



The effectiveness of functional approach in gross motor function of children with cerebral palsy: systematic review & meta-analysis



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Introduction

Cerebral palsy is the leading cause of childhood disability, with a number of therapeutic interventions available for optimizing gross motor performance.

Emerging novel conceptual frameworks (dynamic systems theories) have led to the development of the functional approach, which focuses in learning self-initiated activities, through environmental and task adaptations.

Nevertheless, a systematic review and meta-analysis focused on the efficacy of functional approach on gross motor function has never been performed.

Purpose

A systematic review regarding the effectiveness of functional approach in the gross motor function in children with cerebral palsy, and a meta-analysis comparing functional approach and traditional child-focused approach.

Methods

PubMed, EBSCO (MEDLINE, CINAHL plus etc) and Physiotherapy Evidence Database (PEDro) were searched from 1990 to March 2016.

Selection criteria were studies, with experimental or quasi-experimental or cohort design, which included functional therapy for cerebral palsied children between 2-18 years old and reported gross motor function as an outcome measure.

The methodological quality of selected randomized controlled trials (RCTs) was evaluated by PEDro scale.

Meta-analysis of the RCTs was based on both fixed and random effects models. The effect size was expressed via Hedges' g. The sample heterogeneity was assessed by Cochran's Q test and I² index. P=0.05 was taken as level of significance.

Results

Ten studies met the inclusion criteria, of which four were randomized controlled trials (RCTs),¹⁻⁴ three were pretest-posttest design,⁵⁻⁷ two were prospective studies^{8,9} and one was single subject design.¹⁰

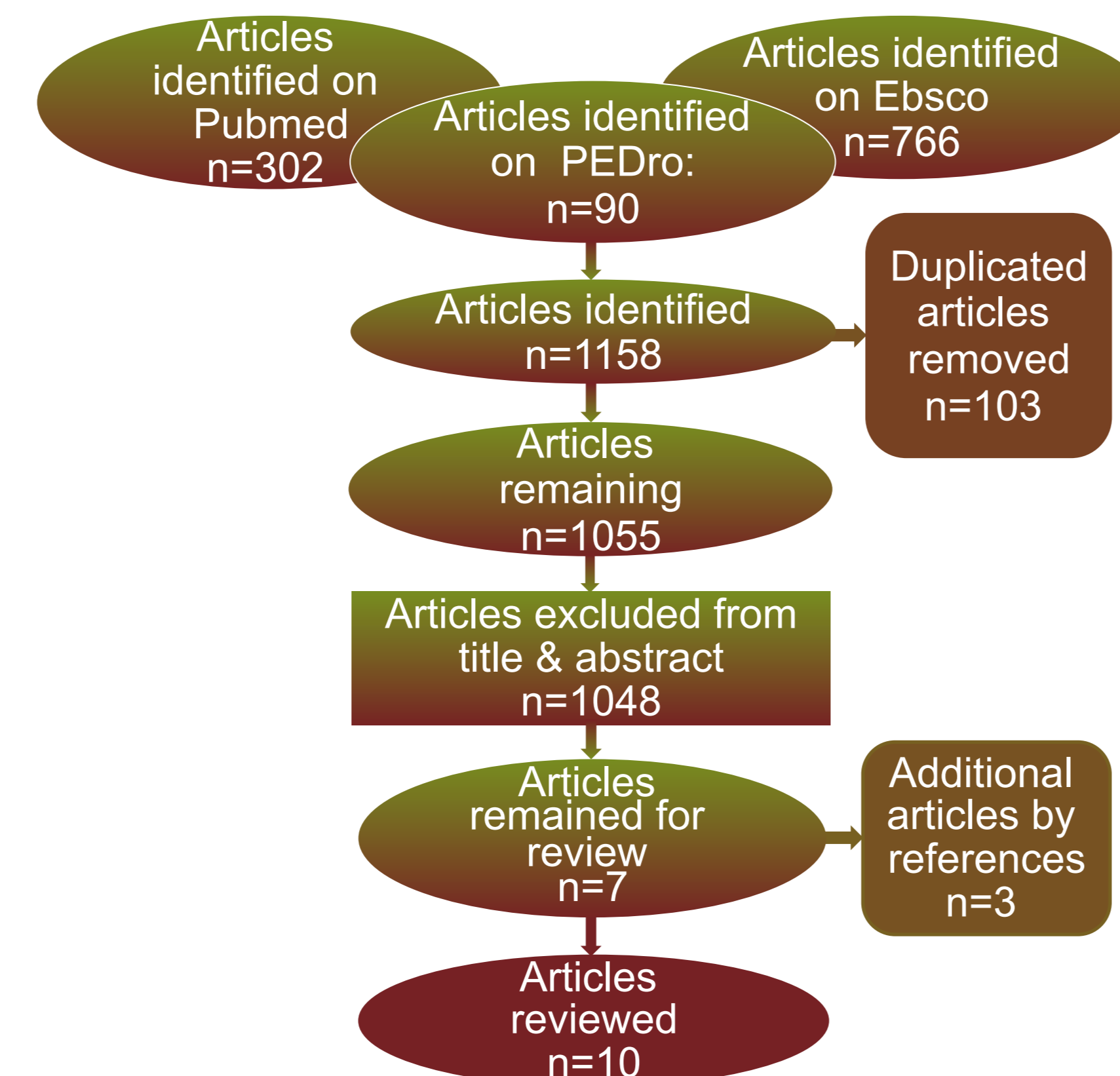


Figure 1. Flow diagram

Nine studies reported improved of gross motor capacity using Gross Motor Function Measure (GMFM),¹⁻⁹ four of which demonstrated positive effects on gross motor capability and performance via Pediatric Evaluation of Disability Inventory (PEDI).^{3,4,7,8}

PEDro scale	Ketelaar et al 2001 ¹	Salem & Godwin 2009 ²	Law et al 2011 ³	Kruijssen-Terpstra et al 2016 ⁴
Eligibility criteria	Yes	Yes	Yes	Yes
Random allocation	No	Yes	Yes	Yes
Concealed allocation	No	Yes	Yes	No
Baseline comparability	Yes	Yes	Yes	Yes
Blind subjects	No	No	No	No
Blind therapists	No	No	No	No
Blind assessors	Yes	Yes	Yes	Yes
Adequate follow-up	Yes	No	Yes	Yes
Intention-to-treat analysis	No	No	Yes	Yes
Between-group comparisons	Yes	Yes	Yes	Yes
Point estimates & variability	Yes	Yes	Yes	Yes
Total score	5/10	6/10	8/10	7/10

Table 1. Quality assessment based on PEDro scale of randomised controlled trials included in the systematic review.

Results

Two RCTs^{1,2} were of moderate and two RCTs^{3,4} were of high methodological quality.

The RCTs contributed to the analysis for a total of 242 cerebral palsied children: 116 in the functional approach group and 126 children in the child-focused approach group.¹⁻⁴

The meta-analysis of RCTs showed no statistically significant difference in the effectiveness of functional approach compared to child-focused approach ([Total fixed effects: p=0.931, g=-0.011] [Total Random effects: p=0.931, g=-0.011]).

There was no also heterogeneity among the studies (Q=0.2 [Df=3, p=0.977] and I² = 0% (95% CI: 0%-0%).

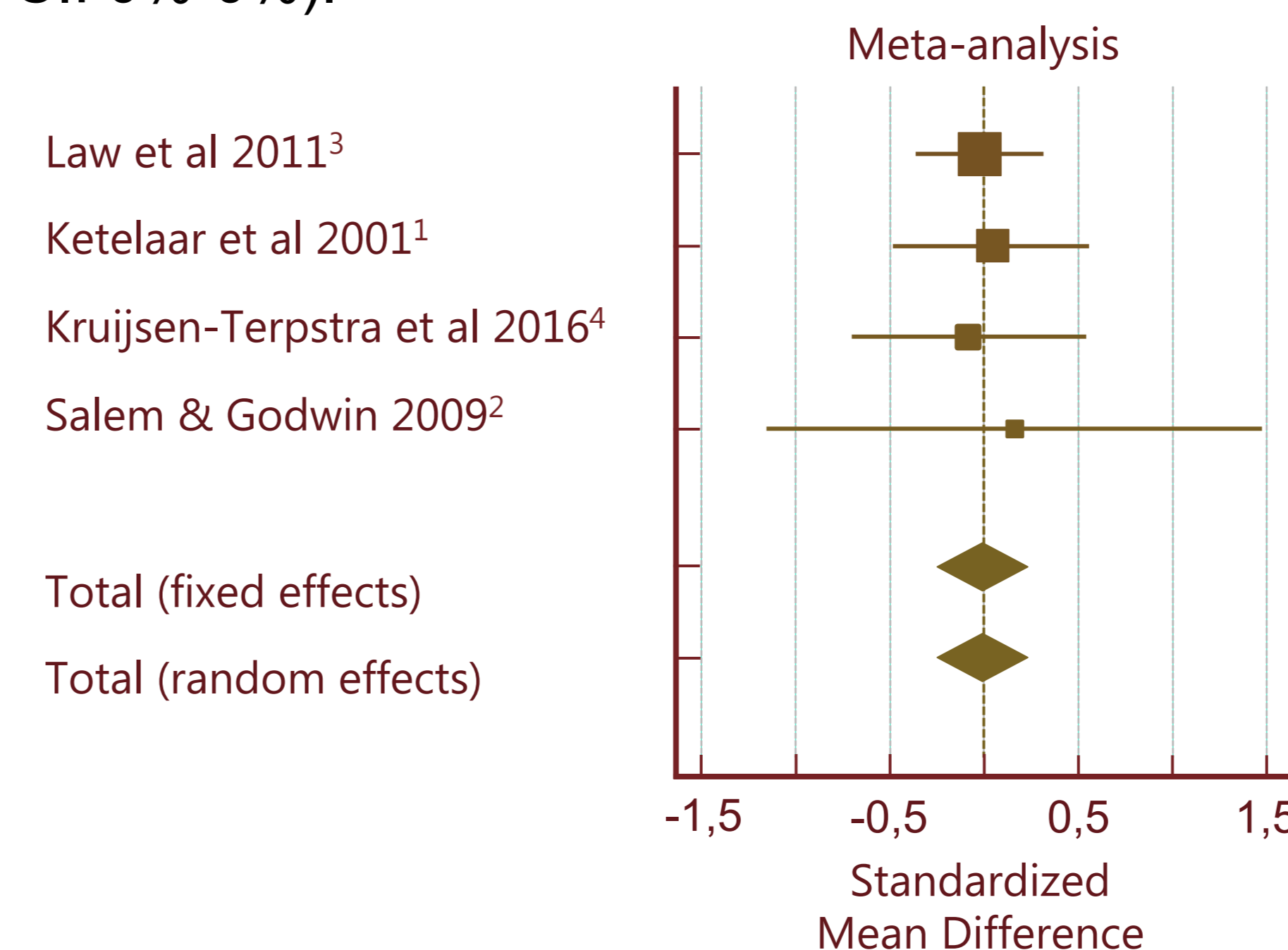


Figure 2. Forest plot for the difference of effectiveness between functional and child focused approach.

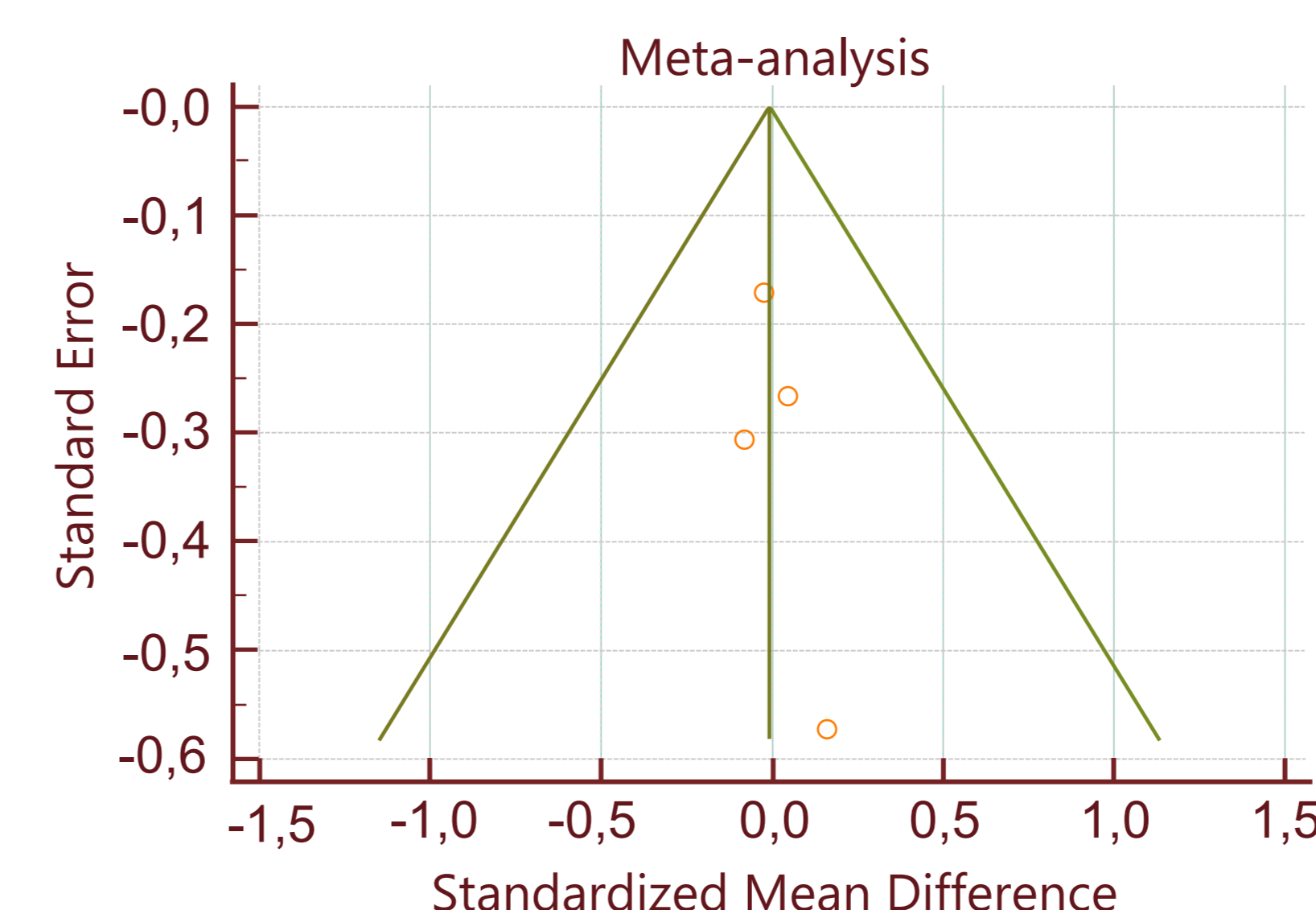


Figure 3. Funnel plot of meta-analysis data.

Conclusions

The functional approach is suggested as an effective physiotherapeutic intervention of improving the gross motor function in children with cerebral palsy.

The functional approach is shown to be equally efficacious with traditional, child-focused intervention.

Clinical Implications

Clinical physiotherapists can effectively apply the functional approach in children with cerebral palsy.

The equal effectiveness of functional and child-focused approaches allows physiotherapists to choose any of the two interventions that best suits their rehabilitation philosophy and/or the individual circumstances of the child and family.

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