There's a buzz about a new customized music therapy designed to reduce the disturbance of tinnitus through desensitization. The Neuromonics™ Tinnitus Treatment shares some features with other sound therapies, like masking and Tinnitus Retraining Therapy (TRT). As with TRT, counseling and education are important, and like masking, the treatment can act as a tinnitus "off switch." The treatment, developed in Australia and in use there and in New Zealand since 2004, is now available in the United States.

Jill Meltzer, Au.D., uses the Neuromonics Tinnitus Treatment in her Highland Park, Ill., practice. As a service to Tinnitus Today readers, Dr. Meltzer shares her impressions of this new technology treatment.

Neuromonics Tinnitus Treatment

By JILL MELTZER, Au.D.

The annoyance of tinnitus is a brain thing, not an ear thing. The difference is far more than simple semantics. Central brain connections may differentiate one who suffers with tinnitus from one who merely experiences it. In fact, neuroscientists have spent considerable effort and time investigating where in the brain – in terms of a physical location – tinnitus arises. We suspect that multiple sites play a role in problematic tinnitus.

Brain chemicals called neurotransmitters allow the passage of information between neurons (brain cells). Some of these chemicals act to excite (increase) neural activity, while other neurotransmitters inhibit (reduce) this information exchange. There are researchers investigating the link between problematic tinnitus and abnormal activity of these neurotransmitters. It appears this aberrant activity triggers reorganization (changes) in the central auditory system. Treatments for this have involved changing how the brain processes information.

Tinnitus sufferers often report anxiety, sleep disturbances and trouble concentrating. Interestingly, music often helps people manage these symptoms, whether they arise from tinnitus or other causes. Instrumental music bypasses the speech (linguistic) center of the brain and may instead more directly influence the limbic system, one part of the brain that forms associations about fear, stress and anxiety.

Obviously, if we could find ways to increase this calming effect, we might help people to better manage their tinnitus. That's why I was interested in learning more about the Neuromonics Tinnitus Treatment, which includes instrumental music, counseling and education. According to one of my patients who used the treatment, "It's certainly calming and relaxing, and makes it easy to take my mind off the tinnitus. Listening gives me a sense of control over the tinnitus."

How Neuromonics Tinnitus Treatment works

The treatment addresses the audiological, psychological and neurological aspects of tinnitus disturbance. It delivers a spectrally modified acoustic signal. This means that the music is digitally adjusted to compress some low frequencies and expand some high frequencies, while still maintaining the music's artistic integrity. The relaxing music is metered to mimic a resting heart rate. The signal (music) is customized for each ear based on hearing levels from 250 Hz through 12,500 Hz. Since the device is customized based on each person's hearing and tinnitus profile, it compensates for hearing differences between the ears and ensures a high degree of neural stimulation from the music. The treatment uses Bang & Olafsen non-occluding high-fidelity earphones to deliver the sound.

The best candidates for treatment have an audiological profile with average hearing levels of 50dB or more in their "better" ear.

The device

Operating the device is simple (Fig. 1). One button begins a treatment session and another ends it. The user adjusts the volume at the start of each session, with instructions to "set it and forget it." There are four music tracks. Each one plays for just under an hour. Tracks 1 and 2 are baroque music; tracks 3 and 4 are new age music. The unit can play a continuous loop (tracks 1,2,3,4,1,2,3,4, etc.) or the patient can set continued on page 12
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it to play a single track, which we often recommend
for facilitating sleep.

A data-logging feature keeps a record within the
device that notes time of day,
hours of use and average volume
for each treatment. This makes
it easy for a clinician to down­
load information from the log
and review the patient's results
during clinic visits.

We instruct patients to use the
treatment two to four hours each
day. The best times are when
their tinnitus is most disturbing
or while they are engaged in
quiet activities, such as reading,
relaxing or using the computer.

A two-stage treatment
The Neuromonics treatment has
two stages. This approach is
beneficial because the user
experiences significant, rapid
relief during the first part of the
treatment. Therefore, patients
may initially set their volume
higher so they get a great deal of tinnitus relief
while using the treatment. The ultimate goal is
desensitization, which occurs after a period of time
when patients are instructed to reduce the volume
so they get perhaps 50 percent relief, which results
in a more intermittent perception of tinnitus.

Stage One is the "Pre-Conditioning" phase and
includes a shower noise embedded in the music.
This results in broad stimulation of the neural path­
ways and increased masking of the tinnitus (Fig. 2).
Stage One lasts approximately eight weeks and
treatment benefits are most apparent while actually
using/playing the treatment.

Stage Two, the "Active" phase, eliminates the shower
noise from the music. Without the shower noise, the
music has less of a masking effect since the brain has
more exposure to the tinnitus (Fig. 3). During Stage
Two, we instruct patients to set the volume so they
are aware of their tinnitus about half of the time. This
helps retrain the brain to relegate the tinnitus signal
to the background. This second phase of treatment
may last four or more months, and as in Phase One,
should be used two to four hours each day.

Treatment candidates
During a tinnitus assessment, the clinician takes a
detailed case history and records a number of patient
measures; the Tinnitus Reaction Questionnaire (TRQ)
examines 26 items related to lifestyle disturbances
caused by the patient's tinnitus. Other measures
include, for example, hearing levels, loudness toler­
ance levels, and pitch and loudness matching. The
clinician obtains these again at several treatment
intervals. As mentioned, patients with an audiological
profile of average hearing levels of 50dB or more in
their "better" ear are the best candidates for the
Neuromonics Tinnitus Treatment.

Treatment efficacy
By the end of treatment, patients should report a
reduction in both the awareness and disturbance of
their tinnitus. In our practice, most patients experi­
enced improvement. To date, Davis, et al. have con­
ducted four clinical trials in Australia. Paul Davis
was an author/investigator in all four clinical trials.
The first two clinical trials were also authored by
PB Davis, RA Wilde and LG Steed – all of Curtin
University – and published in the Proceedings of
the 7th International Tinnitus Seminar 2002.

The third clinical trial was recently published in Ear
and Hearing, the journal of the American Auditory
Society. The authors report that combined data from
the four clinical trials have shown that 90 percent of
patients treated with Neuromonics improved – with
improvement defined as a 40 percent or greater
reduction in their TRQ score. The trials also indicated

Figure 2: Tinnitus perception during Pre-Conditioning
stage.

Figure 3: Tinnitus perception during Active
Treatment stage.

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Conclusions

We conclude from our observations that the combination of Tinnitus Activities Treatment and music as a sound therapy can be effective in reducing the problems associated with tinnitus. We believe that individual differences are highly important in sound therapy. Many patients clearly prefer music compared to noise. Passive listening is easy to implement, and patients who substantially benefit from it can work it into many aspects of their daily lives.

Active listening requires specified time commitments, but can be very effective at diverting attention away from tinnitus symptoms. We identified several categories and specific examples of music that many patients found particularly helpful. We now share these with others for daytime listening and to help them fall asleep at night. One example is the music of Janalea Hoffman, which we believe is particularly helpful for getting to sleep. She has produced several CDs, including Musical Biofeedback II and Deep Daydreams, that our patients have used for both daytime and sleep listening.

Another benefit of the study is the large database we have established, which includes several measurements of the tinnitus patients who participated in the music trial. This will allow us to examine the relationship between different questionnaires and different measures of tinnitus severity (Tyler et al., 2006). Such databases enable us to search for similarities and differences among tinnitus patients, and to provide insights into new directions in our search for a cure.

References


All at the University of Iowa, Richard Tyler, Ph.D. is a professor in the Department of Otolaryngology-Head & Neck Surgery and in the Department of Speech Pathology & Audiology; Anne Gehringer and Stephanie Gogel are audiologists in the Department of Otolaryngology.

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improved tolerance of previously uncomfortable noise levels (volume). We have also observed this trend in our clinic. I have been told that Neuromonics plans to implement a U.S. Clinical Study Registry beginning in 2007 to track outcome measures for patients treated with Neuromonics, validate treatment effectiveness, and evaluate potential treatment candidates.

Patient comments

Severe tinnitus is difficult to treat. Any treatment program will have some patients who do not respond as well as others. In our practice, some tinnitus sufferers have been disappointed. One of my patients reported, "I can't say it has performed as I hoped it would in that the tinnitus is still at times very problematic." On the other hand, many tinnitus patients have found considerable relief from this treatment. One patient reported, "I was skeptical at first, but like any new or chronic tinnitus sufferer, I was willing to give this treatment a try. Neuromonics gave me some immediate relief and helped mask my noise on bad days, but I -- being impatient -- wanted it to be the immediate answer to getting my normal life back. This was not the case nor was it ever the promise of Neuromonics or my audiologist. I have kept up the treatments and my life, though not yet perfect, has improved. The noise level has decreased and I think my nights are better. It just seems like my brain is calming down."

Another patient reported, "It's very soothing and relaxing. I enjoy using it."

Find information about Neuromonics, those who provide the treatment and the upcoming U.S. Clinical Study Registry at www.neuromonics.com or by calling (866) 606-3876.

Dr. Meltzer is a board-certified audiologist at North Shore Audio-Vestibular Lab in Highland Park, Ill. She serves on the Board of Governors of the American Board of Audiology (ABA) and has served on several American Tinnitus Association (ATA) committees.

Disclaimer: Dr. Meltzer has been a paid lecturer at Neuromonics training seminars.