



## Frequently Asked Questions about Transcranial Magnetic Stimulation

### What is TMS Therapy?

TMS stands for Transcranial Magnetic Stimulation. TMS is a non-invasive brain stimulation technique that uses a treatment coil placed over the patient's head to administer brief magnetic pulses to a specific location in the brain. When these pulses are administered in rapid succession, it is referred to as "repetitive TMS" or "rTMS". TMS can be used therapeutically, and has been used to treat depression since the 1980's.

### Why does TMS work?

TMS produces changes in the activity of neurons in regions of the brain thought to be associated with mood or pain regulation, such as the prefrontal cortex. The magnetic pulses that pass through the skull and into the brain induce brief activity of nerve cells inside the magnetic field beneath the treatment coil. The frequency of TMS pulse delivery influences whether brain activity is increased or decreased after therapy.

### When is TMS used?

TMS might be used as an alternative treatment, or to augment pharmacotherapy or psychotherapy. Patients who have failed to achieve an adequate response from pharmacotherapy, or who are unable to tolerate medications, might consider TMS therapy. However, similar to pharmacotherapy, not all patients will respond to TMS treatment.

### Is TMS Therapy like electroconvulsive therapy (ECT)?

No, TMS and ECT are very different treatments. Electroconvulsive therapy (ECT) or "shock therapy" intentionally causes a seizure. Patients receiving ECT must be sedated with general anesthesia and paralyzed with muscle relaxants. Recovery from an ECT treatment session occurs slowly, and patients are usually closely monitored for minutes to a few hours after treatment.

By contrast, TMS does not induce a seizure and therefore does not require sedation, anesthesia, or muscle relaxants. Patients are able to resume daily activities immediately after a TMS session.

### Is TMS FDA approved?

TMS is currently FDA approved to treat major depression. Ongoing studies are currently researching the effects and usefulness of TMS as a treatment for pain, tinnitus, anxiety, and more. Researchers in these areas follow current guidelines set by the FDA for treating depression.

### What happens during a TMS procedure?

Because TMS uses magnetic pulses, patients are asked to remove any magnetic-sensitive objects (such as jewelry and credit cards). Since TMS produces a loud clicking sound with each pulse, much like an MRI machine, it is recommended patients wear earplugs during treatment for their comfort and hearing protection. Patients are seated during each session of TMS.



**PATIENT RECEIVING TMS TREATMENT**

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 technician then locates the patient's motor cortex and 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 an individual patient's nerve cells in the brain.

Once the motor threshold is determined, the coil is placed above the patient's treatment area. During the treatment, patients will hear a series of clicking sounds and will feel a tapping sensation on their scalp under the treatment coil.

### Who administers TMS?

TMS is always administered by a trained TMS technician. The TMS technician will always be present to monitor the patient during the treatment. The patient can stop a treatment at any time by asking a staff member present.

### **Do I need to be hospitalized for a course of TMS?**

No. 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.

### **What are the side-effects of TMS?**

TMS is well-tolerated and is associated with few side-effects. Only a small percentage of patients discontinue treatment because of side-effects. 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 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, so patient receive earplugs to use during 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.

The most serious risk of TMS is seizures. However, the risk of a seizure is exceedingly low. In patients not predisposed to seizure either through epilepsy or medication, the risk of seizure is less than 0.5%. 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 cannot get TMS therapy?**

Patients with any type of non-removable metal in their heads (with the exception of braces or dental fillings), should not receive TMS.

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