Is reflexology an effective intervention? A systematic review of randomised controlled trials

Edzard Ernst

ABSTRACT

Objective: To evaluate the evidence for and against the effectiveness of reflexology for treating any medical condition.

Data sources: Six electronic databases were searched from their inception to February 2009 to identify all relevant randomised controlled trials (RCTs). No language restrictions were applied.

Study selection and data extraction: RCTs of reflexology delivered by trained reflexologists to patients with specific medical conditions. Condition studied, study design and controls, primary outcome measures, follow-up, and main results were extracted.

Data synthesis: 18 RCTs met all the inclusion criteria. The studies examined a range of conditions: anovulation, asthma, back pain, dementia, diabetes, cancer, foot oedema in pregnancy, headache, irritable bowel syndrome, menopause, multiple sclerosis, the postoperative state and premenstrual syndrome. There were > 1 studies for asthma, the postoperative state, cancer palliation and multiple sclerosis. Five RCTs yielded positive results. Methodological quality was evaluated using the Jadad scale. The methodological quality was often poor, and sample sizes were generally low. Most higher-quality trials did not generate positive findings.

Conclusion: The best evidence available to date does not demonstrate convincingly that reflexology is an effective treatment for any medical condition.

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Reflexology is one of the most popular complementary therapies.[1] It has been defined as

> a Chinese and Indian system of diagnosis and treatment dating from 3000 BC ... based on the belief that the whole body is represented on the foot (mostly on the soles of the feet), and that the internal organs can be stimulated by pressing particular areas of the foot (less commonly the hands).[2]

Other authors have explained that "'reflex' in the context of 'reflexology' means the 'reflection' of all the organs, systems and structures of the body onto the feet or the hands".[3]

In 1997, I (with Kerstin Köder) published a review of the trial data pertaining to reflexology.[4] We were able to include five randomised controlled trials (RCTs) and two non-randomised studies. Our conclusion from the totality of this evidence was that "it seems possible, even probable, that its perceived benefit is brought about by non-specific effects".[4] Since then, numerous new RCTs have been published.

The aim of this systematic review was to summarise and critically evaluate the data from RCTs of reflexology as a treatment for any human condition.

METHODS

The following databases were searched from their inception to February 2009: MEDLINE, EMBASE, CINAHL, British Nursing Index, AMED and the Cochrane Library. The search terms were "reflexology", "Fussreflexzonen Massage" (the German term), "massage" and "reflex therapy". No language restrictions were imposed. The bibliographies of all articles and our departmental files were hand searched. Publications found were read either as abstracts or full texts.

Non-randomised trials,[5,6] studies of reflexology not delivered by trained reflexologists,[7] studies of non-reflexology foot massage,[8] and trials with healthy volunteers[9-11] were excluded.

The key data (condition studied, study design and controls, primary outcome measures, follow-up, and main results) from all included trials were extracted according to the above criteria. The methodological quality of all included RCTs was assessed by two independent reviewers using the Jadad scale.[12] Scores on the scale range from 0 to 5, with 5 indicating the highest quality. Because therapist blinding was not possible, studies were considered "double blind" if the patient and the evaluator of the results were blinded to the group allocation.

A meta-analytic approach had been envisaged; however, it had to be abandoned due to the heterogeneity of the primary data.

RESULTS

Of 217 publications identified, 18 RCTs met the inclusion criteria.[13-30] Their key features are summarised in Box 1. Twelve of these studies failed to show convincingly that reflexology is an effective treatment.[13-15,18,21-25,27,28] Five RCTs suggested positive effects,[16,19,20,26,29] and the direction of the result of one was unclear.[17]

The methodological quality of the RCTs varied, but, in most cases, it was poor. There were nine RCTs with a Jadad score of 3 or higher.[16,18,21-23,26-28,30] Of these higher-quality RCTs, two generated positive[16,26] and seven negative results.[18,21-23,27,28,30] Many of the RCTs did not adequately control for non-specific effects.[13-15,17,20,25,29]

Of the nine placebo-controlled studies, three suggested specific effects of reflexology — symptom control in premenstrual syndrome,[16] improved quality of life during cancer palliation,[19] and symptomatic treatment of multiple sclerosis.[26] The other six placebo-controlled RCTs failed to demonstrate specific therapeutic effects of reflexology.[18,21-24,28]

Most of the included RCTs had extremely low sample sizes. Only five studies[18,22,25-27] had more than 50 participants, and seven trials had 30 or fewer participants.[13,15,19,20,23,29,30] The two large RCTs[18,27] (130 and 243 participants, respectively) both generated negative results.

The range of conditions being treated with reflexology was remarkably wide. For most of them, a single RCT was available. Only for asthma (two studies),[15,21] postoperative state (2),[13,18] cancer (3),[19,20,23] and multiple sclerosis (2)[26,30] were independent replications available. For asthma and multiple sclerosis, the results were contradictory (one positive[21,26] and one

1 Key features of randomised controlled trials (RCTs) of reflexology

First author, year	Condition	*n* (Jadad score)	Design*	Interventions	Primary outcome measure	Follow-up	Main result
Engquist, 1977[13]	Post-op (cholecystectomy)	16 (2)	RCT (A + B v B)	Conventional care + foot reflexology on "pituitary–adrenal zones" v conventional care alone	Blood cortisol levels	None	No intergroup difference
Lafuente, 1990[14]	Headache	32 (2)	RCT	Foot reflexology (12–30 sessions) + oral placebo v arm massage + oral flunarizine for 2–3 months	Intensity and duration of headache	3 months	No intergroup difference
Petersen, 1992[15]	Asthma	30 (2)	RCT (A + B v B)	Conventional care + foot reflexology v conventional care alone for 3 months	Symptoms recorded in patient diaries, medication use, objective parameters of pulmonary function	6 months	No intergroup difference
Oleson, 1993[16]	Premenstrual syndrome	35 (3)	RCT (PC)	Ear, hand and foot reflexology v placebo reflexology for 2 months (30 min/session)	Score of 38 symptoms recorded in patient diaries	4 months	Symptom decrease significantly greater in treatment group than in placebo group
Wang, 1993[17]	Type 2 diabetes	32 (2)	RCT (A + B v B)	Conventional care + daily foot reflexology (35 min/session) for 30 days v conventional care alone	Blood sugar levels, other variables	Not known	Blood sugar and other variables normalised in treatment group only; no intergroup comparison provided
Kesselring, 1998[18]	Post-op (gynaecological)	130 (3)	RCT (PC)	(A) reflexology (5 daily sessions; 1 day pre-op to 3 days post-op); (B) placebo reflexology; (C) attention control	Pain, sleep quality, wellbeing	3 days post-op	Group A had significantly poorer outcomes than Group B
Hodgson, 2000[19]	Cancer palliation	12 (1)	RCT (PC)	Foot reflexology (3 sessions) v placebo reflexology	QOL (VAS)	5 days	Greater improvement of QOL in the treatment group
Stephenson, 2000[20]	Breast and lung cancer	23 (2)	RCT crossover	Reflexology (1 session) v no treatment	Anxiety, pain (VAS)	None	Significant decrease in anxiety during reflexology
Brygge, 2001[21]	Asthma	40 (5)	RCT (PC)	Reflexology (10 sessions) v placebo reflexology	Lung function, QOL	10 weeks	No difference to placebo
Williamson, 2002[22]	Menopause symptoms	76 (3)	RCT (PC)	Reflexology (9 sessions) v placebo reflexology	Women's Health Questionnaire	19 weeks	No difference to placebo
Ross, 2002[23]	Cancer palliation	26 (3)	RCT (PC)	Reflexology (6 sessions) v placebo reflexology	Depression, anxiety (HADS)	6 weeks	No difference to placebo
Tovey, 2002[24]	Irritable bowel syndrome	34 (1)	RCT (PC)	Reflexology (6 sessions) v placebo reflexology	Pain, diarrhoea, abdominal distension	4 weeks	No difference to placebo
Mollart, 2003[25]	Foot oedema in third trimester of pregnancy	55 (2)	RCT (3 groups)	(A) rest; (B) reflexology; (C) "lymphatic" reflexology	Ankle and foot circumference	None	No differences between groups
Siev-Ner, 2003[26]	Multiple sclerosis	71 (3)	RCT (PC)	Reflexology (11 sessions) v placebo	Intensity of paraethesia, urinary symptoms, muscle strength, spasticity	11 weeks	All outcome measures except muscle strength favoured reflexology
Poole, 2007[27]	Chronic low back pain	243 (3)	RCT crossover	(A) reflexology (6 sessions); (B) relaxation; (C) usual care	Pain, unction	6 months	No significant intergroup differences
Holt, 2008[28]	Anovulation	48 (4)	RCT (PC)	Reflexology (8 sessions) v placebo reflexology	Ovulation detected by serum progesterone levels	10 weeks	Ovulation rates: 42% (reflexology); 46% (sham)
Hodgson, 2008[29]	Dementia	21 (1)	RCT crossover	Reflexology (4 weekly sessions) v attention control	Stress (salivary α-amylase), pain	4 weeks	Significant reduction with reflexology compared with controls
Mackereth, 2009[30]	Multiple sclerosis	25 (3)	RCT crossover	Reflexology (6 weekly sessions) v progressive muscle relaxation	Salivary cortisol levels, multiple secondary endpoints	6 weeks	No significant intergroup difference in primary (and most secondary) outcome measures

op = operation/surgery. A + B v B = reflexology + conventional care v conventional care. PC = placebo-controlled. Placebo reflexology = gentle foot massage without stimulating reflexology points. QOL = quality of life. VAS = Visual Analogue Scale. HADS = Hospital Anxiety and Depression Scale. * Parallel groups if not stated otherwise. ◆

2 Conditions believed to be treated effectively with reflexology

"Reflexology can address your particular needs. Painful, congested or overactive states within the body can be balanced and normalised. Thousands of documented case studies from around the world have demonstrated the benefits for:

- [premenstrual tension]
- Migraine
- Sinus
- Colic
- Menopause
- Constipation/Diarrhoea
- Back Pain
- Neck Pain
- Sciatica
- Shoulder Pain
- Asthma
- Stroke
- Menstrual Irregularities"

— Reflexology Association of Australia (http://www.reflexology.org.au)

"Reflexology is the most wonderful pain reliever . . ."

— International Council of Reflexologists (http://www.icr-reflexology.org) ◆

negative[15,30] for each condition); for cancer, two studies suggested benefit[19,20] and one suggested no benefit;[23] and for postoperative state, both RCTs failed to demonstrate effectiveness.[13,18]

Interest in conducting RCTs and the methodological quality of the published RCTs both seem to have increased during recent years. Twelve RCTs have become available since 2000; seven of these newer studies were placebo controlled,[19,21-24,26,28] and two had a Jadad score higher than 3.[21,28]

DISCUSSION

This systematic review failed to produce convincing evidence to suggest that reflexology has health benefits beyond a placebo response. Multiple RCTs were available for only four conditions, indicating a general lack of independent replication. The methodological quality of the primary studies was often poor. Most high-quality RCTs did not demonstrate effectiveness. The most promising evidence seems to be in the realm of cancer palliation.[19,20]

Reflexology has been tested for an impressive range of conditions, implying that reflexologists believe it to be effective in many different situations. The claims made of reflexology by some professional organisations seem to confirm this notion (Box 2). There is little doubt that a foot massage is pleasantly relaxing;[31] however, specific medical claims should always be supported by sound evidence. In the case of reflexology, this unfortunately does not appear to be the case.

Reflexologists use "maps" on which one particular area (usually on the sole of the foot) is assumed to represent one particular organ or organ system. The maps are based on the assumption that 10 "energy zones" run longitudinally through the body. Each foot has five of these lines, and all body organs are believed to lie along one or more of these lines.[32] By palpating "blockages" on the foot, reflexologists also engage in diagnostic procedures. A certain finding in a particular area and the patient's reaction to manual pressure are thought to provide clues about a tissue injury or malfunction.[33] Previous studies suggest that the diagnostic validity of this method is insufficient.[34,35]

Reflexologists postulate that malfunctioning of an organ or body system leads to deposits of uric acid or calcium crystalline.[3,36] These, in turn, would impinge on the nerve endings on the feet and obstruct lymph flow. Massaging these areas would break down the crystalline deposits so that they can be reabsorbed and eliminated.[37] Other hypotheses relate to improvement of blood flow; the theory that reflex points are nerve receptors, the stimulation of which reduces muscular or psychological tension, inducing "deep relaxation",[37] or emits "impulses to all parts of the body, as to Golgi tendon and muscle spindle cells";[32,35] the involvement of the lymphatic system; the notion that waste products, like lactic acid, are removed through reflexology massage; and the enhancement of general homoeostasis.[32,38] These theories have, so far, not been submitted to sufficient experimental testing. Future investigations might address these issues, and employ rigorous control for a placebo effect, as incorporated in some of the recent trials.[26,28]

Most proponents of reflexology would argue that this method is free of risks. However, if used as a diagnostic tool, it will generate false-positive and false-negative diagnoses.[34,35] Moreover, if employed as an alternative therapy to treat serious conditions, reflexology can be life-threatening.[39] Thus, the notion of an entirely benign intervention does not withstand critical evaluation.

Why, then, do people pay for reflexology? As mentioned before, the treatment can be a pleasant and relaxing experience. There is also evidence to suggest that "a strong therapeutic relationship with providers who listen and provide time and knowledgeable advice"[40] might contribute to reflexology's popularity. If that is true, the current high level of use of "alternative" treatments would be a biting criticism of conventional health care, which often seems to fail patients' needs in this respect.[41] A further reason was recently pointed out by Raymond Tallis:

> Alternative medicine does not merely offer unfounded hope of cure: it offers meaning to someone who may feel that the scientific facts of their case do not translate into personal meanings, and who feel their illness, their suffering, indeed themselves, caught in the stony, unreciprocating "gaze from nowhere" that is created by the ever more abstract and complex discourse of the community of scientific minds.[42]

Three systematic reviews have previously assessed the value of reflexology. Our previous evaluation is now outdated;[4] this article is an attempt to update it. Hughes and colleagues recently published a review of massage techniques in paediatric cancer care.[43] Even though it included several RCTs of reflexology, its aim was not to summarise the totality of the evidence for or against reflexology. Wang and colleagues recently published a systematic review of the efficacy of reflexology and found that "there is no evidence for any specific effect of reflexology in any conditions".[44] Unfortunately, this systematic review included less than 50% of the available RCT data.

My systematic review has several limitations. Although efforts were made to find all relevant RCTs, I cannot be sure that this aim was achieved. Publication bias might have led to the disappearance of negative studies. In this case, the (already quite disappointing) overall picture generated here might be too positive. Finally, the paucity and the poor quality of the existing studies prevents definitive judgements about the value of reflexology.

In conclusion, this systematic review failed to demonstrate that reflexology is clinically effective for any of the wide range of conditions for which it has been tested.

COMPETING INTERESTS

None identified.

AUTHOR DETAILS

Edzard Ernst, MD, PhD, FMedSci, Director Complementary Medicine, Peninsula Medical School, Universities of Exeter and Plymouth, Exeter, United Kingdom.
Correspondence: Edzard.Ernst@pms.ac.uk

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