

Transcranial magnetic stimulation for the treatment of Tinnitus

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Chronic tinnitus is a debilitating and life-altering experience affecting millions of people in western countries. Despite its enormous social and economic burden, up to now no well-established specific treatment for this disorder is available. While traditionally chronic tinnitus has been viewed as having a purely auditory etiology, growing evidence underscore abnormal functioning of the central nervous system including hyperactivity of the auditory cortex and maladaptive neuroplasticity in distinct cortical networks. Repetitive Transcranial Magnetic Stimulation (rTMS) is a new biophysical treatment method which applied in a low-frequency range has shown to reduce brain hyperexcitability and to modulate neuroplasticity in critical cortical circuits. Based on these neurobiological qualities and used as a causally-orientated treatment strategy, low-frequency rTMS was able to improve tinnitus complaints significantly beyond the stimulation period in several clinical trials. Simultaneously, beneficial therapeutical response was associated with selective changes in neurobiological mechanisms, pointing to alterations in neuroplasticity as crucial for the mediation of treatment effects. The proposed large controlled trial will study the efficacy of neuroimaging guided low frequency rTMS in the treatment of chronic tinnitus and will focus to elucidate neurobiological mechanisms underlying rTMS induced clinical effects.

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