

*As I began editing my first issue of Tinnitus Today, in January 2007, a wide world blossomed before my eyes – tinnitus and the search for its cure.*

# The world is looking for a cure: A year in review

By NINA ROGOZEN, *Tinnitus Today* EDITOR & ATA PUBLICATIONS MANAGER

I find it deeply meaningful to edit and write for a publication that focuses on a problem people I know and love struggle with every day. My partnership with ATA staff and collaboration with titans of the field, like Jack Vernon, are true gifts.

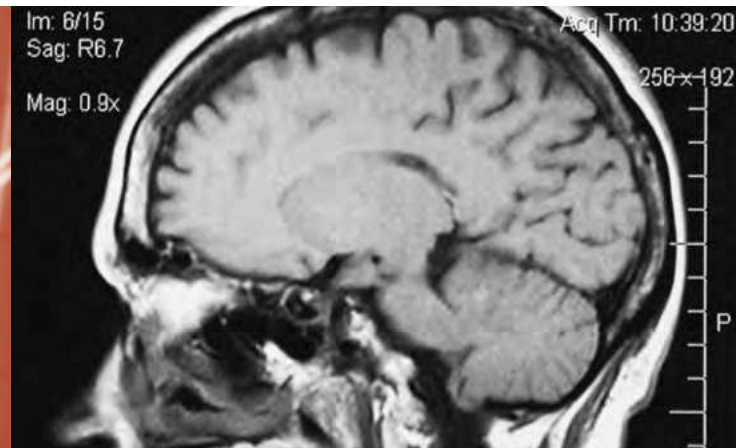
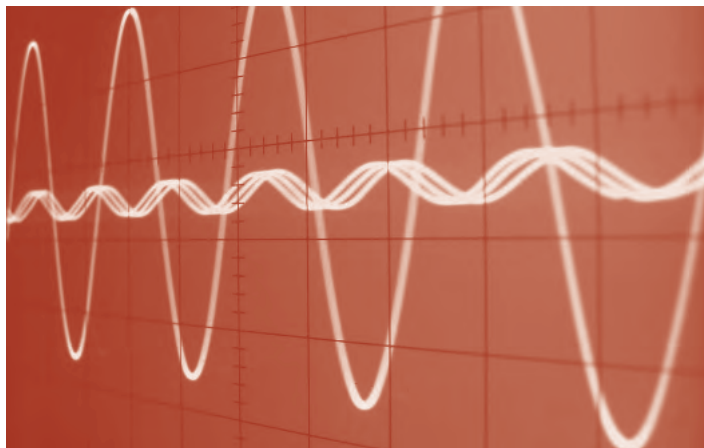
Readers write to me about how tinnitus has caused a brutal train wreck of their lives or how they've found relief and want to share their experience with others. They all need our attention and help. As the tinnitus research community expands around the world, scientists are exploring more and more avenues

worsen with increasing tinnitus, role-physical (physical productivity) and physical pain had the strongest associations with tinnitus severity. The study also suggested that when other factors are equal, people with a more recent onset of tinnitus experience a larger degree of discomfort than those who have suffered from it longer.

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## Sexual disturbance and tinnitus <sup>2</sup>

*Turkey, April 2007*



of discovery and hope. They are hunting for a cure with the voracity of creatures searching the earth for truffles. Here is a sampling of this year's research.

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## Diminished quality of life in seniors with tinnitus <sup>1</sup>

*USA, March 2007*

Researcher Nondahl and his team documented a clear association between tinnitus and reduced quality of life in a large cohort of older adults. They noted that tinnitus, in its more severe forms, can be accompanied by depression, anxiety, insomnia, headaches and concentration problems, all of which can diminish one's quality of life.

The study included 2,749 participants 53 to 97 years old. Though all quality of life scores tended to

Researchers Bayar Muluk, Murad Basar, Og'uztürk and Dikici investigated how sexual disturbance is related to the psychological problems of patients with low and mid-level subjective tinnitus. Their study included a tinnitus group of 20 and a control group of 20. All participants were non-psychiatric patients with normal hearing, were married and had an active sexual life.

Participants took tinnitus, personality and sexual function tests. Results showed sexual disturbance in very quiet- and intermediate-level tinnitus sufferers in the early period of the disease. Over time, they became used to living with their tinnitus and experienced no measurable loss in sexual performance. Future work will include investigating the sexual disturbance of patients with severe subjective tinnitus loudness level scores (STLL-Scs scores).

## Comparing tinnitus masking and tinnitus retraining therapy <sup>3</sup>

USA, December 2006

This is the first research to definitively document and compare the efficacy of tinnitus masking (TM) and tinnitus retraining therapy (TRT).

This controlled clinical trial, directed by researcher Henry and his team, enrolled 123 veterans with severe enough tinnitus to justify 18 months of individualized treatment. Investigators randomly placed subjects in a TM or TRT group. They evaluated the two treatments using self-administered tinnitus questionnaires: Tinnitus Handicap Inventory, Tinnitus Handicap Questionnaire and Tinnitus Severity Index.

The team concluded that both approaches can considerably and effectively improve tinnitus. When compared, TM effects remained fairly constant over time. TRT effects improved incre-

tion of certain face muscles (a condition which may change tinnitus subjective rating) as the real rTMS.

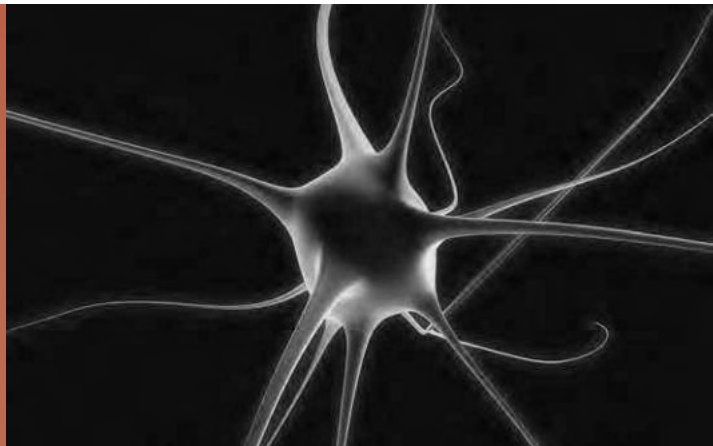
The rTMS induced an overall significant, but transient, improvement of subjective tinnitus perception that was independent of tinnitus laterality, mood or anxiety changes. No correlations were found between response to rTMS and tinnitus duration, initial subjective score or patients' age. 71.4 percent of patients failed to identify the temporal sequence of the real or sham rTMS interventions; beneficial effects of rTMS on tinnitus are independent of mood changes.

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## Central nervous system plasticity <sup>5</sup>

USA, July/August 2007

*Neural plasticity* allows the brain to form new connections to compensate for disease or injury or to adapt to new situations. It can also contribute to problems such as tinnitus. Saunders and his research team theorize that plastic changes occurring in the



mentally, but with continued treatment may produce the greatest long-term results.

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## Transcranial magnetic stimulation on chronic tinnitus <sup>4</sup>

Italy, February 2007

In patients with complex conditions such as chronic pain, with which tinnitus shares similarities, placebo effects may be pronounced. Repetitive transcranial magnetic stimulation (rTMS) is a procedure that involves sending tightly focused magnetic pulses into the brain in order to stimulate brain circuits without surgery.

Rossi and his team gave 14 patients with chronic tinnitus rTMS treatment for five days. They found that a placebo rTMS procedure produced the same activa-

auditory system may sustain tinnitus following original damage to the ear. Primary pathways are the principal neural nuclei and tracts of the sensory system. When they enter other areas of the brain, they are called non-primary pathways. Scientists hypothesize that these changes contribute to perceived tinnitus severity and emotionality.

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## Tinnitus after cochlear implantation <sup>6</sup>

Italy, February 2007

Di Nardo and his group evaluated the effect of a cochlear implant on the evolution of tinnitus in 20 adult patients. All participants had language skills prior to becoming deaf, and subsequently underwent cochlear implantation at the investigators' clinic. Group A's 10 subjects already had tinnitus

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and Group B's 10 subjects did not. Both groups underwent pre- and post-surgery assessments of their tinnitus characteristics, psychological and social impact, emotions and activities of daily living.

Post surgery, none of the patients in Group B developed tinnitus. Forty percent in Group A reported complete suppression, 30 percent quieter tinnitus, 25 percent unchanged and five percent worsening. The authors propose that doctors add tinnitus to the selection criteria for determining which ear to implant; consider implantation eligibility for patients with bilateral severe hearing loss associated with severe tinnitus; and inform patients about the small risk of their tinnitus worsening after surgery.

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## Cognitive behavioral therapy for tinnitus <sup>7</sup>

England, January 2007

As a psychological treatment, cognitive behavioral therapy (CBT) uses relaxation, restructuring of thoughts and exposure to challenging situations to promote habituation in people with depression, anxiety, insomnia and chronic pain.

Martinez-Devesa, Waddell, Perera and Theodoulou reviewed six trials (285 participants total) to assess whether CBT is effective in tinnitus management. Their data analysis did not demonstrate a significant effect when using CBT to treat the subjective loudness of tinnitus or the depression associated with tinnitus. However, they did find a significant improvement in patients' quality of life. Their decrease of global tinnitus severity suggests that CBT has a positive effect on the way people cope with this problem. None of the trials reported any adverse side effects.

Damage to the ear can affect the balance of chemicals in the brain, which may then cause new nerve activity. The result may be a persistent perception of tinnitus. This study found that the variables associated with the behavioral experience of tinnitus, such as perceived severity, are as complex as the biological variables. Also, there may be no one brain location associated with tinnitus; it may result from interactions between multiple brain areas.

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## The dorsal cochlear nucleus in the etiology of tinnitus <sup>8</sup>

USA, December 2006

Kaltenbach reviewed key findings in animal and human subject studies accumulated in the last

decade that conclude that the dorsal cochlear nucleus (DCN) may be an important site in the etiology of tinnitus. The findings collectively strengthen the view that the DCN may be a key structure that should be included as a target of anti-tinnitus treatment.

Some key findings include: 1) Tinnitus loudness may be linked to changes in the level of neural activity in the DCN. 2) Exposure to intense sound and other tinnitus inducers chronically elevate neural activity in the DCN (neuronal hyperactivity). 3) Hyperactivity may signal the presence of sound, even when there is no longer any sound stimulus. 4) The correlation between level of hyperactivity and behavioral index (a gauge) of tinnitus is statistically significant. 5) The basis of how tinnitus, when perceived on one side, can be changed by particular manipulations of the neck and head on the same side, but rarely on the opposite side. 6) The different forms of neuronal and tinnitus plasticity are consistent with plasticity exhibited by the DCN. (((

<sup>1</sup> Nondahl D, Cruickshanks K, Dalton D, Klein B, Klein R, Schubert C, Twee T, Wiley T. The Impact of Tinnitus on Quality of Life in Older Adults. *J of Am Acad Audiol*. 2007 Mar;18(3):257-66.

<sup>2</sup> Bayar Muluk N, Murad Baflar M, Og'uztürk O, Dikici O. Does Subjective Tinnitus Cause Sexual Disturbance? *J Otolaryngol*. 2007 Apr 1;36(2):77-82.

<sup>3</sup> Henry JA, Schechter MA, Zaugg TL, Griest S, Jastreboff PJ, Vernon JA, Kaelin C, Meikle MB, Lyons KS, Stewart BJ. Clinical trial to compare tinnitus masking and tinnitus retraining therapy. *Acta Otolaryngol Suppl*. 2006 Dec;(556):64-9.

<sup>4</sup> Rossi S, De Capua A, Ulivelli M, Bartalini S, Falzarano V, Filippone G, Passero S. Effects of repetitive transcranial magnetic stimulation on chronic tinnitus. A randomized, cross over, double blind, placebo-controlled study. *J Neurol Neurosurg Psychiatry*. 2007 Feb 21; [Epub ahead of print].

<sup>5</sup> Saunders JC. The role of central nervous system plasticity in tinnitus. *J Commun Disord*. 2007 Jul-Aug; 40(4):313-34. Epub 2007 Mar 14. [PubMed - in process].

<sup>6</sup> Di Nardo W, Cantore I, Cianfrone F, Melillo P, Scorpecci A, Paludetti G. Tinnitus modifications after cochlear implantation. *Eur Arch Otorhinolaryngol*. 2007 Jun 9; [Epub ahead of print].

<sup>7</sup> Martinez Devesa P, Waddell A, Perera R, Theodoulou M. Cognitive behavioural therapy for tinnitus. *Cochrane Database of Systematic Reviews* 2007, Issue 1.

<sup>8</sup> Kaltenbach JA. Summary of evidence pointing to a role of the dorsal cochlear nucleus in the etiology of tinnitus. *Acta Otolaryngol Suppl*. 2006 Dec;(556):20-6.