



# Effects of Complementary Therapies on Labor Pain: A Literature Review

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## Abstract

**Context:** Labor is among the most painful events in females' lives. Labor pain (LP) is alleviated using both pharmacological and non-pharmacological methods. The current study aimed at reviewing clinical trials in Iran as well as other countries on the effects of acupressure, aromatherapy, and massage therapy on LP.

**Evidence Acquisition:** In the current review study, online databases such as SID, Iranmedex, Magiran, IranDoc, Cochrane library, PubMed, and Google Scholar were searched to retrieve studies published before 2017 in Persian or English language. Search keywords were labor pain, acupressure, aromatherapy, and massage as well as their Persian equivalents. Retrieved clinical trials were appraised using the Jadad checklist. Data were analyzed qualitatively.

**Results:** In total, 46 clinical trials were enrolled. Most studies reported the positive effects of acupressure, aromatherapy, and massage therapy on labor pain. The most frequently used therapies were aromatherapy with lavender essential oil and acupressure on the LI4 and SP6 points.

**Conclusions:** Acupressure, aromatherapy, and massage therapy were effective in alleviating labor pain. These techniques are mostly safe without serious side effects for parturient females and their babies. Therefore, they can be used to alleviate labor pain.

**Keywords:** Labor Pain, Complementary Therapy, Acupressure, Aromatherapy, Massage

## 1. Context

Labor pain (LP) intensity is one of the most severe pains that almost all females experience (1, 2). LP is mild in 15%, moderate in 35%, severe in 30%, and extremely severe in 20% of the cases (3). Giving birth is one of the most important events in mother's life and is a physiological process (4). LP may lead to loss of emotional control, which plays a key role in experiencing a traumatic delivery (5) and psychological disorders (6). LP and fear of experiencing the pain may also increase the tendency toward cesarean delivery (7). Such complications necessitate the use of methods decreasing LP. Today, various pharmacological and non-pharmacological methods are used to reduce LP (8). There are considerable advantages in the application of non-pharmacological LP relief techniques with few side effects for both the mother and fetus and no interference with labor process (9). The use of complementary and alternative medicine (CAM) to manage LP is greatly developed in the last decade (1). The most common complementary thera-

pies for pain alleviation are reflexology, acupuncture, acupressure, massage, and aromatherapies (10).

The use of medicinal plants is greatly increased in recent years. Essential oils extracted from aromatic plants can significantly reduce stress and anxiety, promote relaxation, stimulate endorphin release, and alleviate LP (11, 12). Acupressure is also a complementary therapy. Acupressure creates balance between two opposites, except vital forces in the body, i.e., yin and yang. In acupressure, certain points on the body surface are compressed using hands or other devices in order to provide balance in the flow of forces in certain hypothetical pathways called meridians (13, 14). In fact, acupressure is similar to acupuncture, but it does not need needle insertion, and hence, is free of acupuncture side effects such as fainting, infection, bleeding, and hepatitis (13). According to acupressure, there are 12 main meridians or invisible channels throughout the body. Any imbalance in the meridians can decrease or increase energy level in some areas of the body, which finally result in disorders (15). It is supposed that meridian blockages dur-

ing labor cause LP. Thus, stimulation of acupoints via acupressure or acupuncture can clearly block and restore normal functioning of the meridians. Some researchers believe that acupressure and acupuncture can alleviate pain through blocking pain transmission and stimulation of endorphin release (16). Acupoints, which can be used for LP alleviation, are located on hands, feet, and ears (17).

Different clinical trials assessed the effects of acupressure, aromatherapy, and massage therapy on LP. The current study aimed at reviewing clinical trials conducted in Iran and other areas of the world on the effects of acupressure, aromatherapy, and massage therapy on LP.

## 2. Evidence Acquisition

The present systematic review was conducted using the guideline of preferred reporting items for systematic reviews and meta-analysis (PRISMA) on all clinical trials published before 2017. Accordingly, all online databases such as SID, Iranmedex, Magiran, IranDoc, Cochrane Library, PubMed, and Google Scholar were searched to retrieve studies published in Persian or English language. Searched keywords were LP, acupressure, aromatherapy, and massage as well as their Persian equivalents. Keywords were extracted from Medical Subject Headings (MeSH) national library. The Boolean operators "AND" and "OR" were also used to combine search keywords. The search strategy in PubMed was as follows:

((Acupressure [Title/Abstract]) OR Massage [Title/Abstract]) OR Aromatherapy [Title/Abstract] AND LP [Title/Abstract].

Clinical trials included in the current review study were conducted on 18 - 35 - year - old females in the gestational age of 37 - 42 weeks (based on the date of last menstruation period or ultrasound findings before the gestational age of 12 weeks), with a singleton pregnancy and a live fetus in the cephalic presentation who were in the active phase of labor and regular uterine contractions (three contractions per 10 minutes), with no history of infertility, need for cesarean section, and pregnancy complications (such as bleeding, hypertension, and premature delivery). Clinical trials with accessible online full - texts were included in the current review and the Jadad checklist was used for their appraisal. Accordingly, clinical trials with a Jadad score  $\geq 3$  were included (Figure 1). The Jadad checklist, with a total score of 0 - 5, assesses biases in randomization, patient follow - up, and blinding.

## 3. Results

Based on the effects of aromatherapy on LP, most studies (N = 10) used lavender and conducted through aro-

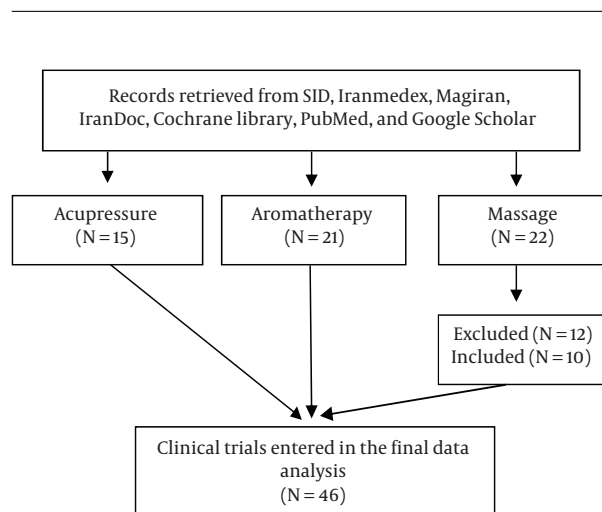


Figure 1. The Flow Diagram of the Study

matheprapy, aromatherapy massage therapy, aromatherapy bath, and smoke aromatherapy. Table 1 summarizes the studies on the effects of aromatherapy on LP.

In the area of acupressure and LP, seven studies applied acupressure on the SP6 point, five on the LI4 point, one on the GB21 and SP6 points, and two on the GB21 point. The studies are summarized in Table 2.

Respecting the effects of massage therapy on LP, 22 studies were retrieved. However, 12 papers were excluded due to their ineligibility and Jadad scores of  $< 3$ . Therefore, 10 studies were included; most of them assessed the effects of Swedish massage, as well as effleurage and stroking movements applied on the abdomen, waist, sacrum, back, buttocks, shoulders, and feet. Table 3 provides a summary of the studies.

## 4. Discussion

The current study reviewed clinical trials on the effects of acupressure, aromatherapy, and massage therapy on LP. Findings are discussed as follows:

### 4.1. Aromatherapy

Aromatherapy is used to alleviate pain, anxiety, depression, insomnia, fatigue, and asthma, and even to increase self - confidence, maximize success, and promote creativity. Essential oils are used through oral, dermal (massage, compress, or bath), and inhalation routes (21). A study reported that aromatherapy massage using jasmine, geranium, lavender, and rose essential oils had positive effects

**Table 1.** Clinical Trials on the Effects of Aromatherapy on LP

Author	Aroma	Year	Place	Sample Size	Finding
Vakilian et al., (18)	Lavender	2011	Shahrud, Iran	120	LP alleviation
Seraji et al., (19)	Lavender	2011	Shahrud, Iran	120	LP alleviation
Ahmadi et al., (20)	Lavender	2013	Qazvin, Iran	70	LP alleviation
Pirak et al., (21)	Lavender	2015	Iranshahr, Iran	120	LP alleviation
Alavi et al., (22)	Lavender	2010	Shiraz, Iran	160	LP alleviation
Mohammadkhani et al., (23)	Lavender	2011	Tehran, Iran	90	LP alleviation
Burns et al., (24)	Lavender	2007	Puerto Rico	513	LP alleviation
Janula et al., (25)	Lavender	2015	India	600	LP alleviation
Lamadah et al., (26)	Lavender	2016	Egypt	60	LP alleviation
Ozgoli et al., (27)	Peppermint	2013	Tehran, Iran	128	LP alleviation
Ozgoli et al., (28)	Clave	2016	Karaj, Iran	126	LP alleviation
Vahabi et al., (29)	Damask rose essential oil and rosewater	2016	Ahvaz, Iran	80	LP alleviation
Roobahani et al., (30)	Damask rose essential oil and rosewater	2015	Arak, Iran	111	LP alleviation
Valipour et al., (31)	Damask rose	2012	Tehran, Iran	120	LP alleviation
Asgari et al., (32)	Sesame oil	2015	Abadan, Iran	120	LP alleviation
Heidarifard et al., (33)	Chamomile	2014	Abhar, Iran	130	LP alleviation
Tork-Zahrani et al., (34)	<i>Peganeum harmala</i>	2016	Shadegan, Iran	204	Positive effects on LP onset and cervical preparation
Rashidi-Fakari et al., (35)	Orange and geranium essential oils	2013	Bojnord, Iran	150	LP alleviation after applying orange essential oil. No LP alleviation after the application of geranium essential oil
Namazi et al., (11)	Bitter orange	2014	Tuyserkan, Iran	126	LP alleviation
Kaviani et al., (36)	Salvia and jasmine	2014	Shiraz, Iran	156	LP alleviation

**Table 2.** Clinical Trials on the Effects of Acupressure on LP

Author	Acupoint	Year	Place	Sample Size	Finding
Heidari et al., (37)	SP6	2008	Karaj, Iran	128	LP alleviation
Kordi et al., (38)	SP6	2010	Mashhad, Iran	102	LP alleviation
Samadi et al., (39)	SP6	2010	Tehran, Iran	131	LP alleviation and shortened labor length
Salehian et al., (40)	SP6	2011	Iranshahr, Iran	90	LP alleviation and shortened labor length
Lee et al., (41)	SP6	2004	Korea	75	LP alleviation
Sayyedzadeh-Aghdam et al., (42)	BL32, GB21	2012	Arak, Iran	130	No LP alleviation
Hosseinpour et al., (43)	SP6	2012	Shiraz, Iran	135	No LP alleviation
Ozgoli et al., (44)	LI4	2010	Tehran, Iran	60	LP alleviation
Hamidzadeh et al., (45)	LI4	2011	Shahrud, Iran	100	LP alleviation
Kordi et al., (46)	LI4	2010	Mashhad, Iran	83	LP alleviation
Kaviani et al., (16)	LI4	2012	Shiraz, Iran	131	LP alleviation
Akbarzadeh et al., (47)	GB21	2012	Shiraz, Iran	153	LP alleviation
Chung et al., (48)	GB21	2003	Taiwan	127	LP alleviation

on parturient females' mind (19). Inhalation of essential oils between uterine contractions can stimulate endorphin release and alleviate LP (12).

#### 4.2. Lavender

Lavender is native to the Mediterranean region. Because of its pleasant aroma and therapeutic effects, it was

brought to other areas by migrants. Lavender aromatherapy is used to treat depression, amenorrhea, vaginitis, insomnia, and pain. In ancient medicine, lavender has been used for its antitussive, carminative, antispasmodic, sedative, and diuretic effects.

Lavender contains linalool, ketones, esters, and aldehyde. Ketones in lavender effectively reduce pain and in-

**Table 3.** Clinical Trials on the Effects of Massage Therapy on LP

Author	Massage Technique	Year	Place	Sample Size	Finding
Kimber et al., (49)	Rhythmic and stroking	2008	England	90	LP alleviation and shortened labor length
Abasi et al., (50)	Effleurage	2009	Bojnord, Iran	62	LP alleviation
Khodakarami et al., (51)	Effleurage	2007	Tehran, Iran	60	LP alleviation
Chang et al., (52)	Effleurage	2002	Taiwan	60	LP alleviation
Gallo et al., (53)	Ascending back	2013	Brazil	60	LP alleviation
Taghinejad et al., (54)	Lower abdomen, shoulders, back, and pubis	2010	Ilam, Iran	101	LP alleviation
Dehcheshmeh et al., (55)	Ice massage on Hoku point	2008	Shahrekord, Iran	90	LP alleviation
Mortazavi et al., (56)	Massage	2012	Tehran, Iran	120	LP alleviation
Chang et al., (57)	Massage	2006	Taiwan	60	LP alleviation
Field et al., (58)	Massage	1997	United States	28	LP alleviation

flammation and promote sleep. Esters also prevent muscle spasms and reduce tension and depression. Cold compress on the forehead using lavender and salvia can reduce fatigue and refresh the mind (19). Several studies reported that aromatherapy with lavender essential oil significantly alleviated LP (18-26).

#### 4.3. Peppermint

Peppermint essential oil is produced through distilling its flowers and twigs. As a colorless or yellowish - green liquid with a strong aroma and taste, peppermint essential oil contains menthol, menthone, and menthyl acetate. It alleviates abdominal cramps, relaxes lower esophageal sphincter, smooth muscles, coordinates the movements of gastrointestinal tract, alleviates colon spasms, and exerts carminative and digestive effects. The menthol component of peppermint essential oil affects kappa opioid receptors and blocks pain transmission and thereby, brings pain alleviation. Besides, inhalation aromatherapy with peppermint essential oil alleviates anxiety through reducing the release of corticotropin - releasing hormone from hypothalamus, adrenocorticotropin from pituitary, and cortisol from adrenal. A study showed that peppermint significantly alleviated LP and anxiety (27).

#### 4.4. Clove

Clove is another plant used in aromatherapy. The active ingredient of clove (*Caryophyllus aromaticus* L.) is eugenol and has antioxidant, analgesic, anti-inflammatory, and anti - microbial effects. Clove also includes considerable amounts of essential oils. Other compounds found in clove include caryophyllene, alcohol, benzylic, dimethylbenzoate, and flavonoids. The latter is among the inhibitors of nitric oxide. The inhibition of nitric oxide reduces pain perception. Moreover,

flavonoids reduce intracellular calcium through inhibiting N - methyl - D - aspartate (NMDA), which subsequently, reduces the activity of nitric oxide synthase and calcium - dependent phospholipase A2. These reductions result in the reduction of nitric oxide and prostaglandins, which in turn, brings pain alleviation. A study showed the greater effectiveness of clove aromatherapy than peppermint aromatherapy in LP alleviation (28).

#### 4.5. Damask Rose Essential Oil and Rosewater

Rosewater is made through the distillation of water - steeped damask rose petals. Rosewater and other damask rose essential oils can reduce pain or at least prevent pain aggravation. Aromas stimulate receptors in the olfactory bulb, which sends olfactory signals to the limbic system. The limbic system is the center of emotion in the brain. In response to stress, the system produces enkephalin, endorphin, and serotonin and thereby, induces sedation and alleviates pain (29, 30). Previous studies reported that aromatherapy with rosewater in the first stage of labor significantly alleviated LP (29, 30). Another study showed the effectiveness of damask rose essential oil in alleviation of anxiety in parturient females during labor (31).

#### 4.6. Sesame Oil

In Iranian traditional medicine, sesame oil is considered as a thermogenic, emollient, relaxant, and tonic agent. It is used to prepare parturient females for delivery, because it relaxes muscles as well as abdominal and pelvic organs. In Ayurvedic medicine, sesame oil is used for health maintenance and promotion, massage therapy, and many other therapeutic purposes. Biochemical analyses showed that sesame oil contains seven components with analgesic effects. A study found that massage therapy

with sesame oil applied on the back, sacrum, and the lateral sides of the spine could significantly alleviate LP and shorten labor length (32).

#### 4.7. Chamomile

Chamomile is an aromatic plant. The term chamomile means small flowers with apple-like aroma. It has diuretic, digestive, lactogenic, antipyretic, analgesic, and antimicrobial effects. A study showed that aromatherapy with chamomile was helpful in alleviating LP (33).

#### 4.8. Orange and Geranium Essential Oils

The essential oils of orange and geranium are familiar and popular aromatic compounds. Orange essential oil has sedative, analgesic, muscle relaxant, anti-inflammatory, and antihypertensive effects. It is a stimulant for the central nervous system (CNS). Geranium also has anti-inflammatory, anti-hemorrhagic, antiseptic, analgesic, diuretic, and muscle relaxant effects. It can alleviate chest pain, menopause-related health problems, and pain associated with shingles. The essential oils of geranium, jasmine, lavender, and rose seem to have positive effects on parturient females' mind during labor (35). A study showed that orange essential oil significantly alleviated LP, while geranium essential oil had no significant effects on it (59).

#### 4.9. Bitter Orange Blossom

The essential oil of bitter orange blossom is among the essential oils used for aromatherapy. Bitter orange, *Citrus aurantium*, is a 3-5-meter tree with a round-shaped crown planted in Northern and Southern areas of Iran. Its flowers spread over the axes of branches singularly or in groups. Flowers have yellowish-white thick and juicy aromatic petals, on which oil-secreting trichomes are clearly seen. Bitter orange blossoms have 0.2% essential oil, called neroli oil. There are more than 10 compounds in bitter orange essential oil, mainly monoterpenes such as limonene, linalool, alpha-terpineol, beta-pinene, and neryl acetate. Bitter orange essential oil has antidepressant, antiseptic, antispasmodic, libido-boosting, and mild sedative effects. Previous studies reported that its use in prenatal, perinatal, and postnatal periods was safe and had no significant side effects. The limonene component of bitter orange essential oil can alleviate LP by inhibiting cyclooxygenase-1 and -2 and reducing prostaglandins in the body. A study showed that bitter orange essential oil significantly alleviated LP during the first stage of labor (11).

#### 4.10. *Salvia Officinalis*

*Salvia* is native to the Mediterranean countries and is also found in Iran. Its brewed leaves are used for therapeutic purposes for many years. It has coagulant, anticonvulsive, antispasmodic, antiseptic, antibiotic, antioxidant, and analgesic effects and can reduce LP and lactation. An earlier study indicated that aromatherapy with *salvia* alleviated LP (36).

Different types of aromatherapy with different types of essential oils had positive effects on LP (34, 60). Of course, lavender is the most effective and the most frequently used aromatic plant for LP. Therefore, lavender aromatherapy is recommended for LP alleviation.

#### 4.11. Acupressure

Since long ago acupressure is used to alleviate LP and shorten labor period. Different types of acupressure used for LP are discussed as follows:

##### 4.11.1. Acupressure on the SP6 or the San Yin Jiao Point

The SP6 or the San Yin Jiao point is the most important acupoint used to alleviate pain. It is commonly used to manage gynecological disorders. This point is four fingers above the medial malleolus on the posterior border of the tibia. Different studies showed that SP6 acupressure in the first stage of labor significantly decreased LP intensity (37-41). Another study reported that transcutaneous electrical nerve stimulation and SP6 acupressure were significantly effective in alleviating LP (43). A study showed that acupressure with BL32 and GB21 points was ineffective for labor pain in examined females (42).

##### 4.11.2. Acupressure on the LI4 or the He Gu point

The LI4 or the He GU point is one of the most important points of the large intestine meridian. It is located on the dorsal surface of the hand between the first and the second metacarpal bones. Previous studies in different areas of Iran reported the effectiveness of LI4 acupressure for the alleviation of LP (16, 44-46).

##### 4.11.3. Acupressure on the GB21 Point

The GB21 point is located on the midpoint of the hypothetical line, which connects the seventh cervical vertebra to the highest point of the shoulder. Different studies showed that acupressure on the GB21 point significantly decreased LP intensity (47, 48).

#### 4.12. Massage Therapy

The most commonly used massage therapy techniques for LP include stroking, effleurage, Swedish massage, and rhythmic massage applied on the sacrum, buttocks, shoulders, back, and ankle. Most previous studies found that massage therapy techniques were effective in LP alleviation (49-58). A study showed that although massage therapy could alleviate LP during the first and second stages of labor, it had no significant effects on LP in the third stage of labor (58).

#### 4.13. Conclusion

The current study concluded that acupressure, aromatherapy, and massage therapy are effective in LP alleviation. The most frequently used therapies were aromatherapy with lavender essential oil and acupressure on the LI4 and SP6 points. These techniques are mostly safe and not associated with serious side effects for parturient females and their babies. Therefore, they can be used to effectively alleviate LP.

One of the limitations of the present study was the inclusion of only Persian and English literatures. Moreover, the included studies used different tools to assess LP. Such variation might have affected the study results.

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