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# Talking to Individuals and Families About Transcranial Magnetic Stimulation (TMS)

**Transcranial magnetic stimulation (TMS) is a procedure for non-invasive stimulation of the brain. TMS was initially approved by the Food and Drug Administration (FDA) in 2008 as a treatment for major depression. It is now widely available at clinics and hospitals across the country.**

## How Does TMS Work?

**TMS produces stimulation to the brain by generating a brief, high-intensity magnetic field by passing electric current through a magnetic coil.**[1] The stimulation can inhibit or excite a small area in the brain. Treatment can be applied to all parts of the brain just below the surface of the skull, though most studies focus on the motor cortex, where a specific muscle twitch can be produced.[1] This is called the motor-evoked potential.

Pulses administered in rapid succession are referred to as repetitive TMS (rTMS), which can produce longer lasting changes in brain activity. You may see this therapy referred to as both TMS or rTMS interchangeably.

## What is TMS Used For?

**TMS is used to treat a range of medical and mental health conditions:**

- depression[2]
- schizophrenia[3]
- obsessive compulsive disorder[4]
- panic disorder[5]
- Posttraumatic stress disorder (PTSD)
- substance use disorders[6]
- pain
- amyotrophic lateral sclerosis (ALS)
- tinnitus
- epilepsy
- recovery after a stroke

## Potential Positive Outcomes

Data show that TMS is a safe and well-tolerated procedure that can be an effective treatment for depression, with a **response rate between 30-64%.**[7] This is important for patients who have not benefited from antidepressant medications or cannot tolerate their side effects.

Some evidence suggests that TMS may be helpful for managing positive and negative symptoms of schizophrenia, including auditory hallucinations.[8] There are mixed results in this area. As studies continue into the efficacy of TMS, it is worth considering this as an option due to the limited negative side effects and potential to engage patients more actively in their treatment plan.

## Potential Side Effects

TMS usually causes few side effects[9] and only a small percentage of patients discontinue treatment because of them. The most common side effect reported in about half of patients is headaches. These are mild and can be treated with over-the-counter pain medication. They generally diminish over the course of the treatment.

About one-third of patients may experience painful scalp sensations or facial twitching with TMS pulses[9]. These too tend to diminish over the course of treatment. Adjustments can be made right away in coil positioning and stimulation settings to reduce discomfort.

The TMS machine produces a loud noise so patients are given ear plugs to use during the treatment. Some may still complain of hearing problems right after treatment. There is currently no evidence to suggest these hearing problems are permanent if someone used ear plugs during treatment.

The most serious risk of TMS is seizures.[9] However, the risk of a seizure is exceedingly low.

## Discussing TMS With Your Patients and Their Families

**As you talk about this treatment approach, it is important to clearly describe TMS, the treatment process, and possible outcomes.** There are meaningful physiological and technical achievements with TMS to review and many new studies under way.[9]

When you share this information, it can help address questions and concerns that individuals may have. It can help them make decisions about their treatment plans and can also be a big help to family members in their support roles. A few important basics to cover:

- TMS is an adjunct treatment that works along with medication and psychotherapy. This complementary therapy may be beneficial as part of a standard treatment plan.
- During TMS, an electromagnetic coil is placed against the scalp and delivers a brief magnetic pulse to stimulate nerve cells in the brain that help control mood.
- Although how TMS works within the brain is not completely understood, TMS is thought to influence how the brain functions to ease symptoms and improve mood. For example, TMS is thought to activate regions of the brain with decreased activity, as occurs with depression.

As you develop goals and treatment plans with your patients, let them know that TMS requires a series of treatments to be effective. They initially undergo daily treatments for the first 4-6 weeks and taper down the remaining six sessions over three weeks. They could potentially receive around 36 treatments. You can help set expectations on the possible number of treatments they may need to improve symptoms. This can lessen anxiety or misinformation about the procedure and possibly improve adherence to their treatment series.

It is always important to introduce all treatment options – pharmacological and nonpharmacological – as you work with individuals to develop treatment goals. This can help engage people more actively in their care and provide a potential way to more successful outcomes.

## Additional Resources

NAMI: Transcranial Magnetic Stimulation
Mayo Clinic: Transcranial Magnetic Stimulation

## References


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**GRANT STATEMENT:**
Funding for SMI Adviser was made possible by Grant No. SM080818 from SAMHSA of the U.S. Department of Health and Human Services (HHS). The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by SAMHSA/HHS, or the U.S. Government.