Interventions for Sensory Impairment in the Upper Limb After Stroke

Susan Doyle, MS; Sally Bennett, PhD; Susan Fasoli, ScD; Kryss McKenna, PhD†

Sensory impairments significantly limit functional use and safety of the upper limb in people after stroke. This systematic review aimed to determine the effectiveness of interventions directed at improving sensory impairments of the upper limb after stroke.

**Search Strategy**

We searched the Cochrane Stroke Group Trials Register (last searched October 8, 2009), the Cochrane Central Register of Controlled Trials (CENTRAL; The Cochrane Library 2009, Issue 1), MEDLINE (1966 to January 2009), EMBASE (1980 to January 2009), and 6 further electronic databases to January 2009. We also hand-searched relevant journals, contacted authors in the field, searched doctoral dissertation databases, checked reference lists, and completed citation tracking.

**Selection Criteria**

Randomized controlled trials and controlled trials comparing interventions for sensory impairment after stroke with no treatment, conventional treatment, attention placebo, or with other interventions for sensory impairment.

**Data Collection and Analysis**

Two review authors selected studies, assessed quality, and extracted data. We analyzed study data using mean differences and odds ratios as appropriate. The primary outcome we considered was sensory function and secondary outcomes included upper limb function, activities of daily living, impact of stroke, and quality of life as well as adverse events.

**Main Results**

We included 13 studies, with a total 467 participants, testing a range of different interventions. Outcome measures included 36 measures of sensory impairment and 13 measures of upper limb function. All but 2 studies had unclear or high risk of bias. Although there is insufficient evidence to reach conclusions about the effects of interventions included in this review, 3 studies provided preliminary evidence for the effects of some specific interventions, including mirror therapy for improving detection of light touch, pressure, and temperature pain; a thermal stimulation intervention for improving rate of recovery of sensation; and intermittent pneumatic compression intervention for improving tactile and kinesthetic sensation. We could not perform meta-analysis due to a high degree of clinical heterogeneity in both interventions and outcomes.

**Authors’ Conclusions**

Multiple interventions for upper limb sensory impairment after stroke are described but there is insufficient evidence to support or refute their effectiveness in improving sensory impairment, upper limb function, or participants’ functional status and participation.

**Applicability of Findings to Clinical Practice**

Several techniques show promise for addressing sensory impairments in the upper limb after stroke, but there are inadequate high-quality trials to be able to make recommendations that support or refute the use of specific interventions. Clinicians should be conscious of monitoring adverse effects, because few studies recorded them.

**Future Research**

Further high-quality, better reported studies are needed not only to address interventions and methodological limitations identified in this review, but also interventions identified in the search process and commonly used in the clinical setting to evaluate their effectiveness.

This review is published as a Cochrane Review in the Cochrane Database of Systematic Reviews 2010, Issue 9. Cochrane Reviews are regularly updated as new evidence emerges and in response to comments and criticisms, and the Cochrane Database of Systematic Reviews should be consulted for the most recent version of the Review. Copyright Cochrane Collaboration, reproduced with permission.

Note: The full text of this review is available in the Cochrane Library: Doyle S, Bennett S, Fasoli SE, McKenna KT. Interventions for sensory impairment in the upper limb after stroke. Cochrane Database Syst Rev. 2010. Issue 6.

**Sources of Funding**

Internal sources of funding included Southwest Washington Medical Center USA and University of Queensland Australia.

**Disclosures**

None.

**Key Words:** occupational therapy ▪ physiotherapy ▪ rehabilitation ▪ sensory retraining ▪ stroke ▪ upper limb ▪ sensation

Received October 15, 2010; final revision received November 1, 2010; accepted November 5, 2010.

From the Cascade Park Care Center (S.D.), Vancouver, WA, and the Division of Occupational Therapy, University of Queensland, Queensland, Australia; the Division of Occupational Therapy (S.B.), School of Health and Rehabilitation Sciences, University of Queensland, Queensland, Australia; the Department of Physical Medicine & Rehabilitation (S.F.), Harvard Medical School, Cambridge, MA, and Newton Wellesley Hospital, Newton, MA; and the University of Queensland, Queensland, Australia.

†Deceased (Formerly from the Division of Occupational Therapy, School of Health and Rehabilitation Sciences, University of Queensland, Queensland, Australia). Correspondence to Susan Doyle, MS, PO Box 822875, Vancouver, WA 98686. E-mail suel10@hotmail.com (Stroke. 2011;42:e18.)

© 2011 American Heart Association, Inc.

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

DOI: 10.1161/STROKEAHA.110.604348
Interventions for Sensory Impairment in the Upper Limb After Stroke
Susan Doyle, Sally Bennett, Susan Fasoli and Kryss McKenna

Stroke. 2011;42:e18; originally published online December 30, 2010;
doi: 10.1161/STROKEAHA.110.604348
Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2010 American Heart Association, Inc. All rights reserved.
Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://stroke.ahajournals.org/content/42/2/e18

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published
in Stroke can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office.
Once the online version of the published article for which permission is being requested is located, click
Request Permissions in the middle column of the Web page under Services. Further information about this
process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Stroke is online at:
http://stroke.ahajournals.org//subscriptions/