Authors' objectives
To review and critique the research on the effect of massage therapy (MT) and therapeutic touch in children, and to describe clinical implications and make suggestions for future study.

Searching
CINAHL, MEDLINE, PsycINFO and SocioFile were searched online using the keywords 'tactile', 'kinesthetic massage therapy', 'touch', 'therapeutic touch', 'infants' and 'children'. To be included in the review, studies had to be published in refereed nursing, allied health, or infant and child development journals between 1969 and 1999.

Study selection
Study designs of evaluations included in the review
Quantitative studies; no further restrictions on study design were reported.

Specific interventions included in the review
MT: duration of MT ranged from 15 minutes daily to 15-minute periods during 3 or 4 consecutive hours daily in neonates, and from 15 minutes daily twice a week to 30 minutes daily in children. Studies in neonates also investigated stroking for 5 to 7.5 minutes daily. All the controlled studies in neonates compared MT to standard nursing and medical care.

Participants included in the review
All studies in children were eligible for inclusion. Children included in the review were pre-term infants and children with depression, post traumatic stress, juvenile rheumatoid arthritis, autism, asthma, atopic dermatitis and cystic fibrosis. Age of children (excluding pre-term infants) ranged from 2 to 16 years.

Outcomes assessed in the review
No inclusion criteria relating to outcomes were specified. Outcomes reported in studies of pre-term infants included in the review were polygraph readings, Brazelton Neonatal Behavioural Assessment Scale (BNBAS), weight, Thoman’s sleep/wake state criteria, feeding, stooling, caloric intake, transcutaneous blood gas pressure, and days in hospital.

Outcomes reported in other children were depression (measured by the Profile of Mood States and CES-D scale), anxiety (measured by the State Trait Anxiety Inventory, Revised Children's Manifest Anxiety Scale, Behaviour Observation Scale), salivary cortisol levels, cooperation, nighttime sleep, mood state (measured by the Happy Faces Scale), emotional problems (measured by self-drawings), relaxation level (visual analogue scale), pain (Varni/Thompson Pain Questionnaire, Child and Parent forms), stiffness, measures of autism (touch aversion, off-task behaviour, orienting to irrelevant sounds, stereotypical behaviours, Autism Behaviour Checklist, Early Social Communication Scales activity), asthma measurements (vocalising, asthma attitude, peak air flow), clinical measures of dermatitis, and peak air flow in children with cystic fibrosis.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
No formal assessment of validity was undertaken.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction. For all studies, data were extracted on author, year, treatment, number of participants, and instruments used to assess outcomes and benefits of the intervention. For studies in neonates, data were also extracted on when the treatment was started (number of hours per days after birth) and gestational age. For studies in children, data were also extracted on condition and age.

Methods of synthesis
How were the studies combined?
The results of the studies were reported separately for neonates and older children. A narrative synthesis was provided.

How were differences between studies investigated?
Heterogeneity was not investigated.

Results of the review
Fourteen studies of massage therapy. Seven studies looked at neonates (n=200): 4 RCTs, 2 controlled trials and 1 uncontrolled trial. The other 7 studies looked at older children with medical conditions (n=229); study designs were not reported for these studies.

Neonates (n=7).

Benefits reported were rapid weight gain (4 studies), increased levels of activity (2 studies), more rapid habituation (3 studies) and fewer days hospitalised (2 studies). Studies also reported the following: increased stooling, increased caloric intake and larger amounts of formula intake with fewer feedings (1 study); easier consolation, and improved alertness and body tonus (1 study); more mature responses to social stimulation, and an improved motor behaviour and range of state on the BNBAS scale (1 study); and improved oxygen tension levels (1 study).

Older children with medical conditions (n=7).

Consistent benefits included lower anxiety (6 studies), improved mood and affect (4 studies), and lower salivary cortisol (4 studies). Other significant benefits were condition-related: increased cooperation and sleep in emotionally disturbed children; improved relaxation in children with post traumatic stress; reduced pain in children with juvenile rheumatoid arthritis; reduced distraction to noise, decrements in touch sensitivity, increased classroom attention and improved relating with teachers in children with autism; improved attitude about asthma, and improved air flow and forced expiratory flow (25 to 75%) in asthmatics; better clinical response in children with atopic dermatitis; and increase in peak air flow for cystic fibrosis patients.

Therapeutic touch in neonates (n=1).

A crossover study found the pre-term neonates showed a greater change from a higher aroused state to a more relaxed state after therapeutic touch; no effect was found on transcutaneous blood-pressure.

Authors' conclusions
A set of common findings across 2 decades of research suggests that MT may be useful in the care of infants and children.

CRD commentary
This was a poorly reported review. The literature search was limited to publications in selected peer-reviewed journals, thus important studies may have been missed and the results may be subject to publication bias. The inclusion criteria were stated, but more details could have been provided. Very few details of the review process were reported, such as the methods used to assess the studies for inclusion and to extract the data, and study validity was not formally assessed.

Details of the studies were tabulated, but these tables did not include information on study design. A narrative synthesis
was appropriate in view of the heterogeneous nature of the studies, with respect to the patients and outcomes reported. However, the way in which the results were synthesised could have been improved. There was no indication of the magnitude of the effect of the intervention, as the authors only reported whether the studies found significant benefits. One of the major limitations of this review was the lack of an appropriate discussion of the study designs of the included studies. The designs of the studies in neonates were reported in the text, but these were not related to the study results. For studies in older children with medical conditions, there was no mention of the study designs used and so it is difficult to judge the validity of the results of these studies. The results and conclusions of the review should be interpreted with extreme caution due to the limitations discussed.

The authors also present data on studies of therapeutic touch; however, this section of the review does not meet DARE quality criteria and so is not reported here.

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

Practice: The authors state that 'there is insufficient evidence to recommend the use of MT in preterm neonates, except in those for whom tactile stimulation is too arousing. Use of massage therapy in older children is probably safe and useful in eliciting the relaxation response in a variety of clinical conditions'.

Research: The authors state that 'further research is needed to replicate these findings, explore residual and longer term effects, study underlying mechanisms and test the efficacy of massage therapy as a cost-effective adjunct therapy'.

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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.