A systematic review of the effectiveness of contrast baths
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CRD summary
This evaluation of the protocols and efficacy of contrast baths did not make any definitive conclusions, due to the limited evidence available, but there was weak evidence for an improvement in superficial blood flow and skin temperature. Clearer reporting of some aspects would have made the review easier to interpret.

Authors' objectives
To review the range and efficacy of methods used in contrast bath procedures for hand therapy.

Searching
CINAHL, PubMed, and OTseeker were searched for articles included up to spring 2007. Only one search term was used and a manual search of reference lists was also performed.

Study selection
Studies of any design that evaluated contrast baths were eligible for inclusion. There were no restrictions on the diagnostic groups, extremity tested (hand or foot), and outcome measures.

Included studies assessed treatment of the hand or foot for rheumatoid arthritis, diabetes, or foot or ankle sprains, or in healthy volunteers. Studies were either randomised controlled trials (RCTs) or prospective cohort studies. The contrast bath protocols varied, but most of them alternated between cold (between 7 and 22°C) and hot (between 27 and 45°C) baths, for between 12 and 32 minutes. Outcome measures included skin temperature, intramuscular tissue temperature, and blood flow.

Studies were selected for inclusion by two reviewers independently.

Assessment of study quality
Study validity was assessed using the Structured Effectiveness Quality Evaluation Scale (SEQES), which covers background, study design, participants, interventions, outcomes, analysis, and results providing a maximum possible score of 48. Studies were also rated using levels of evidence and each study was scored by a minimum of two reviewers.

Data extraction
Data on study design, interventions, protocols, measures, and results were extracted. Two reviewers organised the data extraction, but it was not clear if it was performed in duplicate.

Methods of synthesis
The results were presented in tables and narratively.

Results of the review
Ten studies (264 participants) were included; five were randomised and sample size ranged from 16 to 51. Quality scores ranged from 15 to 36 out of 48. Studies were published between 1939 and 2007.

Eight studies reported increased skin temperature and superficial blood flow with warm water immersion or application of hot packs. Three studies that assessed intramuscular tissue temperatures found that these did not rise after the contrast bath procedure and that there was no significant physiological effect on intramuscular temperature. Four studies found that spending time in a warm room before the procedure was more effective than warm water immersion alone for increasing superficial blood flow.

Authors' conclusions
There was weak evidence that contrast baths improved superficial blood flow and skin temperature, but the limitations
of the evidence prevented more definitive conclusions.

**CRD commentary**
This review had wide inclusion criteria, but a fairly limited search strategy. No language restrictions were reported, but it is possible that some studies were missed. Studies were selected and quality assessed by two reviewers, but it was not clear if the data were extracted using similar methods. The quality assessment covered 24 items, but a description of each item was not given and reporting a total score is less useful as some aspects of quality are more important than others. More information was reported on the contrast bath procedures than on the study results, which addressed one aim of the review, but clearer reporting of each study's findings would have been useful.

The authors' conclusions were suitably cautious, for the limited evidence, but some aspects of the reporting needed to be clearer.

**Implications of the review for practice and research**
The authors did not state any recommendations for practice and research.

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