The effect of whole body vibration in common neurological conditions: a systematic review

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CRD summary
The review concluded that there was weak to moderate evidence that whole body vibration had positive effects on postural control, mobility, motor function and strength for neurological conditions, but evidence was limited by the paucity and heterogeneity of studies. Potential for publication and language biases and few studies and small sample sizes, the authors’ cautious conclusion appears appropriate.

Authors' objectives
To evaluate the effectiveness of whole body vibration for the treatment of neurological conditions.

Searching
MEDLINE, EMBASE, AMED, CINAHL, Health Source: Nursing/Academic edition, SPORTDiscus, Academic Search Premier, SCOPUS, Web of Science, PEDro and The Cochrane Library were searched to January 2008 for studies in English. Search terms were not reported, but the full search strategy was available from the authors. Reference lists of included articles were searched.

Study selection
Randomised controlled trials (RCTs) or pseudo RCTs that evaluated whole body vibration training for adults with neurological conditions were eligible for inclusion. Studies were excluded if they evaluated vibration other than whole body vibration or traditional resistance training. Also excluded were studies that included participants who did not have a neurological condition or who were exposed to vibration in occupation/industry transport. Case series or abstracts were excluded.

Parameters and duration of whole body vibration varied between included studies. Most studies evaluated a single whole body vibration application; two studies evaluated repeated whole body vibration over several weeks. Control groups varied between studies and included rest, moderate walking, standing on a non-vibrating platform with or without application of transcutaneous electrical stimulation (TENS), regular exercise and resistance training. Frequency of whole body vibration varied between studies (range 2Hz to 30Hz). Total duration of whole body vibration ranged from three to six minutes. Participants in the included studies were adults with Parkinson's disease, stroke, multiple sclerosis (MS) and cerebral palsy. Mean age ranged from 31 to 69 years. Outcomes varied widely between studies and included mobility, motor symptoms, postural control, balance, strength, spasticity, activities of daily living and proprioception.

The authors did not state how studies were selected for inclusion.

Assessment of study quality
Methodological quality was assessed using Physiotherapy Evidence Database Scale (PEDro) for evaluation of suitability of eligibility criteria, random allocation, concealment of allocation, similarity of groups at baseline, blinding, outcomes, intention-to-treat analysis and statistical analysis. The maximum possible score was 11 points.

Two reviewers independently assessed validity.

Data extraction
Data from individual studies were extracted for relevant outcomes. The effect of whole body vibration on each outcome was assessed as positive (in favour of whole body vibration group, p≤0.05), negative (in favour of control group, p≥ 0.05) or no difference. Assessment was based on reporting by primary study authors. Effect sizes were calculated by dividing the difference between experimental and control groups by the pooled standard deviation. Authors were contacted regarding missing data where appropriate.
The authors did not state how many reviewers performed data extraction.

**Methods of synthesis**

Studies were grouped according to application of whole body vibration (single or multiple) and combined in a narrative synthesis.

**Results of the review**

Seven studies were included in the review (n=243, range 12 to 68): five RCTs and two pseudo RCTs. Methodological quality of the included studies ranged from 1 to 9 (mean 5.71). Five studies reported random allocation to groups. Only two studies reported allocation concealment. Three studies reported blinding of assessors. No studies reported blinding of participants or therapists.

**Single application of whole body vibration (five studies)**: Single studies reported positive effects of whole body vibration on postural control, mobility, motor function and strength. No significant differences between treatment and control groups were found for proprioception or balance (two studies).

**Multiple applications of whole body vibration (two studies)**: There were no statistically significant differences between treatment and control groups for any outcome in either study.

**Authors’ conclusions**

There was weak to moderate evidence that whole body vibration applied to neurological populations had positive effects on postural control, mobility, motor function and strength. The evidence was limited by the paucity and heterogeneity of studies.

**CRD commentary**

The review question was supported by broad inclusion and exclusion criteria for study design, intervention and participants. Several relevant sources were searched, but limitation to studies published in English gave potential for publication and language biases. Validity was assessed using an appropriate instrument and results of the assessment were reported. Appropriate methods to reduce reviewer error and bias were used in validity assessment, but it was unclear whether similar methods were used for study selection and data extraction. A narrative synthesis was appropriate given differences between studies in terms of parameters and duration of the intervention, population and outcomes. Most studies evaluated single sessions of whole body vibration and so the long term treatment effects were unclear. Sample sizes were small and data from outcomes were often derived from a single study. Given the potential for publication and language biases and the small number of studies with small sample sizes, the authors’ caution conclusion appears appropriate.

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

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

**Research**: The authors stated that further rigorous research was needed to evaluate the effectiveness of whole body vibration in neurological populations. Future studies should use control groups that include some form of exercise similar to whole body vibration or TENS and determine the most effective whole body vibration parameters (frequency, duration, type and intensity) and should consider links between muscle strength and client fatigue.

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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.