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Therapeutic touch for healing acute wounds (Review)

O'Mathúna DP, Ashford RL

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[Intervention Review]

Therapeutic touch for healing acute wounds

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ABSTRACT

Background

Therapeutic Touch (TT) is an alternative therapy that has gained popularity over the past two decades for helping wounds to heal. Practitioners enter a meditative state and pass their hands above the patient's body to find and correct any imbalances in the patient's 'life energy' or chi. Scientific instruments have been unable to detect this energy. The effect of TT on wound healing has been expounded in anecdotal publications.

Objectives

To identify and review all relevant data to determine the effects of TT on healing acute wounds.

Search methods

In January 2014, for this fifth update, we searched The Cochrane Wounds Group Specialised Register; The Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*); Ovid MEDLINE; Ovid MEDLINE (In-Process & Other Non-Indexed Citations); Ovid EMBASE; and EBSCO CINAHL.

Selection criteria

All randomised or quasi-randomised controlled trials, which compared the effect of TT with a placebo, another treatment, or no treatment control were considered. Studies which used TT as a stand-alone treatment, or as an adjunct to other therapies, were eligible.

Data collection and analysis

One author (DO'M) determined the eligibility for inclusion of all trials in the review. Both authors conducted data extraction and evaluation of trial validity independently. Each trial was assessed using predetermined criteria.

Main results

No new trials were identified for this update. Four trials in people with experimental wounds were included. The effect of TT on wound healing in these studies was variable. Two trials (n = 44 & 24) demonstrated a significant increase in healing associated with TT, while one trial found significantly worse healing after TT and the other found no significant difference. All trials are at high risk of bias.

Authors' conclusions

There is no robust evidence that TT promotes healing of acute wounds.

PLAIN LANGUAGE SUMMARY

Therapeutic touch therapy for healing acute wounds.

Therapeutic touch is an alternative therapy that is gaining popularity as a wound treatment. Practitioners enter a meditative state and pass their hands above the patient's body to find and correct any imbalances in the patient's 'life energy' or chi. Scientific instruments have been unable to detect this energy. The review found contradictory evidence about the effects of therapeutic touch. Some trials showed a benefit while others suggested that the process slowed the rate of healing. The review concluded that trials do not show therapeutic touch to be beneficial in healing wounds from minor surgery and that the trials are at high risk of bias.

BACKGROUND

Therapeutic Touch (TT) is an alternative nursing intervention first developed in the 1970s by Dora Kunz, a lay healer, and Dolores Krieger, RN, PhD, then a nursing professor at New York University (Krieger 1997). Faster wound healing continues to be frequently cited as an effect of TT (Burr 2005; Engebretson 2007; Herdtner 2000; Smith 2003; Umbreit 2000), even when concerns are acknowledged about the validity of some studies (Leskowitz 2007). Interest in alternative methods of wound care is growing, but requires more well-designed research and systematic review to ensure only effective and safe therapies are promoted (Leach 2004; Papantonio 1998).

TT is a method of detecting and balancing nonphysical 'life energy', also called prana or chi. A balanced flow of life energy between the environment and the body is assumed to underlie good health (Krieger 1997). Imbalances and blockages in the energy field lead to illness and ill-health. Life energy has not been detected with scientific instruments. Practitioners state they sense the energy field after entering a meditative state called 'being centered.' One study found that TT practitioners could not reliably detect human energy fields with statistical reliability (Rosa 1998). This study has been replicated (Long 1999). The negative studies have been denounced by TT practitioners as flawed and biased (Blank 1998; Carpenter 1998; Collins 1998; Freinkel 1998; Howell 1998; Ireland 1998; Jarski 1998; Lee 1998; Manos 1998; Palmer 1998; Schmidt 1998; Streltzer 1998).

When receiving TT, patients are encouraged to relax while sitting or lying, and remain clothed. When 'centered', practitioners pass their hands 2 to 4 inches above the patient's body. For this reason, TT is also called Non-Contact Therapeutic Touch (NCTT). Physical contact is not necessary with TT, although it is sometimes incorporated into the practice. Practitioners assess the patient's energy field, looking for imbalances. Congested areas of the energy field are removed by 'unruffling', in which practitioners move their hands gently down the length of the patient's body. The treatment phase follows where practitioners consciously facilitate the direction of life energy from the universal energy field to the patient. When the field is balanced, or after approximately 10-20 minutes, the therapy is usually concluded (Krieger 1997).

TT has gained widespread support within nursing, especially in the US. It is one of a number of 'energy healing' therapies being provided in hospitals and other healthcare settings (DiNucci 2005). In North America, TT is reported to be taught at 75 schools and universities and practiced at 95 health care facilities (Krieger 1997). Training is available from practitioners, and through the Nurse Healers-Professional Associates, Inc. The American Nurses Association, American Holistic Nurses Association, and the National League for Nursing promote TT to various extents through accredited workshops and publications. In the United Kingdom, TT is gaining popularity through the work of the Didsbury Trust (Sayre-Adams 1995). Courses in TT are taught in over 70 countries. Professional standards or certification programs are not available for TT (Meehan 1998).

The North American Nursing Diagnosis Association has accepted 'energy field disturbance' as a nursing diagnosis, for which TT is the only treatment recommended (Carpenito 1995). Anecdotal reports claim that TT is effective for a wide variety of conditions (DiNucci 2005). A number of researchers have received US federal grants to study the effectiveness of TT in particular settings, such as with burn patients (Turner 1998). Its clinical efficacy is said to be supported by controlled trials in four main areas. These are the reduction of situationally induced anxiety (assumed to occur via

a relaxation response), relief of pain, hastening of wound healing, and boosting of the immune system (Engebretson 2007; Krieger 1997).

TT's growing popularity is at least due in part to claims made regarding its efficacy. Krieger states that over 20 years of clinical research supports the claims made concerning TT (Krieger 1993). Others claim that TT 'is among the most well-researched of the alternative touch healing techniques' (Thorpe 1994). In contrast, two narrative reviews of the research found little evidence to support these claims (Claman 1994; Clark 1984). Two meta-analyses of TT research for any indication found much variability and methodological problems in the studies, though an overall effect was calculated (Peters 1999; Winstead-Fry 1999).

Krieger states that TT is most effective in reducing anxiety, relieving pain, and promoting healing. Most research has been conducted on the first two effects using a variety of conditions and measuring numerous outcomes. This particular review will focus on TT's effect on acute wound healing. This will include recent surgical interventions as opposed to trauma wounds which have failed to heal and become chronic wounds. The studies already identified in this area are similar, quantitative, and may be amenable to meta-analysis. A number of narrative reviews of this research have been published, but no systematic review or meta-analysis (Daley 1997; Finch 1997; Kenosian 1995; Rosenbaum 2012; Wirth 1995; Wirth 1996b).

OBJECTIVES

To identify and review RCT and quasi RCT evidence on the effects of Therapeutic Touch on acute wound healing.

METHODS

Criteria for considering studies for this review

Types of studies

All randomised or quasi-randomised controlled trials comparing Therapeutic Touch (TT) with sham TT, another treatment, or a no treatment control. Studies which used TT as a stand-alone treatment, or as an adjunct to other therapies, were eligible:

- TT compared with sham TT
- TT compared with other treatment
- TT compared with no treatment
- TT plus wound care interventions compared with wound care interventions alone.

Quasi-randomised trials (for example using alternate allocation to groups) were subjected to sub-group analysis.

Types of participants

Any person with acute wounds after trauma, surgery, or who have a wound which has been experimentally induced. The latter are usually induced using biopsy instruments to give uniform wounds.

Types of interventions

All interventions in which Non-Contact Therapeutic Touch was administered were considered. Trials evaluating all forms of touch therapy that do not involve direct skin to skin contact were included.

Types of outcome measures

Any quantifiable means of measuring wound healing rates or degrees of healing, such as the changes in area, volume, depth or circumference of the wound, or time to heal.

Search methods for identification of studies

The search methods used in the previous update of this review can be found in Appendix 1.

In January 2014, for this fifth update, we searched the following electronic databases:

- The Cochrane Wounds Group Specialised Register (searched 28 January 2014);
- The Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2013, Issue 12);
- Ovid MEDLINE (1946 to January Week 3 2014);
- Ovid MEDLINE (In-Process & Other Non-Indexed Citations, January 23, 2014);
- Ovid EMBASE (1974 to 2014 January 24);
- EBSCO CINAHL (1982 to January 24, 2014).

The following search strategy was used in the Cochrane Central Register of Controlled Trials (CENTRAL):

#1 MeSH descriptor Acute Disease explode all trees
#2 MeSH descriptor Wounds and Injuries explode all trees
#3 (#1 AND #2)
#4 MeSH descriptor Surgical Wound Infection explode all trees
#5 MeSH descriptor Surgical Wound Dehiscence explode all trees
#6 MeSH descriptor Wounds, Penetrating explode all trees
#7 MeSH descriptor Lacerations explode all trees
#8 MeSH descriptor Burns explode all trees
#9 MeSH descriptor Skin Transplantation explode all trees #10 MeSH descriptor Fractures, Open explode all trees
#11 ((traumatic NEXT wound*) or (acute NEXT wound*)): ti,ab,kw

#12 ((surgical NEXT wound*) or (incised NEXT wound*)):ti,ab,kw
#13 acute NEXT ulcer*:ti,ab,kw
#14 (burn or burns or burned or scald*):ti,ab,kw
#15 ((thermal or blast or crush or avulsion) NEXT injur*):ti,ab,kw
#16 (laceration* or gunshot or (gun NEXT shot) or stab or stabbing or stabbed):ti,ab,kw
#17 ((donor NEXT site*) or (skin NEXT graft*)):ti,ab,kw
#18 experimental NEXT wound*:ti,ab,kw
#19 ((mechanical NEXT trauma) or polytrauma):ti,ab,kw # 20 ((open NEXT fracture*) or (compound NEXT fracture*)):ti,ab,kw
#21 (#3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20)
#22 MeSH descriptor Therapeutic Touch explode all trees
#23 MeSH descriptor Relaxation Techniques explode all trees
#24 non-contact NEAR/5 therap*:ti,ab,kw
#25 non-contact NEAR/5 heal*:ti,ab,kw
#26 therapeutic NEXT touch*:ti,ab,kw
#27 (#22 OR #23 OR #24 OR #25 OR #26)
#28 (#21 AND #27)

The search strategies for Ovid MEDLINE, Ovid EMBASE and EBSCO CINAHL can be found in Appendix 2, Appendix 3 and Appendix 4 respectively. The Ovid MEDLINE search was combined with the Cochrane Highly Sensitive Search Strategy for identifying randomised trials in MEDLINE: sensitivity- and precision-maximizing version (2008 revision); Ovid format (Lefebvre 2011). The EMBASE and CINAHL searches were combined with the trial filters developed by the Scottish Intercollegiate Guidelines Network (SIGN 2011). There were no restrictions on the basis of language.

Data collection and analysis

Selection of studies

Titles and abstracts of reports identified in the review were assessed by one author (DO'M). Their relevance and design were assessed according to the selection criteria. Complete copies of those articles and studies which appeared to satisfy these criteria were obtained. Full papers were checked to identify those eligible for inclusion, and these were checked independently by a second author (RA). A data extraction sheet was used to extract and summarize the details of the studies. If data were missing from any reports, attempts were made to contact the authors to obtain the missing information. Data from studies that were published in duplicate were included only once.

Data extraction and management

Data extraction was undertaken independently by both authors and then compared. Disagreements were resolved by discussion. An editor of the Cochrane Wounds Group was available to act as arbitrator in the event agreement could not be reached but this was not necessary. When necessary information was missing, authors were contacted.

Each study was originally appraised according to a standard checklist developed from the Cochrane Handbook to assess study validity. Data were collected on:

- inclusion and exclusion criteria
- baseline comparability of treatment groups for important variables
- adequacy of experimental intervention, by comparison with usual practice procedures
- adequacy of control treatment, by comparison with the duration and frequency of the experimental intervention
- allocation concealment
- randomisation method
- blinding of recipients of therapy
- blinding of outcome assessors of therapy
- extent of loss to follow-up, and reasons for this
- documentation of co-interventions.

Further patient data extracted and presented in an evidence table included:

- details on the type of wound
- age and gender of patients
- reason for and number of withdrawals and drop-outs
- year of the study
- country of the study
- manner of recruitment
- adverse effects.

Treatment data extracted included:

- precise type of treatment used
- training and experience of the practitioners
- duration of treatment
- frequency of treatments
- total number of treatments
- method of assessment of healing.

Assessment of risk of bias in included studies

For the previous update of this review, one review author assessed each included study using the Cochrane Collaboration tool for assessing risk of bias (Higgins 2011). This tool addresses six specific domains, namely sequence generation, allocation concealment, blinding, incomplete outcome data, selective outcome reporting and other issues (e.g. baseline comparability; fraud).

Blinding and completeness of outcome data will be assessed for each outcome separately. We completed a risk of bias table for each eligible study. We presented the assessment of risk of bias using a

'risk of bias summary figure', which presents all of the judgments in a cross-tabulation of study by entry. This display of internal validity indicates the weight the reader may give the results of each study.

RESULTS

Description of studies

We have undertaken five update searches for this review resulting in a total of 102 citations, none of which met the inclusion criteria. Two of these citations were narrative reviews previously identified and cited (Daley 1997; DiNucci 2005). Two studies published in Portuguese were excluded on the basis of their English abstracts, they involved non-human subjects, one using guinea pigs (Savieto 2004a) and the other rats (Savieto 2004b). The fifth update identified a recent literature review of complementary therapies for wound healing which included did not identify any additional studies of TT beyond those included here (Rosenbaum 2012).

The original search strategies identified seven articles selected as potentially relevant. One of these, Wirth 1992, was a secondary publication of an earlier study (Wirth 1990). In one trial the researchers gave a narrative description of their findings but reported no data (Wirth 1994b). This study was excluded because it did not meet the inclusion criteria for the review. Letters were written in 1988 and 2000 to Daniel Wirth at the Healing Sciences Research International, but no reply was obtained. Another study did not report wound healing as an outcome and was also excluded (Turner 1998). Hence, four studies were included in this review (Wirth 1990; Wirth 1993; Wirth 1994a; Wirth 1996a).

All of the studies were conducted by the same principal researcher. They all involved relatively small numbers of subjects; sample sizes ranged from 15 to 44). All subjects received experimental full thickness dermal wounds on the lateral deltoid from an experienced physician using a skin biopsy instrument. The wounds were 5 mm in diameter in the first study (Wirth 1990), and 4 mm in all subsequent studies. All wounds were washed with an antibacterial solution and bandaged with either an occlusive (Wirth 1990; Wirth 1993; Wirth 1996a) or non-occlusive dressing (Wirth 1994a).

All trials included use of dressings by all subjects. One excluded trial (Wirth 1994b) also used biofeedback, progressive muscle relaxation and guided imagery with all subjects. In addition, each group was given a different combination of three other therapies: LeShan therapy, intercessory prayer and Reiki. Brief overviews of these therapies are given here, but detailed descriptions can be found elsewhere (O'Mathuna 2007). All subjects used biofeedback for 10 minutes, progressive muscle relaxation for 15 minutes and guided imagery for 45 minutes in sessions carried out every second day. The biofeedback involved using a hand-held thermometer to consciously increase the subject's hand temperature. Progressive muscle relaxation is a method of tensing and relaxing muscles around the body to learn to consciously induce relaxation. Guided imagery is a method of relaxing which involves mentally picturing peaceful scenes while listening to instructions on an audiotape. LeShan therapy allegedly allows healers to achieve a heightened sense of consciousness which energizes another person's natural healing capacity. Intercessory prayer in a health context usually involves asking God or a divine being for healing. The precise nature of the prayer was not specified in this study. Reiki is another 'life energy' therapy that looks similar to TT except that physical contact also occurs and spiritual beings are consulted for guidance during the therapy.

The outcomes measured in every study were the number of completely healed wounds in each group. The wounds were evaluated by one or more experienced physicians who were usually blinded to the nature of the study and the group to which each subject belonged. On preselected days, the physicians determined whether or not each wound was fully healed. In the first study (Wirth 1990), wound area was also calculated, but all subsequent studies reported only numbers of wounds 'fully healed' or 'not healed'.

Risk of bias in included studies

Wirth 1990 - 44 healthy male subjects in two arms. Inclusion and exclusion criteria listed - no. Sample size calculation described - no. Method of sequence generation - unclear. Allocation concealment - unclear. Baseline comparability of groups - age only. Blinded outcome assessment - yes. Subjects, researchers, and physicians evaluating wounds were blinded. Appropriate outcome measures were reported, although wound sizes were small (5 mm) and measurement highly prone to error. Analysis by intention to treat - not applicable as there were no drop outs.

Wirth 1993 - 24 healthy subjects in two arms. Inclusion and exclusion criteria listed - no. Sample size calculation described - no. Method of sequence generation - unclear. Allocation concealment - unclear. Baseline comparability of groups - age only. Blinded outcome assessment - yes. Subjects, researchers, and physicians evaluating wounds were blinded. Selective reporting is suggested because the pre-specified outcomes were six criteria for the evaluation of wound healing. Few of these were reported due to lack of data and the main outcome reported was the number of wounds either fully healed or not, which was not a pre-specified primary outcome. Appropriate outcome measures were reported, although wound sizes were small (4 mm) and measurement highly prone to error. Analysis by intention to treat - not applicable as there were no drop outs.

Wirth 1994a - 15 healthy subjects in two arms who crossed over to different interventions (total of four different protocols). Data were only used to the point of cross over because wound healing in cross over trials is not a stable phenomenon. Inclusion and exclusion criteria listed - no. Sample size calculation described - no.

Method of sequence generation - unclear. Allocation concealment - unclear. Baseline comparability of groups - age only. Blinded outcome assessment - yes. Subjects and physicians evaluating wounds were blinded. Appropriate outcome measures were reported. Analysis by intention to treat - not applicable as there were no drop outs.

Wirth 1996a - 38 healthy subjects in two arms. Inclusion and exclusion criteria listed - no. Sample size calculation described - no. Method of sequence generation - unclear. Allocation concealment - unclear. Baseline comparability of groups - age only. Blinded outcome assessment - yes. Subjects, researchers, and physicians evaluating wounds were blinded. Appropriate outcome measures were reported. Analysis by intention to treat - not conducted as data for the six withdraws is not reported. Withdrawals - six reported but no reasons given.

The risk of bias in these four included studies by Wirth is moderate to high when considered solely from a methodological perspective (see Figure 1 and Figure 2 for the 'risk of bias summary figure and graph'). The trials are described in detail, with innovative (but complex) methodologies used to ensure blinding. The reports suffer from not describing the methods of randomisation or allocation concealment.

Figure 1. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

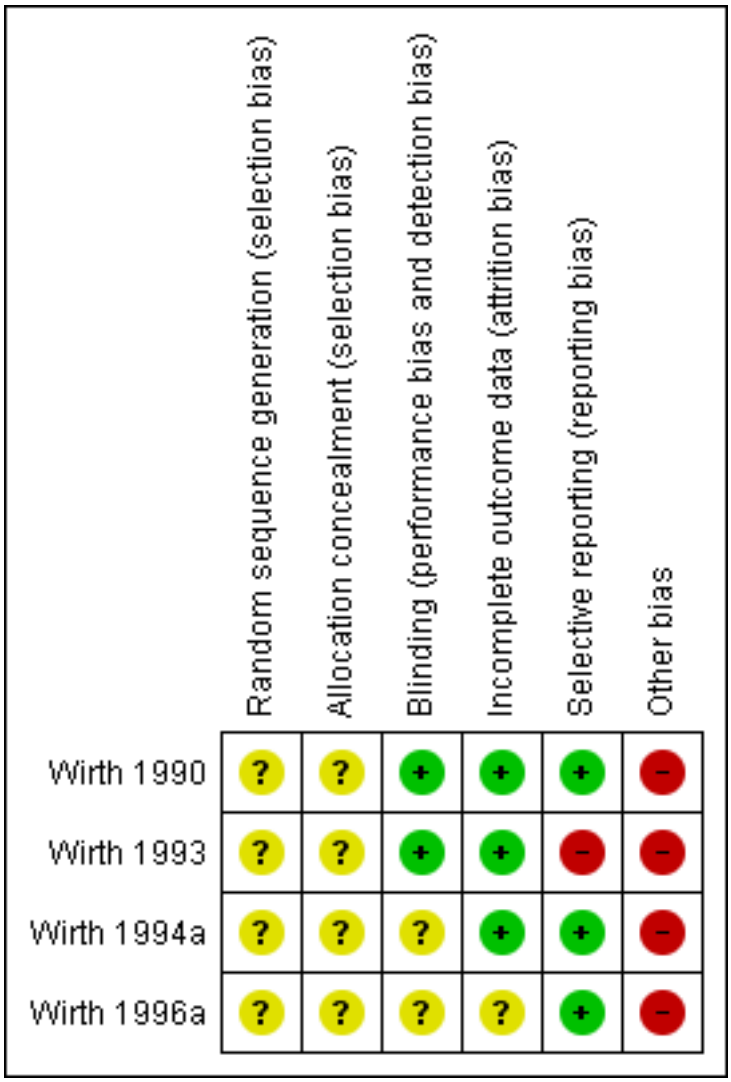
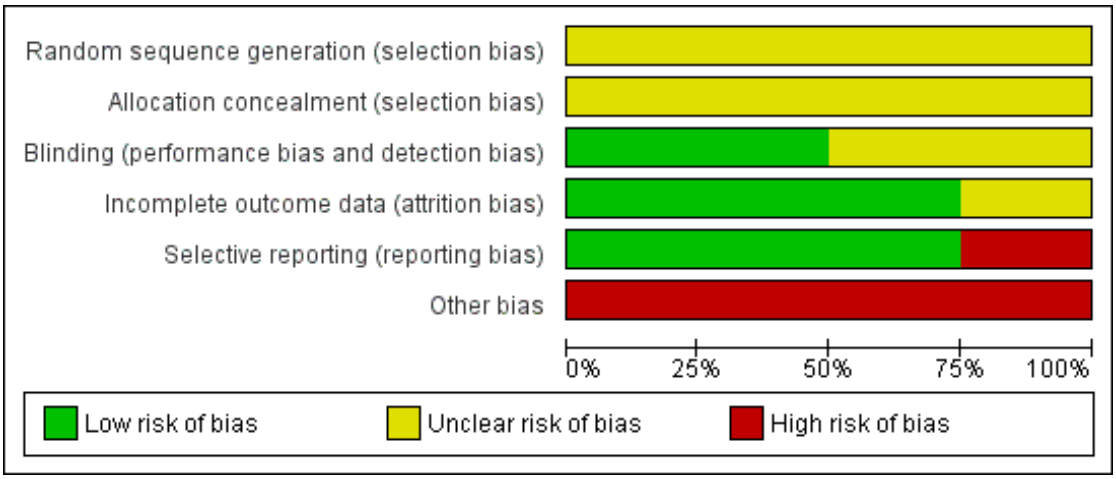


Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.



However, the value of this series of studies is overshadowed by allegations against the principal researcher (Wirth) and some of his co-researchers (Flamm 2005). One issue arises from concerns that participants in some of the studies may have been biased by prior involvement in earlier studies or by financial remuneration (see Characteristics of included studies). Wirth's former colleagues have specifically identified concerns about these wound healing studies (Solfvin 2005). They have appealed publicly to him to resolve the uncertainty around all his research, recommending that "Wirth's studies not be considered as scientifically valid until Wirth responds directly to these concerns" (Solfvin 2005). At the same time, the experimental protocols of these studies appear valid and the studies have not been withdrawn from publication. However, until the concerns about these four trials by Wirth are addressed, this uncertainty introduces additional, high risk of bias which must be considered when guiding practice based on their findings.

Effects of interventions

After screening the results of the search five citations to four trials were identified and included in this review. The following are the main results of these (see Characteristics of included studies for additional information).

Wirth 1990 compared TT with sham TT (both groups had film dressings). Treatment occurred daily for 16 days. In the intervention group 57% of the wounds healed completely (13/23), compared with 0/23 in the control group (RR 27.00, 95% CI: 1.70 to 428.90, Analysis 1.1). This shows a statistically significant effect in favour of TT.

Wirth 1993 compared TT with sham TT (both groups had occlusive dressings). Treatment occurred daily for 10 days. In the intervention group 83% of the wounds healed completely (10/12), compared with 4/12 (33%) in the control group (RR 2.50, 95% CI: 1.08 to 5.79, Analysis 1.1). This shows a statistically significant effect in favour of TT.

Wirth 1994a compared TT with sham TT (both groups had nonocclusive dressings). Treatment occurred daily for 10 days. Concurrent interventions for all subjects were guided imagery, biofeedback, and visualisation. Concurrent interventions for subjects in the two treatment protocols were Reiki, LeShan, and intercessory prayer. In the intervention group 7% of the wounds healed completely (1/15), compared with 7/15 (47%) in the control group (RR 0.14, 95% CI: 0.02 to 1.02, Analysis 1.1). This indicates no significant difference, however the authors report a statistically significant effect using Fisher's exact test (Fisher's exact test A=4, df=1, 2 sided p = 0.035). The difference in results between the Fisher's Exact and the risk ratio used by RevMan indicates that the result is highly sensitive to choice of test and should be regarded as not significant.

Wirth 1996a compared TT with sham TT (both groups had occlusive dressings). Treatment occurred daily for 10 days. In the intervention group none of the wounds healed completely (0/16), compared with 4/16 (25%) in the control group (RR 0.11, 95%CI: 0.01 to 1.91). This result is not statistically significant.

There was evidence of statistical heterogeneity between the studies (I^2 = 79%) and other minor differences in wound dressings used and duration of intervention. Pooling the studies using a random effects model showed no statistically significant difference in complete healing (RR 1.03, 95% CI 0.12 to 8.60)(Analysis 1.1). In general, the study quality was poor leading to concerns about the validity of the results. While all studies were reported as randomised, the method of sequence generation was not de-

scribed, nor was allocation concealment discussed. Inclusion and exclusion criteria were not described to explain how subjects were chosen from all those who volunteered (44 of 175 in Wirth 1990 and 38 of 54 in Wirth 1996a). No baseline comparison data were reported between the groups except that the groups did not differ significantly by age distribution. In all studies, the subjects and wound assessors were blinded, although in Wirth 1996a it is not explicitly stated that the assessor was blinded. Intention to treat was not mentioned in any study, but was not applicable in the three studies with no withdraws. Of the 38 subjects in Wirth 1996a, 4 withdrew from the treatment group and 2 from the control (16 percent loss). No reasons were given for the withdrawals.

DISCUSSION

The pooled results of the four included trials do not provide evidence of a benefit of therapeutic touch in the healing of biopsy wounds. The concerns about the conduct of these trials reflect negatively on any potential value these studies may have. Taken as published, however, a variety of interventions were used for comparison in the trials which made generalising the results difficult. Although statistically significant benefit was demonstrated for therapeutic touch in the first two studies, the two later studies showed no statistically significant benefit and all studies were at high risk of bias.

TT was studied as part of a portfolio of complementary therapies in Wirth 1994a, while it was the sole intervention in the three other trials. The very complicated design of Wirth 1994a, where several different interventions were used in different combinations, makes attribution of any effect to TT impossible. Subjects crossed over between different groups, as a result data was only included up to the point of crossover. All of these factors led to complicated protocols with few subjects experiencing any one set of conditions.

The creative design of these studies, done in an attempt to reduce biases, led to important differences between the study intervention and that administered in practice. In the studies, treatment was administered for 5 minutes, which is shorter than the more usual 15 to 20 minutes (Krieger 1997). Practitioners usually assess the patient's whole body (or energy field) while in the studies the wound area was isolated. Treatment through one-way mirrors and using video cameras is not usual practice. Different physical materials were placed between the practitioners of therapeutic touch and the subjects. Whether or not this influences the effectiveness of the procedure is controversial among therapeutic touch practitioners. The researchers did not carry out tests to validate the assumptions they made about the impact of these materials.

There were several other methodological problems with the studies. Participants in two studies (Wirth 1993; Wirth 1994a) were selected from a group meeting to practice progressive relaxation and visualisation techniques. These subjects may have responded differently to the study intervention due to their interest in complementary therapies, making the results less generalizable. It should also be noted that all the studies were conducted by the same principal researcher.

Although the early studies supported the efficacy of TT for wound healing, in later studies the control group did better, though the differences were not significant. The authors of the most recent study (Wirth 1996a) concluded that their study was the first randomised double-blind trial to demonstrate an inhibitory response because the healer was in a 'highly stressed or physically or emotionally unbalanced state'. The greater healing found in the control group of an earlier study was explained as possibly due to a cancellation effect between TT and the other complementary therapies (Wirth 1994a). Rather than generating such new hypotheses, the data point to the role of chance in producing different results from four small studies.

Some ethically questionable approaches were used in some of these studies. Potential subjects in all the studies were not informed that they would be receiving one or more therapies. Instead, the researchers told the subjects that the study would measure the bioelectrical energy released from the site of the biopsy. They were told that the study was double-blinded and that all the details would be revealed upon conclusion of the study. This approach was taken to minimise placebo and suggestion effects. However, such an approach is questionable given the controversial nature of therapeutic touch (and the Reiki, LeShan and prayer therapies used in Wirth 1994a). In a study of therapeutic touch with bone marrow transplant recipients, one third of the subjects withdrew from the study (Smith 2003). One reason given was conflict between people's religious beliefs and TT, leading those researchers to conclude that TT 'is a more controversial therapy that probably requires greater preparation and explanation.' Failure to reveal that the therapy will be given, or to explain anything about its nature, does not meet the usual standards for informed consent (O'Mathuna 1998).

A second concern with these wound studies involves the inducements subjects received to become involved. Wirth 1994b offered free training in biofeedback and visualisation for stress reduction, a medical examination, and nutritional counselling. The researchers noted that the subjects enrolled primarily to obtain these free services. The most recent study in this series (Wirth 1996a) was conducted in Mexico and the subjects enrolled primarily for the monetary compensation (amount not reported). The compensation may have encouraged subjects to overcome their apprehension of the clinical setting and biopsy procedure, and to risk the potential adverse effects of TT (O'Mathuna 1998). Such inducements are controversial, especially when the procedure being tested will not be readily available to the population in which the study is conducted (O'Mathuna 2002). The risk of bias inherent in these studies makes any findings questionable.

AUTHORS' CONCLUSIONS

Implications for practice

There is insufficient evidence for the effectiveness of TT for healing acute wounds. Two trials reported a significant benefit with TT and two found a non significant trend to reduced healing with TT, when all trials were pooled there was no significant difference in complete healing. All trials used patients undergoing a biopsy from healthy skin and the findings may not be generalisable to other wound types.

Implications for research

Further research into the effects of TT on acute wound healing is unlikely to be a good use of resources.

ACKNOWLEDGEMENTS

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Wirth 1990

Methods	Randomised, double-blind, placebo-controlled study.
Participants	44 healthy male students, 21 to 32 years old (mean 26 years)
Interventions	Group 1: 5 minutes TT daily for 16 days. Subject passed arm through a screen and could not see what happened to it. Group 2: 5 minutes sham TT - subject sitting in a room. All subjects received a full thickness 5 mm wound using a skin biopsy instrument. The wound was covered with a polyurethane dressing (Tegaderm) which was changed at day 8 and 16. In each group, half received the wound in their right arm and half in the left
Outcomes	After 8 days, 3 of 23 wounds treated in Group 1 were completely healed; 0 of 21 in Group 2 ($p<0.001$). After 16 days, 13 of 23 (57%) wounds treated in Group 1 were completely healed; 0 of 21 in Group 2 ($p<0.001$). Mean wound area in Group 1 was 3.9 mm^2 (SD 2.958); in Group 2 it was 19.34 mm^2 (SD 4.469)
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Stated to be "randomized" but no details given
Allocation concealment (selection bias)	Unclear risk	No details given
Blinding (performance bias and detection bias) participants	Low risk	Participants, experimenter and outcome assessors blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	No drop-outs
Selective reporting (reporting bias)	Low risk	All primary outcomes reported
Other bias	High risk	Concerns have been raised that this trial (of a series) may be at risk of fraud

Wirth 1993

Methods	Randomised, double-blind, placebo-controlled study
Participants	24 healthy subjects drawn from people practicing progressive relaxation and visualization. Aged 35 to 63 years (mean 47 years). Gender not reported. All given 4 mm skin biopsy wound
Interventions	Group 1: 5 minutes TT daily for 10 days. Practitioners were behind a one-way mirror. Group 2: Subject sat in the room with no therapist behind the one-way mirror. The 4 mm skin biopsy wound was covered with a polyurethane dressing which was changed at days five and 10
Outcomes	After five days, seven of 12 wounds treated with in Group 1 were completely healed; 0 of 12 in Group 2 ($p<0.006$). After 10 days, 10 of 12 wounds treated in Group 1 were completely healed; 4 of 12 in Group 2 ($p<0.041$). Mean wound area in Group 1 was 3.9 mm^2 (SD 2.958); in Group 2 it was 19.34 mm^2 (SD 4.469)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Stated "randomly assigned," but no details given.
Allocation concealment (selection bias)	Unclear risk	No details given
Blinding (performance bias and detection bias) participants	Low risk	Participants, experimenter and outcome assessors blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	No drop-outs
Selective reporting (reporting bias)	High risk	Six outcomes were examined as evidence of wound healing, but most were not reported due to a lack of data for each assessment. The results were based on whether the wounds were fully healed or not, which was not a pre-specified primary outcome
Other bias	High risk	Concerns have been raised that this trial (of a series) may be at risk of fraud

Wirth 1994a

Methods	Randomised, double-blind, within-subject cross-over study
Participants	15 healthy subjects from Wirth et al 1993.
Interventions	Part A (10 days). Group 1: Even-numbered days: subjects used biofeedback to increase hand temp. and send healing energy to wounds and told TT would be given through a one-way mirror, but no TT given. On odd-numbered days: 1 hour group guided imagery using audiotape and receiving LeShan and Intercessory Prayer. During this, each subject received TT for 6 min. TT practitioners received Reiki/massage also. Group 2: Control Even-numbered days, subject used biofeedback to increase hand temp only. Odd-numbered days, listened to relaxation tape in presence of therapists with no experience of TT moving their hands over subjects. Part B. 7 days after Part A finished, subjects cross-over with one exception: each subject used the same audiotape used in Part A. All 4 mm skin biopsy wounds treated with antibacterial solution and covered with nonocclusive dressing (Band-Aid)
Outcomes	After 10 days of treatment, one of 15 wounds was healed, compared to seven of 15 in control group ($p < 0.01$). Comparing Part A treatment and Part B control (same subjects), one of eight were healed after treatment and five of eight after control ($p < 0.04$)
Notes	Very large number of variables included.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Stated "randomly assigned" but no details given.
Allocation concealment (selection bias)	Unclear risk	No details given
Blinding (performance bias and detection bias) participants	Unclear risk	Participants blinded but had participated in previous studies in this series. The physician outcome assessors were not blinded. The participants in this study had participated in Wirth 1993 and would have been familiar with the study design.
Incomplete outcome data (attrition bias) All outcomes	Low risk	No drop-outs
Selective reporting (reporting bias)	Low risk	All primary outcomes were reported

Wirth 1994a (*Continued*)

Other bias	High risk	Concerns have been raised that this trial (of a series) may be at risk of fraud

Wirth 1996a

Methods	Randomised, double-blind study.
Participants	38 healthy volunteers from 54 respondents to advertisements.
Interventions	Group 1. 5 minutes TT daily for 10 days. Practitioners were behind a one-way mirror, within 6 inches of the subjects. Group 2. Subject sat in the room with no therapist behind the one-way mirror. The wounds were 4 mm skin biopsy wounds covered with an occlusive dressing, changed at day 5 and 10
Outcomes	After 10 days, none of 16 wounds receiving TT were fully healed, while four of 16 were healed in the control group (P = 0.05)
Notes	Inclusion criteria not given. Four withdrew from treatment group and two from control - no reasons given

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Stated "randomly assigned," but no details given.
Allocation concealment (selection bias)	Unclear risk	No details given
Blinding (performance bias and detection bias) participants	Unclear risk	The participants and experimenter were blinded but unclear if the outcome assessor was
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Number of subjects randomly assigned to each group was not reported (n = 38 total). Four dropped out of the treatment group and 2 from the control group. Results were given for 16 people in each group. Suggests uneven distribution to groups initially or possible movement between groups after drop-outs
Selective reporting (reporting bias)	Low risk	All primary outcomes reported
Other bias	High risk	Concerns have been raised that this trial (of a series) may be at risk of fraud. In addition, the participants were given monetary compensation which the au-

		thors suggested could have influenced the outcomes

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Savieto 2004a	Animal study.
Savieto 2004b	Animal study.
Turner 1998	Study was retrieved using search criteria, but did not include wound healing as an outcome. Outcomes were pain and anxiety
Wirth 1994b	After 10 days of daily treatment there were insufficient numbers of fully healed wounds to warrant statistical comparisons. The researchers reported no data

DATA AND ANALYSES

Comparison 1. Therapeutic Touch vs Control

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 wounds healed completely	4	132	Risk Ratio (M-H, Random, 95% CI)	1.03 [0.12, 8.60]

Analysis 1.1. Comparison 1 Therapeutic Touch vs Control, Outcome 1 wounds healed completely.

Review: Therapeutic touch for healing acute wounds

Comparison: 1 Therapeutic Touch vs Control

Outcome: 1 wounds healed completely

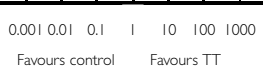
Study or subgroup	Treatment n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Wirth 1990	13/23	0/23		21.3 %	27.00 [1.70, 428.90]
Wirth 1993	10/12	4/12		31.8 %	2.50 [1.08, 5.79]
Wirth 1994a	1/15	7/15		26.0 %	0.14 [0.02, 1.02]
Wirth 1996a	0/16	4/16		20.9 %	0.11 [0.01, 1.91]
Total (95% CI)	**66**	**66**		**100.0 %**	**1.03 [0.12, 8.60]**

Total events: 24 (Treatment), 15 (Control)

Heterogeneity: $Tau^2 = 3.50$; $Chi^2 = 14.27$, df = 3 (P = 0.003); $I^2 = 79\%$

Test for overall effect: Z = 0.03 (P = 0.98)

Test for subgroup differences: Not applicable



APPENDICES

Appendix 1. Search strategies for the fourth update

For the fourth update, searches were carried out in the following databases:

- Cochrane Wounds Group Specialised Register (Searched 31/3/10)
- The Cochrane Central Register of Controlled Trials (CENTRAL) - The Cochrane Library 2010 Issue 1
- Ovid MEDLINE - 2007 to March Week 3 2010
- Ovid MEDLINE - In-Process & Other Non-Indexed Citations (Searched 30/3/10)
- Ovid EMBASE - 2007 to 2010 Week 11
- EBSCO CINAHL - 2007 to March 26 2010

The following search strategy was used in the Cochrane Central Register of Controlled Trials (CENTRAL):
#1 MeSH descriptor Acute Disease explode all trees
#2 MeSH descriptor Wounds and Injuries explode all trees
#3 (#1 AND #2)
#4 MeSH descriptor Surgical Wound Infection explode all trees
#5 MeSH descriptor Surgical Wound Dehiscence explode all trees
#6 MeSH descriptor Wounds, Penetrating explode all trees
#7 MeSH descriptor Lacerations explode all trees
#8 MeSH descriptor Burns explode all trees
#9 MeSH descriptor Skin Transplantation explode all trees #10 MeSH descriptor Fractures, Open explode all trees
#11 ((traumatic NEXT wound*) or (acute NEXT wound*)):ti,ab,kw
#12 ((surgical NEXT wound*) or (incised NEXT wound*)):ti,ab,kw
#13 acute NEXT ulcer*:ti,ab,kw
#14 (burn or burns or burned or scald*):ti,ab,kw
#15 ((thermal or blast or crush or avulsion) NEXT injur*):ti,ab,kw
#16 (laceration* or gunshot or (gun NEXT shot) or stab or stabbing or stabbed):ti,ab,kw
#17 ((donor NEXT site*) or (skin NEXT graft*)):ti,ab,kw
#18 experimental NEXT wound*:ti,ab,kw
#19 ((mechanical NEXT trauma) or polytrauma):ti,ab,kw #20 ((open NEXT fracture*) or (compound NEXT fracture*)):ti,ab,kw
#21 (#3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20)
#22 MeSH descriptor Therapeutic Touch explode all trees
#23 MeSH descriptor Relaxation Techniques explode all trees
#24 non-contact NEAR/5 therap*:ti,ab,kw
#25 non-contact NEAR/5 heal*:ti,ab,kw
#26 therapeutic NEXT touch*:ti,ab,kw
#27 (#22 OR #23 OR #24 OR #25 OR #26)
#28 (#21 AND #27)

Appendix 2. Ovid MEDLINE search strategy

1 exp Acute Disease/ (179226)
2 exp "Wounds and Injuries"/ (683628)
3 and/1-2 (9899)
4 exp Surgical Wound Infection/ (27605)
5 exp Surgical Wound Dehiscence/ (6117)
6 exp Wounds, Penetrating/ (29923)
7 exp Lacerations/ (1692)
8 exp Burns/ (47250)
9 exp Skin Transplantation/ (30605)
10 exp Fractures, Open/ (4281)
11 (traumatic wound$ or acute wound$).ti,ab. (921)

12 (surgical wound$ or incised wound$).ti,ab. (4159)
13 acute ulcer$.ti,ab. (671)
14 (burn or burns or burned or scald$).ti,ab. (44555)
15 ((thermal or blast or crush or avulsion) adj injur$).ti,ab. (7448)
16 (laceration$ or gunshot or gun shot or stab or stabbing or stabbed).ti,ab. (17331)
17 (donor site$ or skin graft$).ti,ab. (20750)
18 experimental wound$.ti,ab. (363)
19 (mechanical trauma or polytrauma).ti,ab. (2806)
20 (open fracture$ or compound fracture$).ti,ab. (3036)
21 or/3-20 (190699)
22 exp Therapeutic Touch/ (641)
23 exp Relaxation Techniques/ (6948)
24 therapeutic touch.ti,ab. (381)
25 non-contact therap$.ti,ab. (6)
26 non-contact heal$.ti,ab. (1)
27 or/22-26 (7709)
28 21 and 27 (36)
29 randomized controlled trial.pt. (359010)
30 controlled clinical trial.pt. (86881)
31 randomi?ed.ab. (310448)
32 placebo.ab. (141107)
33 clinical trials as topic.sh. (166531)
34 randomly.ab. (186021)
35 trial.ti. (111455)
36 or/29-35 (844137)
37 exp animals/ not humans.sh. (3865236)
38 36 not 37 (776037)
39 28 and 38 (12)

Appendix 3. Ovid EMBASE search strategy

1 exp Wound/ (171121)
2 exp Acute Disease/ (101054)
3 1 and 2 (667)
4 exp Surgical Infection/ (26052)
5 exp Wound Dehiscence/ (10184)
6 exp Penetrating Trauma/ (9621)
7 exp Laceration/ (5961)
8 exp Burn/ (58989)
9 exp Skin Transplantation/ (50161)
10 exp Open Fracture/ (4417)
11 (traumatic wound$ or acute wound$).ti,ab. (1267)
12 (surgical wound$ or incised wound$).ti,ab. (5566)
13 acute ulcer$.ti,ab. (923)
14 (burn or burns or burned or scald$).ti,ab. (60085)
15 ((thermal or blast or crush or avulsion) adj injur$).ti,ab. (9718)
16 (laceration$ or gunshot or gun shot or stab or stabbing or stabbed).ti,ab. (22587)
17 (donor site$ or skin graft$).ti,ab. (27164)
18 experimental wound$.ti,ab. (440)
19 (mechanical trauma or polytrauma).ti,ab. (4059)
20 (open fracture$ or compound fracture$).ti,ab. (4013)
21 or/3-20 (220234)

22 exp Therapeutic Touch/ (34423)
23 exp Relaxation Training/ (8420)
24 therapeutic touch.ti,ab. (441)
25 non-contact therap$.ti,ab. (10)
26 non-contact heal$.ti,ab. (1)
27 or/22-26 (41987)
28 21 and 27 (285)
29 Randomized controlled trials/ (45578)
30 Single-Blind Method/ (18881)
31 Double-Blind Method/ (122381)
32 Crossover Procedure/ (39650)
33 (random$ or factorial$ or crossover$ or cross over$ or cross-over$ or placebo$ or assign$ or allocat$ or volunteer$).ti,ab. (1343387)
34 (doubl$ adj blind$).ti,ab. (150245)
35 (singl$ adj blind$).ti,ab. (14637)
36 or/29-35 (1409792)
37 exp animals/ or exp invertebrate/ or animal experiment/ or animal model/ or animal tissue/ or animal cell/ or nonhuman/ (20931447)
38 human/ or human cell/ (15267952)
39 and/37-38 (15221293)
40 37 not 39 (5710154)
41 36 not 40 (1217838)
42 28 and 41 (43)

Appendix 4. EBSCO CINAHL search strategy

S29 S22 and S28
S28 S23 or S24 or S25 or S26 or S27
S27 TI non-contact heal* or AB non-contact heal*
S26 TI non-contact therap* or AB non-contact therap*
S25 TI therapeutic touch or AB therapeutic touch
S24 (MH "Relaxation Techniques+")
S23 (MH "Therapeutic Touch")
S22 S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17 or S18 or S19 or S20 or S21
S21 TI (open fracture* or compound fracture*) or AB (open fracture* or compound fracture*)
S20 TI (mechanical trauma or polytrauma) or AB (mechanical trauma or polytrauma)
S19 TI experimental wound* or AB experimental wound*
S18 TI (donor site* or skin graft*) or AB (donor site* or skin graft*)
S17 TI (laceration* or gunshot or gun shot or stab or stabbing or stabbed) or AB (laceration* or gunshot or gun shot or stab or stabbing or stabbed)
S16 TI (thermal injur* or blast injur* or crush injur* or avulsion injur*) or AB (thermal injur* or blast injur* or crush injur* or avulsion injur*)
S15 TI (burn or burns or burned or scald*) or AB (burn or burns or burned or scald*)
S14 TI acute ulcer* or AB acute ulcer*
S13 TI (surgical wound* or incised wound*) or AB (surgical wound* or incised wound*)
S12 TI (traumatic wound* or acute wound*) or AB (traumatic wound* or acute wound*)
S11 (MH "Fractures, Open")
S10 (MH "Graft Donor Site")
S9 (MH "Skin Transplantation")
S8 (MH "Burns+")
S7 (MH "Tears and Lacerations")
S6 (MH "Wounds, Penetrating+")
S5 (MH "Surgical Wound Dehiscence")

S4 (MH "Surgical Wound Infection")
S3 S1 and S2
S2 (MH "Wounds and Injuries+")
S1 (MH "Acute Disease")

WHAT'S NEW

Last assessed as up-to-date: 24 January 2014.

Date	Event	Description
22 April 2014	New search has been performed	Fifth update, new search, no new studies identified.
22 April 2014	New citation required but conclusions have not changed	Conclusions not changed

HISTORY

Protocol first published: Issue 4, 1998

Review first published: Issue 4, 2003

Date	Event	Description
25 April 2012	New citation required but conclusions have not changed	Fourth update. The authors' conclusions remain unchanged.
2 June 2010	New search has been performed	For this third update, a new search was conducted. No new studies were identified. Risk of bias tables were completed. The authors' conclusions remain unchanged
23 July 2008	Amended	Converted to new review format.
26 November 2007	New search has been performed	For this second update, a new search strategy was used and carried out in November 2007. No new studies were identified.The authors' conclusions remain unchanged
16 January 2006	New search has been performed	For the first update, new searches were carried out in January 2006. Two new studies were excluded from the review. The authors' conclusions remain unchanged
19 August 2003	New citation required and conclusions have changed	Substantive amendment. This review, with 4 included trials, was originally published in The Cochrane Library, Issue 4, 2003

CONTRIBUTIONS OF AUTHORS

DO'M developed the protocol for this review and conducted the initial literature search. Relevant studies were determined by DO'M and data extracted. Data was extracted independently by RLA and compared. First draft of the review was written by DO'M followed by revision and additions by RLA. The updates were conducted by DO'M who is guarantor of the review.

DECLARATIONS OF INTEREST

None

SOURCES OF SUPPORT

Internal sources

- Mount Carmel College of Nursing, USA.
- Faculty of Health and Community Care, University of Central England, UK.
- School of Nursing, Dublin City University, Ireland.

External sources

- The National Institue for Health Research (NIHR) is the sole funder of the Cochrane Wounds Group, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

*Therapeutic Touch; *Wound Healing; Acute Disease; Bandages; Biopsy; Randomized Controlled Trials as Topic

MeSH check words

Humans