Positioning to prevent or reduce shoulder range of motion impairments after stroke: a meta-analysis

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CRD summary
The review found that positioning of the paretic shoulder following stroke did not appear to help prevent or reduce impairment in shoulder external rotation range of movement. Although the included studies were small and few details were reported about their characteristics, their findings were consistent and the authors’ conclusions appear likely to be reliable.

Authors' objectives
To assess how positioning the paretic shoulder after stroke affects shoulder external rotation range of motion.

Searching
MEDLINE via PubMed, CINAHL, EMBASE, Science Citation Index, Cochrane Central Register of Controlled Trials (CENTRAL) and PEDro were searched. Search dates varied across databases and spanned 1929 to 2008. Search terms were reported. Reference lists of relevant articles were checked.

Study selection
Randomised controlled trials (RCTs) of clearly described positioning programmes for patients with stroke were eligible for inclusion. Studies were required to report shoulder range of motion as an outcome.

Mean age of participants in the included studies was 52 to 70 years. Mean time since onset of stroke was 14 to 84 days. Positioning programmes were administered for 20 to 30 minutes, two to three times a day, five to seven days per week for four to 12 weeks (where stated).

The studies were selected independently by two reviewers.

Assessment of study quality
The PEDro format (Maher 2003) was used to grade study validity. Up to 10 points were allocated for quality items that included eligibility criteria, randomisation, allocation concealment, group similarity, blinding, follow-up rate, use of intention-to-treat analysis, outcomes reporting and reporting of measures of statistical variability. The assessment was conducted independently by two reviewers.

Data extraction
Mean range of motion change scores and standard deviations were extracted from each study for each comparison group. Data were extracted by one reviewer and checked by a second. Primary study authors were contacted for more information if necessary.

Methods of synthesis
Study data were combined to calculate standardised mean differences (SMDs) between the two groups in change scores, with 95% confidence intervals (CIs). Random-effects and fixed-effect models were used. Heterogeneity was assessed using the Q statistic.

Results of the review
Five RCTs were eligible for inclusion (n=126, range 17 to 32). Quality ratings ranged from 6 to 8 points (out of a possible 10).

Shoulder external rotation range of motion deteriorated in both groups, with no statistically significant difference between the groups in the degree of loss (SMD -0.216, 95% CI -0.573 to 0.141). Random-effects and fixed-effect models gave similar results. The pooled mean loss across intervention groups was 13.6 degrees and across controls was
15.0 degrees, without significant statistical heterogeneity within the groups.

**Authors’ conclusions**
Positioning of the paretic shoulder following stroke did not appear to help prevent or reduce impairment in shoulder external rotation range of movement.

**CRD commentary**
The objectives and inclusion criteria of the review were clear and relevant sources were searched for studies. It was not stated whether the search was limited by language or publication status, so the potential for language or publication biases was unknown. Steps were taken to minimise the risk of reviewer bias and error by having more than one reviewer independently undertake study selection, validity assessment and data extraction, and suitable criteria were used to assess study validity. Few details were reported about individual studies and there was no information about some important factors (such as follow-up rates and control conditions). Appropriate methods were used to combine the studies and assess for statistical heterogeneity within and between the two groups. Although the included studies were small and few details were reported about their characteristics, their findings were consistent and the authors’ conclusions appear likely to be reliable.

**Implications of the review for practice and research**

**Practice**: The authors did not state any implications for practice.

**Research**: The authors stated that future studies should investigate the effectiveness of longer duration positioning and of intervening earlier in the recovery process. The effect of positioning on other shoulder movements and on other joints should also be investigated, as should the effect of combining positioning with other interventions (such as heat and electrical stimulation).

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