

## TMS-Burns Frequently Asked Questions

This factsheet is for anyone who wants to know more about the non-invasive brain stimulation technique Transcranial Magnetic Stimulation, or 'TMS'. Please feel free to contact the researchers at any time with any questions.

### What is the point of this research?

Recovering from a burn injury is a challenge. While most people recover well, a burn injury can have long term effects on sensation and movement, which can affect your daily activities. The brain changes in response to experience (e.g. learning something new) and injury: these brain changes are known as neuroplasticity. So, a burn injury is likely to drive changes in the brain.

Transcranial Magnetic Stimulation or TMS can measure brain changes as well as produce short lasting changes in brain activity (like those produced by learning something new). Therefore, applying TMS as a treatment during recovery from a burn injury might improve recovery.

### What is TMS?

Transcranial Magnetic Stimulation or TMS is a non-invasive procedure that uses magnetic pulses to stimulate nerve cells in the brain. TMS is a safe, *painless* and approved way of measuring the natural activity of the brain. It is used in this capacity across the world and within Australia.

TMS involves delivering weak magnetic pulses to the top of the scalp, which can reach the top layer of the brain. Depending on where the pulses are delivered, TMS can produce small twitches in different muscles of the hand. The twitches are recorded at the hand and based on the recordings we can conclude the activity level of the brain.

For a more visual depiction of TMS and the muscle twitch, please refer to the following video: <https://vimeo.com/manage/videos/727591675/7a8e55b3f6>



A large body of research on TMS has been published, demonstrating its safety and tolerability.

## What is are the two types of TMS?

**TMS** is used to measure the natural activity of a brain.

On the other hand, **repetitive TMS** can be used to change brain activity for a short period of time (minutes-to-hours). Repetitive TMS is safe, painless, and well tolerated, there are no major safety concerns.

Depending on the study branch you choose to volunteer for, you could receive just TMS or TMS and repetitive TMS.

## How is brain activity measured using TMS?

We use TMS to measure the natural activity of the brain. This involves delivering a single pulse or two consecutive pulses to the brain.

The single pulse produces a twitch response like the one demonstrated above. This single response is used as a comparison to the two consecutive pulses.

## How is brain activity altered using repetitive TMS?

We use repetitive TMS to produce short lasting changes in brain activity. This technique involves delivering multiple pulses of a very low intensity to the brain; the intensity is so low that it does not produce a muscle twitch.

This technique has been used across Australia by foundations such as the Black Dog Institute, as well as hospitals including St John of God and Sir Charles Gardener to treat depression and anxiety, to help slow the cognitive effects of dementia, and to assist in recovery from stroke.

Repetitive TMS has also been used to improve cognitive performance, to reduce chronic pain, and improve mobility.

## Is TMS suitable for everyone?

TMS is suitable for almost everyone: the National Institute for Health and Clinical Excellence and the Therapeutics Good Administration of Australia state that there are no major safety concerns with (repetitive) TMS.

While TMS is safe and tolerable for most individuals, it is not recommended for individuals with epilepsy, a neurological condition, women who are pregnant, or individuals who are on certain kinds of medications.

A list of possible side effects and their likelihood is given below:

1. Seizure induction – very rare
2. Fainting – possible secondary effect (not related to direct brain effect)
3. Temporary headache or neck pain – possible, ~3%
4. Temporary hearing changes – possible (but rare)

No other side effects have been reported.

Before taking part in any research using TMS, a researcher will go through a safety checklist with you and rule out any potential safety concerns. You will be also be closely monitored during any TMS research session.

### Can I drive after TMS?

Yes, you can drive, work, or do anything that you would do normally. There are no restrictions on what you can do.

### Does TMS hurt?

TMS is not painful or invasive. TMS is felt as a rapid tapping sensation over the scalp, and people do not report this sensation as 'painful.' The sensation tends to be variable and depending on an individual's scalp sensitivity and the stimulus dose.

If the tapping sensation feels too strong or uncomfortable, we can reduce the intensity or stop the session.

### Will I need to do anything before TMS?

No, you do not need to prepare in anyway, nor do you need to stop any medication or supplements.

### More resources on TMS

To read more about TMS please feel free to have a look at the links below. Please note. The links mostly discuss repetitive TMS use in treating depression. However, some of the protocols and procedures still apply to the Burns Research study.

- Mayo Clinic: <https://www.mayoclinic.org/tests-procedures/transcranial-magnetic-stimulation/about/pac-20384625>
- Neuralia TMS: <https://www.neuraliatms.com.au/about-tms/>
- Cleveland Clinic: <https://my.clevelandclinic.org/health/treatments/17827-transcranial-magnetic-stimulation-tms>

### Is my burn too small?

Not at all! Even small burns have been shown to produce changes in the skin, body, and brain. This study is interested in the full spectrum of burns injuries, and we are aiming to recruit burns of less

than 20% total body surface area. Understanding how different sized burns affect the brain is important for us to develop new targeted therapies for burn survivors.

### **What if I have a full range of movement?**

That's okay! Every burn is different and has different effects on an individual, and we are interested in understanding how many different factors, such as range of movement, affects the recovery following a burn injury.

### **What if my burn is mostly healed?**

That's okay! We wish to explore the full spectrum of the effects of a burn injury, including the healing process.

### **I want to participate but I work full-time and/or have kids. What do I do?**

We are flexible and can accommodate everyone's circumstances. We understand you are going out of your way to volunteer for this research project, and we are very grateful. As such, we will do our best to work with you in arranging research session times and offer after hours and weekend visits.

### **Are there any costs associated with participation?**

There are no additional costs associated with participating in this research project.

You will be reimbursed for travel and parking expenses associated with the research project visits.

### **What is the point of this research?**

While we cannot guarantee or promise that you will receive any direct benefits from this research, you will be contributing greatly to the way we understand and treat burns patients in the future. There is still much that we do not know about the complexity of burns recovery and the effects on the body and brain, your participation will go a long way in putting us one step closer to more efficient care.