

## **Tinnitus: It Has a Certain Ring to It.**

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### Introduction:

Fifty million Americans experience some form of tinnitus. Twelve million have sought professional intervention. Tinnitus is a significant and common problem across the USA. For individuals with tinnitus, something is occurring within the auditory system, or elsewhere in the neural pathways, which gives rise to the perception of an acoustic-like sensation, for which there is no known external cause. There are two types of tinnitus; objective tinnitus, wherein the patient and the practitioner can hear the ongoing tinnitus, and, subjective tinnitus, heard only by the patient. By far, the most prevalent of the two is subjective tinnitus. Some estimates indicate that 95 percent of all tinnitus is subjective.

Since the audiologist has interest in conditions and anomalies that affect the auditory system, and since tinnitus is such a condition, it seems logical that our scope of training should provide differential diagnostic and therapeutic intervention management for tinnitus. However, many audiologists do not have an extensive background in the clinical management of tinnitus. This is not an indictment of audiologists as a professional body. Audiologists have strong clinical backgrounds in the assessment of hearing loss with regards to the type and degree of hearing loss, diagnostic testing and interpretation, prevention of hearing loss and in the provision of rehabilitative practices and devices for the hearing impaired. Tinnitus management is a relatively new arena for the audiologist and therefore, this paper serves to explore some of the issues associated with tinnitus management by the audiologist. Based on a thorough understanding of tinnitus, a definitive and defensible audiologic diagnosis can be made and a plan of rehabilitation formulated. It is not the purpose of this article to encourage audiologists to consider clinical involvement with tinnitus patients. Rather, our purpose is to offer an overview of major therapeutic approaches used in the treatment of this disorder.

At this time, there is no single therapeutic approach to the treatment of tinnitus that is sufficiently compelling to warrant its exclusive use above all others. There are no test batteries for tinnitus that provide reliable, clinical predictors of cause or treatment. Perhaps this uncertainty keeps many audiologists from being involved in treating the tinnitus patient. For others, the obstacle may be the depth of the psychic involvement of tinnitus sufferers with their condition, for tinnitus is as much an emotional issue as it is a 'hearing' issue.

### Three Realities in Tinnitus Treatment:

There are three realities that one must be aware of in the treatment of tinnitus. First, there is no consensus as to what causes the problem. This is not to suggest that a rational answer for the mechanisms of tinnitus is not of interest, but rather that is not germane to our discussion of tinnitus treatment. Second, there is no known cure. Third, all present forms of therapeutic intervention treat the symptoms of the disorder, not the cause of the disorder.

Given these clinical limitations, what are the current therapeutic practices used by those who treat the tinnitus patient? Rather than offering an exhaustive analysis of each modality, we will discuss specific approaches related to both medical and non-medical intervention processes. Parenthetically, it has been our observation that the therapeutic modality chosen is most often determined by the professional and clinical backgrounds of the practitioner. Medical models seem to be supported by physicians. Non-medical models appear to be supported by other non-physician professionals. For example, psychologists rely on counseling, whereas audiologists generally employ some form of sound/auditory therapy.

### Medical Management:

Medical models typically include the use of drugs to attempt to control the subjective loudness of the ongoing tinnitus, or (more commonly) to reduce the intensity of the patient's response to it. For the most part, specific drugs seem to be the medical treatment of choice. Anti-anxiety and anti-depression medications reduce negative behaviors brought on by the presence of tinnitus. Other drugs used in the treatment process may include lidocaine, tocanide (oral cognate of lidocaine), Lasix, Misolene, Tegretol and others. Sandlin and Olsson (1999) reviewed the value of drug use and the risks assumed by the patient.

To date, there is no large body of evidence that warrants adapting one particular form of drug therapy. Each of the drugs mentioned above has proven beneficial to some. The general wisdom suggests that drugs constitute an ongoing process that permit the patient to derive some prolonged benefit. Brummet (1997) cautions the practitioner about possible consequences of drug use to control tinnitus. Most patients are treated with non-medical approaches.

### Surgical Management:

Some, but very few, physicians have previously elected to perform surgery to eliminate or reduce or control tinnitus. Surgical management of tinnitus has not produced consistent, acceptable results. Surgically sectioning the auditory nerve of the offending ear, more often than not, does not solve the problem. For some, the subjective loudness of the tinnitus, as perceived in the post-operative period, is the same. For others, the tinnitus is exacerbated. Another form of surgical control of tinnitus involves microvascular surgery to eliminate or reduce vascular compression (i.e. 'vascular loops') in the area of the VIII cranial nerve, theorized by some to be a frequent cause of tinnitus (Vernon, 1998). Another surgical approach involves direct electrical stimulation of structures deep in the brain (Shi & Martin, 1999).

### Non-Medical Management:

Although there are many non-medical treatment modalities, only a few have received widespread acceptance. The three most common, and most promising, non-medical methods of treatment are masking, tinnitus retraining therapy (also known as habituation therapy) and cognitive therapy. Alterna-

tive non-medical treatments include; biofeedback, psychological counseling, nutritional controls, acupuncture, ginkgo biloba, and Vitamin B 12. For an overview and comprehensive listing of herbs and vitamins purported to assist in the management of tinnitus, the reader is referred to the March 2000 issue of Tinnitus Today, published by the American Tinnitus Association (ATA). It should be noted that ginkgo biloba, despite its enthusiastic cohort of supporters, has been rather clearly shown to have no more benefit than a placebo (Drew & Davies, 1999). For a more comprehensive overview of treatment, the reader is referred to the book by Vernon (1998), Tinnitus - Treatment and Relief, available from the ATA (published by Allyn and Bacon).

### Maskers and Combination Devices:

Masker use, as described by Dr. Jack Vernon, (1977, 1978, 1979, 1981) has proven to be effective for some, but not for all. Masking involves using an external signal (i.e., masking noise) sufficient to mask or 'cover' the ongoing tinnitus. The rationale is that an external acoustic stimulus is easier for the patient to ignore than the constant, ongoing tinnitus. Johnson (1998) reported the use of masker devices was effective about 35 to 40% of the time for those who investigated their use. Although not an impressive number in isolation, tinnitus sufferers who were in the 35 to 40% group find masker devices to be a godsend.

A combination device, an instrument containing both a hearing aid and a noise generating circuit, increased success rates to about 70%. That is, for those tinnitus patients having tinnitus and hearing loss sufficient to interfere with speech understanding, the combination device provided more relief than a masker device alone. The combination device also provided more relief than a hearing aid alone.

Maskers and combination devices continue to be used by tinnitus patients, suggesting that these instruments continue to be a valuable therapeutic modality, which provides relief and reduces the high stress level often associated with tinnitus.

### Tinnitus Retraining Therapy

Dr. Pawel Jastreboff ([www.tinnitus-pjj.com/](http://www.tinnitus-pjj.com/)) is recognized as the person who conceived and popularized the use of Tinnitus Retraining Therapy. In essence, Dr. Jastreboff postulated that acoustic, or acoustic-like perceptions, could be habituated to if they were not considered to be a harbinger of disease, danger or mental stress. For example, grandfather clocks ticks day in and day out. Yet those who live in a house with a grandfather clock have habituated to its ticking. Literally, they do not perceive it. Similarly, the refrigerator motor goes on and off many times during the day, yet one is not consciously aware of it. If you are sitting in front of a computer as you read this, you are probably not aware of its cooling fan. This ability to habituate to a number of sensory experiences is an integral part of human behavior.

Jastreboff's (1987, 1994a, 1994b, 1990) account of the model goes something like this:

First, there is the perception of the stimulus. At the cortical level, a decision is made as to whether overt action of any kind is mandatory. If the conscious brain deems the stimulus does not demand some purposeful behavior, it can be habituated to (i.e., dismissed) if there are frequent occurrences of the same stimulus. Suppose, however, that tinnitus serves as the stimulus? The conscious brain attempts to make some rational decision. 'Have I heard this before? What causes it? Is it some sort of precursor indicating I am going deaf? Do I have a serious disease? I haven't heard this sound before and I must attend to it until I understand its cause.' The cortex, failing to find an answer for the tinnitus' presence, labels the sound a threat. The limbic system (the brain's emotional control system) is thus alerted and activated to the tinnitus, and the tinnitus becomes a more significant problem for the

patient.

Emotional involvement with tinnitus can produce psychological and physiological behaviors. Sleep disturbance, irritability, anger, loss of concentration and anti-social consequences are often reported. If these negative behaviors produced by the limbic system persist over time, then the autonomic nervous system may also become involved.

A self-perpetuating cycle of events takes place in the brain. The subconscious brain continues to maintain the conscious brain's awareness of the tinnitus. The conscious brain continues to involve the subconscious brain, including the limbic and autonomic nervous systems, as it seeks a resolution that is not forthcoming. This cycle, in turn, serves to increase the subjective loudness and importance of the perceived sound.

Jastreboff suggests two things that are important in the control of the tinnitus:

- 1- The patient must habituate to the tinnitus itself, and
- 2- The patient must habituate to the emotional consequences of the tinnitus.

To habituate to the tinnitus, it is necessary to reduce the contrast between the ambient noise level and the subjective level of the ongoing tinnitus. To accomplish this task, bilateral noise generators are used. These are acoustically similar to, but much quieter than, tinnitus maskers. Depending on the individual patient requirements and categorization, the level of the noise produced by the generators may be increased equal to the loudness of the tinnitus. This makes it more difficult for the conscious brain to concentrate on the ongoing tinnitus.

To habituate to the emotional consequences, directive counseling is used. The essence of this directive counseling, according to Jastreboff, is to make certain the patient understands what tinnitus is, demystifies it as much as possible, and realizes that it is not an indicator of a serious physical or psychological problem. To achieve this change of thinking, it is necessary to reinforce one's understanding of the disorder. To do so, the patient must be adequately counseled. This is accomplished through a prearranged and individually scheduled series of follow-up appointments wherein the clinician and the patient review the patient's current status.

Jastreboff maintains that the Tinnitus Retraining Program treatment program typically achieves its greatest success within 18 to 24 months. Importantly, this does not mean that nothing positive happens until then. Rather, it indicates that it probably will take 18 to 24 months to achieve maximal results.

Clinics throughout the world, our own included, report success rates in the 80-90% range with tinnitus retraining therapy. Success is determined by the following criteria:

1. Tinnitus awareness is reduced by 20%.
2. The impact of tinnitus on the quality of life is reduced 20%.
3. Tinnitus annoyance is decreased by 20%.

The success criteria listed above represent minimal levels of improvement. The majority of patients exceed the 20% level of change.

## Cognitive Therapy

One of the common threads found in therapeutic approaches to tinnitus treatment is the effective use of counseling intervention. One such counseling intervention process is Cognitive Therapy. 'Cognition' refers to thought processes. 'Therapy' refers to some form of management intended to create change in the thinking process. Therefore, the purpose of cognitive therapy is to alter the negative thinking of the patient and bring about a more realistic assessment and understanding of the problem. Sweetow (1986) reports on management of the tinnitus patient using cognitive therapy as a therapeutic base.

Dr. David Burns (1980) is to be given much of the credit in the development of Cognitive Therapy. Cognitive Therapy is a form of behavioral modification. The practitioner attempts to modify the ways in which the patient may react to his or her tinnitus. Dr. Burns coined the phrase 'cognitive distortions.' These distortions are defined in the following ways:

1. All or nothing thinking: If performance falls short of perfect, you see yourself as a total failure.
2. Overgeneralization: You see a single negative event as a never-ending pattern of defeat.
3. Mental Filter: You see a single negative detail and dwell on it exclusively.
4. Disqualifying the positive: You reject positive experiences by insisting that for some reason or another, they don't count.
5. Jumping to conclusions: You make a negative interpretation of a particular event, although there is no evidence to support the negative conclusion.
6. Magnification: You exaggerate the importance of things or events.
7. Emotional reasoning: You think your negative emotions reflect the way things really are.
8. Should statements: You try to motivate yourself with should or shouldn't statements. The emotional consequence is guilt.
9. Labeling and mislabeling: Instead of describing your action as an error, you attach a negative label, such as 'I'm no good,' to yourself
10. Personalization: You see yourself as the cause of some negative event, even though you were not.

It is evident that these distortions of thinking tend to perpetuate the patient's negative behaviors. Failure to modify cognitive distortions can have undesirable consequences and lead to destructive behaviors. Although Cognitive Therapy was not intended primarily for tinnitus patients, it has been useful in their counseling process.

Whether, and to what extent, audiologists should be involved in cognitive therapy with tinnitus patients is a controversial topic. There are strong arguments both for and against. On the one hand, audiologists, more than anyone else, understand the auditory system, and provide hearing system rehabilitation. Furthermore, audiologists engage in counseling routinely. All aural rehabilitation beyond the provision of hearing aids is by definition counseling. The hearing aid fitting process itself involves counseling. On the other hand, audiologists generally do not have explicit training in emotionally centered counseling, and need to work within their scope of practice and licensure.

## Summary

The incidence of tinnitus is rather high. Early on, there was little interest in the clinical management of this disorder. That is changing. Increased awareness and interest, spurred on by the American Tinnitus Association, have contributed greatly to the number of clinicians, audiologists included, providing therapeutic programs.

Although the cause, or causes, of tinnitus is unknown, treating the symptoms of the disorder has been beneficial. Even though there is no one absolute therapeutic approach or treatment modality, there are medical and non-medical intervention programs, which have proven to be of significant value. It is no longer defensible to tell a patient to 'go home and learn to live with it.'

We are convinced that audiologists will find clinical and research challenges in working with the tinnitus patient. However, if the audiologist is to diagnose and manage those with tinnitus, we strongly recommend that he or she seek sufficient academic and clinical training prior to the provision of service. Reading a few articles is a wholly inadequate preparation. In particular, attempting to implement tinnitus retraining therapy without proper instruction can leave the patient in a worse condition.

We feel that at some future date a cure will be found for tinnitus. It is quite possible that the cure will come in the form of specific drugs, which are effective in altering neurochemical behaviors that reduce or eliminate the onset or awareness of tinnitus without the serious side effects of the medications now sometimes employed. We also believe that a compelling therapeutic approach will emerge.

Regardless of what the future holds, there is a current need to provide treatment for those who suffer from this disorder and seek relief. As individuals who have worked with the tinnitus patient for several decades, the authors can say without fear of contradiction that providing tinnitus management therapy is a demanding challenge that can stimulate your clinical and intellectual abilities and can greatly impact and improve the quality of life of your patients.

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