Is hand splinting effective for adults following stroke? A systematic review and methodological critique of published research
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CRD summary
The authors concluded that there was insufficient evidence to support or refute the effectiveness of hand splinting for adults following stroke. Despite some limitations regarding the review methods, these conclusions reflect the paucity of the evidence available in 2003 and seem reliable.

Authors' objectives
To evaluate the effectiveness of hand splinting on the hemiplegic upper extremity following stroke.

Searching
Seven databases including MEDLINE, EMBASE, CINAHL and Cochrane Register of Controlled Trials (CENTRAL) were searched to May 2003 for studies in English. Search terms were reported. Fifteen websites from relevant professional organisations were searched. References of primary studies, review articles and books were searched.

Study selection
Randomised controlled trials that investigated upper extremity splinting programmes for adults following stroke were eligible for inclusion. More than 50% of study populations had to be adults who had experienced a stroke. Eligible outcomes of interest included measures of functional hand use, joint range of motion, tone, spasticity, oedema and pain. Studies where less than 50% of splints were applied to the wrist or hand were excluded.

Nearly all of the participants in the included studies had had a stroke. Mean age of participants (where reported) ranged from 64 to 70 years. Splinting interventions varied across the studies. Controls mostly received no intervention or a form of occupational therapy. One study did not have a control group but made comparisons according to different durations of splinting. Treatment durations ranged from two hours to five weeks.

One reviewer selected the studies for inclusion in the review.

Assessment of study quality
The methodological quality of randomised controlled trials were assessed using the PEDro Scale (with a maximum score of 10). Criteria were: specification of eligibility criteria; randomisation; allocation concealment; prognostic similarity at baseline; blinding of participants, therapists and outcome assessors; more than 85% follow-up, between-group statistical comparison and point estimates of variability provided for at least one key outcome; and use of intention-to-treat analysis.

Total scores of 7 or more were considered to be high quality, scores of 5 or 6 were considered to be moderate quality and scores of 4 or less were considered to be poor quality.

Quality assessment was performed independently by two reviewers.

Data extraction
Data on functional outcomes were extracted by an unknown number of reviewers.

Methods of synthesis
Data were presented in the text and in a table.

Results of the review
Five randomised controlled trials were included in the review (99 participants, range 10 to 30). Trial quality was rated as high (one trial), moderate (one trial) or poor (three trials). All of the trials reported randomisation but only two studies blinded their outcome assessors and only one study reported allocation concealment and intention-to-treat.
analysis. Only two studies reported prognostic similarity at baseline.

One of the poor quality trials reported that, compared with no splint, use of volar or dorsal hand splinting in the functional position for two hours (total time to outcome) was associated with a statistically significant increase in passive range of wrist extension and a decrease in hypertonus (quantitative results not reported).

No other statistically significant differences in any reported outcome were found by studies that compared an inflatable pressure splint or thermoplastic hand sprint (including dorsal, volar and finger-spreader splints) with controls (individual results reported in paper).

Authors' conclusions
There was insufficient evidence to either support or refute the effectiveness of hand splinting for adults following stroke.

CRD commentary
The review question was clear and supported by reproducible inclusion criteria. Relevant databases and websites were searched and handsearching was carried out. The restriction to publications in English meant that potentially relevant studies may have been missed. An attempt was made to minimise reviewer error and bias during quality assessment but this was not attempted during study selection and was unclear for the process of data extraction. A basic quality assessment tool was employed and indicated that only one of the five trials included was of high quality. Study details were presented. The studies were shown to be clinically diverse, so the lack of a statistical synthesis seemed appropriate. The authors acknowledged that the strength of the review findings were limited by the small number of trials and their methodological flaws. This review was published in 2003 so its current value may be limited.

Despite some limitations relating to the review methods, the authors’ conclusions reflect the paucity of the evidence available in 2003 and seem reliable.

Implications of the review for practice and research
Practice: The authors stated that there was level one evidence to refute the effectiveness of hand splinting in the functional position for the management of contractures in adults who received a daily stretching programme following a stroke. It should be noted that this clinical message presented by the authors related to evidence from one small trial (28 participants).

Research: The authors stated that well-designed randomised controlled trials were required to further investigate the efficacy of hand splinting. Such trials should not include hand splinting or upper limb stretching in control conditions and should try to adhere to recommendations made by Pocock (stated in the paper). The authors suggested that future trials should not only consider the effects of different splint designs but also consider the effects of the time period for which a splint is worn and the hand's position within the splint.

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