

## Effects of Repetition Transcranial Magnetic Stimulation on spinocerebellar ataxia-3: A Systematic Review and Meta-Analysis

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### ADMINISTRATIVE INFORMATION

**Support** - None.

**Review Stage at time of this submission** - Data analysis.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202370091

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 22 July 2023 and was last updated on 22 July 2023.

### INTRODUCTION

**Review question / Objective** To determine the effectiveness of transcranial magnetic stimulation in improving spinocerebellar ataxia-3.

**Condition being studied** TMS parameters were further optimized, and patient selection criteria improved; an updated meta-analysis is necessary to reassess the overall impact of TMS on ataxia's symptom recovery.

### METHODS

**Search strategy** We will search PubMed, EMBASE, the Cochrane Library, Springer, Science Direct, China National Knowledge Infrastructure (CNKI), Chinese Science and Technology Periodical Database (VIP). The search terms were "spinocerebellar Ataxias, Transcranial Magnetic Stimulation/TMS, systematic review, Treatment" In addition, the bibliography lists of selected papers will be checked manually.

**Participant or population** Patients of spinocerebellar ataxia-3.

**Intervention** rTMS's stimulation.

**Comparator** Real stimulation or sham stimulation.

**Study designs to be included** They were randomized controlled trials.

**Eligibility criteria** Study information(number of participants, Intervention),participant characteristics (Age, Duration),intervention protocol (TMS stimulation,frequency, and additional interventions),Outcomes.

**Information sources** EMBASE, the Cochrane Library, Springer, Science Direct, China National Knowledge Infrastructure (CNKI), Chinese Science and Technology Periodical Database (VIP).

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**Main outcome(s)** The effect of TMS on ICRAS ( $P=0.85$ ,  $I^2=0\%$ ), SARA ( $P=0.63$ ,  $I^2=0\%$ ), in spinocerebellar ataxia-3 patients was significant.

**Quality assessment / Risk of bias analysis** Two reviewers will assess the risk of bias in the included trials using the Cochrane Collaboration's risk of a bias assessment tool. We will evaluate the risk of bias (low, unclear, or high risk) in seven areas, including random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other sources of bias. Methodological quality was assessed using an improved Jada scale (0–3: low rate; 4–7: high quality) 11.

**Strategy of data synthesis** Review Manager V.5.3 software will be used for meta-analysis. The  $I^2$  and Cochran-Q test are used to assess the heterogeneity between studies.  $P<0.1$  or  $I^2<50\%$ , the fixed effects model will be used; and  $p<0.1$  or  $I^2\geq 50\%$ , the random-effects model will be used. Mean differences (MD) or standardized mean differences (SMD), as well as 95% confidence intervals (CI), will be computed for continuous data. When the quantitative evaluation is unavailable, we will provide a qualitative description of the individual study results. Publication bias was conducted by using funnel plots.

**Subgroup analysis** None.

**Sensitivity analysis** For quantitative data synthesis, the estimated combined effect was calculated by comparing the changes between the intervention and control groups from baseline to the end of the study. We assessed transcranial magnetic stimulation on symptoms in patients with cerebellar ataxia, compared with sham samples using the total score of each scale.

**Language restriction** None.

**Country(ies) involved** China.

**Keywords** spinocerebellar ataxia-3; Transcranial Magnetic Stimulation; systematic review.

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