Biofeedback therapy in poststroke rehabilitation: a meta-analysis of the randomized controlled trials

Authors' objectives
To determine whether biofeedback therapy increased the range of motion of paretic limb joints after stroke.

Searching
MEDLINE was searched using the keywords 'cerebrovascular disease' (and) 'rehabilitation', and 'hemiplegia' (and) 'rehabilitation'. The bibliographies of review articles and identified studies were searched.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were included.

Specific interventions included in the review
Biofeedback therapy.

Participants included in the review
Patients in the rehabilitative phase, post-stroke, were included (n=168).

Outcomes assessed in the review
Change in range of motion of paretic limb joints were assessed.

How were decisions on the relevance of primary studies made?
Two reviewers independently assessed each study in terms of data presentation: the data had to be presented in such a way that effect sizes could be calculated and in terms of outcome measures which had to be range of motion.

Assessment of study quality
A quality score was derived for each study based on the method of Chalmers, where the reviewers were blind to the author, place, journal and the discussion of results. Two reviewers independently determined a quality score for each study and any discrepancies in scoring between the reviewers were resolved in a consensus conference format with the assistance of a co-author/biostatistician.

Data extraction
Two reviewers independently extracted the data blinded to the outcome of the studies. Any controversies were resolved in a consensus conference format, with the assistance of a co-author/biostatistician.

Methods of synthesis
How were the studies combined?
The effect size and standard error for each study were calculated using the method of Glass et al. The DerSimonian and Laird random-effects model was used to estimate pooled effect sizes.

How were differences between studies investigated?
Both fixed-effect and random-effects results were computed with associated tests for heterogeneity.

Results of the review
Eight RCTs were included: 5 assessed improvement in lower-extremity range of motion, 2 reported changes in upper-extremity range of motion, and one study evaluated both the upper and lower extremity range of motion, reporting the results as a combined variable.

Significant heterogeneity among studies was found (Q = 161.8, p<0.01) and therefore the results of the random-effects model were reported. The results were presented separately for lower extremity (ankle, knee) and upper extremity (shoulder, elbow) range of motion.

Lower extremity: The mean effect size estimate was 1.50 (95% CI: -0.59 to 3.59), indicating no overall statistically-significant treatment effect.

Upper extremity: The mean effect size was 2.30 (95% CI: -1.06 to 5.66), indicating no overall statistically significant treatment effect.

Authors' conclusions
The efficacy of biofeedback therapy in the rehabilitation of cerebrovascular disease has not been established by this meta-analysis.

CRD commentary
No dates are given for the MEDLINE search and no attempt was made to identify unpublished studies. The tables of studies are very informative and both included and excluded studies are presented.

Bibliographic details

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Indexing Status
Subject indexing assigned by NLM

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.