

# Reflexology in Childbirth Pain Management

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**Abstract-** This study was conducted to review the related articles and draw a final conclusion regarding the application of reflexology for delivery (labor and cesarean section) pain management in women all over the world. In this systematic review, relevant articles were searched in Google Scholar, PubMed, Cochrane Library, Science Direct, and Scopus databases from the year 2000 to 2018. All the human clinical trials that examined the effects of reflexology methods on delivery pain (labor or Cesarean section) were included, and others were excluded from the study. All the 18 included original articles (with 1391 patients) reported that reflexology significantly reduces the pain of delivery, confirming its decreasing effect on labor, Cesarean section, and post-delivery pain. Results of all articles showed that if true reflexology is performed on the right location of the body and at the appropriate time, the pain of delivery can be significantly decreased. Reflexology is appropriate pain relief and prophylaxis for any kind of pain, especially delivery and post-delivery pain. It is a safe remedy with no adverse effects reported so far.

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## Introduction

The application of pressure to areas on feet, hands, ears, and other parts of the body is called reflexology (1-3). Reflexology may be an effective method to alleviate stress and is commonly relaxing. The theory behind reflexology states that these areas correspond to organs and systems of the body (4,5). Its proponents believe that pressure applied to these areas affects the organs and has health benefits. Foot charts guide reflexologists when they apply pressure to specific areas (6-8). Rubber balls, rubber bands, and sticks of wood are the items these practitioners sometimes utilize for assistance. Practitioners of reflexology are, among others, chiropractors, physical therapists, and massage therapists (9-12).

Several studies conducted by the National Cancer Institute and the National Institutes of Health show that reflexology may lessen pain and psychological symptoms, such as nervousness and depression, and improve relaxation and sleep (13-17). Studies also report

that reflexology may have profits in the palliative care of people with cancer (18-24). Reflexologists claim that reflexology is also able to treat a wide range of medical conditions such as asthma, diabetes, and cancer. However, scientific evidence is required to verify these claims (25-27).

Reflexology is generally believed to be safe, even though very vigorous pressure may cause discomfort for some people. Besides, it is an alternative treatment for a variety of conditions and has been used for thousands of years. In ancient times, the Chinese and Egyptians had documented practices very similar to reflexology as treatments for certain afflictions. This method involves the reflexologist exerting pressure on specific regions in the hands, feet, and ears that affect certain reflex areas of the body (28-31). The theory behind reflexology is to align your qi, but even for those who normally do not have much trust in reflexology, there are numerous studies backing up the claims of reflexologists. This method is not broadly accepted in the medical world, but a large number of physicians worldwide have been

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employing reflexology for generations with astonishingly positive results (32-36).

The benefits of reflexology include its capability to stimulate nerve function, increase energy, boost circulation, and induce a deep state of relaxation (37-44). Furthermore, it helps stimulate the central nervous system and avoid migraines (45-50). This sort of massage speeds up recovery after an injury or surgery, decreases sleep disorders, and relieves depression and pain. It also helps facilitate the treatment of different types of cancer and alleviate pregnancy-related pains, even those occurring after delivery (51-63).

Whether you work in an office, plant, field, hospital, or any other place, there is a good chance that you put heavy weights and stress on your feet every day. It is not always the back; stress can manifest itself in the other parts of our body too. This special area of massage therapy also includes hands and ears, making it a holistic massage (64,65).

When an egg is fertilized by a sperm, the result is pregnancy. Then, an embryo grows inside a woman's uterus and develops into a baby (66,67). In humans, this process lasts about 264 days from the date of fertilization. Labor happens in three phases. The first phase begins with contractions and continues until the cervix has become thinner and dilated to about 4 inches wide (68,69). The second phase is the active one, in which the mother starts to push the embryo downward. Crowning is when the baby's scalp can be seen and, a short time after, the baby is born (70,71). In the third phase, the placenta exits the uterus. During pregnancy, the placenta supplies food and oxygen to the baby (72,73). Both mother and baby are monitored thoroughly during labor. The majority of women can have a baby through normal vaginal delivery. When there are complications, the baby may need to be delivered surgically by a Cesarean section (74,75).

Pain during labor is created by pressure on the cervix caused by contractions of the muscles of the uterus. This pain can be felt as strong cramping in the abdomen, back, and groin, as well as an achy feeling (76-78). Some women also experience pain in their sides or thighs. Other reasons for pain during labor include pressure on the bladder and bowels by the baby's head

and the stretching of the birth canal and vagina. Every woman has a different feeling of pain during labor (79,80). Although labor is often thought of as one of the most painful events experienced by humans, it varies highly from woman to woman and even from pregnancy to pregnancy. Women experience labor pain differently. For some, it feels like menstrual cramps; for others, severe pressure; and for others, extremely strong waves that feel like diarrheal cramps (81-86).

Many pregnant women all over the world search for a method to reduce the pain of delivery, and many of these methods have their own risks and problems. Reflexology is a safe and proven way to decrease various types of pain. Therefore, the present study was conducted to review the related articles and draw a final conclusion regarding the application of reflexology for delivery pain management.

## Materials and Methods

Relevant articles were searched in Google Scholar, PubMed, Cochrane Library, Science Direct, and Scopus databases by searching English article topics same to our topic and equal and same to our article keywords (Reflexology, acupressure, massaging in combination with labor, labor pain, cesarean, cesarean pain, delivery, delivery pain, post-delivery pain management, childbirth pain, and pain management) from 2000 to 2018. All the articles were searched by two members of our research group in a double-blind manner for better quality and accuracy of the work. All the studies that examined the effect of reflexology methods on delivery pain (labor and Cesarean section) were included, and others were excluded from this study.

In the first search, 463 articles were found. After removing duplications, 294 articles remained, and after removing articles belonging to years before 2000 as well as those related to any kind of massage therapy except for reflexology, 114 articles remained. Finally, after the examination of articles' abstracts, 18 articles met the inclusion criteria and were included. The search process is showed in Figure 1.

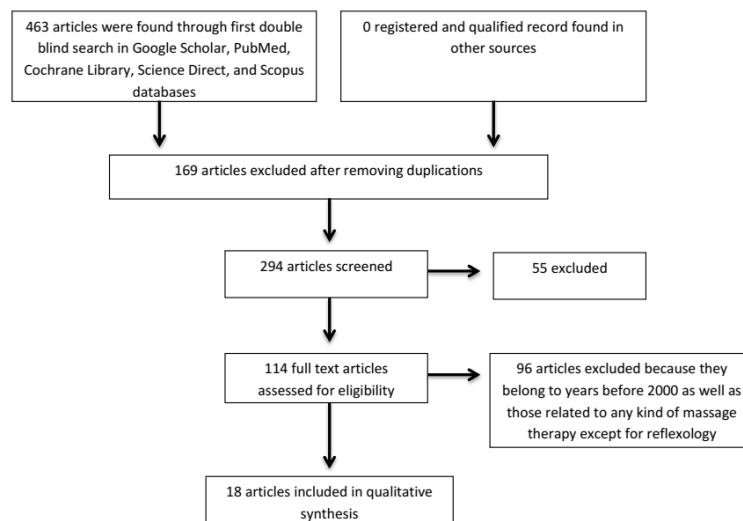


Figure 1. The searching strategy in preferred reporting items for systematic reviews and meta-analyses (PRISMA) flow diagram

Results

Five internet databases were selected for searching about records of reflexology (Google Scholar, PubMed, Cochrane Library, Science Direct, and Scopus) in addition to various books. Any study before the year

2000 and any other study that worked on massage and unspecialized massaging were excluded. We extracted data about the first author, year of publication, delivery type, and all of the important results of the included records and showed them in Table 1.

Table 1. Studies on the effect of reflexology and their outcomes

Row	First author	Year	Delivery type	Number of participants	Results
1	Mehrnoosh Khoshtarash	2012	Cesarean section	62	The severity of pain in the first day was significantly decreased in comparison to the time before reflexology and the control group (p<0.001 and p<0.0001, respectively). The severity of pain after the second stage was also significantly decreased in the case group in comparison with the control group (p<0.001). Physiologic parameters in the case group (systolic and diastolic blood pressure, pulse rate, and respiration rate) showed no significant differences in comparison with the control group (87).
2	Soheila Moghimi Hanjani	2015	Labor	80	Applying the reflexology method reduced pain severity (30, 60, and 120 minutes after intervention) and also significantly reduced anxiety level and duration of labor (p<0.001). Besides, a significant difference was seen between the two groups in terms of the frequency distribution of the type of labor and Apgar score (p<0.001). Results indicated that reflexology decreases labor pain intensity, duration of labor, anxiety, and frequency distribution of natural delivery while raising Apgar scores (88).
3	M. Dolatian	2010	Labor	120	Pain intensity in all three dilatation stages was significantly lower in the reflexology group (p<0.001). However, in the comparison between the supported group and the routine care group, the severity of pain was lower in the supported group only in the 4-5cm dilatation, and there was no significant difference between these two groups during 6-7 and 8-10cm dilatation (89).
4	Mahboubeh Valiani	2010	Labor	88	In this study, there was no major difference between the groups before the intervention. In the reflexology group, there was an important difference between the PRI before and that after the four stages of intervention (p<0.001). The PRI was changed significantly between the studied groups following intervention (p<0.001). The active phase of labor length significantly differed across groups, but this difference was not significant during the second (p=0.29) and the third (p=0.27) stage. The alteration between the 1 <sup>st</sup> -min and the 5 <sup>th</sup> -min Apgar score (p<0.001) and hemorrhage rate between the two groups were significantly different (p=0.02) (90).
5	M. Dolatian	2011	Labor	120	All the three stages of cervical dilatation pain severity were significantly lower in the reflexology (intervention) group in the duration of the 4-5cm dilatation stage.
6	Soheila Moghimi Hanjani	2012	Labor	80	Women in the reflexology group reported less intense pain compared to those receiving routine care, but there were no important differences in the later stages of labor. This shows that reflexology managed to reduce the duration and pain of the first, second, and third stages of labor (91). In this study, there were no significant differences between the two groups before the intervention (p=0.15). After reflexology, the difference in anxiety score differed across groups (p<0.001) (92).

Cont. table 1

7	Jipi Varghese	2014	Caesarean section	60	Mean PSQI was found to be meaningfully smaller in the reflexology group ( $p < 0.001$ ) compared to the control group. The post-test means a score of pain severity of an experimental group was meaningfully lesser than that of a control group ( $X=4.75$ , $X=7.65$ , $t=-10.627$ , $p < .001$ ). Also, there was an important difference between groups in terms of pain severity and requesting pain-reducing medications ( $p < .001$ ). The hypothesis of this research was accepted, indicating that after receiving foot reflexology, the intervention group showed significant pain relief and improved quality of sleep (93).
8	Soheila Moghimi Hanjani	2013	Labor	80	Labor pain intensity before and immediately after intervention (foot reflexology) did not differ across intervention and control groups ( $p > 0.05$ ). Nevertheless, half, one, and two hours after reflexology, the intensity of labor pain was lower in the reflexology group than in the control group ( $p < 0.001$ ). The duration of labor was significantly lower in the reflexology group than in the control group ( $p < 0.001$ ) (94).
9	Razmjoo, Nastaran	2012	Cesarean section	61	In this study, there was no important difference in pain severity before reflexology between the two groups based on the t-test ( $p = 0.814$ ). After reflexology, however, the difference was significantly based on the Mann-Whitney U test ( $p = 0.004$ ). There was no significant alteration between the two groups regarding postoperative anxiety score ( $p = 0.215$ ) (95).
10	Jenabi, Ensiyeh	2012	Labor	70	In this study, the reflexology group had a significant correlation with decreased labor pain ( $p = 0.001$ ), but there was no significant correlation between the place of reflexology and duration of labor ( $p = 0.59$ ) (96).
11	Shayesteh Hassani	2015	Cesarean section	20	The results of this study revealed that there was no significant difference between the two groups before the study. On the other hand, after the reflexology, there was a significant difference between the intervention and control groups. Therefore, reflexology is a useful way to reduce mothers' pain (97).
12	Goweily Eman	2015	Labor	60	Before reflexology, there was no significant difference between the two groups, whereas there was a significant difference between them after reflexology ( $p = 0.0001$ ). There was a significant reduction in physiological and behavioral responses in the reflexology group after intervention sessions.
13	Mathew Ancy Merin	2016	Labor	30	Reflexology can decrease labor pain. Thus, because of the safety of this method, it can be utilized as an alternative for pharmacological methods (98). The calculated t value is 7.54, which is greater than the table value of 2.763 ( $p < 0.05$ ). This shows that there is a significant reduction in the intensity of pain in the experimental group (99).
14	Hajjighasemali	2014	Labor	106	Kruskal-Wallis test indicated no significant difference in pain severity at the start of the study and before the first intervention among the three groups. However, the statistical test showed significant differences between the first intervention and before and after the second intervention among them. The intensity of pain increased significantly in the routine care group ( $p = 0.001$ ). Findings indicated that the average pain score was lower in the acupressure group than the reflexology group, but the Mann-Whitney U test found no significant difference. The pain intensity of labor before and after intervention examined with the Wilcoxon test in both stages indicated that there was no significant difference after intervention in comparison with the time before the intervention in acupressure and reflexology groups. However, in the routine care group, the intensity of pain was significantly increased ( $p = 0.001$ ) (100).
15	Moghimi Hanjani	2012	Labor	80	Duration of labor was significantly lower than in the intervention group than in the control group ( $p < 0.001$ ), the difference between the type of delivery and the 1 <sup>st</sup> - and 5 <sup>th</sup> -minute Apgar score between the two groups was significant ( $p < 0.001$ ) (101).
16	Bagheri, K.	2009	N/A	60	During delivery, pain severity and stress increased, and the t-test showed that pain severity was meaningfully smaller in the intervention group in three phases of delivery. Moreover, stress showed a significant difference in the latent phase across both groups (102).
17	Thottingal	2013	Cesarean section	60	The paired t-test score (14.26) shows that there is a significant difference between pretest and posttest pain scores at the 0.05 level in the experimental group. The independent t-test (38.8) indicated that there was a significant difference between the experimental and control groups on the first day. On the second day, the paired t-test (17.02) revealed that there was a significant difference between pretest and posttest pain scores at the 0.05 level, and the independent t-test (36.3) demonstrated that there was a significant difference between experimental and control groups (103).
18	Yılar Erkek Zümrit	2018	Labor	154	Mean STAI TX-1 scores were measured before reflexology in the latent and active phases of labor and early in the postpartum period (four times in total). Mean STAI TX-1 scores were higher in the experimental group than the control group ( $p < 0.001$ ). Mean STAI TX-1 scores post-reflexology application (when cervical dilation was 3–4 cm) and during the active phase of labor (when cervical dilation was 6–8 cm) of the pregnant women in the experimental group were lower than those of the control group (respectively $p = 0.010$ and $p < 0.001$ ). In the experimental group, there was no statistically significant difference between mean STAI TX-1 scores pre- and post-reflexology ( $p = 0.820$ ). Mean STAI TX-1 scores in the early postpartum period were similar across experimental and control groups ( $p = 0.08$ ) (104).

All the 18 included original articles about the effect of reflexology on delivery pain conducted foot

reflexology and found that this significantly decreased the pain of delivery and confirmed its pain reduction

role for labor, Cesarean section, and post-delivery pain.

Based on the several foot reflexology chart and included articles in this study, several zones on the sole of the foot, especially three forth of the low part of foot bottom and its internal margins, are the main determining parts to deal with the pain of about abdomen to pelvic regions and so related to delivery pain. Exerting massage on these specific points or just massaging the whole foot sole was effective and significant in all studies.

Here, 18 clinical trials and 1391 patients with delivery pain were surveyed. Results of all articles showed that if true reflexology is performed on the right location of the body and at the appropriate time, the pain of delivery can be significantly decreased.

Approximately 293 patients from all included articles were among the Cesarean section group, and the other was in the labor group, and 363 patients of all were among the post-delivery pain group. All three groups show effective pain decrease with  $P < 0.01$ .

Some articles surveyed and showed that the place of reflexology had no correlation with delivery time.

Between all 1391 patients surveyed in this study, in each article, we found reflexology is conducted for 15 to 40 minute for each foot that. In most studies, reflexology was conducted simultaneously for feet, and in some studies, this was conducted on one foot then another, but all analyzed data showed that the whole of these methods was effective with  $P < 0.01$ .

Information, including the first author of each article, year of publication, type of delivery, number of participants, and the outcomes of each article, are presented in Table 1.

## Discussion

Reflexology stimulates the nerve endings in the foot, which sends feedback to other parts of the body by the spinal cord. Reflexology promotes relaxation in blood circulation and eliminates the waste of tissue metabolism from the site. These effects cause changes in heart rate and variations in baroreceptor reflexes (105-108). Reflexology specifically increases blood pressure. These changes can be useful in promoting healing and increasing the capacity of human organisms to respond to internal and external challenges (109-112).

Skin contact in reflexology causes a release of hormones and neuropeptide oxytocin which affects the autonomic nervous system as well as cardiac and vascular systems. Oxytocin inhibits pituitary, adrenal, hypothalamic, and alpha-adrenergic activities. This

hormone also reduces the level of catecholamine that increases blood pressure and cardiac output (113-118).

Changes in the sensitivity of barometric receptors in different situations can increase or decrease blood pressure. Also, these baroreceptors have an inhibitory effect on the brain under the influence of reflexology, thereby decreasing muscle tension and stimulating sleep and the inhibition of the sensory nerves of the spinal cord that decreases pain and anxiety (119-123).

Dysfunction in each part of the body and even the normal functioning of the body leads to the formation of uric acid and calcium crystals, usually occurring in the feet and their nerves. This sediment prevents the flow of lymph and even blood. Reflexology causes this material to be discarded, resulting in the flow of lymph and blood in the area (124-128). In reflexology, pressure on the foot causes cell receptors to open the ion channels in the plasma, thereby causing a local action potential and transmitting these messages to the spine and the brain (129,130).

Here, we conducted a systematic review to study any articles focusing on the effects of reflexology on any kind of delivery pain from 2000 to 2018. All the studies reported that reflexology significantly reduces delivery pain even in the Cesarean section and the post-Cesarean period. A number of excluded studies from the present article had administered body massage or acupuncture for the reduction of delivery pain, and some of them found fewer pain-reduction effects in delivery. This clarifies the effect and the difference of reflexology between similar complementary and alternative medicines.

In conclusion, reflexology is found to be a desirable pain relief and prophylaxis for various types of pain, especially for delivery and post-delivery pain. This method is a safe remedy with no adverse side effects reported so far. Further studies are required to find other kinds of reflexology and their effects on the human body.

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