Effectiveness of physiotherapy for adults with cerebellar dysfunction: a systematic review

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**CRD summary**

The authors found that physiotherapy may be effective for management of cerebellar dysfunction in adults, but that there was insufficient evidence to support the efficacy of any specific intervention; well-designed studies were required. Although the review had methodological limitations, the conclusion that more research was required appears well justified.

**Authors' objectives**

To assess the effectiveness of physiotherapy for adults with cerebellar dysfunction.

**Searching**

CINAHL, MEDLINE via PubMed, PEDro, Web of Science, Proquest Health and Medical Complete, The Cochrane Library and EMBASE databases were searched for studies in English published up to December 2007. Search terms were provided. Reference lists of eligible articles were handsearched. Conference abstracts were excluded.

**Study selection**

Quantitative studies of any design were eligible for inclusion provided their primary intervention was physiotherapy for adults (aged over 18 years) with cerebellar dysfunction or disease diagnosed by radiological scans or neurological examination/diagnosis. The intervention was required to target impairment and/or restrictions on activity or participation related to cerebellar dysfunction and to be conducted in a clinical setting. Studies were included if all or a distinct subset of participants met inclusion criteria.

Participants in the review ranged in age from 19 to 90 years and had a variety of cerebellar pathologies including multiple sclerosis, traumatic brain injury, stroke, cerebellar degeneration and neoplasm. Interventions in the included studies targeted a range of impairments related to cerebellar dysfunction and differed widely in the type, frequency, intensity and duration of exercise involved. Commonly used interventions were vestibular habituation exercises, proprioceptive neurofacilitation, Frenkel's exercises and activities to retrain balance. Some studies used standardised programmes and others were tailored to participant needs. The intervention was delivered in an inpatient, outpatient and/or home setting. Controls (where relevant) received no intervention or a less intensive intervention. A variety of outcomes were reported, with differing measures used to evaluate the same variable. Most studies were case series or case studies. Most had no follow up beyond the intervention period, which ranged from a one-off session to 21 months.

Three reviewers conducted the final selection of studies for inclusion. Disagreements were resolved by consensus.

**Assessment of study quality**

Studies were ranked by quality of design using an established model (National Health and Medical Research Council 2000). In addition, a set of published criteria (Law 1998) for evaluating qualitative studies was applied, with up to 16 points allocated for characteristics such as reporting quality, likely bias, informed consent, outcomes reporting and statistical methods. Two reviewers independently conducted the validity assessment. Disagreements were resolved by consensus.

**Data extraction**

Descriptive data on changes from baseline were extracted for each study, in some cases with effect measures and/or p values. The authors stated neither how data were extracted for the review nor how many reviewers performed the data abstraction.

**Methods of synthesis**

Study findings were summarised briefly in a narrative synthesis. Only studies gaining at least 8 points in the validity assessment were deemed suitable for inclusion in the narrative synthesis.
Results of the review
The review included nine studies (n=221, range one to 48): one randomised controlled trial; one cross-sectional comparative study; three prospective case series; two retrospective case series; and two retrospective case studies. The median quality score was 8 (range 4 to 10) out of 16. Five studies gained at least 8 points and were included in the narrative synthesis. No studies reported using valid and reliable outcomes measures and few described using blinded assessment. In most cases interventions were poorly described.

Effectiveness of physiotherapy (one cross-sectional study, three case series, one case study, n=135): All five studies showed a positive effect of physiotherapy on gait. The intervention also appeared to improve trunk control (two studies) and decrease activity limitations (three studies).

Authors’ conclusions
Physiotherapy may be effective for management of cerebellar dysfunction in adults, but there was insufficient evidence to support the efficacy of any specific intervention.

CRD commentary
The objectives and inclusion criteria were clear. Relevant sources were searched for studies, although the restriction to published studies in English meant that the review was prone to publication and language biases. Steps were taken to minimise bias and error by having more than one reviewer independently assess study validity, but it was unclear whether similar steps were taken throughout the process of study selection and for data extraction. The decision to combine studies by narrative synthesis appeared appropriate. Several studies were excluded from the synthesis by a somewhat arbitrary selection process based on the quality score, whereby all methodological criteria were given equal weighting regardless of their likely impact on bias. This resulted in the exclusion from the evidence synthesis of the only available randomised controlled trial. The evidence synthesis was very brief and lacked interpretation of the clinical significance of the results reported. Problems associated with poor study quality and with heterogeneity between the studies were well addressed in the discussion section. Although the review had methodological limitations, the authors’ conclusion that more research was required appears well justified.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that high-quality controlled studies with blinded outcomes assessment were needed to investigate customised physiotherapy programmes for cerebellar dysfunction. Interventions and outcome measures should be described in detail.

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