Sound Therapy —
A Short History of Habituation

**Tinnitus is an often debilitating condition** where a person hears constant noise in his ears that is not present in the environment. Often called ‘ringing in the ears’, tinnitus can present as a buzzing, or whooshing, or virtually any other type of sound, except speech or music. There is currently no known cure for tinnitus, but many find relief in therapeutic treatment. The most successful treatment for tinnitus is sound therapy, which can include sound generation in conjunction with a structured approach, most often from an audiologist, or hearing aids fit to a patient’s hearing loss. In fact, the American Tinnitus Association (ATA) says that “sound therapy is currently the most effective” treatment for tinnitus and “has shown a consistent success rate of 60-90% in treating tinnitus but few predictors exist as to which patients will benefit and what the magnitude of success will be.” [1]

Sound therapy has been used for over 30 years in many different forms. Probably the most recognized program is Tinnitus Retraining Therapy (TRT) formalized by Pawel Jastreboff and Jonathan Hazell. Many other programs exist such as Tinnitus Activities Therapy, developed at the University of Iowa by Rich Tyler, and Progressive Tinnitus Management developed by Jim Henry at the Portland VA Hospital.

Prior to sound being used to treat tinnitus, it was recognized that sound could interfere with tinnitus acutely. In 1931, Ibbotson states that “objective noises such as that of traffic machinery, high or low tuning forks” are among the factors likely to influence tinnitus. [2] Hearing aids became available as a portable device in the 1940s and many with subjective hearing loss found that amplifying surrounding sounds allowed for natural interference of their tinnitus. Saltzman and Ersner characterized this phenomenon in 1947. [3] Early analog hearing aids further had the benefit of circuit noise. While not ideal for amplifying speech clearly, the additional noise was beneficial for many hearing aid users. In the 1970s, Jack Vernon, co-founder of the ATA, led the push for hearing aid companies to produce wearable sound generators. [4] In the early 1980s, Jonathan Hazell, with colleagues, carefully examined the usage of maskers with relationships to hearing loss and tinnitus type. [5, 6] At this point, masking was still used in terms of acute relief and little of long term benefit, or habituation, was known. Then, in the early 1990s, Hazell, with Pawel Jastreboff, presented work on what they termed the Neurophysiological model of
tinnitus and began to discuss tinnitus in terms of auditory system along with the limbic system (emotional response) and the autonomic nervous system (fight or flight response). [7, 8] This work described the use of therapeutic masking sounds to be softer than the patient’s tinnitus at the so-called ‘mixing point’. They also began to discuss how tinnitus can be treated long term through a process known as habituation.

Since then, dozens of different sound therapy approaches to tinnitus have arisen and virtually all show a consistent improvement in patients’ subjective response to their tinnitus in the 70 – 90% range. Critics argue that the majority of the studies are of a lower quality in terms of study design and adequate controls, but the sheer volume of studies, the enormous aggregate treatment population, and the inclusion of studies of high enough caliber to satisfy even the toughest critics, all suggest that sound therapy is a rigorously tested and proven means to treat tinnitus long term. A recent review by Fioretti, Eibenstein, and Fusetti discusses 16 studies showing benefit from TRT. [9] Another review by Hoare, Stacey and Hall looked at 9 studies for the effect of auditory training on tinnitus. [10] While the conclusion is that a higher quality set of studies with longer outcome measures is needed, the overwhelming sense of the data available is that these approaches provide some measure of therapeutic relief for patients. Finally, a review by Henry et al. characterizes the approach known as Progressive Audiologic Tinnitus Management [11] and a review by Tyler, Gogel and Gehringer discusses the approach known as Tinnitus Activities Treatment [12] both of which rely heavily on extensive counseling in combination with sound therapy but specifically characterize success as coming from a customized approach for each patient. Further, the need for effective counseling was recently demonstrated when a TRT approach was used in a cognitive behavioral therapy (CBT) framework and was shown to be significantly more beneficial that the standard of care, which included hearing aids or maskers as indicated, but did not include formal sound therapy or counseling. [13]

What seems clear is that sound therapy with hearing aids or with direct sound production is an effective tool for the management and often treatment of tinnitus by habituation. What is less clear is why one method works for some and not others but why virtually all methods show similar effectiveness in the range of 70 – 90% success. What likely is not often characterized is that each study shows the success of research subjects who were capable of being compliant with the protocol. Clearly, then the ability to accept or be compliant with a treatment regimen is a necessary condition for habituation or management. As it is unlikely that a single tool will ever address the majority of patients’ suffering from the symptom of tinnitus stemming from a highly diverse set of causes and manifesting with an even greater diversity of perceptions, tools with a high degree of customizability to the patient and variety of approaches will likely be the most successful.