A systematic review of repetitive functional task practice with modelling of resource use, costs and effectiveness


CRD summary
This review concluded that repetitive functional task practice can be effective for improving lower limb function at any time after stroke, but the duration of the effect was unclear and there was insufficient good quality evidence to make firm recommendations for upper limb interventions. This was a well-conducted review and the authors' conclusions are likely to be reliable.

Authors' objectives
To assess whether repetitive functional task practice (RFTP) following stroke improved limb-specific, global function or activities of daily living and whether treatment effects were dependent on the amount of practice or the type or timing of intervention.

Searching
Several sources (including Cochrane Stroke Trials Register, MEDLINE, EMBASE, CINHAL and others) were searched for published and unpublished data. Further trials were sought from trial registers, conference proceedings, reference lists of existing systematic reviews, citation searching and contact with experts. The search end dates were mid-2006. Search terms were reported. There were no language restrictions.

Study selection
Randomised controlled trials (RCTs) and quasi-randomised trials that evaluated RFTP in adults who had experienced a stroke and an active motor sequence was performed repetitively within a single training session aimed towards a clear functional goal (as opposed to motor-performance goal) were eligible for inclusion. Trials of RFTP in combination with another intervention (such as biofeedback) were excluded. Relevant control groups were usual practice or an attention control. The primary outcomes of interest were global and limb-specific functional measures. Secondary outcomes were activities of daily living and adverse outcomes.

The included studies assessed repetitive task training, constraint-induced movement therapy and treadmill training. There was variability in the interventions delivered within each of these three types of RFTP. Repetitive task training approaches included whole therapy motor approaches, training in single tasks and mixed functional task training. Constraint-induced movement therapy included the traditional form and a modified approach. Treadmill training included body-weight supported and unsupported methods. Studies varied in the mean time since stroke and whether they restricted participants to those with a first stroke. The mean age of patients ranged between 53.9 and 78 years.

Two reviewers independently selected studies for inclusion.

Assessment of study quality
Studies were assessed for adequacy of random allocation, allocation concealment, baseline comparability of groups, equal treatment of groups, blinding of outcome assessors, description of loss to follow-up and percentage loss to follow-up.

Two reviewers independently assessed quality. Disagreements were resolved by discussion and referral to a third reviewer.

Data extraction
For continuous outcomes using similar measurement scales, data were extracted in order to calculate the weighted mean difference (WMD) and 95% confidence interval (CI) post therapy. Standardised mean difference (SMD) was calculated where similar outcomes used different outcome scales. Authors were contacted for missing data.

Two reviewers independently extracted data. Disagreements were resolved by discussion and referral to a third reviewer.
reviewer.

Methods of synthesis
Heterogeneity was assessed using $I^2$ ($\leq 50\%$ was classed as insubstantial). Studies were pooled in a fixed-effect meta-analysis where heterogeneity was insubstantial, otherwise a random-effects model was applied. Subgroup analyses were undertaken for time since stroke (mean $< 6$ months or $> 6$ months post stroke), type of RFTP, amount of intervention ($\leq 20$ and $> 20$ hours training) and study quality (allocation concealment). A $X^2$ test of the between subgroups $Q$ statistic was performed (10% level of significance). Publication bias was assessed using a funnel plot.

Results of the review
Thirty-one trials were included (1,078): 13 RCTs and one quasi-randomised trial of repetitive task training, eight of which had adequate allocation concealment; 11 RCTs of constraint-induced movement therapy, all of which had an unclear method of allocation concealment; and six RCTs of treadmill training, four of which had adequate allocation concealment.

Global motor function: There was a statistically significant small to moderate effect size in favour of RFTP (SMD 0.38, 95% CI 0.09 to 0.68; three RCTs, $I^2=0\%$).

Upper limb function: There was a statistically significant small effect size for arm function in favour of RFTP (SMD 0.24, 95% CI 0.06 to 0.42; 15 trials). There was a statistically significant difference ($p=0.03$) in the effect sizes for repetitive task training and a larger effect size for constraint-induced movement therapy. Trials with an adequate method of allocation concealment had a smaller effect size than trials with an inadequate or unclear method ($p=0.08$).

A small effect size in favour of RFTP for hand function was not statistically significant (SMD 0.19, 95% CI -0.03 to 0.42; seven trials). A small effect size in favour of RFTP for sitting balance/functional reach was not statistically significant (SMD 0.23, 95% CI 0.05 to 0.50; five trials). Statistical heterogeneity was less than 50% for all analyses.

Lower limb function: There was a statistically significant difference between RFTP and control for walking distance (WMD 50.05, 95% CI 29.65 to 70.44; seven trials); there was substantial heterogeneity and the effect size was sensitive to the metric used. There were small statistically significant effect sizes in favour of RFTP for walking speed (SMD 0.28, 95% CI 0.09 to 0.47; 10 trials), functional ambulation (SMD 0.28, 95% CI 0.05 to 0.51; seven trials) and sit to stand (effect size 0.39, 95% CI 0.18 to 0.61; seven trials). There were no statistically significant between-group differences in the subgroup analyses.

Few trials monitored and reported adverse events adequately. The funnel plot for upper limb function suggested there was reporting bias. The authors noted a large number of ongoing trials at the time of the review.

Cost information
An economic model constructed as part of the study suggested RFTP was cost effective on the basis of a threshold of £20,000 per quality-adjusted life-year (QALY) gained provided the net cost per patient was less than £1,963.

Authors' conclusions
Some form of RFTP can be effective in improving lower limb function at any time after stroke but the duration of intervention effect was unclear. No firm recommendations could be made for upper limb interventions due to insufficient good quality evidence.

CRD commentary
This review had explicitly stated inclusion criteria. Reasonable attempts were made to reduce publication and language bias. There was a possibility of publication bias based on a funnel plot. Appropriate methods were used to reduce error and bias in the review processes.

The statistical analysis seemed appropriate. Heterogeneity was assessed and investigated in prespecified subgroup analyses. Study quality was assessed and its impact on the results was assessed. Limitations in the evidence included small trial sizes and considerable clinical differences between studies.

The authors' conclusions reflected the evidence presented and are likely to be reliable.
Implications of the review for practice and research

Practice: The authors stated that compared to usual care and attention control, RFTP for lower limbs can result in functional gain. Adverse effects should be monitored where task-specific training is used.

Research: The authors recommended that the review be updated within two years due to a large number of relevant ongoing trials. Any future review should include a comparison of RFTP with other forms of therapy (such as strength and stamina training). They suggested a need for well-designed adequately powered trials to evaluate upper limb interventions (especially constraint-induced movement therapy), evaluation of the effectiveness and cost effectiveness of different methods of delivering RFTP and long-term functional gain. Several recommendations were for the design of future trials.

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