

Transcranial Magnetic Stimulation (TMS)

Patient Information Booklet - page 1 of 5

What is TMS?

TMS is an extremely safe and effective medical treatment for certain psychiatric disorders. TMS is a procedure that uses targeted magnetic pulses to stimulate areas of the brain. The patient is awake, and the procedure takes place in a doctor's office. TMS may work when other treatments are unsuccessful.

When is TMS used?

For many people, antidepressant medications and psychotherapy are the first line treatments for depression. These treatments, however, do not work for all patients. In these instances, TMS might be used as an alternative treatment, or to augment antidepressant medications or psychotherapy. Patients who have not experienced adequate improvement from antidepressants, or who are unable to tolerate medications due to side effects, might consider TMS therapy.

How does TMS work?

TMS has been shown to produce changes in neuronal activity in regions of the brain implicated in mood regulation, such as the prefrontal cortex. As each magnetic pulse passes through the skull and into the brain, this induces brief activity of brain cells underlying the treatment coil.

The frequency of pulse delivery also influences whether brain activity is increased or decreased by a session of TMS. Recent studies also suggest that stimulation over the left and right sides of the brain can have opposite effects on mood regulation.

Transcranial Magnetic Stimulation (TMS)

Patient Information Booklet - page 2 of 5

Who Administers TMS?

TMS is always prescribed by a TMS physician. At the Menninger Clinic, all TMS physicians are specifically TMS credentialed by the Clinic. Motor threshold is determined by a TMS physician. The treatment itself is administered by an experienced TMS technician under the supervision of the TMS physician or by the TMS physician.

What happens during a TMS procedure?

For each TMS session, the patient sits in a specially designed treatment chair, much like the kind used in a dentist's office. Because TMS uses magnetic pulses, before beginning a treatment, patients are asked to remove any magnetic-sensitive objects (such as jewelry, credit cards). Patients are required to wear earplugs during treatment for their comfort and hearing protection, as TMS produces a loud clicking sound with each pulse, much like an MRI machine.

During the first TMS session, several measurements are made to ensure that the TMS coil will be properly positioned over the patient's head. Once this is done, the TMS coil is suspended over the patient's scalp. The TMS physician then measures the patient's motor threshold, by administering several brief pulses. The motor threshold is the minimum amount of power necessary to make the patient's thumb twitch, and varies from individual to individual. Measuring the motor threshold helps the physician personalize the treatment settings and determine the amount of energy required to stimulate brain cells.

Once the motor threshold is determined, the coil is then brought forward so that it rests above the front region of the patient's brain. Treatment is then commenced. During the treatment, patients will hear a series of clicking sounds and will feel a tapping sensation under the treatment coil.

Succeeding treatment sessions do not require that the motor threshold be determined again, unless indicated otherwise, such as when changes in medications are made during the course of the treatment.

Transcranial Magnetic Stimulation (TMS)

Patient Information Booklet - page 3 of 5

How long is a TMS procedure?

TMS therapy involves a series of treatment sessions. Treatment sessions are approximately 40 minutes each, and administered 5 days a week. A typical course of TMS is 4 to 6 weeks. However, this can vary depending on an individual's response to treatment.

Do I need to be hospitalized to receive TMS?

Unlike ECT, TMS does not require any sedation or general anesthesia, so patients are fully awake and aware during the treatment. There is no “recovery time”, so patients can drive home afterwards and return to their usual activities. Patients are not required to be in the hospital to receive TMS, although patients admitted to the hospital because of the severity of their illness may receive TMS during the hospitalization.

What the potential side effects of TMS?

TMS is well-tolerated and associated with few side-effects and only a small percentage of patients discontinue treatment because of these. The most common side-effect, which is reported in about half of patients treated with TMS, is headaches. These are mild and generally diminish over the course of the treatment. Over-the-counter pain medication can be used to treat these headaches.

About one third of patients may experience painful scalp sensations or facial twitching with TMS pulses. These too tend to diminish over the course of treatment although adjustments can be made immediately in coil positioning and stimulation settings to reduce discomfort.

The TMS machine produces a loud noise and because of this earplugs are given to the patient to use during the treatment. However, some patients may still complain of hearing problems immediately following treatment. No evidence suggests these effects are permanent if earplugs are worn during the treatment.

Transcranial Magnetic Stimulation (TMS)

Patient Information Booklet - page 4 of 5

TMS has not been associated with many of the side-effects caused by antidepressant medications, such as gastrointestinal upset, dry mouth, sexual dysfunction, weight gain, or sedation.

The most serious risk of TMS is seizures. However, the risk of a seizure is exceedingly low. At the Menninger Clinic, we follow up-to-date safety guidelines that are designed to minimize the risk of seizures. While TMS is a safe procedure, it is important to point out that because it is a new treatment, there may be unforeseeable risks that are not currently recognized.

Who should not receive TMS?

Patients with any type of non-removable metal in their heads (with the exception of braces or dental fillings), or within twelve inches of the coil should not receive TMS. Failure to follow this rule could cause the object to heat up, move, or malfunction, and result in serious injury or death. The following is a list of metal implants that can prevent a patient from receiving TMS:

- Aneurysm clips or coils
- Stents in the neck or brain
- Implanted stimulators
- Cardiac pacemakers or implantable cardioverter defibrillator (ICD)
- Electrodes to monitor brain activity
- Metallic implants in your ears and eyes
- Shrapnel or bullet fragments in or near the head
- Facial tattoos with metallic or magnetic-sensitive ink
- Other metal devices or object implanted in or near the head

Who is likely to benefit the most?

Existing evidence to date suggests that patients who are less treatment-resistant respond better to TMS than those who are highly treatment-resistant. However, there is much yet to be learned about particular variables that may impact response to TMS.

Transcranial Magnetic Stimulation (TMS)

Patient Information Booklet - page 5 of 5

Researchers are presently conducting clinical studies to evaluate who will benefit most from TMS therapy. For example, there is a lot of interest in evaluating whether TMS with antidepressant medications is more effective than TMS alone.

Recommended Information about TMS on the Internet

It is easy to find information about TMS by searching the Internet. Be careful. There is a lot of false information on the Internet. Two websites you can trust are below.

www.psych.org (web site for the American Psychiatric Association)
—Click on Public, then on Let’s Talk Facts, then on Transcranial Magnetic Stimulation

www.isen-ect.org (web site for the International Society for ECT and Neurostimulation)
—Click on Resources for Patients

<http://3000pulseslater.com/> (web site for Martha Rhodes, a TMS patient advocate and professional speaker)

Write down Any Questions or Concerns You Have about TMS
