



## Article

# Repetitive Task Training for Improving Functional Ability After Stroke: A major update of a Cochrane Review

Thomas, Lois Helene, French, Beverley, Coupe, Jacqueline, McMahon, Naoimh, Connell, Louise, Harrison, Joanna, Sutton, Chris J, Tishkovskaya, Svetlana and Watkins, Caroline Leigh

Available at <http://clock.uclan.ac.uk/17335/>

*Thomas, Lois Helene ORCID: 0000-0001-5218-6546, French, Beverley, Coupe, Jacqueline ORCID: 0000-0002-2025-5620, McMahon, Naoimh ORCID: 0000-0001-6319-2263, Connell, Louise ORCID: 0000-0002-0629-2919, Harrison, Joanna ORCID: 0000-0001-8963-7240, Sutton, Chris J ORCID: 0000-0002-6406-1318, Tishkovskaya, Svetlana ORCID: 0000-0003-3087-6380 and Watkins, Caroline Leigh ORCID: 0000-0002-9403-3772 (2017) Repetitive Task Training for Improving Functional Ability After Stroke: A major update of a Cochrane Review. Stroke, 48 (4). e102-e103. ISSN 0039-2499*

It is advisable to refer to the publisher's version if you intend to cite from the work.  
<http://dx.doi.org/10.1161/STROKEAHA.117.016503>

For more information about UCLan's research in this area go to <http://www.uclan.ac.uk/researchgroups/> and search for <name of research Group>.

For information about Research generally at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the [policies](#) page.

# Cochrane Corner

Section Editor: Peter Sandercock, MA, DM, FRCPE, FMedSci

## Repetitive Task Training for Improving Functional Ability After Stroke

### A Major Update of a Cochrane Review

Beverley French, PhD; Jacqueline Coupe, MPH; Naoimh McMahon, MA; Louise Connell, PhD; Joanna Harrison, MA; Christopher J. Sutton, PhD; Svetlana Tishkovskaya, PhD; Caroline L. Watkins, PhD; Lois H. Thomas, PhD



AQ1

AQ3

**R**epetitive task training (RTT) involves the active practice of task-specific motor activities and is a component of current therapy approaches in stroke rehabilitation.

#### 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 GRADE system.

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  $\leq 6$  months post-treatment 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  $\leq 6$  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 (Table). Further research should focus on the type and amount of training, including ways of measuring the number of repetitions actually performed by participants.

AQ7

T1

AQ8

Received January 20, 2017; final revision received January 20, 2017; accepted January 23, 2017.

From the Faculty of Health and Wellbeing, University of Central Lancashire, Preston, United Kingdom (B.F., L.H.T., J.C., N.M., L.C., J.H., C.J.S., S.T., C.L.W.); and Australian Catholic University, Sydney (C.L.W.).

Correspondence to Lois H. Thomas, PhD, Faculty of Health and Wellbeing, University of Central Lancashire, Preston PR1 2HE, United Kingdom. E-mail lhthomas@uclan.ac.uk

(Stroke. 2017;48:00-00. DOI: 10.1161/STROKEAHA.117.016503.)

© 2017 American Heart Association, Inc.

Stroke is available at <http://stroke.ahajournals.org>

DOI: 10.1161/STROKEAHA.117.016503

**Table. Summary of Findings Table**

Outcomes	Illustrative Comparative Risks (95% CI)		Relative Effect (95% CI)	No. of Participants (Studies)	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=746)	low <sup>‡</sup>
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 <sup>‡</sup>
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 <sup>‡</sup>
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 <sup>‡</sup>
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 <sup>‡</sup>
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 <sup>‡</sup>
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 <sup>‡</sup>

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; SMD, standardized mean difference; and RTT, repetitive task training.

### Disclosures

AQ11 None.

Reviews are regularly updated as new evidence emerges and in response to feedback, and The Cochrane Library should be consulted for the most recent version of the review.

### Sources of Funding

This review was funded by a grant from the NIHR Cochrane Incentive Scheme.

### Acknowledgment

This article is based on a Cochrane Review published in The Cochrane Library 2016, Issue 11 (www.thecochranelibrary.com). Cochrane

### Reference

- 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;CD006073. doi: 10.1002/14651858.CD006073.pub3.

KEY WORDS: arm ■ quality of life ■ rehabilitation ■ stroke ■ walking

AQ10

AQ12

AQ2

# AUTHOR QUERIES

## AUTHOR PLEASE ANSWER ALL THE QUERIES

- AQ1—Please note only those terms that are used 5 times or more can be abbreviated, except trial names, which should be expanded at first use but then can be abbreviated throughout regardless of how many times they appear.
- AQ2—Key words may have been edited to match the US National Library of Medicine's Medical Subject Headings (<http://www.nlm.nih.gov/mesh/MBrowser.html>). If they need modification, please limit the total number of key words to 7.
- AQ3—Please confirm that all authors are included in the correct order in the byline and that all names are spelled correctly, including special characters, accents, middle initials, and degrees, if applicable. For indexing purposes, confirm author names have been correctly identified as given names (blue) and surnames (red). Color in the byline will not appear on the final published version. Note that journal style discourages listing honorary degrees (FAHA, FRCP, etc.) in the byline; please delete such degrees from the author byline.
- AQ4—Please confirm that all authors' institutional affiliations (including city/state/country locations) are correct as shown in the affiliations footnote.
- AQ5—Per style, quotes and italics should not be used for emphasis. Hence, they have been deleted throughout the article. Please confirm whether the change made throughout is appropriate.
- AQ6—Please provide expansion for terms "GRADE and NIHR," if any.
- AQ7—Please note that the reference "1" is not cited in the text. Please cite it in text or delete from the reference list.
- AQ8—There was no in-text citation for Table. Please check the suggested in-text citation of for Table and correct the location if necessary.
- AQ9—Please review the typeset tables carefully against copies of the originals to verify accuracy of editing and typesetting.
- AQ10—Please note that as per style, the symbols " $\oplus\oplus$ " and " $\oplus\oplus\oplus$ " have been modified to "\*" and "†," respectively, in Table. Please provide footnote for the same.
- AQ11—Please carefully review any Acknowledgments, Sources of Funding, and/or Disclosures listed at the end of the manuscript (before the References), and confirm that they are accurate and complete for all authors.
- AQ12—Please provide volume number for reference 1.