

## Transcutaneous vagus nerve stimulation in tinnitus: a pilot study.

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#### Abstract

**CONCLUSIONS:** This pilot study shows that transcutaneous vagus nerve stimulation (tvNS), if combined with sound therapy (ST), reduces the severity of tinnitus and tinnitus-associated distress. Our magnetoencephalography (MEG) results show that auditory cortical activation can be modulated by the application of tvNS. Thus, tvNS might offer a new avenue to treat tinnitus and tinnitus-associated distress.

**OBJECTIVES:** Recent studies suggest that tinnitus can be improved by tailored ST or by VNS plus ST. Our aims were to study whether tvNS has therapeutic effects on patients with tinnitus and, additionally, if tvNS has effects on acoustically evoked neuronal activity of the auditory cortex.

**METHODS:** The clinical efficacy was studied by a short-term tvNS plus ST trial in 10 patients with tinnitus using disease-specific and general well-being questionnaires. tvNS was delivered to the left tragus. The acute effects of tvNS were evaluated in eight patients in the MEG study in which the N1m response was analyzed in terms of source level amplitude and latency in the presence or absence of tvNS.

**RESULTS:** The treatment with tvNS plus ST produced improved mood and decreased tinnitus handicap scores, indicating reduced tinnitus severity. The application of tvNS decreased the amplitude of auditory N1m responses in both hemispheres.