International Platform of Registered Systematic Review and Meta-analysis Protocols

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Author Affiliation: Nantong University. The effect of exercise combined with and without non-invasive brain stimulation on motor function and spasticity in children with cerebral palsy: A systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - None.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 21 April 2025 and was last updated on 21 April 2025.

INTRODUCTION

R eview question / Objective This review will examin the impact of exercise with and without non-invasive brain stimulation (NIBS) on motor function (MF) and spasticity in children with CP based on a meta-analysis.

Condition being studied Cerebral palsy (CP) includes persistent movement impairments affecting posture or mobility. This outcome is usually attributed to the CP influence on muscle tone. The conditions arise from developmental anomalies in foetal or infant brains due to nonprogressive factors, which are not inherently neurodegenerative. Nonetheless, the clinical manifestation of CP may change as the central nervous system matures. The impairment in the motor system restricts functional capabilities and activities, demonstrating a range of severity. Individuals experiencing CP also frequently exhibit numerous supplementary symptoms. These symptoms are intellectual disability, spasms, impaired balance, musculoskeletal complications, and seizures.

METHODS

Search strategy This study proposed a literature search on four electronic databases: (i) Web of Science, (ii) Scopus, (iii) PubMed, and (iv) EBSCO. The process involved a specified timeframe between January 2010 and April 2025.

Participant or population Children with cerebral palsy.

Intervention Exercise with non-invasive brain stimulation.

Comparator Exercise without non-invasive brain stimulation.

Study designs to be included Randomised Controlled Trial.

Eligibility criteria

i. Randomised controlled trials.

ii. Children with CP under 12 years of age.

iii. Studies involved the experimental group (EG, exercise with NIBS) and control group (CG, exercise without NIBS).

iv. Measurement of MF, spasms, balance, LLS, walking speed, and SLA were measured at preand post-intervention .

v. Reporting of test indicators as mean (standard deviation) and/or median (interquartile range) vi. English language full-text articles.

Information sources Four electronic databases: (i) Web of Science, (ii) Scopus, (iii) PubMed, and (iv) EBSCO.

Main outcome(s) Motor function and spasticity.

Additional outcome(s) Balance, lower limb strength (LLS), walking speed, and social life ability (SLA).

Quality assessment / Risk of bias analysis The methodological quality of the selected articles was evaluated utilising the Cochrane risk of bias assessment tool. Various components of the selected articles were investigated using this tool, including allocation concealment, outcome assessment blinding, selective reporting, random sequence generation, participant with personnel blinding, and incomplete outcome data. Items were assessed as "yes", "no", or "unclear" to examine the quality of the selected articles.

Strategy of data synthesis Various search terms will be applied in this process, such as "Cerebral palsy", "Stimulate", and "Children". This search strategy and the associated outcomes were developed using information.

Subgroup analysis None.

Sensitivity analysis Conduct sensitivity analysis by gradually excluding studies.

Language restriction English.

Country(ies) involved China.

Keywords Children; Cerebral palsy; Exercise; Noninvasive brain stimulation; Motor function.

Contributions of each author

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