A systematic review of common physiotherapy interventions in school-aged children with cerebral palsy

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CRD summary
The authors concluded that there was strong evidence for interventions to strengthen targeted muscle groups, and emerging evidence for functional training, in children with cerebral palsy. This was a generally well-conducted review, but the limitations of the evidence (small studies at a high risk of bias), suggest that the authors’ conclusions may be over optimistic.

Authors' objectives
To review the evidence for the effectiveness of commonly used physiotherapy interventions, for children with cerebral palsy, aged four to 18 years.

Searching
The authors searched MEDLINE, CINAHL, EMBASE, PEDro and The Cochrane Library, for articles from 1995 to October 2009. Search terms were reported. Reference lists from key articles were checked.

Study selection
Studies that recruited children, aged four to 18 years, with cerebral palsy, and evaluated mainstream physiotherapy interventions, were eligible for inclusion. Mainstream interventions were those that the authors considered to be common normal interventions. Studies of interventions such as horse-riding therapy and hydrotherapy were excluded, as were studies that focused primarily on upper limb therapy. It seems that all designs, except single-case studies, were eligible.

In the included studies, strength training interventions were most common, followed by body weight-supported treadmill training, functional training, and neurodevelopmental therapy. The intervention duration, where reported, ranged from two to 78 weeks. Studies varied widely in their average participant age and severity of symptoms; recruitment was frequently from one centre or organisation.

Two reviewers assessed study eligibility for inclusion.

Assessment of study quality
The authors did not report a formal quality assessment, but some relevant issues were reported in the text and tables. Studies were assigned a level of evidence, based on their design.

Data extraction
Two independent reviewers extracted the data. Any disagreements were resolved by consensus, with a third reviewer.

Methods of synthesis
A narrative synthesis, organised by type of intervention, was presented. Differences between the studies were discussed in the text and presented in tables.

Results of the review
Thirty-four studies were included, of which 15 (according to tables) were randomised controlled trials (RCTs), 16 were case series, and three had other designs. The total number of participants was unclear, but most studies had fewer than 30 and none had more than 60. Eleven studies provided a power analysis, and nine fully described their inclusion and exclusion criteria. Follow-up was reported in 14 studies, and ranged from four to 111 weeks.

Strength training: In 16 studies, improvements were seen in strength of selected muscle groups on dynamometry and the Gross Motor Function Measure (GMFM), some of which were maintained at follow-up.
**Functional training**: Results varied across the five studies and outcomes. Some studies reported improvements in GMFM, endurance, and measures, such as gait speed and stride length.

**Body weight-supported treadmill training**: Six studies were found. GMFM showed a significant improvement in two case series, but the only controlled study found a non-significant difference between groups.

**Neurodevelopmental therapy**: Two of three studies reported significant improvements in GMFM. One of these compared two levels of intensity and found greater improvements with the higher intensity.

**Treatment dosage**: Four controlled studies compared different intensities of general physiotherapy; none found a significant difference.

Further results were reported.

**Authors’ conclusions**

There was strong evidence for interventions to strengthen targeted muscle groups, and emerging evidence for functional training. Better evidence was needed for treadmill training, for neurodevelopmental therapy, and to determine the most effective intensity of physiotherapy.

**CRD commentary**

The review question and inclusion criteria were generally clear; the criteria for study design and outcomes of interest were not explicitly stated. The definition of widely used interventions was subjective, but seems to have been reasonable. The search covered a range of relevant sources; it was unclear whether any language restrictions were imposed.

Appropriate methods were used to minimise the risks of reviewer error and bias, affecting the review. Study quality was not formally assessed, but some relevant information was reported, and it was clear that most studies were small and potentially at a high risk of bias. A narrative synthesis was appropriate and the authors tended to emphasise the higher quality evidence.

This was a generally well-conducted review, but the limitations of the evidence suggest that the authors’ conclusions may be over optimistic.

**Implications of the review for practice and research**

**Practice**: The authors did not state any implications for practice.

**Research**: The authors did not state any specific implications for research.

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