



Reflexology and cancer

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ABSTRACT

Reflexology is a complementary alternative medicine procedure carried out by applying pressure to specific points located mostly in the feet (sometimes in the hands), with intent to provide relief from certain symptoms. In reflexology thought to have a history of approximately 5000 years, it is believed that specific points in the feet are linked to certain organs and systems in the body, through energy channels, and that applying pressure to these points provides relief in the relevant organ and system, as well. However, no evidence has yet to be found that proves the alleged connections and mechanisms of reflexology. Indeed, studies carried out up to date were focused on the symptomatic effects of reflexology, rather than such links and mechanisms. In some studies, certain positive results have been obtained especially in terms of pain and anxiety. However, these studies were methodologically incomplete, as well, due to challenges such as the difficulty in creating blinding and placebo effect. As a result, currently we have no reliable evidence about the use of reflexology in any clinical situation. Nevertheless, when it is considered to be a safe procedure in terms of unwanted effects, it can be provided to patients as a supportive care service.

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1. Introduction

Complementary and alternative medicine procedures find place in the lives of cancer patients ever-increasingly, in a controlled or uncontrolled manner.¹ According to data obtained from surveys conducted in Europe; approximately 36% of cancer patients try complementary alternative medicinal procedures.² Reflexology, among the manipulative and body-based practices, is one of the 6 most commonly used complementary medicine procedures in the United States.³

Reflexology is a complementary medicine procedure based on the principle of providing relaxation and healing by systematically applying pressure to specific reflex points mostly located in the feet but also in the hands, depending on some other practices. In this procedure, it is believed that some energy channels pass through certain points in the feet, and that when pressure is applied to these points, the blocked channels are unblocked in such a way as to restore the balance in the corresponding organs, glands or systems.⁴ Besides these, some reflexologists assert that sensibility or

gritty tissues felt by palpation in the reflex areas of the feet indicate an imbalance in organs or systems; in other words, this procedure is also a diagnostic procedure.⁵ (Fig. 1).

Until now, there have been many published studies on the use of reflexology for various health problems. However, there is no up-to-date and adequate compilation studies on its use especially in cancer patients. For this reason, this study was intended for providing an extensive evaluation of clinical trials carried out on the effects of reflexology practices on cancer patients, as well as the evidentiary values of such studies.

2. History

Despite the assertion that the treatment involving the application of pressure to the hands and feet was invented 5000 years ago in China, old proofs showing its use are seen in Egyptian papyruses dating back to 2300 BCE.⁶ In Europe, it began to be popular under the name of “zone therapy” in the 14th century.⁷ In the early 20th century, Dr. William Fitzgerald considered to be the father of reflexology observed that when pressure is applied to certain bony protrusions, numbness occurred at some other points of the body, and thought that such reflex responses could be used as a method of treatment. Later on, physiotherapist Eunice Ingham laid the foundations of today’s reflexology by mapping the reflex points in

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Foot Reflexology Chart



Fig. 1. Foot Reflexology Chart (Credit by Can Stock Photo Inc./Peter Hermes Furain. Permission received).

the hands and feet.⁸ Afterwards, reflexology became a procedure preferred by many people because of certain reasons such as the facts that it is a safe and easy-to-apply procedure based on simple manual techniques that do not require any drugs or invasive intervention.⁹

3. Application

In reflexology, there are two internationally recognized techniques ad Ingham method and Rwo Shur method. The first method does not involve the use of any tools whereas the second method utilizes certain tools such as a wooden stick.¹⁰

According to the available sources of information, an ideal reflexology therapy should include the followings:

- Reflexology sessions should take 1 h on the average, and should be applied on a weekly basis.
- Sessions should definitely be done in a relaxing environment.

-When a patient comes for a reflexology session for the first time, his/her detailed medical history should be taken and his/her

current medical conditions and complaints should be fully learned. Then, whether the patient has ever seen a physician for those complaints should be questioned, and if he/she has not done so already, the necessity of such a consultation should be told to him/her. In addition, the patient should also be told that he/she should not stop taking any drugs before consulting his/her physician during this period.

-Inspection is the second step that a reflexologist should take after taking the medical history. If the reflexologist observes any contraindication for the procedure (gout, leg ulcers, peripheral vascular disease, deep vein thrombosis, infections, wounds-bruises, lymphedema) at this stage, he/she should not carry out the process. If the reflexologist is in doubt about the patient's health status and is suspicious of a specific problem during inspection, he/she should not tell it to the patient and should just tell him/her to see a physician. It is because a reflexologist does not have the authority and competence to make diagnosis. After completion of the session, the patient should be informed about the possible side effects, and should be advised to contact the reflexologist in case of any unexpected effect.^{11,12}

-When reflexology is intended to be applied to cancer patients,

the procedure should be carried out within the knowledge of the oncologist. Special care should be taken when treating those who receive chemotherapy, radium or hormonal therapy; and the reflexologist should be a well-educated person.¹²

4. Mechanism of action

Possible action mechanisms of reflexology practices are described with the energy channels theory, lactic acid theory, and neuromatrix pain theory. According to the energy channels theory, blockage of energy channels in the body disrupts the balance in the organs and systems, and unblocking these channels restores the balance.¹³ In the lactic acid theory, pressure and massage are believed to break down the lactic acid deposits accumulated in the foot and increase the energy flow.¹⁴ And the neuromatrix pain theory is the theory constituting a basis for the explanation of massage's effect in general. In this theory, afferent impulses given by touching and applying pressure are transmitted faster than pain in the dorsal root of the medulla spinalis, and block the transmission of pain.¹³ According to another opinion, reflexology as just a simple method of patient care relaxes the patient in such a way as to reduce the distemper and stress.¹⁴

5. Clinical studies on the use of reflexology in cancer treatment

In the literature, there are many studies on the symptomatic effects of reflexology in cancer and many non-cancerous diseases (Table 1). Especially its effect on pain, nausea, depression, anxiety, and dyspnea in cancer patients are emphasized.^{15,16} Although many of these results gave unfavorable results, there are also studies that gave favorable results. However, such studies are methodologically quite incomplete. Now, the only possible inference about the favorable effects of reflexology can be that it reduces stress by providing a general relaxation, and is useful in reducing pains.⁹

In a systematic compilation published in 2008 that included 5 randomized controlled studies, the effect of reflexology on relieving cancer-related physical and physiological symptoms were reviewed. As a result, the study was found to be methodologically limited in terms of making a clear conclusion.¹ In another systematic compilation published in 2008, whereby 5 randomized controlled studies were reviewed, it was stated that there were no reliable evidence of any specific effect of reflexology in any situation but that it could be useful for only treating urinary symptoms in MS (multiple sclerosis) patients.¹⁷ In a systematic compilation published in 2009 that involved the review of 18 randomized controlled studies, it was concluded that there were no convincing data on the use reflexology for any health condition.¹⁸ In a compilation published in 2010 that involved the review of 4 controlled clinical studies conducted with the participation of patients with breast cancer, it was observed that reflexology provided benefit in relieving pain, fatigue, and nausea in 3 non-randomized clinical studies. However, the possibility of bias was high in these studies due to insufficient number of cases, incompatible control groups, and short observation or treatment periods.¹⁹ Another systematic compilation published in 2011, reviewed 23 randomized controlled studies (5 of which were conducted on cancer patients) intended for the investigation of the effect of reflexology on any health condition. But as a conclusion, no convincing evidence could be obtained to prove any significantly positive effects of reflexology on any health condition. In addition, studies that gave positive results were reported to be methodologically insufficient.²⁰ Among these, in a study conducted with the participation of these 20 patients, it was reported that reflexology significantly increased the quality of life of palliative cancer patients.²¹ However, when considering the

number of patients enrolled in the study, it is difficult to say that the results are convincing.²⁰ A meta-analysis published in 2015 reviewed the effect of reflexology on symptoms such as stress, anxiety, and fatigue as well as on parameters such as blood cortisol levels, blood pressure, and pulse, when self-applied by people after being trained; and consequently, the conclusion was that there were no adequate evidence to recommend its use.²²

In a comprehensive randomized controlled study published in 2012 that involved the review of 385 women with advanced stage breast cancer treated with chemotherapy and/or hormone therapy, the physical functions of patients in reflexology group were observed to develop; and especially the severity of dyspnea was observed to be lower.²³ However, the fact that the study was not a blind study impairs the reliability. A randomized controlled study published in 2010, conducted with the participation of 183 women with early stage breast cancer, showed that the administration of reflexology in postoperative period improved the quality of life significantly.²⁴ However, due the study's design (A + B & B), it is difficult to say that this effect is the specific effect of reflexology. In two randomized controlled studies conducted by Stephenson NL and his team in 2000 and 2007, which enrolled 23 and 86 cancer patients respectively, reflexology was found to lower the pain level and anxiety but these were short-term effects.^{14,16} In a randomized controlled study published in 2008, conducted with the participation of 61 women with hepatocellular or gastric cancer treated with surgery, the patients were divided into two groups, in one of which the standard pharmacological pain treatment was administered whereas also reflexology was administered in the other group on the 2nd, 3rd, and 4th postoperative days. As a result, a significant reduction could be obtained in pain and anxiety in the reflexology-administered group; and on the other hand, the need for opiate analgesics was less in this group.²⁵ However, this study is methodologically inadequate, as well. In another controlled study published in 2006 that was conducted with the participation of 30 cancer patients, the state anxiety scale score was 7.1 point lower in patients, to whom reflexology was administered. However, this study is quite insufficient in terms of reliability, as well, when the fact that only a small number of patients enrolled in the study and the absence of randomization were considered.²⁶ In another randomized controlled study published in 2013, which was conducted with the participation of 115 cancer patients, reflexology was compared with aromatherapy massage, and it was concluded that reflexology generally had efficiency similar to that of aromatherapy massage, in terms of symptoms and the sense of relief.²⁷ However, there were some methodological insufficiencies such as the fact that the study was not a blind study.

In pilot study conducted in 2003 with the participation of 35 patients with metastatic cancer, reflexology provided benefit in reducing the pains, but no significant difference was observed in the evaluation made 3 h after the practice. In other words, reflexology provided a little bit benefit in relieving the pains but it was a short-term benefit.²⁸ In a single-arm study published in 2016, which was conducted with 26 patients with breast cancer, who had lymphedema after axillary dissection, reflexology applied to the feet provided benefit in cancer-related lymphedema.²⁹ In a pilot study conducted in 2012 with 18 cancer patients living in a nursing home, who were at the age of 75 or over, reflexology relieved the pains and lowered the salivary cortisol levels.³⁰ In another pilot study conducted in 2002 that enrolled 17 patients with advanced-stage cancer, reflexology was administered to a group (n = 7) was, while a simple foot massage was applied to the other group (n = 10), and it was evaluated using anxiety and depression scale. As a result, the both methods were observed to provide a temporary relief in the patients, and it was ascertained that reflexology had no superiority over a simple foot massage.³¹

In a pilot study conducted in 2010, which did not directly

Table 1
Systematic compilations and clinical studies on the use of reflexology in cancer patients.

First author (year) [ref]	Study design	Participants	Main results	Conclusion
Wilkinson (2008) [1]	Systematic Review	Adult outpatients with cancer 5 Randomized Controlled Trials	It is encouraging that 5 RCTs exist for the efficacy of reflexology for cancer patients, but several methodological issues still require resolution. The sample sizes in all but one of the studies were small, and the follow-up periods were very limited.	No definitive conclusions can be drawn due to the methodological limitations of the studies.
Wang (2008) [17]	Systematic Review	Adult outpatients with various health conditions 5 Randomized Controlled Trials	Among the five studies suitable for review, there was only one report of a statistically significant treatment effect. Among the 12 outcome variables examined, the treatment effect size for urinary symptoms was large, whereas the effect size for other conditions was negligible.	There is no evidence for any specific effect of reflexology in any conditions, with the exception of urinary symptoms associated with multiple sclerosis. Routine provision of reflexology is therefore not recommended.
Ernst (2009) [18]	Systematic Review	Adult outpatients with various health conditions 18 Randomized Controlled Trials	Twelve of these studies failed to show convincingly that reflexology is an effective treatment. Five RCTs suggested positive effects, and the direction of the result of one was unclear. The methodological quality was often poor, and sample sizes were generally low. Most higher-quality trials did not generate positive findings.	The best evidence available to date does not demonstrate convincingly that reflexology is an effective treatment for any medical condition.
Kim (2010) [19]	Systematic Review	Patients with breast cancer 4 controlled trials (1 randomized, 3 non-randomized)	One large RCT showed significant differences in quality of life and mood when reflexology was compared with self-initiated support. Three NRCTs tested reflexology compared with no treatment or simple rest. All of them suggested favorable effects of reflexology on pain, nausea, and vomiting. However, they had a high risk of bias.	Collectively, the existing evidence does not convincingly show that reflexology is effective for breast cancer care.
Ernst (2011) [20]	Systematic Review	Adult patients with various health conditions 23 Randomized Controlled Trial	Nine high quality RCTs generated negative findings; and five generated positive findings. Eight RCTs suggested that reflexology is effective for the following conditions: diabetes, premenstrual syndrome, cancer patients, multiple sclerosis, symptomatic idiopathic detrusor over-activity and dementia yet important caveats remain.	The best clinical evidence does not demonstrate convincingly reflexology to be an effective treatment for any medical condition.
Song (2015) [22]	Meta-analysis	Adult patients with various health conditions 6 clinical trials (3 non-randomized trials, 3 before and after trials)	Self-administered foot reflexology resulted in significant improvement in subjective outcomes such as perceived stress, fatigue, and depression. However, there was no significant improvement in objective outcomes such as cortisol levels, blood pressure, and pulse rate.	Owing to the small number of studies and methodological flaws, there was insufficient evidence supporting the use of self-performed foot reflexology.
Hodgson (2000) [21]	Randomized Controlled Trial	Adult patients with cancer (n = 20)	All participants felt that their quality of life had improved. The reflexology group, however, reported more benefit than the placebo group.	Reflexology does have an impact on the quality of life of patients in the palliative stage of cancer.
Wyatt (2012) [23]	Randomized Controlled Trial	Women with advanced-stage breast cancer (n = 385)	A longitudinal comparison revealed significant improvements in physical functioning for the reflexology group compared to the control group.	Reflexology may be added to existing evidence-based supportive care to improve health-related quality of life for patients with advanced-stage breast cancer during chemotherapy and/or hormonal therapy.
Sharp (2010) [24]	Randomized Controlled Trial	Women with early breast cancer (n = 183)	Reflexology and massage were both better than self-initiated support (SIS) for Mood Rating Scale (MRS) relaxation. Massage was better than reflexology and SIS for MRS easygoingness. Reflexology, but not massage, was better than SIS on the Trial Outcome Index (TOI) and MRS relaxation.	When compared to self-initiated support, reflexology and massage have statistically significant, and, for reflexology, clinically worthwhile, effects on quality of life following surgery for early breast carcinoma.
Stephenson (2000) [14]	Randomized Controlled Trial	Patients with breast or lung cancer (n = 23)	Following the foot reflexology intervention, patients with breast and lung cancer experienced a significant decrease in anxiety. One of three pain measures showed that patients with breast cancer experienced a significant decrease in pain.	The significant decrease in anxiety observed in this sample of patients with breast and lung cancer following foot reflexology.
Stephenson (2007) [16]	Randomized Controlled Trial	86 dyads of patients with metastatic cancer and their partners (n = 86)	A nurse reflexologist taught partners how to perform reflexology on patients with metastatic cancer pain in the hospital, resulting in an immediate decrease in pain intensity and anxiety; minimal changes were seen in the control group, who received usual care plus attention.	Following the initial partner-delivered foot reflexology, patients experienced a significant decrease in pain intensity and anxiety.
Tsay (2008) [25]	Randomized Controlled Trial	Patients who had received surgery for gastric cancer or hepatocellular carcinoma (n = 61)	Using generalized estimation equations and controlling for confounding variables, less pain and anxiety over time were reported by the intervention group compared with the control group. In addition, patients in the intervention group received significantly less opioid analgesics than the control group.	Reflexotherapy might effectively decrease perceived pain and anxiety postoperatively when complemented with pharmacological pain therapy in patients with gastric and liver cancers.
Quattrin (2006) [26]	Non-Randomized Controlled Trial	Adult patients with cancer (n = 30)	There was an average decrease of 7.9 points on the state-anxiety scale in the treatment group and of 0.8 points in the control group.	Reflexology foot massage can be considered a support treatment used in combination with

(continued on next page)

Table 1 (continued)

First author (year) [ref]	Study design	Participants	Main results	Conclusion
Dyer (2013) [27]	Randomized Controlled Trial	Adult patients with cancer (n = 115)	Reflexology was found to be no less effective than aromatherapy massage for measure yourself concerns and wellbeing (MYCaW) first concerns. There was no statistical difference between groups for MYCaW second concerns or overall well-being scores.	traditional medical treatments and executed by an expert. Reflexology appears to be as effective as aromatherapy massage for this patients' self-selected problems and concerns.
Stephenson (2003) [28]	Randomized Controlled Trial (pilot study)	Patients with metastatic cancer (n = 35)	An analysis of variance of baseline-adjusted post-treatment measurements revealed that pain scores were lower by 2.4 more points in the treatment group than in the control group immediately after intervention. However, adjusting for baseline pain levels, there was no statistically significant effect at 3 h after intervention or at 24 h after intervention.	Foot reflexology was found to have a positive immediate effect for patients with metastatic cancer who report pain.
Whatley (2016) [29]	Non-randomized, Uncontrolled Clinical Trial (single-group test)	Women with breast cancer who had developed secondary lymphoedema (n = 26)	A significant reduction in the volume of the affected arm was identified at follow-up compared to baseline. This reduction in volume appeared to be maintained for more than six months. Participant concerns were significantly reduced and their wellbeing significantly increased.	Reflexology lymphatic drainage may be a useful intervention for breast-cancer related lymphoedema although the results could not be attributed to the reflexology intervention because of research design limitations.
Hodgson (2012) [30]	Randomized Controlled Trial (pilot study)	Adult patients with cancer (n = 18)	Both Reflexology and Swedish Massage resulted in significant declines in salivary cortisol and pain and improvements in mood.	Preliminary data suggest that studies of Swedish Massage Therapy and Reflexology are feasible in this population.
Ross (2002) [31]	Randomized Controlled Trial (pilot study)	Patients with advanced cancer (n = 17)	The touch therapies of reflexology and foot massage to be pleasurable additions to specialist palliative day care that are popular with patients. Symptom distress score results aren't different between groups apart from a significantly greater improvement in appetite and mobility in the foot massage group. Patients in both groups generally enjoyed their therapy and there were few possible adverse effects.	Neither treatment seems to have a major effect on mood or common symptoms in this patient group, although both may lead to temporary relaxation and nonspecific well-being.

enrolled cancer patients but instead enrolled 19 women with constipation as one of the common symptoms in cancer patients, reflexology provided a slight decrease in constipation.³² In another study conducted in 2013, which involved the investigation of reflexology's specific hemodynamic effects (blood pressure, heart rate, heart rhythm, blood flow rate, baroreceptor reflex sensitivity, and sinus arrhythmia), 12 randomized controlled studies were reviewed, and strong evidence could not be obtained to show that reflexology has a significant and specific effect on hemodynamics.³³

6. Safety

Since reflexology is based on simple manual techniques that do not require any drugs or invasive intervention, it is considered to be a safe procedure. So indeed, apart from a few reports and warnings, the literature does not contain important reports about undesirable effects caused by reflexology.^{3,9} Some studies reported certain side effects such as weakness and changes in renal and intestinal functions.⁵ In a study conducted with the participation of 130 patients, who had previously undergone an abdominal surgery, reflexology was applied to the patients for a period of 10 days from the day before surgery, and then its effect on the general condition and pain were evaluated. As a result, it was ascertained that reflexology did provide a significant relief in pain and even triggered postoperative abdominal pains.³⁴ In another study, repeated sessions of reflexology were reported to be likely to increase the sensitivity in sensitive areas of the foot, and cause additional minor ailments.³⁵ Some sources emphasize that certain unwanted effects may occur such as fatigue, swelling at the application site, increased frequency of urination etc.; and that patients should be warned about these in advance.¹²

Some local problems are considered to be the contraindications of the procedure, such as gout, leg ulcers, peripheral vascular disease, deep vein thrombosis, infections, wounds-bruises, and

lymphedema.¹¹ The most emphasized warning is that reflexologists do not the authority and competence for diagnosis or treatment, and that the procedure can be used only as a supportive care practice and cannot be used as a primary procedure intended for the diagnosis or treatment of any medical condition.⁸

7. Conclusion

In the studies carried out up to date, no significant findings could be obtained that can verify the claims that specific points of the foot correspond to specific organs or systems in the body in reflexology, and that reflexology is beneficial in the elimination of disorders in such organs or systems. The literature contains many studies intended for the effect of reflexology on especially pain, anxiety, depression and shortness of breath in cancer patients; and favorable results were achieved in some of such studies. However, these studies have a high risk of bias due to methodological problems such as the insufficient number of cases, the absence of randomization, blinding, and a control group, and the differences in the implementation of the process. However, when we consider the facts that it is a safe procedure and that there are findings showing its short-term effects as relaxation and relief (even if not strong enough) of pains, we can consider it to be a safe procedure in reliable hands that never misuse it. The point to take into consideration is particularly the fact that it is a procedure employable only as a supportive care technique intended for providing relief, which cannot be used for the diagnosis or treatment of any disease.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jons.2018.01.001>.

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