The effect of balance training on balance performance in individuals poststroke: a systematic review

Lubetzky-Vilnai A, Kartin D

CRD summary
The review concluded that there was moderate evidence to suggest that balance performance can be improved with balance training in the short-term for post-stroke individuals in the acute stage, but as both control and intervention groups improved the evidence should be viewed with caution. There were data limitations and potential biases, but the authors' conclusions are suitably cautious and appropriate.

Authors' objectives
To investigate the recent literature on the effect of balance training on balance performance across the continuum of recovery in post-stroke individuals.

Searching
PubMed, PEDro and CINAHL were searched from January 2006 to February 2010 for articles published in English. Search terms were reported. Reference lists of relevant articles were searched.

Study selection
Clinical trials, pilot studies and case series that included adults (least 18 years) at any stage of post-stroke recovery and studied at least one standing balance exercise were eligible for inclusion. Studies had to provide at least one outcome that measured balance or postural challenge using validated methods that were reliable for individuals with stroke. Studies were excluded if they evaluated neurological gait manipulations, unless balance training was applied with the control group. Studies were excluded if they were case studies or referred to data pre-2006.

The included studies considered patients in the acute stage of post-stroke recovery (up to six months), patients in the subacute stage (six to 12 months) and patients in the chronic stage (>12 months). The type of balance training intervention varied from group sessions to one-to-one sessions and varied in intensity and duration. The control group varied and included usual care, no intervention, general physiotherapy sessions, conventional gait training and therapist-centred approach. The case mix of patients was variable: some studies included mixed severity patients and other studies included only high- or moderate- function patients. Most patients were exposed to other treatments. Most studies used the Berg Balance Scale test. Patient age ranged from 24 to 98 years.

The authors did not state how many reviewers performed study selection.

Assessment of study quality
Two reviewers independently assessed study quality using the American Academy of Cerebral Palsy and Developmental Medicine scale. Disagreements were resolved through discussion. Studies were scored out of seven using quality items such as blinding, power calculation, intervention details and exclusion criteria.

Data extraction
Data were extracted on balance outcomes.

The authors did not state how many reviewers performed data extraction.

Methods of synthesis
A narrative synthesis was presented, which grouped studies by time since stroke: acute (up to six months), subacute (six to 12 months) and chronic (>12 months).

Results of the review
Twenty-two studies were included in the review (n=829 participants): six acute studies (n=380), three subacute studies (n=167) and 11 chronic studies (n=274). Study sample sizes ranged from eight to 93 patients. Study quality was variable: scores ranged from 4.5 to 7 out of 7. The main quality problems were a failure to blind assessors and a lack of a power calculation. Some studies reported attrition rates as high as 43%.

**Acute stage:** Experimental and control groups showed significant improvements in balance test scores with no significant between-group differences.

**Sub-acute stage:** Both experimental and control groups showed statistically significant improvements in balance test scores with no significant between-group differences (two RCTs). One non-controlled study showed no difference.

**Chronic stage:** Studies showed a trend for prevention of deterioration with balance training. Two non-RCTs showed balance performance can deteriorate with usual care at six months or no care at nine weeks.

**Authors' conclusions**

There was moderate evidence to suggest that balance performance can be improved with balance training in the short term for individuals in the acute stage in post-stroke patients. As both control and intervention groups improved, the evidence should be viewed with caution and further research was needed.

**CRD commentary**

Inclusion criteria were broadly defined. Three relevant data sources were searched. There was potential for language bias, as only English-language articles were included. Publication bias was not assessed and could not be ruled out. Attempts were made to reduce reviewer error and bias during data quality assessment; it was unclear whether such attempts were made for study selection and data extraction. Quality assessment was undertaken using a predefined criteria, which indicated the variable quality of the included studies. Most studies did not have adequate follow-up and some had small sample sizes. Studies were narratively synthesised, which given the type of data and variability in interventions appeared appropriate. There was only a small number of studies for the acute and subacute stages and a high drop-out rate in the acute-stage studies. Most patients also received other treatments, which made isolating the effects of balance training impossible.

The authors acknowledged some of the limitations in the evidence base and their suggestion to view the evidence with caution appears warranted.

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

**Practice:** The authors stated that the review supported use of balance training for individuals with moderate stroke in the short-term.

**Research:** The authors stated that further high-quality clinical trials were needed to determine a feasible and effective training dosage of balance training for individuals post stroke. There was a need for tools to assess balance performance in higher-functioning individuals. Studies with a longer-follow up were needed to determine the effects in the community and on fall prevention. Studies in patients with different severity levels, especially severe stroke, were needed.

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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.