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# Lavender for Sleep, Rest, and Pain

## *Evidence for Practice and Research*

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*I attended a conference recently and heard a presentation describing the use of inhaled lavender to reduce pain and anxiety and promote sleep in a community hospital setting. What is the evidence base for use of lavender? What are the safety concerns? Finally, what should I be teaching patients regarding aromatherapy with lavender? I would like to explore using this complementary therapy in my practice setting.*

Only 1 poor night's sleep results in transient immune suppression even in the healthy ones. Consider now the hospital inpatient. Alarms, hallway conversations, shift handoffs, bedside rounding, intercom systems, laboratory draws, vital signs, and constant fluorescent lighting drive sleep loss. Add anxiety related to illness, pain, separation from home and family, and lack of control during the hospitalization experience. Sleep and rest become the primary goals after discharge. No wonder patient satisfaction scores remain flat.[1]

Lavender essential oil (EO) has been used as an alternative for sleep and rest for centuries.[2] With origins in the Mediterranean, this ancient herb was used by the Egyptians to mummify bodies and for bathing in Persia, Greece, and Rome. Today, lavender is a significant part of folk remedies for anxiety, insomnia, pain, restlessness, headache, insomnia, depression, hair loss, and nausea and as an antiseptic.[3]

Lavender comes from the labiatae (*Lamiaceae*) family of plants. Commercially available lavender EO is most often obtained from 2 species of lavender—*Lavandula angustifolia* and *L. latifolia*—as well as from hybrids. Reported effects of lavender EO include calming, sedation, and relief of pain. The most common uses are to improve sleep and reduce anxiety.[2]

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## SLEEP

Sleep disturbances are a function of genetic, environmental, habit, and psychobiological factors. The sleep-inducing properties of EOs are not fully understood, and human studies regarding the sedative and hypnotic effects are limited.[4] The biochemical components of EOs such as acids, esters, coumarins, and monoterpenoids are believed to produce hypnotic, sedative, or antianxiety effects through antagonizing or binding specific neuronal receptors.[5]

In a first analysis of studies examining the effect of inhaled EOs on sleep between 1990 and 2012, findings from 15 quantitative studies (11 randomized controlled studies) suggest that EOs do have positive effects on sleep. Strengths of the studies included design, use of blinding and multiple tools for measurement, and geographic diversity. Lavender was the most common EO used, and no adverse events were reported.[4]

Most studies found a positive association and/or trend in improved sleep quality with inhalation of lavender. However, small homogeneous samples and lack of standardized practices with the use of EOs limit the generalizability of findings. Furthermore, only 1 study verified the chemical composition of EOs, and studies that used a blend of EOs did not identify exact proportions. Despite these study limitations, evidence suggests that lavender has a positive short-term effect on sleep and may be an effective intervention for sleep disturbances.[4]

In a recent study of 79 college students with self-reported sleep issues, subjects received a sleep intervention with baseline, postintervention, and 2-week assessments. In this randomized trial, both groups practiced sleep hygiene and wore an inhalation patch on the chest for 5 consecutive nights. The study group inhalation patch had 55 μL of lavender EO, and the control group patch was blank. Sleep quantity was measured with a Fitbit tracker and a sleep diary.

Sleep quality was measured via the Pittsburg Sleep Quality Index and the NIH Patient-Reported Outcomes Measurement Information System sleep disturbance short form. Whereas sleep quantity was not different for the 2 groups, the lavender and sleep hygiene group demonstrated better sleep quality at postintervention and at the 2-week follow-up, with a significant clinical finding of waking refreshed at postintervention ($P = .01$).[6]

## PAIN AND ANXIETY

The anxiolytic effects of lavender seem to be linked to its constituent linalool, a fragrance associated with attenuation of the stress response.[2] In a recent study, 106 preoperative patients were randomized to either lavender aromatherapy or placebo undergoing intravenous (IV) catheter insertion. Before IV cannulation, patients received a 5 × 5-cm gauze impermeable pad with either water or 2 drops of 1% lavender EO. Patients were asked to inhale the pad, seated in a chair for 5 minutes. The patient also inhaled the pad during IV catheter placement. If cannulation was not successful for the first attempt, the patient was excluded from the study. Pain and anxiety scores were significantly lower in the lavender group ($P = .01$ and $P < .001$, respectively). Patient satisfaction was significantly higher for the lavender group compared with control ($P = .03$). Groups were not statistically different with regard to demographic data. Further information is available at www.clinicaltrials.gov (NCT02592044).[7]

In another recent study, 92 healthy adults were randomly assigned to 1 of 3 groups—lavender, a perceptible placebo (coconut), and a nonperceptible placebo (water)—and to 2 prime subgroups, suggestion of inhaling a powerful stress-reducing aroma or no prime. Subjects experienced a battery of cognitive tests at baseline and during aromatherapy. Physiological responses, subjective stress, and intensity, as well as pleasantness of the aroma, were assessed. Lavender exposure and expectancy related to a positive prime significantly improved after stress performance on working memory task and physiological function.[8]

In a randomized open-label trial, the effect of lavender EO on pain and anxiety during chest tube removal after cardiac surgery was examined. Patients with a chest tube for at least 24 hours after coronary artery bypass surgery were randomized (20 per group) to receive either cold gel pack application, aromatherapy with lavender oil, cold gel pack in combination with lavender oil inhalation, or no intervention (control group). Cold gel packs reduce local tissue metabolism and neural conduction velocity and provide local vasoconstrictive, anti-inflammatory, antispasmodic, and analgesic effects.[9]

Pain and anxiety were assessed with a visual analog scale, short form and modified McGill Pain Questionnaire, and the Spielberger Situational Anxiety Level Inventory scale. Subjects in all treatment groups had significantly lower pain intensity and anxiety scores compared with the control group immediately and at 5, 10, and 15 minutes after chest tube removal. Whereas pain scores were not significantly different between the intervention groups, anxiety was significantly lower immediately after chest tube removal for the aromatherapy and cold-aromatherapy combination groups versus the cold application group. The combination of therapies did not increase the analgesic or antianxiety effects of each intervention. Results suggest possible efficacy for cold application and aromatherapy with lavender oil to reduce pain and anxiety associated with post–heart surgery chest tube removal.[9]

## IMPLICATIONS FOR PRACTICE AND RESEARCH

Neural activity through olfactory receptor activity during lavender aromatherapy suggests anxiolytic, sedative, analgesic, and soporific effects. The aromatherapy intervention is easy to implement and low risk and may enhance cognitive activity under stress.[8]

Lack of consistency across the literature for inhalation and topical EO dosing has resulted in a weak foundation for the current practice. As a result, clinical applications and the construction of clinical trials are difficult. Goals for future research should include expanding current understanding of the mechanisms of action for lavender and other EOs. Clinicians and patients need to know appropriate dosing, duration of effects, and long-term effects for safe use.[2,4]

Although emerging evidence suggests significant favorable psychopharmacological effects, potential allergic responses have been identified with linalool exposure. Limited evidence suggests that drug accumulation with inhalation seems not to be a problem in light of the short half-life and excretion via the kidney and exhalation.[2]

Important information for education and counseling should include the following elements. Topical application of lavender EO diluted with a carrier oil such as coconut, grape-seed, avocado, or sweet almond oil is generally safe. However, skin irritation is possible. There have been reports that topical use has resulted in breast growth in young boys. Lavender EO may be poisonous if taken by mouth and should be avoided. As for lavender teas and extracts, headache, appetite changes, and constipation have been reported. Finally, patients should be instructed that using lavender EO with sedative medications may result in increased drowsiness.[3]

A great resource for practice and patients is the NIH National Center for Complementary and Integrative Health–Aromatherapy available at https://nccih.nih.gov/health/aromatherapy. This Web site has valuable information for patients, information regarding current clinical trials, and links to scientific reviews.

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