Effectiveness of aquatic interventions for children with cerebral palsy: systematic review of the current literature

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CRD summary
The review concluded that the evidence suggested aquatic interventions were beneficial for children and adolescents with cerebral palsy. The author's conclusions reflected the evidence presented, but the potential for missed studies, lack of reporting of review methods, and limitations in the evidence mean the reliability of the conclusions is uncertain.

Authors' objectives
To evaluate the effectiveness of aquatic interventions for children or adolescents with cerebral palsy.

Searching
PubMed, CINAHL, PEDro, SPORTDiscus and The Cochrane Library were searched for articles in English or German published in peer-reviewed journals from 1998 to 2011. Search terms were reported.

Study selection
Studies of aquatic interventions for children diagnosed with any type of cerebral palsy were eligible for inclusion. Aquatic interventions had to be the main intervention and be performed in a pool setting under surveillance of a health professional. Outcome measures had to include at least two levels of the International Classification of Functioning, Disability and Health (ICF) 11. Studies including a mixed sample of children in ages or degrees of disability, and studies that included children who had undergone orthopaedic surgery up to six months prior to, or during, the intervention were excluded.

In included studies, the numbers of sessions for aquatic exercise were two or three times a week; the duration of sessions varied between studies. The duration of interventions ranged from six to 24 weeks. Comparison groups (where studies employed these) included regular variations on physical therapy including Bobath physical therapy.

The age of included participants ranged from three to 13 years; one study included adolescents with ages that ranged from 13 to 20 years. Most participants had spastic diplegic cerebral palsy; the remainder had spastic hemiplegic or quadriplegic cerebral palsy. Most of the participants were ambulatory. Most studies classified participants using the Gross Motor Function Classification Scale (classification levels ranged from I to III). In most cases, aquatic therapy was not the sole intervention.

The author did not state how many reviewers selected studies for inclusion.

Assessment of study quality
The quality of the studies was assessed using the PEDro Scale in conjunction with a grading system using methods by Sackett et al, based on study design.

The author did not state how many reviewers assessed quality.

Data extraction
Data were extracted on function, activity and participation.

The author did not state how many reviewers extracted the data.

Methods of synthesis
The data were combined in a narrative synthesis with additional information provided in tables.

Results of the review
Eight studies (115 participants) were included in the review comprising two randomised controlled trials (RCTs), three non-RCTs, one cohort study, one case series, and one case report. Sample sizes ranged from one to 46 participants. The
The average score for quality on the PEDro quality scale was 4.6 points (range 2 to 7 out of 10 points).

All eight studies reported that aquatic interventions, either as a major component or as a stand alone intervention, were beneficial for children and adolescents with cerebral palsy.

Improvements in activity were reported for gross motor skills (three studies including one RCT); maintenance of improvement in gross motor function at six weeks to three months after the intervention (two studies); and increased swimming skills for kindergarten children (two studies including one controlled trial).

Improvements in function were reported for greater walking efficiency (three studies); increases in lower-extremity muscle strength (two studies) and balance (two studies); better respiratory function (one study) and reduced spasticity in adolescents (one RCT). Improvements were also reported for range of motion with an increase in passive range of motion of lower-extremity joints (one study), and improved active and passive range of motion (one RCT).

Positive impacts on participation were reported in six studies (including one RCT) with improvements in performance, satisfaction, social functioning and self-perception.

**Authors’ conclusions**
The evidence suggested that aquatic interventions were beneficial for children and adolescents with cerebral palsy, but more research was needed.

**CRD commentary**
Inclusion criteria were clearly defined. Several relevant sources were searched. Limitation to articles in English or German peer-reviewed publications meant that some studies may have been missed. The author did not report using methods designed to reduce reviewer bias and error at any stage of the review process.

Study quality was assessed; the quality was judged to be moderate to low. A narrative review was appropriate given the variation between studies in the number of participants, length of follow-up, study design, number and duration of aquatic sessions. The author appropriately advised caution in the interpretation of the results due to the variation between studies and the multi-component nature of some of the interventions, of which aquatic exercise was only one component.

The author’s conclusions reflected the evidence presented but the potential for missed studies, lack of reporting of review methods, and limitations in the evidence mean the reliability of the conclusions is uncertain.

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

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

**Research:** The author stated that further methodologically robust trials were needed to evaluate the effectiveness of aquatic physical therapy as an intervention option for children with cerebral palsy.

**Funding**
Not stated.

**Bibliographic details**

**Linked records**
- [Effectiveness of aquatic therapy in children and adolescents with cerebral palsy (ICP): the potential for positive effects is large]
Other publications of related interest

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Subject indexing assigned by CRD

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.