



Sage Neuroscience Center

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Basics of Transcranial Magnetic Stimulation

Transcranial Magnetic Stimulation (TMS)

TMS has been studied and approved by the Food and Drug Administration (as of 2008) for treatment resistant depression. Individuals suffering from major depressive disorder who have not seen adequate treatment with standard medications may be candidates for TMS. TMS is considered quite safe as a treatment option. It is performed in a standard office setting without supplemental medications or sedation.

What are Success Rates?

Studies typically show very good results given the treatment population is one that has failed a series of standard medications and therapy. Open-label studies are closest to real-world settings of a clinic one may visit. In these circumstances, roughly 2/3 of patients completing treatment reported little to no depression at the completion. Standard rating scales done by clinicians showed about 1/2 of the participants had significant improvement in depression and 1/3 were in remission with their depression at the completion.

How does TMS work?

TMS involves utilizing magnetic resonance imaging (MRI) strength magnets to activate the surface of the brain inside the skull. Magnetic fields are able to pass through the skull without losing much energy to stimulate electric currents in neurons. The TMS treatment is done at a specific strength and sequence just behind the left forehead over the course of about 40 minutes. This is done daily, Monday to Friday, for four to six weeks. For most people, the treatment is painless and is done in a reclining medical chair while wide awake. The antidepressant effect is believed to be modulated through the activation of neurotransmitters like serotonin, dopamine and norepinephrine. Increased neuronal firing also increases blood flow to specific areas of the brain involved in regulation of depressed mood. Deeper brain structures are also activated through these processes as the targeted surface is part of the neural network involved in depression.

What are the side effects?

There are incredibly few side effects with TMS. It is a local treatment that is devoid of systemic risks. Side effects to TMS are most commonly scalp discomfort or headaches due to localized magnetic stimulation. For some, pulses through the scalp are uncomfortable and

may cause twitching of local muscles. Headaches can be as much a component of holding tension in the muscles around the scalp in anticipation of the pulses. Therefore, those who are able to remain relaxed seem to have fewer risks of headaches. Treatment with TMS does not cause memory impairment. In fact, it may sometimes even be the opposite where memory is slightly better with treatment.

Seizures are the most concerning risks with any brain stimulation. As opposed to electroconvulsive therapy (ECT) where seizures are the goal, the goal is to not cause seizures in TMS. In fact, seizures are very rare occurring only once in about every 30,000 treatments. Most commonly this seems to happen when someone already has a seizure disorder, is taking medications that can increase the risk of seizures, the pulse energy is very high, or any combination of the above.

How long do effects last?

Effects from TMS will last from months to years. That said, one must understand that major depression is a recurrent illness and there is no cure. Studies have followed people for 6-12 months after treatment and a little more than 30% required re-treatment with TMS. On average this involved an average of 15 sessions. Of those who needed follow up sessions, 84% had a good response to the subsequent sessions. This is promising knowing that depression is a recurrent illness and TMS represents a treatment option that has the potential to recreate a good response on subsequent sessions.

Is TMS covered by insurance and what is the cost?

TMS is covered by many insurance companies and these numbers regularly growing. Check with your benefits if you are not clear if TMS is covered or under what conditions. Treatment generally costs \$8,000 to \$12,000 for the six to eight weeks of treatment needed. This may pale in comparison to the cost burden of the depression when one sums lost productivity, health burden, healthcare costs, and the intangibles of lost time. If insurance coverage is not available, one may apply for healthcare financing which helps reduce the cost of treatment to manageable monthly premiums.

For Further information, visit www.sageclinic.org or call Sage Neuroscience Center at 505-884-1114