

# REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION

## (TMS) INFORMATION SHEET

Depression is the leading cause of disability worldwide. In Australia, it is estimated that 45 per cent of people will experience a mental health condition in their lifetime. In any one year, around 1 million Australian adults have depression. Despite advances in pharmacotherapy depression remains one of the most disabling medical illnesses. Patients who haven't fully responded to antidepressants or psychotherapy may benefit from TMS.

### What is TMS?

TMS is a non-invasive medical procedure for the treatment of depression in adults, now an approved treatment for depression in countries including Australia, the United States, Canada, Israel and the United Kingdom. TMS is a mild form of brain stimulation using a magnetic field. TMS has been extensively studied for at least 15 years, with a large number of clinical trials establishing that it is an effective treatment for patients with depression.

### How does TMS work?

TMS relies on the generation of brief magnetic fields using an insulating coil that is placed over the scalp. These magnetic fields are the same type and strength as those used in magnetic resonance imaging (MRI) machines. The treatment targets the parts of the brain shown in brain-imaging studies to be abnormally low in activity in depressed patients. The severity of the depression often correlates with the extent of the decline in activity in this part of the brain.

The magnetic fields produce tiny electrical currents (pulses) which then go on to activate cells within the brain which release neurotransmitters (chemical messengers in the brain) that are known to have an important role in mood regulation.

### The TMS Procedure

For each TMS session the patient sits in a treatment chair, much like the kind used in a dentist's office. During the first session, which takes approximately 20 to 40 minutes, several measurements will be made to ensure that the TMS coil will be in the correct position over the side of the patient's head. The TMS psychiatrist measures the patient's resting motor threshold and locates the exact position for placement of the magnetic coil. The motor threshold is found by delivering a series of pulses to the motor cortex of the brain until it gives just enough energy to stimulate twitching of the hand.

The energy setting on the TMS machine will then be lowered until the twitching just disappears. The TMS psychiatrist will then prescribe the treatment that is specific to the patient for the duration of treatment sessions. Subsequent treatments will be administered by a TMS trained nurse following this treatment prescription.

During subsequent sessions an individualised cap will be placed on the patient's head and the electromagnetic coil is placed against this cap. The TMS machine will switch on and off repeatedly to produce stimulating pulses. A repetitive tapping or clicking sound that usually lasts a few seconds followed by a pause will be experienced throughout the treatment.

Patients are required to wear earplugs for comfort and safety. A tapping sensation may also be felt on the scalp. A qualified TMS nurse remains with the patient throughout each TMS treatment.

Because TMS does not require an anaesthetic and is usually well tolerated with no cognitive side effects; patients can generally return to their normal daily activities after treatment.

A typical TMS course consists of five to seven (5 to 7) treatments per week over a three to four week period, for an average of twenty (20) treatments in total. Each treatment session lasts for approximately 20 to 40 minutes.

### **Characteristics of Repetitive Transcranial Magnetic Stimulation**

TMS is a non-invasive treatment, suitable for patients with depression that haven't responded to or who can't tolerate other treatments. It may also be used as a first line treatment based on patient choice.

The effectiveness of TMS is well established, with response rates between 40 and 50%, similar to the response rate to antidepressants in patients with treatment-resistant depression.

Potential adverse effects of TMS include scalp pain and facial twitching during stimulation, headache, induction of mania, hearing impairment (if ear protection is not used), and induction of a generalised seizure.

However, TMS is mostly well-tolerated and associated with few side effects. Only a small percentage of patients discontinue treatment because of these. The most common side effect, which is reported in about half of patients treated with TMS, is headaches. These are mild and generally diminish over the course of the treatment. Over-the-counter pain medication can be used to treat these headaches.

TMS has not been associated with many of the side effects caused by antidepressant medications, such as gastrointestinal upset, dry mouth, sexual dysfunction, weight gain or sedation.

### **Who Should Not Receive TMS?**

Patients with any type of non-removable implanted device that is activated or controlled in any way by physiological signals (e.g. stents in the neck or brain region, aneurysm clips, implanted stimulators, heart pacemakers, implanted cardioverter defibrillator, cochlear implant) are contra-indicated in TMS. TMS may be contraindicated for patients with dental implants. Patients should seek clarification from their dental specialist.

Patients who are pregnant, or have a history of seizures should not undergo TMS therapy.

Patients with metallic implants or facial tattoos which have metallic ink or magnetic-sensitive ink, should not receive TMS.

Patients are asked to remove all facial / ear piercings including tongue piercings prior to each treatment. Standard dental fillings and braces are safe for undergoing TMS treatment.

Patients should notify their doctor if they experience worsening of depression symptoms, signs or symptoms of suicidal behaviour and/or unusual behaviour / mania during a treatment course of TMS. Family members and support individuals should also be aware of the need to observe patients and notify their treatment provider if symptoms worsen.

### **TMS at Perth Clinic**

TMS treatment is offered to patients of Perth Clinic who have been referred for treatment of depression. TMS therapy is offered on an inpatient and day patient basis. TMS can form part of a treatment plan which involves psychological therapy during the morning from 9:00am -12:30pm with TMS treatment in the afternoon following lunch.

If you wish to attend as a day patient or you and your treating psychiatrist decide treatment should be on an inpatient basis, you may be covered by your health care fund provider.

If you decide to attend for TMS without the psychological therapy component you can do and arrange payment on a private basis. These fees can be clarified with Perth Clinic administration staff.

### **Additional Reading**

The International Society for ECT and Neurostimulation 2017 recommends the following web sites for an objective overview of Transcranial Magnetic Stimulation:

<https://www.mayoclinic.org/tests-procedures/transcranial-magnetic-stimulation/details/what-you-can-expect/rec-20164433>

<https://well.blogs.nytimes.com/2013/07/01/new-approach-to-depression/?ref=health>

<http://www.tmsyou.org/>

<https://www.psychologytoday.com/blog/struck-living/201306/tms-or-ect-mental-health-consumer-weighs-the-options>

<https://health.usnews.com/health-news/patient-advice/articles/2014/12/15/transcranial-magnetic-stimulation-what-is-it-and-who-needs-it>