

- Harvard Health Blog - <https://www.health.harvard.edu/blog> -

Transcranial magnetic stimulation (TMS): Hope for stubborn depression

Posted By [Adam P. Stern, MD](#) On February 23, 2018 @ 6:30 am In [Anxiety and Depression, Behavioral Health, Brain and cognitive health, Health, Mental Health](#) | [Comments Disabled](#)

Depression is the [leading cause of disability](#) in the United States among people ages 15 to 44. While there are many effective treatments for depression, first-line approaches such as antidepressants and psychotherapy do not work for everyone. In fact, approximately two-thirds of people with depression don't get adequate relief from the first antidepressant they try. After two months of treatment, at least some symptoms will remain for these individuals, and each subsequent medication tried is actually *less* likely to help than the one prior.

What can people with depression do when they do not respond to first-line treatments? For several decades, electroconvulsive therapy (ECT or "shock therapy") was the gold standard for treatment-resistant depression. In fact, ECT is still considered to be the most potent and effective treatment for this condition, and it continues to be used regularly across the country. For many people with depression, however, ECT can be too difficult to tolerate due to side effects on memory and cognition. For those individuals and the many others who have had an inadequate response to medications and therapy alone, there is a newer treatment option called transcranial magnetic stimulation (TMS).

What is transcranial magnetic stimulation?

Transcranial magnetic stimulation, or TMS, is a noninvasive form of brain stimulation. TMS devices operate completely outside of the body and affect central nervous system activity by applying powerful magnetic fields to specific areas of the brain that we know are involved in depression. TMS doesn't require anesthesia and it is generally exceptionally well tolerated as compared to the side effects often seen with medications and ECT. The most common side effect is headache during or after treatment. A rare but serious side effect is seizures, and TMS may not be appropriate for people at high risk such as those with epilepsy, a history of head injury, or other serious neurologic issues.

Does TMS work?

Approximately 50% to 60% of people with depression who have tried and failed to receive benefit from medications experience a clinically meaningful response with TMS. About one-third of these individuals experience a full remission, meaning that their symptoms go away completely. It is important to acknowledge that these results, while encouraging, are not permanent. Like most other treatments for mood disorders, there is a high recurrence rate. However, most TMS patients feel better for many months after treatment stops, with the average length of response being a little more than a year. Some will opt to come back for subsequent rounds of treatment. For individuals who do not respond to TMS, ECT may still be effective and is often worth considering.

What is TMS therapy like?

TMS therapy is an intensive treatment option requiring sessions that occur five days a week for several weeks. Each session may last anywhere from 20 to 50 minutes, depending on the device and clinical protocol being used. When patients arrive, they may briefly check in with a technician or doctor and then begin the stimulation process. The technician will determine the ideal stimulation intensity and anatomical target by taking advantage of a "landmark" in the brain called the motor cortex. By first targeting this part of the brain, the team can determine where best to locate the stimulation coil as it relates to that individual's brain and how intensely it must "fire" in order to achieve adequate stimulation. Calculations are then applied to translate this data toward finding the dorsolateral prefrontal cortex, the brain target with the greatest evidence of clinical effectiveness and an area known to be involved in depression. Though one session may be enough to change the brain's level of excitability, relief isn't usually noticeable until the third, fourth, fifth, or even sixth week of treatment.

Can TMS help with other conditions?

TMS is being studied extensively across disorders and even disciplines with the hope that it will evolve into new treatments for neurological disorders, pain management, and physical rehabilitation in addition to psychiatry. There are currently large clinical trials looking at the effectiveness of TMS in

conditions such as pediatric depression, bipolar disorder, obsessive-compulsive disorder, smoking cessation, and post-traumatic stress disorder. While promising avenues for research, TMS for these conditions is not yet approved and would be considered “off-label.”

Related Information: [Understanding Depression](#)

Article printed from Harvard Health Blog: <https://www.health.harvard.edu/blog>

URL to article: <https://www.health.harvard.edu/blog/transcranial-magnetic-stimulation-for-depression-2018022313335>

Copyright © 2019 Harvard Health Publishing Blog. All rights reserved.