

UAMS Ringing in Ear Study Reported by: KNWA Staff

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A study conducted at the University of Arkansas for Medical Sciences (UAMS) has shown potential to markedly improve tinnitus, commonly known as "ringing in the ears." Mark Mennemeier, Ph.D., and John Dornhoffer, M.D., worked collaboratively to design the treatment study. Results of the initial case were published in the July issue of *The Laryngoscope* in which a single patient was tested to examine the safety and feasibility of using maintenance sessions of low-frequency repetitive transcranial magnetic stimulation (TMS) to reduce tinnitus loudness and prevent its return over time.

Mennemeier is associate professor of neurobiology and director of the Transcranial Magnetic Stimulation Laboratory in the Center for Translational Neuroscience (CTN) at UAMS. He conducts the treatment study and evaluates its effectiveness.

Dornhoffer is professor of otology/neurotology at UAMS and a clinician/scientist in the CTN. He evaluates patients for entry into the study and holds a grant from the Tinnitus Research Consortium that funds the research.

Tinnitus is defined as the perception of sound in the absence of external sound and can manifest itself in variety of ways. "The phantom sounds of tinnitus may sound like ringing, clicking or hissing," Mennemeier said. "The sounds can change with the time of day and often cause sleep problems and emotional distress."

Tinnitus affects about 17 percent of Americans, often without an observable cause.

TMS involves the placement of a coil on the scalp that creates a magnetic field over the brain's surface. The magnetic field penetrates up to two or three centimeters from the surface of the coil. An electric current is induced by the magnetic field that either activates or inhibits neural activity. The goal of the study is to inhibit excessive neural activity believed to cause tinnitus.

"We use a PET scan of the patient's brain to look for excessive neural activity with increased blood flow in the temporal lobe. Then we target that area with low-frequency TMS to inhibit the neural activity and decrease the tinnitus," Mennemeier said.

While TMS has previously shown short-term effectiveness in European studies, the UAMS team was the first to introduce it as maintenance therapy in which patients receive an initial course of treatment and follow-ups as symptoms persist.

The case study of one UAMS patient demonstrated for the first time the feasibility of managing chronic tinnitus through maintenance TMS. "The patient in our case study reported his tinnitus to be unobtrusive in his daily life when he was assessed four months after his final round of maintenance therapy," Mennemeier said.

No side effects were reported by the patient or detected in formal assessments after three rounds of maintenance therapy.