



Therapy with Innovation

Inside PsyFi TMS with Dr. Sujit Varma

Located just southwest of Minneapolis in Edina, Minnesota, an inviting, upscale Twin Cities suburb, PsyFi TMS has emerged as a leader in the rapidly expanding field of Transcranial Magnetic Stimulation (*TMS*), offering ground-breaking treatment options for individuals grappling with Treatment-Resistant Depression (*TRD*) and other

mental health disorders. At the helm of this innovative institution is Dr. Sujit Varma, whose dedication and vision have significantly contributed to the clinic's success. Under his direction, PsyFi TMS has become a sanctuary for individuals seeking solace from their often daily battles with persistent mental health challenges.

The Genesis of a Vision

Dr. Varma's transition from traditional psychiatric treatments to the forefront of TMS therapy is a story of innovation, curiosity, and compassion. In 2018, as the medical community as well as insurance companies began to recognize the potential of TMS as an alternative treatment for TRD, Dr. Varma was at a crossroads. His background in offering Electroconvulsive Therapy (ECT) at a local hospital had provided him with a deep understanding of the need for more patient-friendly treatment options. The emergence of TMS offered a less invasive, side-effect-free alternative that piqued his interest, driven by his fascination with the potential of this technology to revolutionize psychiatric healthcare.

"TMS was far less invasive and had far fewer side effects than ECT," Dr. Varma recalls. He was also greatly reassured by the rigorous research that had been done on TMS, particularly double-blind studies, and the significant success TMS was enjoying overseas, so he was elated that the treatment was finally available in the United States. This marked the beginning of PsyFi TMS, a clinic not just treating mental illness but also one that embodies the future of psychiatric care.

Setting PsyFi Apart

PsyFi TMS differentiates itself through a unique combination of cutting-edge technology, a talented and compassionate staff, plus their patient-centric approach to treatment. "We like to stay ahead of the curve," Dr. Varma remarks, "as we are committed to our clinic's culture of continuous learning and technological adaptation." The staff, recognized for their talent and compassion, help to foster a healing atmosphere that resonates well with patients, making PsyFi TMS their preferred choice. A weekly individualized assessment protocol allows for tailored adjustments, ensuring each patient's journey towards wellness is as effective as it is personal.

The Science of Innovation

At the core of PsyFi's TMS therapy is a sophisticated understanding of the brain's neuroplasticity and how targeted magnetic stimulation can alter neurotransmitter activity, leading to improved mental health. Dr. Varma delves into the mechanisms of TMS, highlighting how it stimulates hemodynamic responses and influences monoamines like serotonin and dopamine, enhancing neuroplasticity and offering a foundational improvement in patients with depression.

Monoamines are a type of amine with a single organic group linked to the nitrogen atom. They serve as neuromodulators within the nervous system, playing diverse roles such as control over the cardiovascular and gastrointestinal systems, secretion of hormones, the modulation of psychomotor function, regulation of body temperature, pain mechanisms, respiratory control, and even the duration and quality of one's sleep.

"Because TMS has the ability to depolarize neurons as well as initiate hemodynamic responses," he explains, "when coupled with changes in these critical neurotransmitters like serotonin and dopamine, this can lead to significant enhancement of the brain's neuroplasticity." Neuroplasticity, also referred to as neural plasticity or brain plasticity, describes the capacity of the brain's neural networks to undergo changes in their structure and organization, leading to growth and adaptation. This process involves the brain's ability to literally rewire itself, enabling it to operate differently from its previous functioning.

Initially, neuroscientists believed that neuroplasticity occurred only in childhood. Later research in the 20th century revealed that the brain retains a considerable degree of adaptability

into adulthood, although it is more pronounced during the developmental stages. The ability of TMS to enhance the brain's natural neuroplasticity is the fundamental mechanism underpinning the therapeutic effect of TMS on depression, showcasing the clinic's reliance on cutting-edge scientific research to inform their treatment protocols.

Safety and Efficacy: A Patient-Centric Approach

"TMS does not produce cognitive impairment and has fewer side effects than many of today's commonly used antidepressants," Dr. Varma reassures, highlighting the treatment's outpatient nature and minimal disruption to daily life. Unlike ECT, TMS requires no anesthesia, and patients can resume their routine immediately, a fact that greatly alleviates concerns of both patients and their families, and encourages ready acceptance of the therapy. With the advent of theta burst stimulation, short, high-frequency stimuli applied repeatedly at various intervals, treatment duration has also been reduced, further enhancing patient comfort and acceptance.

Precision in Treatment

PsyFi TMS's approach to targeting the prefrontal cortex — a region often associated with severe depression — exemplifies the clinic's precision. Techniques such as the 5 cm rule or Beam F3, along with advancements like Neuronavigation, allow for accurate localization of the dorsolateral prefrontal cortex (*DLPFC*), a brain region involved in higher-level cognition and cognitive control. This specificity ensures that each patient receives customized and effective treatment.

Repetitive TMS pulses target and activate the dormant regions of the prefrontal cortex commonly associated with severe depression, and help to sustain these regions' activity far beyond the treatment period to foster long-term change. The pre-frontal cortex (*PFC*) consistently shows impairments in individuals with major depressive disorder (*MDD*), with notable functional and structural changes observed in its ventromedial (*vmPFC*) and dorsolateral (*dLPFC*) sectors.

For instance, depression often leads to reduced activity in the left dorsolateral prefrontal cortex and heightened activity in the right dorsolateral prefrontal cortex. This imbalance can hinder a depressed person's ability to

see goals as attainable or rewarding. Furthermore, the medial prefrontal cortex (*mPFC*), central to emotional regulation and stress response, is significantly affected in those suffering from MDD.

TMS stimulation is applied to various other brain regions, as well as the prefrontal cortex, when addressing conditions like OCD, alcohol dependence, smoking cessation, weight management, tinnitus, and more. The prefrontal cortex serves as a regulatory hub, moderating primal emotions and impulses. Recent studies reveal that acute, uncontrollable stress can initiate a cascade of biochemical reactions that diminish the prefrontal cortex's regulatory effect and amplify the control of the brain's more ancient regions.

Essentially, this process shifts the governance of one's thoughts and feelings from the advanced prefrontal cortex to the primal hypothalamus and similar ancient structures. As these older brain regions assume control, individuals may experience overwhelming anxiety or succumb to usually restrained urges such as overeating, excessive drinking, drug use, or impulsive shopping. In short, self-control unravels.

A Transformative Patient Story

One of PsyFi's first patients was a gentleman who was consumed by significant and debilitating grief that had persisted for years over the loss of his wife. He was in therapy as well as taking high dose antidepressants along with augmenting agents but all he experienced were the side effects from the medications. His life was profoundly transformed by undergoing treatment using TMS. After just a few sessions he noticed some decrease in

anhedonia and improved motivation, so he continued treatment and completed the whole course.

Treatment not only alleviated his symptoms but also allowed him to reduce the dose and frequency of antidepressants medication, marking a significant turning point in his journey towards healing. He is currently on lower dose antidepressants for maintenance with no side effects. He has the option of doing TMS again if his depression resurfaces, as he would prefer that to taking higher doses of medications.



Q&A with Dr. Sujit Varma

What inspired your transition from ECT to TMS in your practice?

The potential of TMS to offer a less invasive option with fewer side effects was compelling. Its technological basis also fascinated me, reflecting my belief in the transformative power of innovation in healthcare.

How does PsyFi TMS ensure it remains at the forefront of TMS therapy?

By investing in our staff's education and staying updated with the latest advancements in TMS. We prioritize creating a therapeutic environment that encourages healing and patient satisfaction.

Can you detail the mechanism of TMS and its benefits?

TMS leverages the brain's neuroplasticity by inducing hemodynamic changes and altering neurotransmitter levels, offering a solid foundation for treating depression and potentially other conditions.

Regarding the activation of the prefrontal cortex for treating severe depression could you elaborate on how TMS targets this specific brain region? How do you determine the precise area to treat for depression and how might this differ from patient to patient?

There is a decrease in the left prefrontal cortical activity in depression with decreased glucose uptake and blood flow. We need to stimulate this part of the brain using TMS for depression. We first stimulate the motor cortex (which is on the crown of the head). From here we find the motor threshold – the minimum stimulation that causes the right thumb to twitch, (as we are stimulating the left motor cortex. After that we use one of the following techniques - the 5 cm rule, or Beam F3 to find the location of the DLPFC on the patient. That is the target zone for treatment. With newer technologies like Neuronavigation we can be more precise.

Would you discuss the safety profile of TMS and how patients typically react to treatment?

The main advantage of TMS is that it is administered in an outpatient office setting. It does not require anesthesia. The patient can drive to and from the clinic. It does not require any changes in the regular routine – like no food for about 6 hours prior to the procedure. There are no cognitive side effects and we have actually had patients report improvements in cognition with TMS. Also with theta burst the time duration of the actual procedure is very low. The main discomfort is some irritation of the scalp or headache and nausea which can be reduced by adjusting the settings.

What future developments in TMS therapy are you most excited about?

I'm eager to see TMS gain broader acceptance for a range of conditions beyond depression. I would like insurance companies to approve TMS for bipolar depression and not just MDD or unipolar depression. The potential for it to benefit individuals with anxiety, pain, ADHD, and even schizophrenia is immense.



Sujit R. Varma
Doctor

Dr. Sujit R. Varma (MBBS, MD, FAPA) is board certified by the American Board of Psychiatry and Neurology (ABPN) and has been working in the mental health field since 1993. He did his initial medical training in India and followed that up with a fellowship in Mood Disorders from the University of British Columbia (UBC) in Vancouver, Canada. Dr. Varma did his American psychiatry residency at the University of Texas, Houston (UTH).

Dr. Varma is the owner of PsyFi TMS in Minneapolis, MN and he received the reputation of being Minnesota's top psychiatrist among the mental health field.

PsyFi TMS, under Dr. Varma's expert and enthusiastic guidance, continues to redefine the landscape of mental health treatment. With a foundation built on innovation, precision, and compassion, the Minneapolis clinic not only offers a new lease on life to those it serves but also paves the way for the future of TMS therapy.

For more information about Dr. Varma and his enthusiastic care of patients with mental illness, visit the clinic's website at <https://psyfitms.com/>