

Transcranial Magnetic Stimulation

TMS for depression that has not responded to medication

If you are reading this, you have probably already tried several antidepressants. Traditionally, the next recommendation would be another medication, a combination of medications, or an augmenting agent. Current evidence indicates that, for many patients, TMS is the more effective next step.

THE KEY FINDING

In a randomized trial of 278 patients whose depression had not responded to medication, TMS outperformed both aripiprazole augmentation and switching to a different antidepressant. An independent Dutch trial reached the same conclusion when TMS was compared with lithium augmentation and nortriptyline.

What TMS is

TMS uses focused magnetic pulses, similar in strength to an MRI, to stimulate the left dorsolateral prefrontal cortex, a region of the brain that plays a central role in regulating mood. The pulses create small electrical currents in brain tissue, much like the signals your brain produces on its own.

You remain fully awake throughout treatment. There is no anesthesia or sedation, and you can drive yourself home afterward. **TMS is not ECT** (electroconvulsive therapy); it does not induce a seizure and does not affect memory.

How it works

Depression involves brain circuits that have fallen out of rhythm. Repeated stimulation strengthens the connections between brain cells, a process called **long-term potentiation**. It is the same process the brain relies on for learning, and it is also engaged by psychotherapy, aerobic exercise, and some medications. TMS is a direct, targeted way of activating a mechanism your brain already uses to change itself.

Clinicians who provide TMS frequently observe that recovery on TMS differs qualitatively from recovery on medication. Patients are not simply less symptomatic: their emotional range returns, their thinking becomes more flexible, and they handle stress differently. Because improvement is often gradual, family members frequently notice it before the patient does.

How treatment fits into one week

The original TMS protocol required six weeks because each session lasted 20 to 45 minutes and could realistically be given only once a day. Two scientific advances made a much shorter course possible.

1. Shorter sessions

A technique called **intermittent theta burst stimulation** (iTBS) delivers pulses in rapid bursts patterned on one of the brain's natural rhythms. Cleared by the FDA in 2018, it reduces each session from 20 to 45 minutes to approximately 3 to 10 minutes.

2. Spacing between sessions

After each session, brain cells need roughly an hour to produce the proteins that consolidate change. Repeating stimulation after only 15 minutes accomplishes little, much like rereading the same flashcard fifty times in a row. Research indicates that intervals between about 30 and 90 minutes allow each session to build on the previous one, and our accelerated schedule uses **50-minute** intervals. The pause is not wasted time; it is an essential part of the treatment.

AN HONEST NOTE

Theta burst stimulation is not more powerful than conventional TMS; in direct comparisons, it works about equally well. Its advantage is efficiency: sessions are brief enough to be delivered several times in a single day.

What the research shows

Question	What studies found
Does TMS beat another medication?	Yes. TMS did better than an add-on drug or a medication switch in two separate randomized trials.
Does accelerated TMS work?	Yes. A review of 44 trials (1,671 patients) found a clear benefit over placebo treatment, with a good safety record.
Is the 5-day schedule as good as 6 weeks?	Improvement was comparable to the standard six-week course. Many patients did not experience the full benefit until 2 to 4 weeks after completing treatment.
Does more pulses mean better results?	No. The number of sessions, not the number of pulses, best predicts improvement.
Does the benefit last?	Often, particularly with periodic booster sessions. In one small study, all 21 participants remained well for a year, averaging about one booster day per month.

What we will not claim: accelerated TMS has not been shown to be *more effective* than the standard six-week course. The evidence supports comparable results delivered in far less time, which also makes patients considerably more likely to complete treatment.

Our two schedules

We offer two schedules. The treatment itself is identical in both, using the same target, the same individualized dosing, and the same stimulation. What differs is the number of sessions per day and, consequently, the overall length of the course.

	Standard course	5-Day Accelerated
Sessions per day	1	5, spaced 50 minutes apart
Length of course	35 weekdays (6 to 7 weeks)	5 weekdays in a row (1 week)
Time in office each day	20 to 40 minutes	About 4 hours
Total sessions	35	25
Evidence	Longest track record; original FDA clearance	Results similar to the standard course

Which schedule fits you?

If this sounds like you	Usually the best fit
I can set aside one full week, but not weeks of appointments	5-Day Accelerated
I am traveling from a distance	5-Day Accelerated
I want the fastest outpatient path to feeling better	5-Day Accelerated
I can come in briefly each weekday for six to seven weeks	Standard course
I prefer a gradual pace	Standard course

Severe depression is as disabling as many serious medical illnesses, and it makes organizing 35 separate appointments genuinely difficult. A condensed schedule removes that obstacle. For many patients, it is the difference between completing treatment and never beginning it.

When we refer you elsewhere

Appropriate care includes recognizing when another setting would serve you better. We will help coordinate referral in the following situations:

- **You may need a higher level of care.** This includes thoughts of suicide with a plan or intent, trouble caring for yourself, or illness severe enough to need a hospital, partial hospital, or intensive outpatient program. Some hospitals and academic centers offer intensive TMS as part of that care.
- **Your depression includes psychotic symptoms.** Patients with psychotic features respond less well to TMS and remarkably well to ECT, so referral is the appropriate recommendation.
- **You are a candidate for SAINT (also called SNT).** This Stanford protocol uses 10 sessions a day plus brain-scan (fMRI) guided targeting, and has produced very high remission rates. We do not use fMRI targeting, so we do not offer SAINT or claim its results. It is available at academic medical centers and certified treatment centers.

Who does well with TMS

- People with marked lassitude: feeling slowed down, drained, or unable to initiate tasks. This predicts an especially good response to accelerated treatment.
- People whose depression comes with significant anxiety (TMS is FDA-cleared for this)

- Older adults whose depression is linked to small blood-vessel changes in the brain. This form of depression often responds poorly to antidepressants but well to TMS, so TMS may be a better early choice rather than a last resort.
- People with a shorter current episode, though this is not required

TMS may not be right for you if

- You have metal implants or devices in or near the head
- You have a seizure history or take medicines that raise seizure risk (this needs a careful review first)
- Active substance use or an untreated medical problem should usually be addressed first

Side effects

Side effect	What to know
Headache	Common, affecting roughly one in four patients. Typically mild, responsive to over-the-counter pain relievers, and diminishes over the course.
Scalp discomfort	Approximately 8%. Localized to the stimulation site and usually decreases as treatment continues.
Tiredness	About 9%. A bit more common on the accelerated schedule.
Seizure	Very rare, approximately 1 in 44,000 sessions. Careful screening and individualized dosing keep the risk low.
Mood elevation (hypomania)	Uncommon, occurring primarily in people with bipolar spectrum illness. We screen before treatment and monitor throughout.
Memory or thinking	No effect. TMS does not harm memory or concentration.
Body-wide effects	None. TMS does not cause weight gain, sexual dysfunction, sedation, or nausea.

What to expect

Before treatment

- A full psychiatric evaluation, medication review, and safety screening
- **Motor threshold testing** to find the right dose for your brain, not an average dose
- Careful measurement to locate the treatment spot on your head
- Short questionnaires to measure your starting point, repeated during and after treatment

How we deliver care

- A psychiatrist determines and supervises your dose, targeting, and treatment plan, rather than delegating these decisions entirely to a technician
- Your motor threshold is re-measured on a set schedule and after any medication change that could affect it
- Your progress is measured with standard rating scales, and you will see your own results
- One practice coordinates your medications, your TMS course, and your maintenance care, so nothing falls between providers

DON'T JUDGE RESULTS ON THE LAST DAY

Roughly half of patients notice meaningful improvement during treatment; the other half improve gradually over the following two to four weeks. For that reason, we formally evaluate your response **four weeks after your final session**, not on your last treatment day.

Missed sessions

- **Standard course:** an occasional missed session is added to the end of the course. Please try not to miss more than one or two sessions in a week.
- **5-Day course:** the consecutive structure and spacing are part of the treatment. A missed session is made up later the same day when possible; if illness interrupts the week, we generally prefer to reschedule the entire block.
- Any interruption longer than about a week requires re-measuring your motor threshold before resuming.
- **Tell us about any new medication before your next session.** Some medicines affect seizure risk.

After treatment

Depression is a recurring illness, and TMS is not a one-time cure. Follow-up care is therefore as important as the treatment course itself, and the maintenance plan is the same for both schedules.

When	What happens
Weeks 1 to 4	Weekly check-ins using rating scales, without TMS sessions. Improvement frequently continues during this period.
Week 4	Formal check of how well treatment worked.
Months 1 to 6	If you responded: one brief maintenance session each week.
Months 7 to 12	If you stay well: sessions every two weeks.
After 1 year	Your doctor may suggest a trial without maintenance, with monthly check-ins.
If symptoms return	A short booster course, not a full repeat of treatment.

Getting the most from treatment

- Keep taking your medications unless your doctor tells you otherwise
- Protect your sleep, especially before treatment days
- Tell us about any medication change, new health problem, or unusual symptom
- Limit alcohol during and after treatment

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This guide is for education and does not replace individual medical advice. Treatment decisions are made with your physician. Research findings reflect published studies at the time of writing; your physician can provide specific references.