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Repetitive Task Training for Improving Functional Ability After Stroke

A Major Update of a Cochrane Review

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Repetitive task training (RTT) involves the active practice of task-specific motor activities and is a component of current therapy approaches in stroke rehabilitation.[1]

Objectives

Primary objective is to determine whether RTT improves upper limb function/reach and lower limb function/balance in adults after stroke.

Secondary objectives are (1) to determine the effect of RTT on secondary outcome measures, including activities of daily living, global motor function, quality of life/health status, and adverse events, (2) to determine the factors that could influence primary and secondary outcome measures, including the effect of dose of task practice, type of task (whole therapy, mixed, or single task), and timing of the intervention and type of intervention.

Methods

We searched the Cochrane Stroke Group Trials Register (March 4, 2016); the Cochrane Central Register of Controlled Trials (CENTRAL; the Cochrane Library 2016, Issue 5: October 1, 2006 to June 24, 2016); MEDLINE (October 1, 2006 to March 8, 2016); Embase (October 1, 2006 to March 8, 2016); CINAHL (2006 to June 23, 2016); AMED (2006 to June 21, 2016), and SPORTSDiscus (2006 to June 21, 2016).

We included only randomized or quasi-randomized trials in adults after stroke, where the intervention was an active motor sequence performed repetitively within a single training session, aimed toward a clear functional goal.

Data Collection and Analysis

Two review authors independently selected trials for inclusion, extracted data, and appraised methodological quality.

Main Results

We included 33 trials with 36 intervention–control pairs and 1853 participants. The risk of bias present in many studies was unclear because of poor reporting; the evidence has therefore been rated moderate or low when using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system (Table).

There is low-quality evidence that RTT improves arm function (standardized mean difference [SMD], 0.25; 95% confidence interval [CI], 0.01–0.49; 11 studies, number of participants analyzed=749), hand function (SMD, 0.25; 95% CI, 0.00–0.51; 8 studies, number of participants analyzed=619), and lower limb functional measures (SMD, 0.29; 95% CI, 0.10–0.48; 5 trials, number of participants analyzed=419).

There is moderate-quality evidence that RTT improves walking distance (mean difference, 34.80; 95% CI, 18.19–51.41; 9 studies, number of participants analyzed=610) and functional ambulation (SMD, 0.35; 95% CI, 0.04–0.66; 8 studies, number of participants analyzed=525). We found significant differences between groups for both upper limb (SMD, 0.92; 95% CI, 0.58–1.26; 3 studies, number of participants analyzed=153) and lower limb (SMD, 0.34; 95% CI, 0.16–0.52; 8 studies, number of participants analyzed=471) outcomes ≤6 months posttreatment but not after 6 months. Effects were not modified by intervention type, dosage of task practice, or time since stroke for upper or lower limb. There was insufficient evidence to be certain about the risk of adverse events.

Conclusions

Patients who receive RTT may be more likely to improve upper and lower limb function after treatment and sustain these improvements ≤6 months after treatment than patients receiving usual care.

Implications for Clinical Practice and Future Research

Our findings indicate that patients seem to benefit from RTT regardless of the amount of task practice, type of intervention, or time since stroke. Further research should focus on the type and amount of training, including ways of measuring the number of repetitions actually performed by participants.

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Table. Summary of Findings Table

Outcomes	Illustrative Comparative Risks (95% CI)		Relative Effect (95% CI)	No. of Studies (Participants)	Quality of the Evidence (GRADE)
	Assumed Risk	Corresponding Risk			
	Estimated Score/Value With Control	Absolute Reduction in Score/Value With RTT			
Arm function	Arm function score in the RTT groups was on average 0.25 SDs (0.01 to 0.49) higher than in the control groups. SD units, measured using different instruments; higher scores mean better arm function		SMD, 0.25; 95% CI, 0.01–0.49	11 studies (n=749)	Low
Hand function	Hand function score in the RTT groups was on average 0.25 SDs (0.00 to 0.51) higher than in the control groups. SD units, measured using different instruments; higher scores mean better hand function		SMD, 0.25; 95% CI, 0.00–0.51	8 studies (n=619)	Low
Walking distance: change from baseline	The mean change in walking distance (meters walked in 6 min; a higher score means greater walking distance) in the control groups ranged from −1.0 to 118.5	The mean change in walking distance (meters walked in 6 min; a higher score means greater walking distance) in the repetitive training group ranged from 19 to 221	SMD, 34.80; 95% CI, 18.19–51.41	9 studies (n=610)	Moderate
Walking speed	The mean walking speed in the control groups ranged from 0.29 to 2.47 m/s. A higher score means faster walking speed	The mean walking speed in the intervention groups ranged from 0.39 to 2.03 m/s. A higher score means faster walking speed	SMD, 0.39; 95% CI, 0.02–0.79	12 studies (n=685)	Low
Functional ambulation	Functional ambulation score in the RTT groups was on average 0.35 SDs (0.04 to 0.66) higher than in the control groups. SD units, measured using different instruments; higher scores mean better function		SMD, 0.35; 95% CI, 0.04–0.66	8 studies (n=525)	Moderate
Lower limb functional measures	Lower limb functional measures in the RTT groups were on average 0.29 SDs (0.10 to 0.48) higher than in the control groups. SD units, measured using different instruments; higher scores mean better function		SMD, 0.29; 95% CI, 0.10–0.48	5 studies (n=419)	Low
Global motor function scales	Global motor function in the RTT groups was on average 0.38 SDs (0.11 to 0.65) higher than in the control groups. SD units, measured using different instruments; higher scores mean better function		SMD, 0.38; 95% CI, 0.11–0.65	5 studies (n=226)	Moderate

GRADE Working Group grades of evidence. High quality: Further research is very unlikely to change our confidence in the estimate of effect. Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. Very low quality: We are very uncertain about the estimate. CI indicates confidence interval; GRADE, Grading of Recommendations Assessment, Development and Evaluation; SMD, standardized mean difference; and RTT, repetitive task training.

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Disclosures

None.

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1. French B, Thomas LH, Coupe J, McMahon NE, Connell L, Harrison J, et al. Repetitive task training for improving functional ability after stroke. *Cochrane Database Syst Rev*. 2016;2016:CD006073. doi: 10.1002/14651858.CD006073.pub3.

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