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THÈME

# Transcranial Direct Current Stimulation and tinnitus: A randomized, double-blind, and placebo-controlled clinical trial

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## Abstract


- **Population:** A total of 42 individuals with tinnitus were randomized to a-tDCS (n=24) and sham tDCS (n=18). Participants had to meet the following inclusion criteria: (a) male and female patients older than 18 years old; (b) chronic tinnitus; and (c) the presence of average hearing thresholds of 500, 1000, 2000, and 4000Hz below 40dBHL.


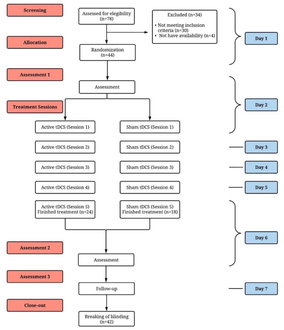


**Figure 1**. Flow diagram for the randomized trial. Adapted from Consolidated Standards of Reporting Trials - CONSORT, 2010

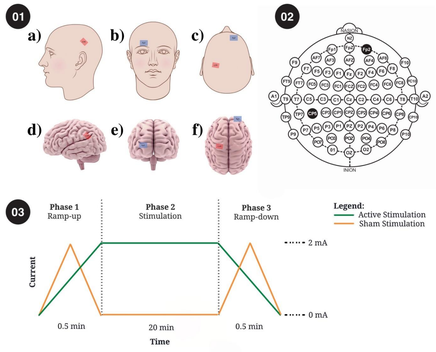


**Figure 2**. Image 01 - stimulation site of the tDCS. Image 02 -electrodes' positioning in the 10-10 EEG System. Image 03 -stimulation current ramp for active and sham conditions.

## Résultats


- There was no effect of comparison between groups or interaction effect (time x group) in all hearing assessments and questionnaires.
- There was only a main effect of time for THI [F(1.642, 45.988) = 5.128; p = 0.014; η2 = 0.155].
- Bonferroni post hoc showed that there was a significant difference in THI in the sham group between pre and post-treatment [CI (0.107, 14.643; p = 0.046)].


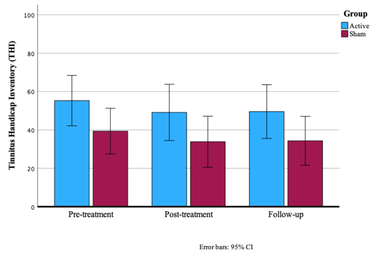


**Figure 3**. Comparison of the THI questionnaire between the groups that received active and sham tDCS at the three evaluations (pre-treatment, post-treatment, and follow-up).

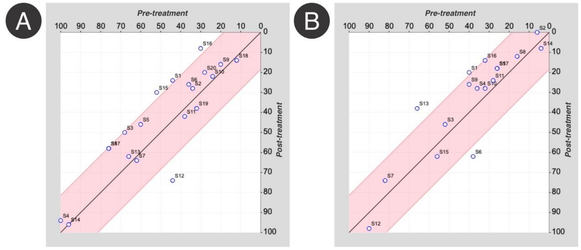


**Figure 4**. The reliable change index of THI pre- and post-treatment is shown. The points above the diagonal represent tinnitus improvement (post<pre), and the points below represent tinnitus worsening (post>pre). The points inside the shaded area indicate unreliable improvement (false positives). Legend: figure A = active group, figure B = sham group.

## Objectifs


- Evaluate the short and long-term effects of anodal transcranial Direct Current Stimulation (a-tDCS) targeting the left temporoparietal area (LTA) on tinnitus severity, annoyance, and loudness.


## Conclusion


- **Interpretation:** The anodal tDCS (20 min, 2mA) over LTA on five consecutive sessions was not effective in decreasing tinnitus severity, annoyance, and loudness. The placebo effect is also found in other studies with neuromodulation for tinnitus (1, 2, 3). However, other neuromodulation protocols had effective results in reducing the characteristics of tinnitus.
- **Conclusion:** This neuromodulation protocol do not improve tinnitus characteristics. Future studies should investigate if other tDCS protocols are effective or a combination of tDCS with other forms of treatment.


## Méthodes et Matériels


- This is a double-blind, randomized, sham-controlled, and parallel-group clinical trial
- The a-tDCS group received tDCS over the LTA during five consecutive day sessions (2 mA, 20 min). The sham group received a placebo current with the same characterists of a-tDCS group.
- Participants were evaluated at baseline, after the fifth session, and at the 30-day follow-up.


## Références


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2. Hyvärinen P, Mäkitie A, Aarnisalo AA. Self-Administered Domiciliary tDCS Treatment for Tinnitus: A Double-Blind Sham-Controlled Study. PLoS One. 2016;11(4):e0154286.
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19›22 September 2024
Paris, France
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