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Transcranial Magnetic Stimulation An Alternative Treatment for Depression

Transcranial magnetic stimulation (TMS), a noninvasive treatment for depression, provides an alternative treatment for patients who have tried and failed at least 1 antidepressant medication trial. TMS is much less invasive than electroconvulsive therapy (ECT). Unlike patients receiving ECT, TMS patients are awake and alert and do not require anesthesia. Also, patients do not have negative cognitive side effects with TMS treatment.

TMS has been clinically available in Canada and other countries prior to the US Food and Drug Administration (FDA) approval for clinical use in October 2008.

"TMS is a new treatment option for moderately treatment-resistant depressed patients or patients who are intolerant of antidepressant medications," says Shirlene Sampson, MD, a psychiatrist at Mayo Clinic in Rochester, Minnesota.

How TMS Works

TMS uses magnetic fields to stimulate nerve cells to change areas of the brain involved in depression. An electromagnetic coil is placed against the

scalp, generally over the dorso-lateral prefrontal

cortex (Figure), and the magnetic field passes undiminished into the underlying cortex to stimulate neurons.

When TMS is effective, symptoms may improve for days or weeks or they may subside completely. Preliminary data suggest that TMS may be less effective for people who are elderly or have psychotic depression.

A common side effect is discomfort at the treatment site during TMS stimulation, as the magnetic field can stimulate nerves under the scalp at the site of stimulation and produce muscle contractions. Some patients also report headaches, light-headedness, or facial twitches during treatment. In rare cases, patients have reported seizures, so individuals at risk for seizures are generally excluded from receiving TMS. The sound of the TMS pulse may shift hearing thresholds. However, this does not occur when earplugs are used.

Success Defined

Simon Kung, MD, a psychiatrist at Mayo Clinic in Rochester, says Mayo Clinic specialists track patient improvement with depression questionnaires administered at the beginning and end of the 6-week treatment period and every 2 weeks during treatment. TMS is generally provided daily, Monday through Friday, for 6 weeks, although some patients may need longer treatment courses. Patients are also monitored daily by physicians and/or nurses who ask detailed questions.

"Although a greater than 50% improvement is considered successful, we aim for remission of depression when possible," says Dr Sampson. Patients are encouraged to continue treatment with their referring health care provider after TMS.

TMS is a newly emerging treatment option. It is in the process of being reviewed by insurance companies for remuneration. At present,

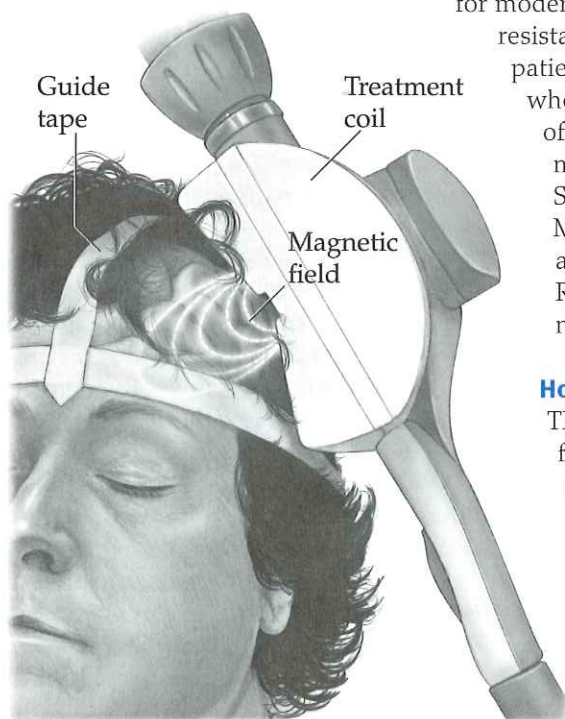


Figure. The TMS treatment coil produces a magnetic field that passes easily through hair, scalp, and skull to stimulate the brain.

coverage of TMS is considered on a case-by-case basis. Few insurance companies currently cover TMS treatments.

Clinical Trials

Mayo Clinic has conducted studies involving TMS for nearly 10 years and participated in the large multicenter trial that collected findings used to gain FDA approval for TMS.

Areas of focus for TMS research at Mayo Clinic include chronic pain and treatment-resistant depression in adolescents. Future studies are being designed to help understand how TMS may be used to improve chronic pain.

During studies of TMS treatment for depression, adult patients and adolescents who also experience chronic pain have shown improvement in their pain. "We know that the neural pathways for pain and depression



Simon Kung, MD, Christopher A. Wall, MD, Donald E. McAlpine, MD, and Shirlene Sampson, MD

overlap. We hope that future TMS research will help us better understand the pathophysiology of chronic pain," says Dr Sampson.