Effects of task-oriented circuit class training on walking competency after stroke: a systematic review

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CRD summary
This review found that task-oriented circuit class training improved gait and gait-related activities in patients with chronic stroke. Overall the review was well conducted and the conclusions appear appropriate and reliable.

Authors' objectives
To examine the effects of task-oriented circuit class training on gait and gait-related activities in patients with stroke.

Searching
Two independent researchers searched MEDLINE, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Reviews, PEDro, EMBASE, SPORTDiscus and CINAHL up to March 2008. Search terms were reported. Bibliographies of review articles, empirical articles and conference abstracts were examined. References from retrieved trials were checked for additional studies. Studies needed to be published in English, German or Dutch.

Study selection
Eligible studies needed to be randomised controlled trials (RCTs) of patients over 18 years old with stroke who participated in a task-oriented circuit class focusing on the lower limb. At least one of the study outcomes needed to focus on gait-related activities.

Time between stroke onset and start of intervention ranged from a mean of 43 days to more than five years. Intervention intensity and duration varied across trials and did workstations applied. Control groups received training of the upper extremity, a seated relaxation intervention that included deep breathing exercises or no rehabilitation training.

Two reviewers were involved in study selection. Disagreements were resolved by consultation with a third reviewer.

Assessment of study quality
Two reviewers assessed trial methodology using the PEDro 11-item scale to assess external validity (generalisability) and internal validity (study quality). A point was awarded if a criterion was reported as being met. Up to 10 points were available for study quality. Trials that scored 4 or more were classified high quality and those with 3 or fewer designated low quality. Disagreements were resolved by consensus or recourse to a third reviewer.

Data extraction
Data were extracted to permit calculation of standardised mean differences and 95% confidence intervals (CI). Where necessary, means and standard deviations were requested from authors. Two reviewers independently checked data extraction.

Methods of synthesis
Standardised mean differences were pooled to obtain a weighted summary effect size (SES) and associated CI. The fixed-effect model of meta-analysis was used. Heterogeneity was assessed using the Q statistic and quantified using the I² statistic. Where I² was greater than 50%, a random-effects model was applied. In the case of significant heterogeneity, a sensitivity analysis was planned based on key methodological quality criteria. Effect sizes less than 0.2 were classified as small, from 0.2 to 0.8 classed as medium and 0.8 classed as large.

Results of the review
Six trials were included in the review (n=307). Sample sizes ranged from nine to 91 participants. Quality scores ranged from 4 to 8 points (median 7.5 points). All except one study scored at least 7 points. Outcome assessors were blinded in all but one study.
Walking distance (five trials): A statistically significant effect size was observed in favour of the intervention group as assessed by the six minute walk test (0.43, 95% CI: 0.17 to 0.68) with no significant evidence of heterogeneity.

Gait speed (four trials): A statistically significant effect size was observed in favour of the intervention group (0.35, 95% CI: 0.08 to 0.62) with no significant evidence of heterogeneity.

Timed Up-and-Go Test (five trials): A statistically significant effect size was observed in favour of the intervention group (0.26, 95% CI: 0.00 to 0.51) with no significant evidence of heterogeneity.

Balance (three trials): Effect sizes in relation to balance were not statistically significant.

Authors’ conclusions
This review supported use of task-oriented circuit class training to improve gait and gait-related activities in patients with chronic stroke.

CRD commentary
This review was underpinned by defined inclusion criteria for participants, interventions, outcomes and study designs. The search encompassed a range of databases and other sources. There were some language restrictions and it appears that unpublished material was ineligible for inclusion, hence some studies may have been missed. Study quality was assessed. Although meta-analysis appeared appropriate from the assessment of statistical heterogeneity, there were important differences across the trials that may have impacted on the overall estimate. The review process included methods to address bias and errors in study selection, data extraction and quality assessment. Overall the review was well conducted. The conclusions appear to be appropriate and the research recommendations appeared of value.

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

Research: The authors stated that further research was needed to investigate cost-effectiveness and effects of task-oriented circuit class training in the subacute phase after stroke, taking comorbidity into account. Future trials should investigate how participants could be encouraged in lifelong participation in physical exercise after rehabilitation ended.

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