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Current Comments

Tinnitus, Anyone?

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For the last few years I've heard a noise like a steam whistle in my ears. This disorder is called tinnitus. According to a 1962 National Institutes of Health survey, 36 million Americans have it.[1] Tinnitus, which can take the form of ringing, roaring, shrieking, hissing, or clicking noises, is not, strictly speaking, a disease. It can accompany a wide variety of other problems, such as concussion, high blood pressure, diabetes, overweight, osteosclerosis, whiplash, and some ear diseases.[2] Only about 5% of those with tinnitus can be cured. The rest, in the past, have been told that they have to live with it.[3]

Fortunately, I and most other tinnitus sufferers manage to survive quite well. But about one-fifth of tinnitus' victims—7.2 million people—have severe tinnitus. It prevents them from sleeping soundly, causes mental and emotional problems, and generally impairs their enjoyment of life. Until recently, there seemed to be little hope that severe tinnitus could be dealt with. But advances in otolaryngology in the last few years show that while there may be no cure for tinnitus yet, there are ways it can be made tolerable.

One way of treating these unwanted ear noises is to cover them with other noises. This form of tinnitus therapy was suggested in the late 1940s. It has only recently been promoted by Jack A. Vernon and co-workers at the University of Oregon Medical School.[4-6] At the Tinnitus Clinic in Portland, Vernon's group conducts audiological tests to find the sound frequency of the patient's tinnitus. This makes it possible to find a band of sound that will cover up the tinnitus. Since hearing loss often accompanies tinnitus, both disorders can sometimes be treated by the same method. If a patient's hearing loss lies along the same frequency as the tinnitus, Vernon found, a hearing aid can amplify environmental sounds while it simultaneously masks the tinnitus, if the tinnitus is relatively low-pitched. Even then, it doesn't always cover the tinnitus.

But some tinnitus patients have no hearing loss. For them, Vernon developed a device called a tinnitus masker. It looks and is worn exactly like a behind-the-ear hearing aid. It produces a band of sound that covers the tinnitus. It might seem strange that patients who hear too much noise are treated with more noise. Yet, Vernon says, most find a band of sound easier to live with than a constant, high-pitched tone. Since wearers can vary the volume of the masking band, they have a sense of control over a condition they used to be helpless to do anything about.

Some people who have tinnitus and hearing loss experience tinnitus at a frequency range different from the range of hearing loss. For such patients, Vernon developed a device called a tinnitus instrument. It's simply a combination hearing aid and tinnitus masker. It corrects the hearing loss at one frequency range while masking the tinnitus at its own range.

Yet another problem is the case of a person with low-frequency tinnitus without a corresponding hearing loss. Such people can have their tinnitus masked, but the masking sounds may

interfere with their ability to hear conversation. Vernon suggests that low-frequency tinnitus could be treated with a masker that produces pulses of sound. A simpler means might be for patients to turn the masker off when they want to hear speech.

Some people who aren't bothered by tinnitus during the day, but find it keeps them from sleeping at night, can benefit from a variation on the masker treatment. Playing static from an FM radio can cover up tinnitus.[4] It can work for people with tinnitus who wear hearing aids or maskers while awake but don't wear them to sleep.

A few unfortunate tinnitus sufferers can't be helped by maskers or hearing aids. For unknown reasons, some tinnitus can't be masked except with intense and unacceptable sounds. This tinnitus occurs at frequencies beyond the reach of these devices. To benefit from Vernon's treatments, they will have to wait until technological progress provides better masking devices. Also, Vernon's treatments won't work for tinnitus patients who are otherwise classified as "totally deaf."

One unexpected result of Vernon's work is that for some time after the tinnitus masker or hearing aid is shut off, the tinnitus stops for many patients. This effect, which Vernon says was first observed in 1903, can last from a few seconds in some patients to half an hour or more in others. Vernon calls this phenomenon "residual inhibition," and thinks further studies could lead to new treatments of tinnitus.

Since Vernon established the Tinnitus Clinic in 1976, he has treated about 800 patients. He told us he doesn't know exactly how many have been successfully treated, but in 1978, he reported a 72% success rate.[6]

Steven E. Berman, an audiologist and speech pathologist with the Medical College of Pennsylvania in Philadelphia, started this year to use Vernon's techniques to treat tinnitus. I visited Berman last May. He told me I had a mild form of tinnitus that might be treated with a masking instrument. However, he could not test my tinnitus because on the day I visited him it had quieted down. I've still not managed to return on a day when the noise is sufficiently pronounced.

Masking techniques are not the only approaches that have been successfully used to deal with tinnitus. Biofeedback is another form of treatment. Biofeedback was developed about 20 years ago, but has only recently been applied to treat stress, migraine headaches, and other problems. In 1976, otolaryngologist Murray Grossan[7] reported that he used biofeedback to treat 66 patients for tinnitus. In 10 to 12 one-hour sessions, he had them monitor the electrical output of the frontalis muscle in the forehead by listening to clicks through headphones. He taught them relaxation exercises, which let them control the muscle's electrical output. He reported that 40 of the patients "subjectively felt significant improvement." John W. House of the Ear Research Institute in Los Angeles and his co-workers reported similar results in 1977[8] and 1978.[9] Most patients who say biofeedback works for them report that it lessens the volume of their tinnitus, makes them more able to tolerate it, or both. House says that tinnitus disappears entirely in one out of ten people who benefit from biofeedback.

Among the benefits of biofeedback, Grossan and House's group agree, are the patients' reduced dependence on tranquilizers and other medication, and the fact that they don't need to wear hearing aids or maskers. Disadvantages are the time and effort needed to learn the relaxation exercises. However, biofeedback's supporters say the exercises benefit the patients because they are in complete control of their therapy. The relaxation exercises sometimes improve their mental well-being, they say. House says some tinnitus patients showed signs of emotional problems before treatment commenced, but denied that they had them. They blamed their emotional state on tinnitus. The silencing of tinnitus allowed many patients to become

aware that they did in fact have emotional disturbances.

The cost of biofeedback training varies across the country, depending on the region and the person administering the training. House says an hour of biofeedback training can cost from $30 to $50. (A tinnitus masker or hearing aid can cost from $300 to $450.) Since biofeedback is a relatively new technique in medicine, the patient should check the credentials of the person giving the treatment and should be wary if treatment is recommended before a physical examination is given.

Drugs are a third way tinnitus has sometimes been successfully treated. Tranquilizers and anesthetics are part of the conventional treatment of tinnitus. Otolaryngologists John J. Shea and Moshe Harell[10] of Memphis, Tennessee reported last year that they used anticonvulsant drugs to treat tinnitus. P.S. Melding and R.J. Goodey[11] of New Zealand published similar results last February. These findings may seem odd because anticonvulsants are used to treat epilepsy. The successful suppression of tinnitus with these chemicals suggests the existence of "sensory epilepsy"— a hypothetical neurological disorder that disrupts the senses instead of disrupting motor control.

The chief disadvantage of chemical treatment is the side-effects of the drugs. These include mild sedation, headache, nausea, weight loss or gain, and disturbed menstrual cycle. The side-effects persist for about a month. Nevertheless, Shea and Harell say that anticonvulsants could become the treatment of choice for appropriate patients because they are less time consuming and rely less on the patient's participation and intelligence than biofeedback or masking. Melding and Goodey disagree. They believe masking or biofeedback should be tried first. However, anticonvulsant drug treatment is still experimental.

A fourth possible way of treating tinnitus is also in the experimental stage. Y. Cazals[12] and co-workers at the Universite de Bordeaux in France experimented with stimulating the cochleas of deaf patients. They observed that the patients experienced sound sensations while the current was turned on. This confirmed earlier reports, but the audiologists also found something new. Those deaf patients with tinnitus said the tinnitus stopped when the current was applied. While this is a promising avenue for future research, it may be some time before the method becomes practical. The long-term effects of electrical current on the cochlea are unknown.

There are still more approaches to treating tinnitus that might prove fruitful if given a chance. Barbiturates, labyrinthectomy, hypnosis, acupuncture, vitamin A, removal of some foods from a patient's diet, or having patients reduce to their ideal weights are some of the means that have been reported.[2] Steven Berman mentions that counseling can be an effective way to lessen a patient's anxiety over tinnitus. Vernon adds that removing or protecting a patient from a source of loud noise can be of great help.[13] One doctor in La Jolla, California said that some patients reported improvements two or three weeks after going off marijuana. He said he wanted to do a pilot study, but couldn't get college students to cooperate. Apparently, they feared the doctor was fronting for the police.[2]

Vernon's tinnitus treatment has probably received more attention than any other approach. Since the beginning of this year, the nonprofit American Tinnitus Association (ATA) has conducted monthly Tinnitus Workshops. The ATA takes the workshops to major cities in the US, where Vernon's techniques are explained. Over 800 doctors have been trained in these workshops to date. Many have incorporated the techniques into their practices and are treating tinnitus patients in the US, Canada, Australia, the Netherlands, Japan, and other countries.

The ATA has limited itself to collecting and disseminating information on

tinnitus, and hopes, through donations from members, to make research grants for the study of tinnitus. Since tinnitus affects so many Americans and effective techniques exist to treat it, why doesn't the National Institutes of Health (NIH) fund research on treatment of tinnitus? I had thought the reason was that tinnitus is not a life-threatening disease and is thus assigned low priority. But Rolf Ulvestad, an otolaryngologist with the NIH's National Institute of Neurological and Communicative Disorders and Stroke, has a simpler reason. Few people have submitted high-quality applications for grants to work on tinnitus.[14] Most scientists seem reluctant to tackle tinnitus as a serious research problem. Vernon agrees that this attitude has held back tinnitus research and treatment; he told us, "We were shamed into it." He added that he recently applied to the NIH for a grant.

Ulvestad said the NIH is not opposed to tinnitus research. The NIH does fund research on many other communicative disorders. Like tinnitus, they are not life-threatening in themselves. If the NIH is willing to fund either basic or clinical research on tinnitus, then it seems to point up one area of the public's dissatisfaction with science. Since Nobel or Lasker prizes are not being awarded for work in such mundane areas as tinnitus how can we encourage more scientists to take an interest in these problems? Perhaps the first step is to organize a meeting to which a diverse group of scientists is invited. They should hear presentations by the leading clinicians. The group should identify basic areas of research that need investigation. They should also identify existing basic scientific knowledge that could be used for clinical development work. Representatives of industry should be included. I should think that any malady which affects several hundred million people throughout the world would be of some interest.

If all this happens then maybe one day we can help identify that basic research discovery which will lead to the future cure for tinnitus. I'm sure an appropriate reward will be forthcoming.

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