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

B French,1 M Leathley,1 C Sutton,1 J McAdam,1 L Thomas,1 A Forster,2 P Langhorne,3 C Price,4 A Walker3 and C Watkins1*

1 University of Central Lancashire, Preston, UK
2 University of Leeds, UK
3 Faculty of Medicine, University of Glasgow, UK
4 Northumbria Healthcare NHS Trust, Newcastle University, Newcastle upon Tyne, UK

* Corresponding author

Executive summary

* Corresponding author

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Background
The repetitive practice of functional tasks is a component of current approaches to stroke rehabilitation. Practice may be augmented by strategies to enhance learning as used in movement science approaches, by mechanical means such as treadmills, or by strategies to encourage use of the affected limb in daily life by restraining the unaffected limb.

All these approaches have a core mechanism based on the repeated practice of functional tasks. This has the potential to be a resource-efficient component of stroke rehabilitation, including delivery in a group setting, or instructed practice in the home environment. This review considers the effectiveness and cost-effectiveness of all forms of repetitive functional task practice (RFTP).

Objectives

The aims of this study were:

- to determine whether RFTP after stroke improves limb-specific or global function or activities of daily living
- to determine whether treatment effects are dependent on the amount of practice, or the type or timing of the intervention
- to provide cost-effectiveness estimates for RFTP.

Methods

Data sources

The following searches were undertaken:

- electronic searches of Cochrane Stroke Trials Register, the Cochrane Library, MEDLINE, EMBASE, CINAHL, AMED, SportDiscus, ISI Science Citation Index, Index to Theses, ZETOC, PEDro and OT Seeker (all from inception to week 4, September 2006)
- electronic searches on non-English-language databases and for unpublished trials on MetaRegister, BioMed Central, CRISP, Centerwatch, National Research Register, ReFeR, Stroke Trials Directory, REHABDATA and CIRRIE (to May 2006)
- searches of conference proceedings, reference lists of existing systematic reviews, citation searching, publication on bulletin boards and author contact for all relevant trials.

Study selection

The review included randomised and quasi-randomised trials in adults after stroke, which included an intervention where an active motor sequence was performed repetitively within a single training session, where the practice aimed towards a clear functional goal and where the amount of task practice could be quantified. Studies using mechanical or behavioural strategies to facilitate or encourage functional task practice were also included. Primary outcomes included limb-specific or global functional measures. Secondary outcomes included measures of activities of daily living and adverse events.

Data extraction

Two reviewers independently screened titles and abstracts, extracted data and critically appraised the trials. Assessment of methodological quality was undertaken for allocation concealment, blinding, loss to follow-up, trial size and equivalence of treatment. Trialists were contacted for additional information.

Data synthesis

Standard Cochrane quantitative systematic review methods were used. A fixed-effect model was used, and results were expressed as weighted or standardised mean differences, with 95% confidence interval. Subgroup analyses were conducted for amount, timing and type of intervention, and for adequacy of allocation concealment, type of comparison group, equivalence of therapy time and trial size.

The measures of efficacy of RFTP from the data synthesis were used to inform an economic model. The model used a pre-existing data set and tested the potential impact of RFTP on cost. From the model an incremental cost per quality-adjusted life-year (QALY) gained for RFTP was estimated. Sensitivity analyses around the assumptions made for the model were used to test the robustness of the estimates.
Results

Thirty-one trials with 34 intervention–control pairs and 1078 participants were included. Overall, it was found that some forms of RFTP resulted in improvement in global function, and in both arm and lower limb function. Overall standardised mean difference in data suitable for pooling was 0.38 [95% confidence interval (CI) 0.09 to 0.68] for global motor function, 0.24 (95% CI 0.06 to 0.42) for arm function and 0.28 (95% confidence interval 0.05 to 0.51) for functional ambulation. Results suggest that training may be sufficient to have an impact on activities of daily living. Retention effects of training persist for up to 6 months, but whether they persist beyond this is unclear. There was little or no evidence that treatment effects overall were modified by time since stroke or dosage of task practice, but results for upper limb function were modified by type of intervention. The economic modelling suggested that RFTP was cost-effective. Given a threshold for cost-effectiveness of £20,000 per QALY gained, RFTP is cost-effective so long as the net cost per patient is less than £1963. This result showed some sensitivity to the assumptions made for the model. The cost-effectiveness of RFTP tends to stem from the relatively modest cost associated with this intervention.

Conclusions

Implications for practice

The evidence suggests that some form of RFTP can be effective in improving lower limb function at any time after stroke, but that the duration of intervention effect is unclear. There is as yet insufficient good-quality evidence to make any firm recommendations for upper limb interventions. If task-specific training is used, adverse effects should be monitored. While the effectiveness of RFTP is relatively modest, this sort of intervention appears to be cost-effective.

Recommendations for future research

Owing to the large number of ongoing trials, this review should be updated within 2 years. Any future review should include a comparison against alternative treatments. Further research should:

- evaluate RFTP upper limb interventions and in particular constraint-induced movement therapy
- address practical ways of delivering RFTP interventions
- be directed towards the evaluation of suitable methods to maintain functional gain
- be powered to detect whether RFTP interventions are cost-effective, include a baseline activities of daily living measure, include indirect costs and use quality of life as an outcome measure to facilitate economic analysis.

Publication

The Health Technology Assessment (HTA) Programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. ‘Health technologies’ are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

The research findings from the HTA Programme directly influence decision-making bodies such as the National Institute for Health and Clinical Excellence (NICE) and the National Screening Committee (NSC). HTA findings also help to improve the quality of clinical practice in the NHS indirectly in that they form a key component of the ‘National Knowledge Service’.

The HTA Programme is needs-led in that it fills gaps in the evidence needed by the NHS. There are three routes to the start of projects.

First is the commissioned route. Suggestions for research are actively sought from people working in the NHS, the public and consumer groups and professional bodies such as royal colleges and NHS trusts. These suggestions are carefully prioritised by panels of independent experts (including NHS service users). The HTA Programme then commissions the research by competitive tender.

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Reports are published in the HTA journal series if (1) they have resulted from work for the HTA Programme, and (2) they are of a sufficiently high scientific quality as assessed by the referees and editors. Reviews in *Health Technology Assessment* are termed ‘systematic’ when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

The research reported in this issue of the journal was commissioned by the HTA Programme as project number 05/17/01. The contractual start date was in November 2005. The draft report began editorial review in February 2007 and was accepted for publication in February 2008. As the funder, by devising a commissioning brief, the HTA Programme specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors’ report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

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