a person who is experiencing tinnitus to investigate the potential role of medication in the perception of tinnitus, and to discuss alternative treatments with their physician (Kitahara, 1988; Hazell, 1987). To date there are many medications on the market, both over the counter and prescription, which list tinnitus as a possible side effect in the **Physician's Desk Reference**.

-A-

Accutane	AcromycinV
Adalat CC	Aloferon N
Ambien	Amicar
Anaprox and Anaprox DS	Anestacon
Aralen Hydrochloride	Arthritis Strength BC Powder
Ascriptin A/D	Ascriptin
Aspirin	Atretol
Atrohist Plus	Azactam
Azo Gantrisin	Azulfidine
Actifed with Codeine Cough Syrup	Altace
Anatranil	Ansaid
Asacol	Asendin
Atrofen	Azo Gantanol

-B-

BC Powder	Bactrim DS
Bactrim	Blocadren
BuSpar	Bactrim I.V.
Buprenex	

-C-

Cama	Capastat Sulfate
Cardene	Cardioquin
Cardura	Cartrol
Childrens Advil	Cibalith-S
Cipro	Claritin
Cognex	Corgard
Cuprimine	Cyotec
Carbocaine Hydrochloride	Cardizem, Cardizem CD & SR
Cataflam	Cinobac
Clinoril	Corzide

-D-

Dalgan	Dapsone USP
Dasprin	Deconamine
Depen Titratable	Desferal Vials
Diamox	Dilacor XR
Diprivan	Disalcid
Duranest	Dyphenhydramine
Dynabac	Daypro
Demadex	Desyrel & Desyrel Dividose
Dipentum	Dolobid
Dyclone	
-E-	
Easprin	Ecotrin
Effexor	Elavil
Emcyt	Emla Cream
Erythromycin	Engerix-B
Esgic-plus	Eskalith
Etrafon	Edecrin
Eldepryl	Empirin with Codeine
Equagesic	Ethmozine
-F-	
Fansidar	Feidene
Flexeril	Floxin
Fungijzone	Fioricat with Codeine
Foscavir	
-G-	
Ganite	Gantanol
Garamycin	Glautabs
Gantrisin	
-H-	
HIVID	Halcion
Hytrin	Hyperstat
-I-	
Ibuprofen	Ilosone
Indocin	Intron A
Imudur	
-K-	
Kerione	
-L-	
Lariam	Lasix
Lncocin	Lioresal

Lithius Carbonate	Lithobid
Lodine	Lopressor Ampuis
Lopressor	Loreico
Ludiomil	Legatrin
Lithane	Lithonate
Lopressor DCT	Lotensin HCT
-M-	
Magnevist	Marinol
Marcaine Spinal	Maxaquin
Meclomen	Methergine
Mexitil	Midamor
Minizide	Mintezol
Mono-Cesac	Monopril
Mustargen	Mykrox
Marcaine Hydrochloride	Mazicon
Methotrexate	Minipress
Moduretic	Motril
MZM	
-N-	
nalfon	Naprosyn
Neptazane	Nescaine
Neurontin	Nicorette
Nipride	Noroxin
Norvasc	Nebcin
Netromycin	Nipent
Norpramin	
-O-	
Omniscan	Ornade
Orudis	Oruvail
Othoclone OKT3	
-P-	
P-A-C Analgesic	PBZ
Pornate	Paxil
Pediazole	Pentrex
Pepto-Bismol	Periactin
Phenergan	Phrenilin
Plaquenil	Platinol
Pontocaine Hydrochloride	Prilosec
Prinvil	Prinzide
ProSam	Provential

Pamelor
Pepcid
Piroxicam
Primaxin
Prozac

Pedia-Profen
Permax
Plendil
Procardia

-Q-

Questran
Quinidex
Quinamm

Quinaglute
Q-Vel Muscle Relaxant Pain Reliever

-R-

Recombivax HB
Riafater
Ru-Tuss
Rhumatrex Methotrexate

Relafen
Risperdal
Rythmol
Romazicon

-S-

Salflex
Sensorcaine
Soma Compound
Streptomycin Sulfate
Sedapap
Stadol

Sandimmune
Septra
Sporanox
Sulfadiazine
Sinequan
Surmontil

-T-

Talacen
Tavist and Tavist D
Tenex
Ticlid
Tobramycin
Tonocard
Torecan
Triavil
Tympagesic Ear Drops
Temaril
Timoptic
Toradol
Trinalin Repetabs

Talwin
Tegretol
Thera-Besic
Timolide
Tofranil
Toprol XL
Trexan
Trilisate
Tambocor
Thiosulfil Forte
Tolectin
Triaminic

-U-

Ursinus

-V-

Vancocon HCl
Vaseretic

Vantin
Vasotec

Voltqaren	Vascor
Vivactil	
-W-	
Wellbutrin	
-X-	
Xanax	Xylocaine
-Z-	
Zestril	Zestrotic
Zoloft	Zosyn
Ziac	Zyloprim

Many people experience tinnitus following the onset of a severe *ear infection*. The subsequent tinnitus may be due to the ear infection itself, or to the medication prescribed to combat the infection (e.g., Garamycin). High cholesterol, vascular abnormalities and tempo-mandibular joint disorders have also been found to cause the perception of tinnitus. Traumatic brain injury, cochlear implant surgery, middle ear surgery, tympanoplasty and food allergies can also cause or exacerbate tinnitus.

Vertigo and imbalance are not uncommon in the individual who suffers from tinnitus. When the chief complaint of a patient is tinnitus, clinical experience at the Martha Entenmann Tinnitus Research Center, Health Sciences Center at Brooklyn State University, indicates that approximately 60% of tinnitus patients, with or without vertigo, demonstrate a vestibular abnormality when tested (Goldstein & Shulman, 1999). This finding indicates some sort of relationship between the vestibular, or balance system, and that system which is responsible for either tinnitus production or tinnitus perception. While a causative relationship has not been found, there does seem to be a statistical correlation (Goldstein & Shulman, 1999).

Determining Severity

The severity of a sufferer's tinnitus has been very difficult to determine. Currently there are two methods to determining the severity of subjective tinnitus, self-assessment tools and tinnitus loudness matching.

Tinnitus Matching

It has been suggested by Fowler (1940), that tinnitus loudness could be determined by matching the perceived tinnitus to the known loudness of a pure tone presented to the ear contralateral to the tinnitus. This method of tinnitus assessment is known as "tinnitus loudness matching." The intensity of the contralateral comparative tone is determined, and

the "loudness" is interpreted as the dB sensation level of the pure tone (Tyler, Conrad-Arnes, 1983). However, as noted previously, there are many factors, which influence a sufferer's perception of the tinnitus loudness (e.g., stress, anxiety, annoyance).

Self Assessment Tools

Self-assessment tools are another method for assessing tinnitus severity. Self-assessment methods are designed for the sufferer to rate the severity of tinnitus using a set of questions, which correlates with a numeric scale. The numeric scale attempts to represent the tinnitus as a numerical value on a continuum compared to other tinnitus sufferers. This form of measure is the most widely used method to determine the severity of tinnitus.

Possible Treatments

Alternative Treatments: The use of magnesium, zinc, B vitamins and Ginkgo biloba has reduced the severity of tinnitus in some sufferers. Acupuncture, chiropractic care and magnet therapy have also helped some sufferers. There is little research on the effectiveness of these treatments; however, the medical risks associated with these treatments are very few. Therefore, it is prudent to consult your physician to get clearance to try these treatments.

Amplification: If you have hearing loss, which could benefit from hearing aids, you may experience complete or partial relief from your tinnitus. The tinnitus generally returns after the amplification is discontinued, however, some tinnitus sufferers maintain residual benefit after they remove their hearing aids.

Biofeedback: Biofeedback is a relaxation technique, which allows the patient to control certain autonomic body functions, such as muscle tension, pulse and level of brain activity. The goal of biofeedback therapy is to help people control their physiological reaction to their tinnitus. Controlling their body's reaction to the tinnitus will hopefully reduce their perceived handicap associated with their tinnitus.

Cognitive Therapy is a behavioral counseling technique designed to modify a person's emotional reaction to tinnitus. This treatment is most effective when used in conjunction with other tinnitus treatments.

Masking Devices look very much like a hearing aid, however, the masker can be used if the sufferer does not have hearing loss. The masker emits a low level constant noise, which distracts the brain from the tinnitus noise. The masking technique may give partial or complete relief from tinnitus, and also provide some residual benefit after the masker is removed.

TMJ Treatment: If your tinnitus is likely due to TMJ (temporomandibular joint dysfunction), bite realignment or dental treatment may relieve some of the pain associated with TMJ and reduce the tinnitus as well.

Tinnitus Retraining Therapy utilizes both directive counseling and masking devices. The goal of retraining therapy is to allow the patient to become unaware of their tinnitus through the natural habituation process. This therapy may take 1-2 years to become effective.

It is important to remember when evaluating various tinnitus treatment techniques that no single treatment method works for everyone. Determining the appropriate and effective treatment plan for you may take some effort as well as trial and error. New treatment plans are becoming available through expanded research in this area, so there is reason to maintain a positive outlook about overcoming your tinnitus.

How Bad is Your Tinnitus?

- Does tinnitus make you feel irritable, nervous or insecure?
- Does tinnitus make you feel tired, ill or depressed?
- Does tinnitus make it difficult for you to relax or fall asleep?
- Does tinnitus interfere with work or social activities?
- Does tinnitus make it difficult to concentrate?
- Does tinnitus make it uncomfortable to be in quiet?
- Does tinnitus cause you to avoid some situations?
- Does tinnitus make it more difficult to interact with others pleasantly?
- Has your tinnitus gotten worse over the years?
- Does tinnitus interfere with the overall enjoyment of your life?

Where to go for Help

Otolaryngologist: If you are suffering from tinnitus, you should first see your

otolaryngologist (ENT) to determine if your tinnitus is caused by a medical condition. Your ENT (EAR, Nose & Throat) physician will be able to determine if your tinnitus is medically treatable and discuss those treatments with you. Your ENT may suggest a complete audiological evaluation performed by an Audiologist.

Audiologists are non-medical professionals who specialize in the diagnosis and treatment of hearing and balance problems. Your audiologist will work in conjunction with your ENT to determine if a medical or non-medical approach to your tinnitus is most appropriate.

Self Help Groups often give a great deal of needed emotional support to those with tinnitus. Self Help Groups are not only a great comfort for the tinnitus sufferer, but also they are a great network to obtain more information on tinnitus and local professionals who specialize in the treatment and diagnosis of tinnitus.

Associated Web Sites

American Tinnitus Association: <http://www.ata.org/>

Tinnitus & Hyperacusis Center: <http://www.tinnitus-pjj.com/>

Tinnitus FAQ: <http://www.bixby.org/faq/tinnitus.html>

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