

# INPLASY PROTOCOL

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**Support:** None.

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

**Conflicts of interest:**  
None declared.

## A meta-analysis of the effects of core muscle group training on balance and motor function in children with cerebral palsy

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**Review question / Objective:** Cerebral palsy, or cerebral palsy for short, is the most common neuromotor disability in pediatrics. Primary disorders caused by brain injury include abnormal muscle activation patterns, spasticity, and these primary disorders limit somatic activity, exacerbate muscle weakness, alter muscle physiology, reduce joint range of motion, and subsequently cause compensatory movement patterns that limit function. Physical therapy for children with cerebral palsy mainly includes treatments to maintain ROM, improve muscle strength, and promote mobility. Studies by foreign scholars have confirmed that muscle strength strengthening training can improve muscle strength, gait and motor function in children with spastic cerebral palsy, but literature data are mainly limited to limb muscles, while studies on core muscle group strengthening for children with cerebral palsy are rarely reported, and specific training protocols vary widely. The purpose of this study was to accurately and systematically evaluate the effects of core muscle group training on balance and motor ability in children with cerebral palsy. P:Children with cerebral palsy; I: Core muscle group training; C: conventional rehabilitation; O: Berg balance scale, Gross motor function measure; S: RCT.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 01 December 2021 and was last updated on 01 December 2021 (registration number INPLASY2021120006).

### INTRODUCTION

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most common neuromotor disability in pediatrics. Primary disorders caused by brain injury include abnormal muscle activation patterns, spasticity, and these

primary disorders limit somatic activity, exacerbate muscle weakness, alter muscle physiology, reduce joint range of motion, and subsequently cause compensatory movement patterns that limit function. Physical therapy for children with cerebral palsy mainly includes treatments to maintain ROM, improve muscle strength, and promote mobility. Studies by foreign scholars have confirmed that muscle strength strengthening training can improve muscle strength, gait and motor function in children with spastic cerebral palsy, but literature data are mainly limited to limb muscles, while studies on core muscle group strengthening for children with cerebral palsy are rarely reported, and specific training protocols vary widely. The purpose of this study was to accurately and systematically evaluate the effects of core muscle group training on balance and motor ability in children with cerebral palsy. P:Children with cerebral palsy; I: Core muscle group training; C: conventional rehabilitation; O: Berg balance scale, Gross motor function measure; S: RCT.

**Condition being studied:** Cerebral palsy is a clinical syndrome caused by a developmental defect or non-progressive brain injury from conception to infancy, in which the child exhibits not only motor impairment but also postural abnormalities. Cerebral palsy is a disabling disease that lacks a specific treatment option, which not only harms the physical and mental health of the child, but also increases the burden on society and the family. Conventional movement therapy through rehabilitation functional training to suppress abnormal posture and movement patterns of the child, facilitate normal movement and sensory development, play a role in enhancing muscle strength, avoiding muscle atrophy, promoting motor function repair, and relieving muscle tone. Core stability training is widely used in the field of competitive sports, which can control the trunk and pelvis muscles to stabilize the posture, create fulcrums for limb movement, coordinate the force of the limbs, and optimize the generation, control and transmission of power.

## METHODS

**Search strategy:** Disease Type: Subject words: Cerebral Palsy Free word: Cerebral Palsy, Dystonic-Rigid Cerebral Palsies, Dystonic-Rigid; Cerebral Palsy, Dystonic Rigid; Dystonic-Rigid Cerebral Palsies; Dystonic-Rigid Cerebral Palsy; Cerebral Palsy, Mixed; Mixed Cerebral Palsies; Mixed Cerebral Palsy; Cerebral Palsy, Monoplegic, Infantile; Monoplegic Infantile Cerebral Palsy; Infantile Cerebral Palsy, Monoplegic; Cerebral Palsy, Quadriplegic, Infantile; Quadriplegic Infantile Cerebral Palsy; Infantile Cerebral Palsy, Quadriplegic; Cerebral Palsy, Rolandic Type; Rolandic Type Cerebral Palsy; Cerebral Palsy, Congenital; Congenital Cerebral Palsy; Little Disease; Little's Disease; Spastic Diplegia; Diplegias, Spastic; Spastic Diplegias; Diplegia, Spastic; Monoplegic Cerebral Palsy; Cerebral Palsies, Monoplegic; Cerebral Palsy, Monoplegic; Monoplegic Cerebral Palsies; Cerebral Palsy, Athetoid; Athetoid Cerebral Palsy; Cerebral Palsies, Athetoid; Cerebral Palsy, Dyskinetic; Cerebral Palsies, Dyskinetic; Dyskinetic Cerebral Palsy; Cerebral Palsy, Atonic; Atonic Cerebral Palsy; Cerebral Palsy, Hypotonic; Hypotonic Cerebral Palsies; Hypotonic Cerebral Palsy; Cerebral Palsy, Diplegic, Infantile; Diplegic Infantile Cerebral Palsy; Infantile Cerebral Palsy, Diplegic; Cerebral Palsy, Spastic; Spastic Cerebral Palsies; Spastic Cerebral Palsy; Interventions: Core stability training; Research Methodology: randomized controlled trial[Publication Type] OR randomized[Title/Abstract] OR placebo[Title/Abstract].

**Participant or population:** Children with cerebral palsy.

**Intervention:** Core stability training.

**Comparator:** General Rehabilitation.

**Study designs to be included:** RCT.

**Eligibility criteria:** Inclusion criteria: 1, The selected study was a randomized

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controlled trial, and there was no significant difference between the experimental group and the control group before the experiment. 2, Children with participants diagnosed with cerebral palsy met the diagnostic and typing criteria established at the 2006 National Pediatric Cerebral Palsy Symposium in Changsha, and had no complications. 3. The experimental group underwent core stability training, and the control group took conventional rehabilitation. 4, The outcome indexes were Berg balance scale and Gross motor function measure. Exclusion criteria: 1. Small sample size2. Presence of complications 3. Other treatment before the intervention4. Literature not available 5.survey or descriptive study 6. duplication of literature 7. Self-controlled trials8. No access to validated outcome indicators.

**Information sources:** PubMed, Embase, CNKI, VIP, Cochrane, WanFang, Sinomed.

**Main outcome(s):** Gross motor function measure.

**Additional outcome(s):** Berg balance scale.

**Data management:** Note Express.

**Quality assessment / Risk of bias analysis:** Cochrane Tool.

**Strategy of data synthesis:** The Berg balance scale uses mean difference (MD) as the effect size, and the Gross motor function measure uses standardized mean difference (SMD) as the effect size. In the presence of heterogeneity, random effects were chosen to combine the data; in the absence of heterogeneity, fixed effects were chosen to combine the data.

**Subgroup analysis:** Subgroup analysis was performed according to patient age, intervention period, intervention frequency, brain stem type, and sample size. Subgroup analysis was performed according to patient age, intervention period, intervention frequency, brainstem type, and sample size.

**Sensitivity analysis:** After deleting any one of them, the combined results of the remaining papers did not differ from those without deletion, which means that the sensitivity analysis was passed.

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

**Keywords:** Cerebral palsy, Core stability training.

**Contributions of each author:**

Author 1 - Xu Jiahao.

Author 2 - Chen Jiaqi.

Author 3 - Gao Kuiting.