

## The Effect of Peppermint on the Treatment of Nipple Fissure during Breastfeeding: A Systematic Review

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### Abstract

**Background:** Considering, the high prevalence of nipple fissures as well as the importance of neonatal health and, on the other hand, the increasing use of herbal medicines, we decided to conduct a systematic review on the effects of peppermint on nipple fissure.

**Materials and Methods:** In this systematic review, all clinical trials evaluating the effect of peppermint on healing of breast fissure in lactating mothers were searched on the online databases of Scopus, EMBASE, Cochrane, Web of Science, and Medline with no language or time restrictions till to Feb. 2019 using the combination related keywords of Mesh. The study selection was carried out by two reviewers.

**Results:** Six studies (with a total 952-sample size) examined the effect of peppermint on nipple fissure. The first study showed that the lanolin, peppermint, and dexpanthenol medicines had similar therapeutic effects on the damaged nipple. The results of the second study revealed that there was a statistically significant difference between the three intervention groups (peppermint tea bag, peppermint cream, and breast milk) in the treatment of nipple cracking. The results of four other studies also showed a positive effect of peppermint on the treatment of nipple fissure.

**Conclusion:** Peppermint can have beneficial effects on the treatment of nipple fissure disorders. Considering the patients' interest in complementary medicine and the low cost of this treatment, this useful herb can be used in improving the symptoms of nipple fissure.

**Key Words:** Breastfeeding, Mother, Nipple fissure, Peppermint, Treatment.

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## 1- INTRODUCTION

Neonatal disorders such as crying, sleep disturbance, and nutrition affect approximately 20% of newborns in the primary years of their life. These disorders are relatively stable during the early years and there is increasing evidence that these problems in infancy are associated with increased behavioral problems in children such as Attention Deficit Hyperactivity Disorder (ADHD) (1). Breast milk, on the other hand, is the most appropriate food for the infant, and will not only help maintain his/her longevity and health, but will also provide health benefits for his/her childhood, adolescence, adolescence, middle age, and old age. One of the problems associated with breastfeeding is the mother's breast problems, which include nipple problems and breast lumps. Nipple problems are considered as one of the most important problems during breastfeeding (2).

Breastfeeding is at risk when the mother's nipples are damaged. Nipple fissure is still considered a common problem and pain or cracks commonly occur after lactation. It is estimated that 80 to 90% of breastfeeding females experience nipple fissure, 26% of them progress to cracking and severe nipple pain (3). Pain interferes with breastfeeding by disrupting the milk spout and reduces the volume of milk delivered to the baby, thereby creating the risk of the baby's weight loss and its associated consequences. Therefore, nipple pain is a common cause of breastfeeding cessation. In some studies, incorrect positioning of the baby's mouth on the breast, inefficient sucking by the baby due to organ and functional causes, short frenulum, very small tongue, using the breast pump, contamination with *Candida albicans*, using pacifiers and powdered milk for the infant, and pulling the breast out of the baby's mouth before sucking is stopped have been noted as the causes of nipple pain, injury, and fissure (4).

So far, topical ointments, solutions or sprays, lactation time limit, exposure of nipple to air and light, training on proper breastfeeding techniques, rubbing the breast milk on the nipple, hydrogels, hot water compresses, peppermint extract, tea bag, collagenase ointment, dexpanthenol, lanolin, aloe vera, and aqueous-alcoholic extract of curcumin have been used to heal the nipple pain and treat and prevent nipple fissure (5-7). Nowadays, due to the failure of therapeutic methods, researchers tend to use complementary medicine, and herbal medicine is accepted as a branch of complementary medicine by about 80% of the population (8). There is currently no explicit comment on the most appropriate topical treatment for nipple injury, and researchers are currently seeking to find and use low-cost, effective, convenient, and accessible methods in health care centers. One of the therapies is the use of peppermint products (3, 9).

It contains menthol, flavonoids, phenolic acid, and tryptophan. The menthol has a sedative and anesthetic effect and is used for numbness, skin, and treatment of burns, wounds, itching, and inflammation (10, 11). Therefore, given the high prevalence of nipple fissures, the importance of neonatal health and, on the other hand, the increasing use of herbal medicines, and also no agreed treatment for the disease, we decided to conduct a systematic review on the evaluation of the effect of peppermint on nipple fissure in lactating mothers.

## 2- MATERIALS AND METHODS

### 2-1. Study design

Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) checklist was used for this review.

### 2-2. Eligibility Criteria

Participants, Interventions, Comparators, and Outcomes (PICO) was used to

formulate the review objective and inclusion criteria.

**Participant:** Lactating Mothers.

**Interventions:** Any type of breast fissure treatment using Peppermint.

**Comparators:** Treatment vs. control group, treatment vs. different type of treatment, before vs. after treatment.

**Outcome:** The reduction of breast fissure in lactating mothers.

### 2-3. Included Studies

Randomized Controlled Trials (RCT), clinical studies both randomized and nonrandomized either retrospective or prospective. We did not consider pilot, preliminary, and case report studies because of the limited sample size and a higher risk of bias. Studies published in Persian and English till Feb. 2019.

### 2-4. Search Strategy

All clinical trials evaluating the effect of Peppermint on breast fissure were searched on the electronic databases of Scopus, EMBASE, Cochrane, Web of Science and Medline (via PubMed) with no language or time restrictions (till Feb 2019) using the combination keywords of (Sore, Nipples, Nipple, Treatment, Therapeutics, Therapy, Trauma, Wound, and Fissure) and (Breastfeeding or Breastfeeding) and (Mentha piperita or Peppermint), and their Persian synonyms and all their possible combinations, were searched in the national databases (Magiran, SID, and Iran.Doc). PRISMA flow diagram was used to show the process of study selection (**Figure.1**). The search process was performed by two independent researchers and a supervisor judged any disagreement in each step.

### 2-5. Selection Process

The relevant studies were chosen independently by two reviewers, who reviewed the abstracts of previously published studies initially and then downloaded their full text to review carefully. Finally, the articles with inclusion criteria were enrolled in the systematic review, and their relevant references were also reviewed to find further studies. Any disagreement was judged by the third party.

### 2-6. Data Extraction

Required data for our systematic review were showed in a checklist. It is containing the name of first authors, year of publication, study design, sample size, intervention period, intervention results, drop out, and assessment tool (**Table.1**). Two independent reviewers extracted the data from the articles. Any discrepancies were judged by the third party. We were unable to implement the meta-analysis since there was high heterogeneity among the outcomes and also the few studies were polished up to now included, thereby making us report the results qualitatively (*Please see the table.1 in the end of paper*).

### 2-7. Quality Assessment

After searching, the search team used the jaded scale (12), a valid and reliable tool to assess the quality of included studies, indicating randomization, blindness, and dropout or withdrawal. The scores of this tool range between 0 and 5. The two independent reviewers accomplished study quality and any discrepancy was judged by the third party (**Table.2**).

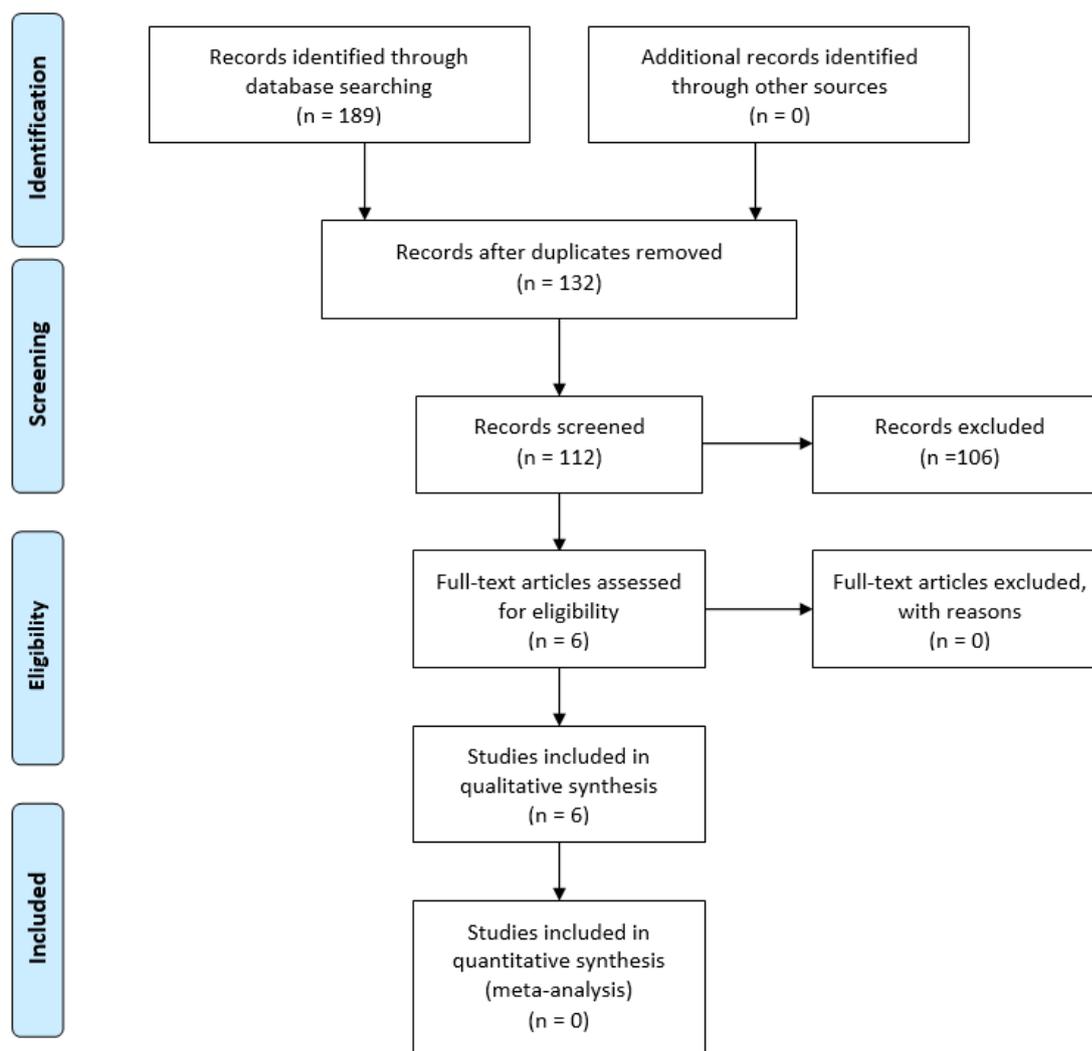


Fig.1: PRISMA flowchart of present study.

Table-2: Quality Assessment using Jadad scale (12).

Authors, Reference	Year,	Randomization			Blinding			Report of dropping out
		Mention randomization	Appropriate method	Inappropriate Method	Mention blinding	Appropriate method	Inappropriate method	
Masaodi et al., 2019, (2)		*	*	-	*	*	-	*
Melli et al., 2007, (3)		Unclear	-	-	Unclear	-	-	*
Abd-Elsalam et al., 2011, (13)		-	-	-	-	-	-	*
Akbari et al., 2014, (14)		*	*	-	Unclear	-	-	*
Gharakhani Bahar et al., 2018, (15)		Unclear	-	-	Unclear	-	-	Unclear
Shanazi et al., 2016, (16)		Unclear	-	-	*	*	-	*

### 3- RESULTS

Six studies with a sample size of 952 were included in this study. Results of a study stated that the use of peppermint water in combination with an oily base could have some beneficial effects in reducing nipple crack (13). A study aimed at comparing the effect of peppermint on the treatment of nipple trauma in breastfeeding mothers by Masaodi et al. in 2017, the findings showed that there was no statistically significant difference between pain and trauma score in these two groups. Although, in the next turns including the third, seventh, and fourteenth days, a statistically significant difference was observed, such that the pain reduction in the peppermint group ( $P < 0.05$ ).

It was concluded that the peppermint cream is effective in reducing nipple pain and trauma and can be used to treat and prevent the exacerbation of breastfeeding problems (2). Akbari et al. (2014), conducted a clinical trial entitled "The Effect of Menthol Essence and Breast Milk on Improving Nipple Fissure in Breastfeeding Women". In this study, samples were randomly divided into two groups of 55. Women in the intervention group applied four drops of menthol essence (peppermint) on their nipple and areola after each feeding. Women in the control group applied four drops of their milk on the nipple and areola after each feeding. Results indicated that there was a significant difference in the mean intensity of nipple pain and the mean nipple fissure before the treatment began and 10 days after delivery, and before treatment and 14 days after delivery in the intervention group. Nipple discharge was significantly different between the two groups before the intervention and 10 days after delivery, and before treatment and 14 days after delivery (14). A randomized trial was conducted by Melli et al. (2007) and they used the peppermint gel, lanolin ointment, and placebo gel to prevent nipple cracking

in primiparous breastfeeding women. It was concluded that the prophylactic peppermint gel is more effective in breastfeeding women compared to the lanolin and placebo and can be recommended for the prevention of nipple cracking along with better breastfeeding training at the beginning of lactation (3). In a comparative study carried out by Gharakhani Bahar et al. in 2017 at the University of Hamadan, the effect of the mint tea bag, mint cream, and breast milk on the treatment of nipple cracking was investigated during lactation. Interventions were performed at least four times a day for 14 days after treatment was initiated. The results showed that there was a statistically significant difference between the three intervention groups (mint tea bag, mint cream, and breast milk) (15).

In another study conducted by Shanazi et al. in Sanandaj (2016), the effect of the lanolin, peppermint, and dexpanthenol creams on the treatment of traumatic nipples in lactating mothers was compared. This double-blind randomized controlled trial was performed on 126 lactating mothers. The study participants were randomly divided into three groups of lanolin, peppermint, and dexpanthenol creams. Finally, the results of this study showed that the lanolin, peppermint, and dexpanthenol medicines had similar therapeutic effects on the injured nipple (16).

### 4- DISCUSSION

Considering the importance of breastfeeding, we reviewed the results of studies on the impact of peppermint on the healing of breast fissure in lactating mothers. The reviewed studies suggested that peppermint is useful for the treatment of breast fissure in lactating mothers. Breastfeeding is an important event in the postpartum period and exclusive breastfeeding is one of the major health priorities for infants. Nipple fissure is one

of the contributing factors to breastfeeding cessation (17), such that in a study on the American mothers, the most important factor in breastfeeding discontinuation was reported to be nipple fissure and race (18). To have successful breastfeeding and avoiding complications such as mastitis or abscesses, nipple fissure therapy plays a crucial role (19). Sore nipples are the second factor leading to the early desuetude of breastfeeding and interpreting the major reason for mothers' tendency to use artificial feeding (15). Approximately 80-90% of lactating women experience various types of nipple soreness and 26% suffer from agonizing nipple fissures (20).

Different studies showed that different forms of peppermint are used in different societies to increase successful lactation. Peppermint is a well-known herbal medicine used to treat a variety of symptoms and diseases and has a long history of safe use in both medicinal plants and as a flavoring substance in food. Peppermint contains menthol, flavonoids, phenolic acid, and triterpene. The menthol in peppermint causes sedation and numbness and can be used to treat breast fissures (2). Peppermint, on the other hand, is a well-known herb used for a variety of symptoms and diseases and has a long history of safe use in both medicines and as a food flavoring. It has been used as an anti-inflammatory, antiemetic, antiprastic, and antibacterial traditional medicine (21).

Menthol essence heals nipple fissures and has strong anti-inflammation and anti-microbial effects on tissues (22, 23), in which Menthol assaults on the cytoplasmic membrane of microorganisms and inflammatory agents destroys the membrane resulting in releasing of intracellular components. Furthermore, regarding its role in the degradation of the electron transport process, nutrients absorption, synthesis of nucleic acid, and ATPase enzyme activity, it can preserve

the cells and demolish microorganisms and consequently prevent damage to tissue cells (24). According to the findings of Melli et al. (2007) in the study on the Peppermint water effect in the prevention of nipple fissures, nipple fissures in the intervention group were significantly fewer than those in the control group (3). Reports of Akbari et al. (2014) indicate that menthol essence can develop nipple fissures in the primiparous breastfeeding women (15). The antispasmodic activity of *Mentha piperita* has been examined in animals and the spasmolytic effect of peppermint oil on the intestinal musculature seems to associate with calcium antagonism (25).

#### 4-1. Study Limitations

The methodological quality of some of the studies reviewed in this systematic review was poor. These deficiencies included the absence or inadequate reporting of random allocation sequences, the absence or inadequate reporting of blinding, and the lack of intention to treat analysis. It is recommended that future studies be designed and reported based on the Consolidated Standards of Reporting Trials (CONSORT). Other limitations of this study included the rare studies and their low sample size, indicating the need for further studies with a larger sample size.

#### 5- CONCLUSIONS

Peppermint can have beneficial effects on treating nipple fissure problems. Considering the patients' interest in complementary medicine and the low cost of this treatment, this method can be used for the improvement of nipple fissure. The efficacy and safety of this method should be assessed through more sophisticated study design and be compared with other recently available treatments in a randomized manner.

**6- CONFLICT OF INTEREST:** None.

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**Table-1:** General characteristics of included studies.

Authors/Country/ Year/ Reference	Outcomes	Type of study	Sample Size	Duration of use	Scale	Drop out	Results
Masaodi et al, 2019/Iran/(2)	The effect of Peppermint cream on improvement of nipple trauma and nipple pain	RCT	84	3 times daily for 14 days	-Store scale -Champion scale	-	Traumatic nipples improves with Peppermint cream.
Melli et al., 2007/Iran/ (3)	The effect of Peppermint water on prevention of nipple cracks and nipple pain	RCT	196	After breastfeeding for 14 days	Breast examination	8%	Peppermint water is effect on prevention of nipples pain and damage.
Abd-Elsalam et al., 2011/Egypt/ (13)	The effect of Peppermint /Tea bag / Dexpanthenol cream on improvement of nipple trauma ,nipple crack and nipple pain	RCT	200	14 days	-Nipple Soreness Rating Scale nipple -Nipple Trauma Score - Visual Analogue Scale	-	Peppermint is effective in the prevention of on the traumatic nipple.
Akbari et al., 2014/Iran/ (14)	The effect of menthol essence / breast milk on the improvement of nipple fissures, nipple discharge	RCT	110	After breastfeeding for 14 days	-Visual analog scale -Amir scale	-	Menthol essence is effective on the improvement of nipple fissures.
Gharakhani Bahar et al., 2018/ Iran/ (15)	The effects of mint tea bag/ mint cream/ breast milk on the cracked nipple and nipple pain	RCT	214	4 times daily for 14 days	-Score Factor Check Scale -Checklist for measuring the amount of ulcer	1%	Breast milk was more effective than mint cream and mint tea in the healing of cracked nipple.
Shanazi et al., 2015/Iran/ (16)	The effect of Peppermint /Lanolin / Dexpanthenol cream on improvement of nipple trauma and nipple pain	RCT	126	3 times daily for 14 days	-Store scale -Champion scale	-	Placebo, peppermint, and Dexpanthenol cream have similar therapeutic effects on the traumatic nipples.

RCT: randomized controlled trial.