

# INPLASY PROTOCOL

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None declared.

## The effect of repetitive transcranial magnetic stimulation on upper limb spasticity after stroke: A meta-analysis

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**Review question / Objective:** To investigate the effect of repetitive transcranial magnetic stimulation (rTMS) on upper extremity spasticity after stroke in a meta-analysis.

**Condition being studied:** Repetitive transcranial magnetic stimulation (rTMS) has been used in the treatment of upper limb spasticity after stroke as a non-invasive brain stimulation method. The method can adjust the excitability of the cerebral cortex by reducing or increasing the activity of nerve synapses, thereby improving motor control. However, the therapeutic effect of rTMS on post-stroke spasticity is still controversial. Therefore, this study conducted a meta-analysis of the clinical RCTs about rTMS in the treatment of post-stroke upper limb spasticity to explore the efficacy of rTMS in the treatment of spasticity.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 07 January 2022 and was last updated on 07 January 2022 (registration number INPLASY202210031).

### INTRODUCTION

**Review question / Objective:** To investigate the effect of repetitive transcranial magnetic stimulation (rTMS) on upper extremity spasticity after stroke in a meta-analysis.

**Condition being studied:** Repetitive transcranial magnetic stimulation (rTMS)

has been used in the treatment of upper limb spasticity after stroke as a non-invasive brain stimulation method. The method can adjust the excitability of the cerebral cortex by reducing or increasing the activity of nerve synapses, thereby improving motor control. However, the therapeutic effect of rTMS on post-stroke spasticity is still controversial. Therefore,

this study conducted a meta-analysis of the clinical RCTs about rTMS in the treatment of post-stroke upper limb spasticity to explore the efficacy of rTMS in the treatment of spasticity.

## METHODS

**Participant or population:** ①The patient had the first onset and was diagnosed as a stroke by brain CT or MRI; ②The course of the disease was more than 1 month; ③The patient had upper limb flexor modified Ashworth index  $\geq 1$ ; ④The patient was between 18 and 75 years old.

**Intervention:** Repetitive transcranial magnetic stimulation combined with routine rehabilitation training.

**Comparator:** Sham repetitive transcranial magnetic stimulation combined with routine rehabilitation training or only routine rehabilitation training.

**Study designs to be included:** Randomized controlled trial.

**Eligibility criteria:** Both Chinese and English papers published in journals are included, but reviews, conference papers, systematic reviews, case reports, etc. are not included in this review.

**Information sources:** Search for literature about rTMS for upper limb spasticity after stroke in PubMed, Web of Science, Embase, Cochrane Library, China Biomedical Literature Database, CNKI, Wanfang, VIP database. And search for literatures from the self-built library to October 30, 2021.

**Main outcome(s):** Modified Ashworth Scale; Fugl-Meyer upper extremity assessment; Barthel Index/Modified Barthel Index; motor evoked potential; The incubation period and volatility of MEP.

**Quality assessment / Risk of bias analysis:** In this study, the Cochrane risk of bias tool was used to assess the risk of bias. Two

reviewers independently evaluated the article. Participating articles are classified into "low risk of bias", "uncertain risk of bias" and "high risk of bias". When the opinions of the two evaluators disagree, they will be discussed first. If the opinions are still not uniform, the third evaluator will conduct the evaluation again.

**Strategy of data synthesis:** RevMan 5.3 software was used to quantitatively analyze the extracted data. First, the included studies were tested for heterogeneity, and  $P50\%$  was used as the criterion for significant heterogeneity. If  $P \geq 0.1$  and  $I^2 \leq 50\%$ , the heterogeneity among the included studies is considered acceptable, and the fixed effects model is used for Meta analysis. If  $P50\%$ , it is considered that there is high heterogeneity among the included studies, and then sensitivity analysis or subgroup analysis is performed to determine the source of heterogeneity, and the random effects model is used for analysis. Continuous variables use mean difference (MD) as the effect size. If the measurement methods are different or the units are inconsistent, the standardized mean difference (SMD) is used as the effect size. Each effect size provides an estimated value and a confidence interval (CI).

**Subgroup analysis:** A subgroup analysis will be performed when there is a high degree of heterogeneity between the studies.

**Sensitivity analysis:** We will conduct a sensitivity analysis when the heterogeneity of the studies is high.

**Country(ies) involved:** China.

**Keywords:** repetitive transcranial magnetic stimulation; stroke; upper limb; spasticity; meta-analyses.

**Contributions of each author:**

Author 1 - Yangyang Wang.

Author 2 - Xiaohua Fan.

Author 3 - Liang Zhou.

Author 4 - Jiqin Tang.