Transcranial Magnetic Stimulation

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What is Transcranial Magnetic Stimulation?

Transcranial Magnetic Stimulation, or TMS, is a non-invasive procedure designed to treat depression. It stimulates the brain using a repetitive process.

Depression is the leading cause of disability in the United States among people aged 15 to 44. The first line of treatment for depression is psychotherapy, or talking with a therapist, and is often combined with anti-depressant medications as needed. However, these treatments do not work for everyone, and major depressive disorder can significantly impact someone's quality of life.

TMS is a newer option for treatment, first developed in 1985, for those who have not responded sufficiently to therapy and medication alone. As it is non-invasive, it does not require anesthesia and is usually tolerated well by patients. There are fewer side effects associated with TMS than with medication therapy. Unfortunately, SSRIs, the category of medications most commonly used to treat depression, are known for associated side effects.

Studies of TMS show that it is effective for 50-60% of patients who may have failed to receive benefits from more traditional therapies. Of the above population, 30-35% can go into complete remission of their depression. Full remission means that these patients no longer experience symptoms of depression, which will drastically affect their daily lives.

These results are positive, but it is worth noting that there is still a high recurrence rate of depression after treatment, as with other traditional therapies. Most TMS patients will feel better for an average of one year after the initial treatment.

Currently, TMS is only approved as a treatment for depression, migraines, and obsessive-compulsive disorder in the United States. Still, it is being studied as a treatment for anxiety, bipolar disorder, and many others.

How does it work?

TMS works by sending repeated magnetic pulses into the brain. The treatment is non-invasive and uses a machine with a magnetic coil. The coil targets specific areas of the brain that we know are involved or affected by depression. It uses electricity and magnetism to create a magnetic field to conduct electricity. It stimulates neurons, which are electrically active brain cells, by influencing activity in the brain. TMS uses a powerful magnet like that used in an MRI scanner.

The magnet uses patterns of pulses to reform neural pathways to stimulate nerve cells. These nerve cells may struggle to communicate, and rebuilding pathways makes communication easier. Strengthening these pathways allows the body to heal and stay healed after the treatment is completed.

What should I expect from TMS treatment?

TMS therapy requires patient commitment as it uses multiple sessions for the treatment to work. As a patient, you will have five sessions a week for around a month or so before scaling back, depending on the clinical protocol that your doctor is following.

The treatment uses a machine with a magnetic coil that your doctor will fit against your head. They will have you sit in a comfortable chair that you will be in for the duration of the session.

The first session is longer as your doctor will actively measure your response to treatment to ensure that the device is targeting the right area for you. They may move the machine around to get the most effective response. Behind the scenes, they are taking advantage of the motor cortex and using it as a landmark to find the dorsolateral prefrontal cortex. This area of the brain is known to be involved in depression, and targeting it shows the most clinical benefit.

After the first session, sessions are usually around 20 minutes and are run by an experienced technician. The technician will control the intensity of the stimulation.

What does the treatment feel like?

Patients describe the treatment as being repeatedly tapped on the head. It can sound like a woodpecker and be loud. Your technician will provide you with ear plugs to help protect your ears from the noise level.

Initially, this can be uncomfortable and may result in mild pain. As it is a repetitive treatment, most patients adjust to it quickly, and discomfort disappears quickly.

Conclusion

Overall, TMS is a promising and effective clinical therapy for non-responsive depression.