

TMS FOR THE TREATMENT OF CHRONIC TINNITUS

Kleinjung T, Langguth B, Landgrebe M, Sand P, Eichhammer P, Hajak G

Department of Psychiatry, University of Regensburg, Germany

Department of Otorhinolaryngology, University of Regensburg, Germany

Tinnitus is a common and often severely disabling disorder for which there is no satisfactory treatment. Neuroimaging studies demonstrate changes in brain activity in the primary and secondary auditory cortices, particularly on the left side. TMS is a non-invasive method of perturbing and inducing change in cerebral cortex. It uses electromagnetic principles and has been successfully employed in the treatment of other conditions associated with increased activity of the cerebral cortex. An increasing number of studies suggest that TMS may be effective in the treatment of tinnitus.

Patients suffering from severe chronic tinnitus underwent a [¹⁸F]deoxyglucose- PET (positron emission tomography) and MRI (magnetic resonance imaging) measurement. Fusioning of the individual PET scan with the structural MRI-scan (T1, MPRAGE) allowed to exactly identify the area of increased metabolic activity in the auditory cortex, which was selected as the target point for rTMS. In this context, a neuronavigational system adapted for TMS positioning enabled to monitor the exact position of the figure 8-shaped magnetic coil in relation to the target area. rTMS (110% motor threshold; 1 Hz; 2000 stimuli/ day over 10 days) was performed using a placebo controlled design. Patients were blind regarding the stimulus condition. For the sham stimulation a specific sham-coil system was used. Treatment outcome was assessed with a specific tinnitus questionnaire (Goebel and Hiller).

Up to date, 80 patients were included. In most of the patients we could localize an increased metabolic activation within the primary auditory cortex. After 10 days of verum rTMS a remarkable improvement of the tinnitus score was found. This effect could not be seen after sham stimulation. These preliminary results demonstrate that neuronavigated rTMS offers new possibilities in the understanding and treatment of chronic tinnitus.