

## RTMS Therapy: Neo-Perspectives of Psychiatric Nursing

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### Abstract

Transcranial magnetic stimulation (TMS) is a procedure that uses magnetic fields to stimulate nerve cells in the brain to improve symptoms of depression and other disorders. RTMS therapy is primarily indicated for major depression, seasonal depression, psychosis and patients who have not responded to antidepressant medications whereas contraindicated in pregnancy and cardiovascular disorders. Short electromagnetic pulses are administered through the coil which stimulates the neurotransmitter activity in specific areas of the brain. Unlike ECT, the side effects are minimal in RTMS. Though RTMS is a medical procedure, the role of the nurse in assisting the therapist as well as the patient in pre, intra and post procedure has vital importance.

**Keywords:** Transcranial Magnetic Stimulation; Neo-Perspective; Depression; Electromagnetic; Psychiatric Nursing.

Transcranial Magnetic Stimulation (TMS) or Repetitive Transcranial Magnetic Stimulation (RTMS) was introduced in 1985 as a noninvasive painless method to stimulate the cerebral cortex. RTMS has been studied as a possible treatment for depression, psychosis and other disorders since the mid-1990. In October 2008, RTMS was approved for use by the FDA as a treatment for major depression for patients who have not responded to at least one antidepressant medication.

### Definition

Transcranial magnetic stimulation (TMS) is a procedure that uses magnetic fields to stimulate nerve cells in the brain to improve symptoms of depression and other disorders.

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Clinical trials studying the effectiveness of RTMS reveal mixed results. When compared to other treatment, some studies have found that RTMS is more effective in treating patients with major depression (Fitzgerald PB, Brown TL, Marston NA, Daskalakis ZJ, 2003).

### Purposes

1. To produce magnetic field over the brain, influencing brain activity.
2. To increase the release of neurotransmitters.
3. To stimulate nerve cells in the brain especially in prefrontal cortex.
4. To use as a better alternative for depression and other disorders.

### Indications

- Seasonal depression.
- Psychosis and other disorders.

- Patients who have not responded to antidepressant medications.

### **Contraindications**

- Pregnancy.
- Cardiovascular Disorders.
- Any metal or implanted medical devices in patient's body such as
  - Pacemakers
  - Aneurysm clips or coils
  - Stents
  - Implanted stimulators
  - Electrodes for monitoring brain activity
  - Any magnetic implants
  - Bullet fragments
  - Any other metal device or object implanted.
- History of seizures or mania, any past injuries or surgeries.

### **Mechanism of Action**

Unlike ECT, in which electrical stimulation is more generalized, RTMS can be targeted to a specific site in the brain. Scientists believe that focusing on a specific spot in the brain reduces the chance for the type of side effects that are associated with ECT.

An electromagnetic coil is held against the forehead near an area of the brain that is thought to be involved in mood regulation. Then, short electromagnetic pulses are administered through the coil. The magnetic pulse easily passes through the

skull, and causes small electrical currents that stimulate nerve cells in the targeted brain region. The magnetic field is about the same strength as that of a magnetic resonance imaging (MRI) scan. Generally, the person will feel a slight knocking or tapping on the head as the pulses are administered.

The RTMS stimulation of the brain's prefrontal cortex may help some depressed patients in much the same way as ECT but without its side effects (Slotema, blom, Hoek&Sommer, 2010).

### **Preliminary Assessment**

- Collect thorough current and past medical and surgical history.
- Perform physical examination
- Assess for contraindications like pregnancy, cardiovascular diseases, seizures, and metal implants in the body.
- Collect drug history about psychotropic medications, over-the-counter medication, herbal supplements or vitamins, etc.
- Presence of any other associated physical or mental disorders.

### **Preparation of Articles**

- Envelop to keep valuable things.
- Clean Gloves.
- Reclining chair.
- Electromagnetic coil/device.
- Ear plugs.
- Articles to check vital signs.

**Table 1: Steps of the Procedure**

S. No	Steps of Procedures	Rationale
<b>Preparatory Phase</b>		
1	Explain the whole procedure thoroughly and get informed consent from the patient.	Patient must know about therapy before he/she undergone it.
2	Remove all the jewelries and place them in locker.	Metals are good conductors of electricity and to prevent possible complications.
3	Brief about what patient should expect during and after the procedure.	To relieve anxiety and it enhances confidence of the patient.
4	Clarify the doubts by reassuring the patient.	To evade confusion.
5	Ask physician to stop or hold doses of any drugs.	As a precautionary measure.
<b>Implementation Phase</b>		
6	Wash hands.	Reduce transmission of microorganisms.
7	Don gloves and gown or use safety measures.	Protection from pathogenic microorganisms.
8	Ask Patient to sit in a reclining chair and make the patient comfortable on the chair.	Avoid discomfort and make patient relaxed on the chair.
9	Provide earplugs to wear during the procedure to the patient.	Ear plugs prevents noise from the electromagnetic coil/device when turned on.

- 10 Assess the physician in identifying the site on the head (prefrontal cortex) to place device/electromagnetic coil.
- 11 An electromagnetic coil will be placed on the identified site on the head. (The electromagnetic coil is switched off and on repeatedly to produce stimulating pulses. This results in a tapping or clicking sound that usually lasts for a few seconds, followed by a pause. Patient also feels a tapping sensation on his/her forehead. This part of the process is called mapping).
- 12 Determine the amount of magnetic energy needed. Physician will increase the magnetic dose until patient's fingers or hands twitch. Known as patient's motor threshold, this is used as a reference point in determining the right dose for patient.
- 13 Once the electromagnetic coil placement and dose are identified, physician turned on the device.
- 14 Patient hears clicking sounds and feels tapping on his/her forehead.
- 15 The procedure will last about 30 to 60 minutes.
- 16 Ensure patient remain awake and alert.
- 17 Patient may feel some scalp discomfort during the treatment and for a short time afterward.
- 18 Monitor the vitals during the procedure.
- 19 Once the prescribed time duration completes the physician turned off the device.

Placement of device on appropriate site can increase the effectiveness.



During the course of treatment, the amount of stimulation can be changed depending on patient's symptoms and side effects.

**Post Procedure Phase**

- 20 Assess physician in removing the electromagnetic coil.
- 21 Make the patient comfortable and interact with patient about his/her experience during or after procedure.
- 22 Wash hands, clean the electromagnetic coil and replace the articles.
- 23 Return all the jewelries to the patient or caretakers.
- 24 Recheck vital signs.
- 25 Document any pre, intra or post procedure changes, especially the psychological and physiological changes observed during the procedure.
- 26 Notify to the physician immediately if any changes identified.

- Validates accuracy of therapy.
- Ensures correct placement of device.
- The total duration should not exceed 60 minutes.
- To get more co-operation from patient.
- Already explained to the patient.
- Ensure normal vital functioning during the procedure.
- To avoid over dosages.

- Ensure the device is turned off before removing it.
- If patient is not comfort inform to physician immediately.
- Prevents contamination and ensures device is ready to use for other patient.
- To avoid any ethical issues.
- To identify abnormalities.
- Documentation prevents duplication of work and provides accurate data for future reference.
- Physician will take necessary actions.

**Special Considerations**

TMS often causes minor short-term side effects. These side effects are generally mild and typically improve after the first week or two of treatment. The psychiatric nurse assess the patient to identify side effects, such as

**Common Side Effects**

- Headache
- Scalp discomfort at the site of stimulation
- Tingling, spasms or twitching of facial muscles
- Light headedness

- Discomfort from noise during treatment

#### *Uncommon Side Effects*

Serious side effects are rare. They can include:

- Seizures
- Mania, particularly in people with bipolar disorder
- Hearing loss due to inadequate ear protection during treatment

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