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TINNITUS AND HYPERCUSIS

Effectiveness of Enriched Acoustic Environment (EAE) compared to white noise in the treatment of tinnitus: Preliminary results of a four-month intervention

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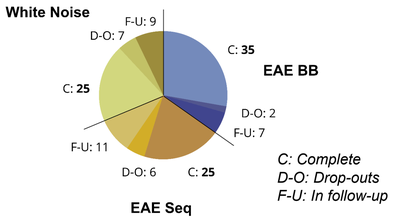
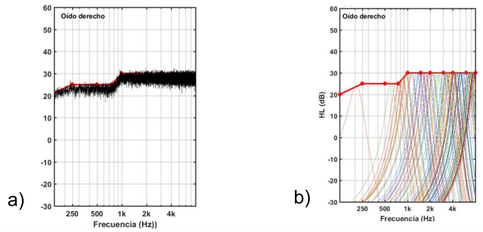
Abstract

Tinnitus is a symptom with no effective pharmacological treatment, which affects 14% of adults. Sound therapies are commonly used to reduce distress and facilitate habituation. **This study assesses Enriched Acoustic Environment (EAE) sound therapy—both broadband (BB) and sequential (Seq)—against white noise over a four-month period**. A total of 127 participants, divided into three groups, received daily therapy. Each group received a different treatment. Both EAE methods significantly reduced distress compared to white noise (WN), with just one hour of daily treatment, in contrast to the 7-8 hours required for traditional Tinnitus Retraining Therapy (TRT) in 4 months, instead of 1-2 years. EAE therapy appears to deliver results more quickly than TRT, potentially reducing treatment time, improving adherence, and enhancing outcomes.

Participants per group

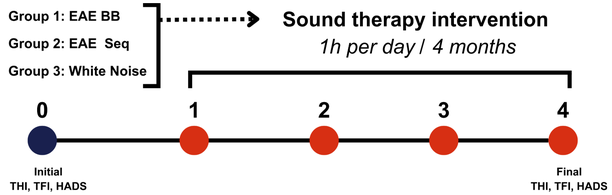


EAE BB (a) and Seq (b) spectrum



Objectives

The aim was to assess whether EAE as a sound therapy can reduce tinnitus-related distress more effectively than standard stimuli, specifically white noise, in a shorter time and with reduced daily application compared to conventional TRT.

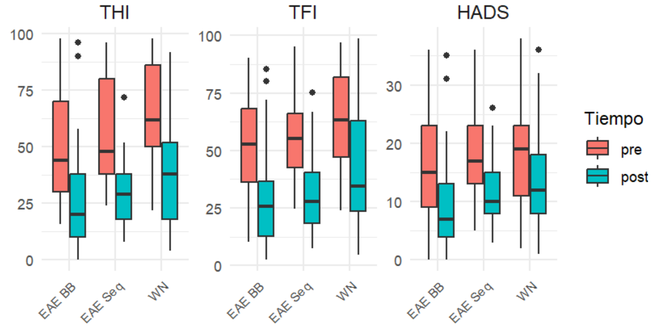


Materials and Methods

The participants were divided into three groups: EAEBB (n=44), EAESeq (n=42) and WN (n=41). Before starting a four-month therapy, each participant completed the **Tinnitus Handicap Inventory (THI)** and the **Tinnitus Functional Index (TFI)** to assess distress (0-100 scale) and **the Hospital Anxiety and Depression Scale (HADS)** to assess anxiety and depression (0-42 scale). Participants completed these questionnaires monthly throughout the course of therapy.

Results

The results showed clinically significant reductions for all three therapies, with the most pronounced effect observed with EAE Seq, followed by EAE BB and WN. In the EAE BB group, differences of 24.5 (THI), 24.7 (TFI) and 5.6 (HADS) were observed. The EAE sequential group showed differences of 27.2 (THI), 26.2 (TFI) and 7 (HADS). The white noise group showed differences of 22.3 (THI), 19.3 (TFI) and 4.7 (HADS).



Δ (Pre-Post)		
EAE BB	THI	24,6
	TFI	24,7
	HADS	5,6
EAE Seq	THI	27,24
	TFI	26,2
	HADS	7
White Noise	THI	22,3
	TFI	19,3
	HADS	4,7

Conclusion

The study suggests that EAE may be more effective than traditional treatments such as white noise**. Seq EAE therapy produced the best results, followed by broadband EAE, and then white noise.** These outcomes were achieved in just four months, surpassing those reported in the literature on conventional TRT (1-2 years) and reducing the daily application time from 7-8 hours to 1 hour. EAE therapy appears to achieve results faster than TRT, indicating it may reduce treatment time, improve adherence, and enhance outcomes. However, the study is preliminary, requiring larger samples and comprehensive analyses for conclusive results.

References

- Cuesta, M., Cobo, P. (2024). Enriched Acoustic Environment as a customized treatment for tinnitus: A non-controlled longitudinal study. Journal of Otology, In Press, https://doi.org/10.1016/j.joto.2024.01.003.
- Jastreboff, P. J. (2015). 25 years of tinnitus retraining therapy. HNO, 63(4), 307–311.
- Noreña, A. J., Eggermont, J. J. (2005). Enriched acoustic environment after noise trauma reduces hearing loss and prevents cortical map reorganization. The Journal of Neuroscience: The Official Journal of the Society for Neuroscience, 25(3), 699–705.

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