



Develop America's Medical Airmen Today ... for Tomorrow

Tinnitus Treatment: Neuromonics Device 59 MDW Experiences

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Overview



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- Introduction
- Prevalence
- Tinnitus Evaluations
- Treatment Options
 - Criteria
- 59 MDW Neuromonics Experience
 - Case Studies
- Overall Impressions
- Summary



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“Despite the high prevalence of tinnitus and its obvious impact on the psychological health of the patient, only a small number of people contact physicians or hearing care professionals for help. The reason perhaps lies in the widespread belief that tinnitus is incurable or untreatable. Yet, there are several methods for treating tinnitus by alleviating the impact it has on quality of life.^{3,5,6}”

Kochkin S, Tyler R. Tinnitus treatment and the effectiveness of hearing aids: hearing care professional perceptions. *Hearing Review*. 2008;15(13):14-18.



Prevalence



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- American Tinnitus Association estimates over 50 million Americans experience tinnitus to some degree
- About 12 million have severe enough tinnitus to seek medical attention
- About 2 million patients are seriously debilitated
- More common in males (possibly occupational)
- Increases with hearing loss
- 70-90% of tinnitus sufferers have hearing loss



Associated Pathologies



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Middle Ear

- Cholesteotoma
- Impacted cerumen
- Glomus jugular tumor (pulsatile)
- Otitis media
- Allergies
- Head/ear trauma

Inner Ear

- Noise exposure
- Meniere's Disease
- Sudden Hearing Loss

- Vestibular schwannoma
- Ototoxicity
- Perilymph fistula

Central

- Vascular
- Dementia
- Cardiovascular disease/hypertension
- Multiple sclerosis
- Blood disease/anemia



Military Significance



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- 400,000 Veterans on tinnitus disability
- Military Relevance
 - Compensation payments nearly \$190 million annually for veterans with tinnitus as main disability
 - Military has 2 to 5 times higher rates for STS shifts than industrial hearing conservation programs
- Committee on Noise-Induced Hearing Loss and Tinnitus Associated with Military Service from World War II to Present (2005)



Treatment Options



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- Amplification
- Biofeedback
- Medication
- Perfusion
- Surgery
- Stress Management
- Nutritional Counseling
- Dietary supplements
- **Masking**
- Reassurance education
- Meditation
- Massage
- Teflon insertions (b/w cochlea & vascular loop)
- Repetitive transcranial magnetic stimulation
- Acupuncture
- Tinnitus Retraining Therapy
- Desensitization/Habituation
- Cognitive-Behavioral Therapy
- **Neuromonics Device**
- Homeopathy
- Ultrasound
- Electromagnetic stimulation
- Ear canal magnets
- Low-power laser therapy
- Hypnotherapy
- Vibrational therapy
- Direct current electrical stimulation
- High-frequency enriched sound environments
- Habituation/Psychological Model

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Treatment Options



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Can Hearing Aids Help?

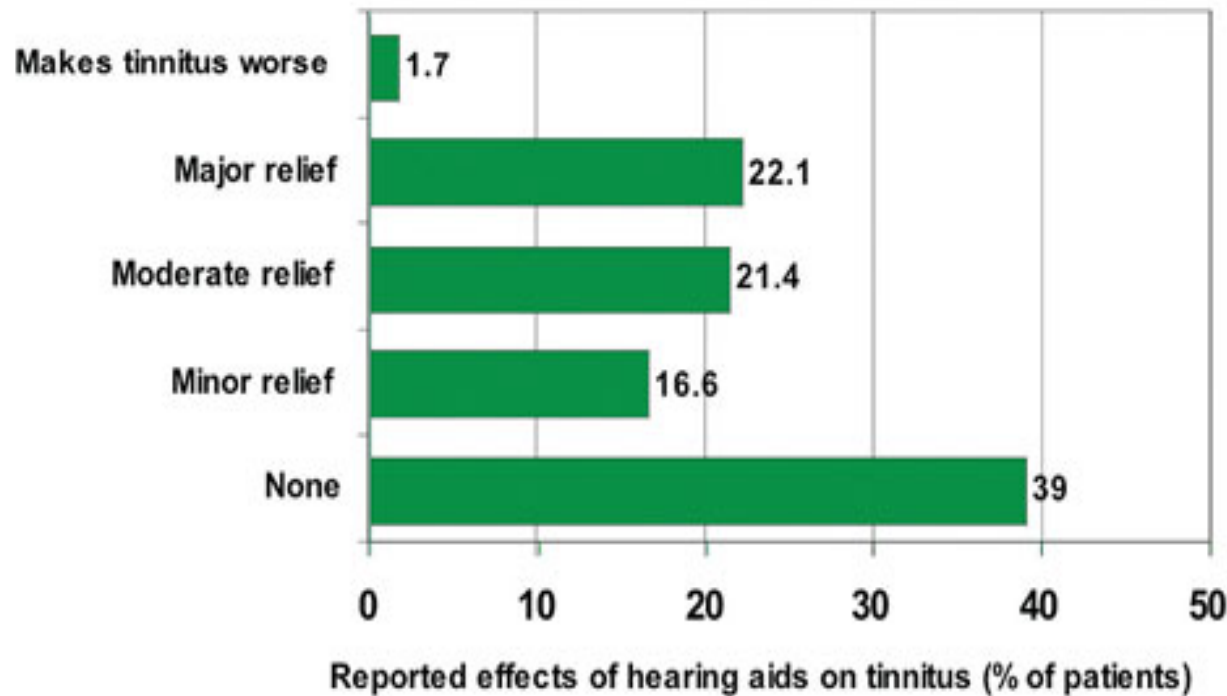


FIGURE 1. Reported effectiveness of hearing aids on patients with tinnitus (survey of 230 hearing health care professionals). About 60% of patients are reported to receive some benefit.

Kochkin S, Tyler R. Tinnitus treatment and the effectiveness of hearing aids: hearing care professional perceptions. *Hearing Review*. 2008;15(13):14-18.



Treatment Options



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- Modification of Existing Compensatory Strategies
 - Listening to tv, radio while working on the computer
 - Listen to relaxing music while sleeping
- New Compensatory Strategies
 - Neuromonics
 - Ear level maskers

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Neuromonics



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- Inventor: Paul Davis, PhD - Curtin University, Perth, Australia
- Neuromonics formed in 2001
- FDA clearance 2005
- Neuromonics began to pursue the VA in 2007
 - VA Price: \$2,295.00



Neuromonics Treatment



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- Neuromonics
 - Fitting device (customize for patient)
 - 4 tracks (2 classical tracks, 2 nature/new age tracks)
 - Phase 1 (approximately 8 weeks)
 - Phase 2 (approximately 18 weeks)
 - Patient wears device 2 to 4 hours per day



Tinnitus Evaluation



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- Tinnitus case history
 - % Awareness
 - % Disturbed
- Tinnitus Questionnaire
 - Tinnitus Reaction Questionnaire (TRQ), 26 questions
 - What type of effect tinnitus is having on the patient's lifestyle
 - Not at all (0)
 - A little of the time (1)
 - Some of the time (2)
 - A good deal of the time (3)
 - Almost all of the time (4)
- Otoscopy
- Tympanometry
- OAEs
 - Outer Hair Cell damage
- Puretone/Speech audiometry including: air, bone, SRT, Word recognition

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Tinnitus Evaluation



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- Loudness Discomfort Levels (LDLs)
- Pitch Matching (Contralateral ear)
- Loudness Matching (Contralateral ear)
- Minimum Masking Levels (Ipsilateral ear)
- *Residual Inhibition (RI)*
 - Play narrowband masking or broadband masking for one minute, present bilaterally
 - Complete RI: absence of tinnitus for a period of time
 - Partial RI: decrease in tinnitus but tinnitus is still present
 - No change in tinnitus
 - Reactive tinnitus: Increase in tinnitus due to a sound

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Neuromonics Criteria



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WHMC Criteria for Neuromonics Fittings

- Must have constant bilateral Tinnitus vs intermittent
- Awareness/Disturbance above 50% on protocol case history form
- TRQ score
 - Responses to impact of tinnitus on their lifestyle are in the good amount of time (3) and almost all the time category (4)
- Jobs where person routinely works in noise
- Lifestyle: pt. needs to wear device 2 to 4 hours/day
- Normal hearing or High Frequency SNHL outside HA fitting range
- Initial trial with sound conditioner or extra counseling



Tinnitus Reaction Questionnaire (TRQ)



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	Not at all	A little of the time	Some of the time	A good deal of the time	Almost all of the time
1. My tinnitus has made me unhappy.	0	1	2	3	4
2. My tinnitus has made me feel tense.	0	1	2	3	4
3. My tinnitus has made me feel irritable.	0	1	2	3	4
4. My tinnitus has made me feel angry.	0	1	2	3	4
5. My tinnitus has led me to cry.	0	1	2	3	4
6. My tinnitus has led me to avoid quiet situations.	0	1	2	3	4
7. My tinnitus has made me feel less interested in going out.	0	1	2	3	4
8. My tinnitus has made me feel depressed.	0	1	2	3	4
9. My tinnitus has made me feel annoyed.	0	1	2	3	4
10. My tinnitus has made me feel confused.	0	1	2	3	4
11. My tinnitus has "driven me crazy".	0	1	2	3	4
12. My tinnitus has interfered with my enjoyment of life.	0	1	2	3	4
13. My tinnitus has made it hard for me to concentrate.	0	1	2	3	4
14. My tinnitus has made it hard for me to relax.	0	1	2	3	4
15. My tinnitus has made me feel distressed.	0	1	2	3	4
16. My tinnitus has made me feel helpless.	0	1	2	3	4
17. My tinnitus has made me feel frustrated with things.	0	1	2	3	4
18. My tinnitus has interfered with my ability to work.	0	1	2	3	4
19. My tinnitus has led me to despair.	0	1	2	3	4
20. My tinnitus has led me to avoid noisy situations.	0	1	2	3	4
21. My tinnitus has led me to avoid social situations.	0	1	2	3	4
22. My tinnitus has made me feel hopeless about the future.	0	1	2	3	4
23. My tinnitus has interfered with my sleep.	0	1	2	3	4
24. My tinnitus has led me to think about suicide.	0	1	2	3	4
25. My tinnitus has made me feel panicky.	0	1	2	3	4
26. My tinnitus has made me feel tormented.	0	1	2	3	4
Total					

Wilson et al. 1991



Case 1



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- Female, 39 yrs
- Mild to moderately-severe HF loss in RE only
- Tinnitus: Constant, RE
- Pitch match: 12.5 kHz pure tone

- Initial TRQ score: 29
- Tinnitus Awareness: 75%
- Tinnitus Disturbance: >50%



Case 1



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Highest TRQ Statements

- My tinnitus has made it hard for me to ***concentrate***
- My tinnitus has made it hard for me to ***relax***
- My tinnitus has ***interfered with my sleep***
- My tinnitus has led me to ***avoid quiet situations***
- My tinnitus has ***“driven me crazy”***.



Case 1



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Progress

	<u>Fitting</u>	<u>+2 mo</u>	<u>+4 mo</u>	<u>+7 mo</u>
TRQ Score:	29	29*	15	3
Awareness:	75%	n/a	< 75%	30%
Disturbance:	>50%	n/a	50%	5-10%

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Case 2



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- Male, 66 yrs
- Bilateral, moderate to moderately-severe HF loss
6 – 12.5 kHz
- Tinnitus: “fairly” constant, bilateral
- Pitch match: 8 kHz pure tone

- Initial TRQ score: 37
- Tinnitus Awareness: 95%
- Tinnitus Disturbance: 50%



Case 2



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Highest TRQ Statements

- My tinnitus has made me feel ***tense***.
- My tinnitus has ***“driven me crazy”***.
- My tinnitus has made it ***hard for me to concentrate***.



Case 2



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Progress

	<u>Fitting</u>	<u>+4 mo</u>	<u>+8mo</u>
TRQ Score:	37	31	☹
Awareness:	95%	25%	☹
Disturbance:	50%	5-10%	☹

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Overall Impressions



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- Increased candidacy scrutiny
- Significant disturbance, lifestyle handicap – cannot rely solely on TRQ score!
- Demonstrate commitment to use device & make f/u appointments
- Demonstrate willingness to incorporate treatment into lifestyle
- Realistic expectations – review & discuss each item on the form
- Awareness/discussion of 30 day warranty.



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59th Medical Wing

**“Providing Great Care...Building
Warrior Medics”**

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