



REVIEW ARTICLE ON USE OF TRANSCRANIAL MAGNETIC STIMULATION FOR THE PATIENT WITH PSYCHIATRIC DISORDERS

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ABSTRACT:

Transcranial Magnetic Stimulation (TMS) is a non-invasive neuromodulation technology that has promising uses in psychiatry. TMS uses magnetic fields to alter neuronal activity in specific brain regions, providing a focused and personalised approach to psychiatric treatment. The review begins by looking at TMS's underlying neurobiological mechanisms and its influence on brain plasticity. It then discusses TMS's clinical applications, with a focus on its efficacy in major depressive disorder (MDD), bipolar disorder, schizophrenia, obsessive-compulsive disorder (OCD) and other psychiatric disorders. The review explores ongoing research efforts and future directions in TMS, including the identification of novel targets, the development of advanced stimulation protocols, and the potential expansion of TMS applications to other psychiatric disorders.

KEY WORDS: TMS, Neuronal activity, tDCS.

INTRODUCTION :

Transcranial magnetic stimulation (TMS) is a technique that stimulates nerve cells in the brain to alleviate symptoms of psychiatric diseases. It is referred to as a "non-invasive" method because it does not require surgery or an incision in the skin. This treatment has been approved by the United States Food and Drug Administration.

How transcranial magnetic stimulation are used to treat the psychiatric disorders

An electromagnetic coil is put over the patient's scalp. This coil produces magnetic pulses that stimulate nerve cells in the brain's region responsible for controlling negative symptoms.

DEFINITION:

Transcranial direct current stimulation (tDCS) is a popular brain stimulation technique that modulates cortical excitability, generating facilitatory or inhibitory effects on a wide range of behaviors.

TYPES

❖ Repetitive transcranial magnetic stimulation

It relies on a figure 8 coil design which only reaches the depth of 0.7 cm.

❖ Deep transcranial magnetic stimulation

It uses a three dimensional “H” coil Helmet design, which manage to encompass a broadersurface area and stimulate deeper brain structures directly reaching a significant sub-threshold of 3.2cm.

MECHANISM OF ACTION:

TMS Coil stimulates the cortical neurons through the scalp



Stimulation conducted by corticospinal tract



Spinal motor neuron stimulated



Action potential generated across peripheral nerve



MEP observed on electromyography



Target muscle fibre

TREATMENT INCLUDES DURATION

Currently, Transcranial magnetic stimulation therapy is generally administered 5 days a week for 4 to 6 weeks, with each session typically lasting somewhere between 20 and 30 minutes, and is prescribed for patients who have not responded to other psychiatric treatments.

STEPS INVOLVED IN APPLYING TMS**Patient Assessment:**

Evaluate the patients medical history and psychiatry history and ensure they meet the criteria for TMS. Exclude individual with implants.

Positioning:

Seat the patient comfortably in a chair. Proper positioning is needed.

Brain Mapping:

Use a neuronavigation system or anatomical landmark to locate the targeted brain region

Coil placement:

Place the TMS coil on the target area on the scalp.

Stimulation parameters:

Set the stimulation parameters, including intensity, frequency, and duration of magnetic pulses.

Stimulation sessions:

Administer a series of TMS sessions according to the treatment plan.

Monitoring:

Monitor the patient for any adverse effects or discomfort during and after the procedure.

Adjust stimulation parameters if necessary.

Follow-up:

Conduct regular follow-up assessment to evaluate the patients response to TMS treatment and adjust the treatment plan.

RESEARCH ACTIVITY

In 2019, randomized controlled trial, researchers delivered left prefrontal TMS therapy every day for three weeks to 190 individuals with major depressive disorder.

Result shows that 14.% of patients receiving TMS achieved remission of their depression, compared to patients in the control group.

INDICATIONS

- ✓ It is mainly indicated for major depressive disorder (MDD).
- ✓ TMS is being explored for other psychiatric conditions such as Bipolar disorder, obsessive-compulsive disorder, and certain types of anxiety disorders.

CONTRAINDICATIONS

Those who have metal in your head, such as

- ❖ Electrodes
- ❖ Neck or brain stents
- ❖ Aneurysm clips or coils
- ❖ Metal plates
- ❖ Cochlear implants
- ❖ Permanent piercings
- ❖ Severe headache
- ❖ History of seizure disorder

SIDE EFFECTS

- ❖ Mild Headache
- ❖ Scalp pain
- ❖ Neck pain
- ❖ Tingling
- ❖ Facial twitching
- ❖ Sleepiness
- ❖ Altered cognition during treatment

CONDITIONS WHICH BENEFITED BY TMS THERAPY

- Depression
- OCD
- Anxiety
- PTSD
- Stroke rehabilitation
- Schizophrenia
- Parkinson's disease
- Alzheimer disease
- Chronic pain
- Nicotene Addiction

NURSE'S ROLE

Patient preparation:

Nurses often assist in preparing the patients for TMS sessions, explaining the procedure, addressing any concerns, and ensuring that patients are comfortable

Monitoring:

During TMS sessions, nurses may monitor patients for any adverse reactions or discomfort, ensuring their safety throughout the procedure.

Documentation:

Nurses may be responsible for documenting patient responses, any side effects, and overall progress during the TMS treatment.

Collaboration:

They work closely with the TMS team, including physicians and technicians, to coordinate and optimize patient care.

Education:

Providing ongoing education to patients about the TMS process, potential side effects, and strategies to manage any discomfort or adverse reaction.

Post treatment care:

After TMS sessions, nurses may assess patients for any effects, offer post treatment care instructions, and address any immediate concerns.

Communication:

Maintaining open communication with patients, addressing questions, and reporting any noteworthy observations to the health care team.

CONCLUSION

In conclusion, Transcranial Magnetic Stimulation stands as a promising non-invasive neuromodulation technique with potential application in various psychiatric disorders. As with treatment, proper patient selection, precise targeting, and adherence to safety protocols are crucial for optimal outcomes. TMS represents a dynamic field at the intersection of neuroscience and clinical practice, offering hope for innovative approaches to address neurological and psychiatric challenges

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