

# Repetitive transcranial magnetic stimulation for improving function after stroke

Zilong Hao, Deren Wang, Yan Zeng, Ming Liu

*The independent commentary was written by Rubens José Gagliardi*

## ABSTRACT

**BACKGROUND:** It had been assumed that suppressing the undamaged contralesional motor cortex by repetitive low-frequency transcranial magnetic stimulation (rTMS) or increasing the excitability of the damaged hemisphere cortex by high-frequency rTMS will promote function recovery after stroke.

**OBJECTIVE:** To assess the efficacy and safety of rTMS for improving function in people with stroke.

### METHODS:

*Search methods:* We searched the Cochrane Stroke Group Trials Register (April 2012), the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2012, Issue 4), the Chinese Stroke Trials Register (April 2012), MEDLINE (1950 to May 2012), EMBASE (1980 to May 2012), Science Citation Index (1981 to April 2012), Conference Proceedings Citation Index-Science (1990 to April 2012), CINAHL (1982 to May 2012), AMED (1985 to May 2012), PEDro (April 2012), REHABDATA (April 2012) and CIRRIE Database of International Rehabilitation Research (April 2012). In addition, we searched five Chinese databases, ongoing trials registers and relevant reference lists.

*Selection criteria:* We included randomized controlled trials comparing rTMS therapy with sham therapy or no therapy. We excluded trials that reported only laboratory parameters.

*Data collection and analysis:* Two review authors independently selected trials, assessed trial quality and extracted the data. We resolved disagreements by discussion.

**MAIN RESULTS:** We included 19 trials involving a total of 588 participants in this review. Two heterogenous trials with a total of 183 participants showed that rTMS treatment was not associated with a significant increase in the Barthel Index score (mean difference (MD) 15.92, 95% CI -2.11 to 33.95). Four trials with a total of 73 participants were not found to have a statistically significant effect on motor function (standardized mean difference (SMD) 0.51, 95% CI -0.99 to 2.01). Subgroup analyses of different stimulation frequencies or duration of illness also showed no significant difference. Few mild adverse events were observed in the rTMS groups, with the most common events being transient or mild headaches (2.4%, 8/327) and local discomfort at the site of the stimulation.

**AUTHORS' CONCLUSIONS:** Current evidence does not support the routine use of rTMS for the treatment of stroke. Further trials with larger sample sizes are needed to determine a suitable rTMS protocol and the long-term functional outcome.

This is the abstract of a Cochrane Review published in the Cochrane Database of Systematic Reviews (CDSR) 2013, issue 5, Art. No. CD008862. DOI: 10.1002/14651858.CD008862.pub2 (<http://cochrane.bvsalud.org/cochrane/main.php?lib=COC&searchExp=Repetitive%20>

and%20transcranial%20and%20magnetic%20and%20stimulation%20and%20for%20and%20improving%20and%20function%20and%20after%20and%20stroke&lang=pt).

The abstract (English, Portuguese and French languages) is available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008862.pub2/abstract>.

## REFERENCE

1. Hao Z, Wang D, Zeng Y, Liu M. Repetitive transcranial magnetic stimulation for improving function after stroke. Cochrane Database Syst Rev. 2013;5:CD008862.

## COMMENTS

This article addresses a very current and interesting subject, and provides comments about this new non-invasive procedure of neuromodulation via transcranial electric or magnetic stimulation. This method may be applied to various neurological and psychiatric diseases and the present paper analyzes the possible effects on the recovery from stroke sequelae. It would have been interesting if the author had separated different common sequelae in patients with stroke, for separate analysis; for example, separately comparing the therapeutic effects of neuro-modulation on dysphasia, paresis and cognitive disorders. It is possible that the effects are not the same in these different situations, and this needs to be properly investigated.

Neuromodulation is still a new acquisition for medicine and it deserves to be studied in detail in order to ascertain its real effectiveness and in which situations it should and/or could be used. The prospects engendered through this procedure are of great interest, because of the great severity of stroke sequelae. There are many variables in patients with stroke and it is likely that the answers will be different in these different situations. The results from motor rehabilitation have been more encouraging than those in cases of dysphasia.

This is a procedure that has gained interest and it deserves to be properly investigated. Currently, it is only allowed in research groups that have been duly authorized by the ethics committees of the institutions that are carrying out the method. This care and ethical rigor must be maintained until the benefits from its clinical use have been defined.

**Rubens José Gagliardi.** Titular Professor of Neurology, School of Medical Sciences, Santa Casa de São Paulo, and Scientific Director of the Department of Neurology, Associação Paulista de Medicina, São Paulo, Brazil.