

**rTMS on Treatment in Depression with Functional and Structural Neuroimaging****윤문현<sup>1)</sup>, 최보영<sup>1)</sup>, 이창욱<sup>2)</sup>, 윤성익<sup>1)</sup>**가톨릭대학교 의과대학 의공학교실<sup>1)</sup>, 정신과학교실<sup>2)</sup>**목적 :**

Transcranial magnetic stimulation (TMS) holds special promise as a tool to study localization of function, connectivity of brain regions, and pathophysiology of neuropsychiatric disorders. Passing current through a coil of wire generates a magnetic field perpendicular to the current flow in the coil. If a conducting medium, such as the brain, is adjacent to the magnetic field, current will be induced in the conducting medium. TMS combined with functional MRI may allow for precise positioning and focusing of the TMS coil, with exact information obtained on the magnetic field produced, as well as the TMS-induced brain alterations in physiology and biochemistry.

**대상 및 방법 :**

High-intensity current is rapidly turned on and off in the coil through the discharge of capacitors. This produces a time-varying magnetic field that lasts for about 100 to 200 microseconds. The magnetic field typically has a strength of about 2T. The proximity of the brain to the time-varying magnetic field results in current flow in neural tissue. The technological advances produce sufficient current in brain to result in neuronal depolarization. Neuroimaging studies have shown that TMS is biologically active, both locally in tissue under the coil and at remote sites, presumably through transsynaptic connections. Transcranial magnetic stimulation imaging studies can be divided into 2 main categories: (1) using imaging to guide TMS coil placement and understand the spatial distribution of TMS magnetic fields in the brain, and (2) using imaging to measure TMS effects on neuronal activity. The primary motor area for the thumb varies across individuals, and a brain region referenced to this site will be even more varied in location given different head size and cortical morphology.

**결과 :**

The research on TMS has used magnetic field intensities near the motor threshold and, therefore, sufficient to cause neuronal depolarization. Research on TMS has also demonstrated that there are important physiological effects with lower intensities.

**결론 :**

It will become clearer whether rTMS has a role in the treatment of psychiatric disorders. Trials in depression have focused on demonstrating antidepressant properties and have not demonstrated clinical utility. We need to know more about the patients who benefit from rTMS, the optimal form of treatment delivery, the magnitude and persistence of therapeutic effects, the capability of sustaining improvement with rTMS or other modalities, and the risks of treatment.

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