



DOSSIER · THERAPY

Aromatherapy

The page compiles the research on aromatherapy, predominantly controlled studies in humans. Notable is the imbalance of endpoints: Almost always measured are anxiety, mood, sleep and pain perception, i.e. self-reports. The most cited work in the field is an observational, not a controlled study.

531

STUDIES IN
TOTAL

363

IN HUMANS

230

OF WHICH
CONTROLLED

8

IN ANIMALS

10

IN THE LAB

Figures from the IHR study database · Last updated 2026-10-15

How to Read This Dossier

ESTABLISHED

measured in humans, with a comparison group

PLAUSIBLE

supported by mechanism, animal studies or observation

HYPOTHESIS

a likely connection that still needs to be tested

Aromatherapy at a Glance

ORIGIN:

Aromatherapy refers to the use of essential oils, mostly via the sense of smell; in the evaluated studies inhalation predominates, alongside skin applications, often as massage, as well as combinations with other procedures such as music. It is not a single substance but a bundle of scent, touch, attention and expectation that is composed differently in each study.

EVIDENCE BASE:

531 evaluated studies · 230 controlled human studies · 133 observational studies · 44 review articles · 8 animal studies · 6 cell-culture studies

STRONGEST EVIDENCE:

- **Cognition and psyche:** A meta-analysis of six randomised and cluster-randomised studies on dental anxiety found a pooled mean difference of -3.36 (95 % CI -3.77 to -2.95) with high certainty of evidence (10).
- **Oncology:** Ten controlled studies on anxiety in 1724 cancer patients and five on depression in 1039 patients yielded standardised mean differences of -0.51 and -0.44 respectively, rated as low quality (2).
- **Sleep in cancer:** Ten controlled studies with 933 patients showed improved sleep quality (SMD = -0.79; 95 % CI -0.93 to -0.66), especially in breast-cancer patients (SMD = -0.98) (3).
- **Anxiety before imaging:** In 200 patients before an MRI scan the combination of lavender inhalation and music produced the greatest anxiety reduction (Δ STAI-1 6.5 versus 2.6 with aromatherapy, 2.7 with music and 1.9 with routine care) (14).
- **Post-operative pain and nausea:** After surgery for lower-limb fractures inhalation of lemon oil differed from the control group in pain intensity ($P < 0.001$) and in nausea and vomiting ($P = 0.001$) (17).

LIMITATIONS:

- Almost all measurements concern anxiety, mood, sleep and pain via questionnaires, i.e. self-reports; a scent can hardly be blinded and a placebo without odour is usually recognisable.
- Oil, duration and setting vary from study to study; when all included papers measure the same soft endpoint the summary is no harder than its primary studies.
- For cancer pain the quantification of the effect is still outstanding, several result statements break off in the present extract, and the evaluated work reports no endpoints for the gut microbiome.

ASSESSMENT:

Aromatherapy acts as a bundle of scent, touch, attention and expectation; the most robust findings concern anxiety, depressive symptoms and sleep quality.

1. What Aromatherapy Is

Aromatherapy refers to the use of essential oils, mostly via the sense of smell. In the evaluated studies **inhalation** predominates: the oil is vaporised or placed on a carrier and inhaled. Skin applications, often as massage, and combinations with other procedures such as music are also used. Oils studied include lavender, Rosa damascena, peppermint and bergamot, either singly or in blends. The studies describe application via scent direction, duration and setting. Crucially, aromatherapy is not a single substance but a bundle of scent, touch, attention and expectation that is composed differently in each study.

For understanding all studies it is essential to know **what is measured**. Anxiety, mood, sleep quality and pain are captured predominantly with questionnaires and scales, i.e. via participants' self-reports. Such values are sensitive to expectation, attention and the care that accompanies a treatment. Blinding adds a further difficulty: a scent can hardly be concealed and a placebo without odour is usually recognisable to participants. Controlled studies and reviews therefore stand side by side without the control providing the same certainty as with an odourless tablet. Readers must distinguish between what participants report and what was measured objectively.

2. What the Studies Show in Detail

The key human studies and the most important reviews — by application area, with population, duration, preparation, measure and result as reported in the original papers. Numbers appear only where the work states them.

Distribution of **controlled human studies** by application area — the numbers are not additive because one study may be assigned to several areas:

APPLICATION AREA	CONTROLLED STUDIES
Cognition and psyche	114
Fatigue and stress	96
Safety and tolerability	42
Heart and circulation	31
Oncology	23
Musculoskeletal system	15

APPLICATION AREA	CONTROLLED STUDIES
Bones and joints	8
Metabolism	4

Cognition and Psyche

For dental anxiety a meta-analysis of six randomised and cluster-randomised studies is available ⁽¹⁰⁾: aromatherapy was associated with a reduction in anxiety scores (pooled mean difference -3.36; 95 % CI -3.77 to -2.95; $P = 0.00001$), with low heterogeneity ($I^2 = 1\%$; $P = 0.41$) and high certainty of evidence. **Proven:** Several consistent controlled studies support the effect on anxiety before dental procedures. In 150 children aged 8 to 12 years ⁶ compared five groups (lavender oil via nebuliser, lavender oil via inhaler, orange oil via nebuliser, orange oil via inhaler, control without aromatherapy): after local anaesthesia the anxiety scores of groups 1, 3 and 4 differed significantly from the control; FLACC values were lower in the aroma groups, as were the pain scores on the Faces Pain Scale-Revised; the lavender-oil inhaler group does not appear among the significantly different groups in the anxiety evaluation.

In 128 schoolchildren aged 10 to 12 years ⁴ tested four arms (control 32, music therapy 33, aromatherapy 31, music with aromatherapy 32) and reports significant within-group changes at the 0.05 level for each arm: the control group showed increased heart rate, the music group reduced dental anxiety and systolic blood pressure, the aroma group increased oxygen saturation, and in the combination group dental anxiety, heart rate and both systolic and diastolic blood pressure fell while oxygen saturation rose; for the interaction of music and aromatherapy on dental anxiety and fear $F = 22.22$ at $P < 0.001$ is given. In 175 patients each ⁸ tested inhaled 2 % lavender vapour against water vapour and reports reduced pain and anxiety scores as well as improved vital parameters except diastolic blood pressure; the values on the Modified Dental Anxiety Scale, the Spielberger State-Trait Anxiety Inventory and the pain scale were 3.4-, 4.2- and 2.4-fold lower than in the control group, measured before inhalation, 20 minutes later, at the end of the session and the following day.

In 64 patients with acute coronary syndrome in the emergency department, a cotton ball soaked in 100 % peppermint oil was placed approximately 20 cm from the nose for one hour; the control group received a water-soaked ball. After the intervention, anxiety was 37.72 ± 10.41 versus 42.62 ± 5.99 ($P = 0.021$), and a significant reduction occurred only in the intervention group ($P < 0.001$) ⁽¹¹⁾. In 200 patients before an MRI examination (mean age 48.3 ± 14.9 years; 126 women, 63.0 %), the combination of lavender inhalation and music produced the greatest anxiety reduction: Δ STAI-1 6.5 versus 2.6 with aromatherapy, 2.7 with music and 1.9 with routine care ($p < 0.001$), with a difference on the Self-Rating Anxiety Scale of 4.0 versus 1.4, 1.7 and 0.6 ⁽¹⁴⁾. Review ¹² examined 76 studies with 6539 patients from 2000 to 2021; in 42 % of the randomised studies, vital parameters or salivary cortisol were also measured, over 70 % reported a positive effect on anxiety in the intervention groups, and the authors cite imprecise specification of plant species and dosage of the essential oil as a limitation.

In 88 postpartum women (bergamot oil $n = 29$, water aroma $n = 31$) who inhaled daily for 15 minutes in the afternoon, depressive mood was lower two and four weeks after the intervention ($p < 0.001$), measured with the Edinburgh Postnatal Depression Scale and the Postpartum Sleep Quality Scale ⁽⁷⁾. In 80 operating-theatre staff during the COVID-19 pandemic, two drops of Damask rose oil were tested for ten minutes at the start of the shift and then a cloth soaked with five drops on the pillow for 30 consecutive nights against paraffin oil, using the Spielberger State Anxiety Inventory and the Pittsburgh Sleep Quality Index before randomisation and on day 31 ⁽⁹⁾. In 88 parturients (44 each), neroli oil reduced anxiety and perceived pain on the visual analogue scale in the latent, early and late active phases ($p < 0.05$); in all participants both values rose with labour progress, more mildly in the intervention arm, and multiparae showed higher anxiety scores in all phases than primiparae, with no difference in pain ⁽¹⁵⁾. Review ³⁰ evaluated 33 studies in which aromatherapy was administered by inhalation, massage, foot bath, birthing pool, acupressure and compress; lavender was the most common oil in 13 studies, and the majority of studies confirmed a reduction in labour pain and anxiety. Critical review ³³ classifies the applications in the perinatal period: before birth against nausea and vomiting, stress and to support immune function; during birth against pain and anxiety and for labour progress; after birth for symptoms after caesarean section, perineal injuries, sleep and depressive and anxious symptoms.

In 88 palliative-care patients (22 each in the arms music, aromatherapy, music with aromatherapy and control), pain, anxiety and distress were measured with the visual analogue scale, the Facial Anxiety Scale and the Distress Thermometer before and after a 20-minute application on three consecutive days; Wilcoxon signed-rank and Kruskal-Wallis tests showed significant differences between pre- and post-values ⁽¹³⁾. In 60 burn patients, five drops of 40 % rose oil were tested against five drops of distilled water over three consecutive nights; sleep quality measured with the St. Mary's Hospital Sleep Quality Questionnaire was 17.88 ± 2.04 after the intervention versus 26.11 ± 3.31 in the control group ⁽¹⁸⁾. Meta-analysis ¹ summarises six studies with 586 burn patients (three randomised, three quasi-experimental) and examined aromatherapy with Rosa damascena and lavender for pain and anxiety; in the present extract the results section breaks off after the description of the pooled effect calculation with STATA v.14 and the heterogeneity test.

Oncology

Meta-analysis ² included eleven randomised controlled trials; ten of them examined the effect on anxiety in 1724 cancer patients, five the effect on depression in 1039 patients. The quality of the included studies was low, and most compared aromatherapy with usual care. For anxiety the standardised mean difference was -0.51 (95 % CI -0.83 to -0.19; $P = 0.002$), for depression -0.44 (95 % CI -0.76 to -0.12; $P = 0.008$). **Proven:** Several consistent controlled studies exist for anxiety and depressive symptoms in cancer patients, albeit with overall low-rated study quality. Inhalation performed more favourably than massage in the analysis, and the effect on anxiety appeared short-term, especially in perioperative patients, while it was absent in one patient group cut off in the extract.

For sleep quality, ³ evaluated ten randomised controlled trials with 933 patients (474 in the intervention group, 459 in the control group); the risk of bias was moderate. Aromatherapy improved sleep quality (SMD = -0.79; 95 % CI -0.93 to -0.66; $p < 0.01$), especially in breast-cancer patients (SMD = -0.98; 95 % CI -1.57 to -0.40; $p < 0.01$). Use of a single essential oil was more effective than a mixture (SMD = -0.94; 95 % CI -1.25 to -0.62; $p < 0.01$); lavender oil is reported to have the strongest effect, whose numerical value is cut off in the present extract.

For cancer pain, ²⁹ screened 1002 hits and included twelve studies, of which six entered the meta-analysis; the analysis shows a significant reduction in pain intensity ($p < 0.00001$). The authors call for earlier, more homogeneous and appropriately designed clinical studies as well as a stepwise testing chain from preclinical to clinical research to provide a rational basis for use in integrative oncology (PROSPERO registration CRD42023393182). The magnitude of the

reduction and the scales with which it was measured are not apparent from the present extract; thus quantification of the effect for cancer pain remains to be clarified.

Fatigue and Stress

In 69 adults after laparoscopic cholecystectomy, ⁵ compared essential-oil therapy with a mandarin-oil placebo and a control group. Demographic and clinical characteristics as well as baseline values were comparable between the groups.

In 105 cardiac patients, ¹⁶ tested three drops of peppermint oil (n = 35), three drops of lavender oil (n = 35) and three drops of an aromatic placebo (n = 35) over seven nights and measured the Fatigue Severity Scale before and after the intervention. Mean fatigue decreased in all study groups; between lavender and peppermint there was no statistically significant difference, while both oils differed significantly from the control group (each $P < 0.001$). Fatigue was recorded as a questionnaire score; whether statements on exhaustion, drive and daily performance change beyond the seven nights was therefore not examined.

Bones and Joints

In 90 patients after surgery for a lower-extremity fracture, ¹⁷ examined inhalation of lemon oil versus a control group. Application began on the morning of surgery, was continued at two-hour intervals until the end of surgery, in the recovery room and up to 16 hours after surgery. Pain and nausea scales, the Rhodes Index of Nausea, Vomiting and Retching and the WACHS Neurovascular Observation Chart were recorded before and after the intervention as well as in the recovery room and at 4, 8, 12 and 16 hours after surgery. Pain intensity ($P < 0.001$) and nausea and vomiting ($P = 0.001$) differed significantly between the groups; frequency and severity of nausea, vomiting and retching as well as volume and duration of postoperative vomiting and nausea also differed, with the extract breaking off at this point.

The extract leaves open whether the control group received a placebo treatment; thus it is not possible to separate what proportion of the difference is attributable to odour perception and expectation. Mobility, wound healing and function of the operated limb beyond the hospital stay were also not recorded.

Hypothesis: Because neurovascular observation was conducted as a separate instrument, it would be worth examining whether inhalation influences perfusion and sensory checks after such procedures. The next step required would be a blinded study with placebo comparison that follows pain, nausea and neurovascular parameters beyond the inpatient stay.

Gut and Microbiome

Under this heading the material contains review ²⁵, which, however, does not address the gut but the transnasal route: essential oils and volatile oils enter the body mainly via the skin or the nose, can also be taken orally and, via the nose, bypass the blood-brain barrier to reach brain tissue; this route has so far been demonstrated in animal experiments and has not been investigated in humans. Animal-experimental findings concern the cortex, the thalamus and the limbic system; the effect on these brain regions has not been investigated in humans. The summarised literature also addresses anxiety symptoms, depressive symptoms and sleep quality. The work is based on clinical and animal-experimental studies of the past decade.

Endpoints of the gut microbiome or gut function are not reported in the evaluated work. **Open question:** Whether inhaled volatile compounds reach the gut in relevant quantities and alter the microbiota or mucosal function there has therefore not been examined. A study that measures stool samples and markers of the gut barrier before and after standardised inhalation would clarify this question.

Oxidative Stress

²⁶ characterised three samples of sage oil (*Salvia officinalis*) — two commercial oils and one from its own steam distillation — by gas chromatography with mass spectrometry and ATR-FTIR spectroscopy. The first two samples corresponded to the common chemotype (α -thujone > camphor > 1,8-cineole > β -thujone); the self-produced oil showed a high content of 1,8-cineole, borneol and α -thujone, similar to the Dalmatian type, and was selected for further testing because borneol is regarded in traditional Asian medicine as a substance with anaesthetic and analgesic action.

The antioxidant capacity of the sage oil is described as modest: 33.61 % and 84.50 % inhibition in the DPPH and ABTS assays. **Proven:** These values derive from cell-free detection methods and are not measurements in humans. For the clinical part the work reports that inhalation of sage oil with high borneol content by hospitalised patients could improve their satisfaction; thus satisfaction and well-being were examined, not oxidative markers. Bibliometric analysis ³² recorded 1159 original and review articles from 578 journals by 260 authors from 2001 to 2021 and 88 countries (United States 188 articles, 16.22 %; China 131, 11.30 %; Brazil 110, 9.49 %; Japan 85, 7.33 %) and concerns anxiety, depression and insomnia, not oxidative endpoints. Whether inhalation in humans alters oxidative markers such as glutathione or malondialdehyde has therefore not been examined; controlled studies with blood or saliva markers before and after application would be needed for this purpose.

Inflammatory Processes

Review ²⁷ classifies lavender for neurological disease pictures and names as constituents terpenes such as linalool, limonene, triterpenes, linalyl acetate, alcohols, ketones, polyphenols, coumarins, cineole and flavonoids; the evaluated literature ranges from 1982 to 2020. The anxiolytic and antidepressant action is explained via an inhibitory effect on GABA, the antiepileptic via enhanced GABA inhibition, an increased potassium current and a reduced sodium current; for the antidepressant action, regulation of glutamate receptors, inhibition of calcium channels and serotonergic factors such as SERT are additionally cited.

PROVEN The work reports indications of anti-inflammatory effects. These findings, as far as the extract allows recognition, derive predominantly from preclinical models; clinical studies with inflammatory markers such as interleukin-6 or CRP in patients are not supported with figures in the extract.

Plausible: The mechanisms named — GABAergic inhibition, involvement of calcium channels and SERT — offer an approach to explain why inhalation works in anxiety and pain studies; direct proof of an anti-inflammatory effect in humans is still lacking in the evaluated work. The next step required would be a controlled study that measures inflammatory markers in blood after standardised lavender inhalation.

Further Investigations

³¹ screened 44 works on inhalation of aromatherapy in various pain conditions, of which 17 entered the meta-analysis; in 35 studies (79.55 %) a significant pain reduction was shown, especially in labour pain and postoperative pain. The pooled analysis yielded a reduction of up to -1.73 points on the visual analogue scale. As factors influencing effect size the authors cite the time point after inhalation, the type of oil used and the type of pain treated; the effect is attributed to the ability of essential oils to modulate pain-control centres and neurotransmitter systems.

Lavender was the most common single oil at 49.5 %, followed by ginger (21.2 %), sweet marjoram (12.3 %), mandarin (9.4 %) and oil mixtures (7.6 %). Sweet marjoram achieved the greatest mean pain change of any single oil at -3.31 units (95 % CI -4.28 to -2.33); lavender and sweet marjoram reached an equivalent mean change in anxiety, whose value is cut off in the extract. As a synthesis of the included works it cannot support a cause-and-effect statement; measurement with the numerical rating scale from 0 to 10 before and after application also reflects self-reports.

Safety and Tolerability

The review ³⁴ compares herbal preparations for migraine treatment, clinical studies on natural remedies, aromatherapy, dietary influences and lifestyle changes with prescription medications and notes that natural preparations have received attention as complementary or alternative approaches and are often perceived as a safer alternative. The extract provides no figures on tolerability, adverse effects or discontinuation rates for aromatherapy in migraine; therefore the tolerability assessment for this field of application remains outstanding.

²⁸ examined eleven clinical studies with 972 participants on the inhalation of lavender oil; ten reported significantly reduced anxiety scores, and in three studies blood pressure, heart rate, respiratory rate, pulse and oxygen saturation were recorded as physiological measures. The authors rate the inhalation of lavender oil as a safe and practicable anxiolytic application for various forms of anxiety and call for further studies with high-quality design and precise details. **Plausible:** This tolerability statement is based on the synthesis of the eleven included clinical studies; systematically collected safety data on skin irritation, respiratory irritation and interactions are not reported in the evaluated review. A prospective collection of adverse effects under standardised inhalation would be the next step.

Overall Picture

Across the areas, the most robust statements relate to anxiety: the meta-analysis on dental anxiety ¹⁰ yields, with low heterogeneity, a pooled mean difference of -3.36 with high certainty of evidence, and for cancer patients ² provides consistent controlled studies on anxiety (SMD = -0.51) and depression (SMD = -0.44). For pain, ³¹ summarises 44 studies and quantifies the mean reduction at up to -1.73 points on the visual analogue scale, with emphasis on labour and postoperative pain. The endpoints are almost invariably self-reports on validated scales; physiological measures such as heart rate, blood pressure or oxygen saturation change in several studies as well, yet not uniformly — in ⁸ diastolic blood pressure was excluded, in ⁵ sympathetic activity. Several studies tested inhalation in addition to music therapy and found greater changes for the combination, for example in MRI anxiety (¹⁴) and in dental treatment of children (⁴).

Three areas are recognisable where assessment is still at an early stage: for oxidative markers and for inflammatory markers in humans the evaluated studies report no controlled trials with figures, and for gut and microbiome the material contains no study with intestinal endpoints. The procedural details themselves are also an open question: ¹² names imprecise specification of plant species and dosage as a limitation, ²⁸ calls for more precise details, and ² rates the quality of the included studies as low. Aromatherapy was almost always tested as an adjunct to usual care; whether it works as a stand-alone measure has therefore not yet been clarified.

Methodology of the Evidence Base

Application duration ranges from a single inhalation of ten to 20 minutes up to 30 consecutive nights, seven nights or three days; in one study 15 minutes were inhaled daily over four weeks. Anxiety and pain scales (STAI, SAI, MDAS, VAS, FAS, FLACC, FPS-R), sleep and fatigue measures (PSQI, SMHSQ, Postpartum Sleep Quality Scale, FSS), depression scales (EPDS), distress and comfort instruments (Distress Thermometer, General Comfort Questionnaire) as well as vital parameters and, in 42 % of the randomised studies, salivary cortisol are recorded. Controls are frequently water, paraffin oil or almond oil; blinded designs, details on species and dosage, and assessments of tolerability and of effects after the end of the intervention remain outstanding.

The Scent Cannot Be Separated from the Ritual

The central weakness of the field is not the number of studies but their

CONTROL

. An aromatherapy application consists of several components: the scent, the touch during massage, the calm environment and the attention from the treating person. Control groups usually receive only part of this or a placebo that smells different. What is then measured cannot be unambiguously attributed to the oil. The thesis therefore states: part of the reported effects belongs to the ritual, not to the aromatic substance.

This is supported by the structure of the

ENDPOINTS

. Where anxiety, mood and sleep quality are captured via self-report, the experience of the application is also measured. Where more objective measures were recorded, for example in the safety or cardiovascular domain, the statements are more cautious. This is not an objection to the application but a question for the design: a study that tests scent against odourless placebo with equal attention would clarify the attribution. Such studies are rarer in the field than studies using wait-list or usual care as comparator.

3. How Robust the Research Is

Research is distributed markedly unevenly. Most frequently investigated are **cognition** as well as **fatigue and stress**, followed by safety, cardiovascular system and oncology. Smaller fields are musculoskeletal system, bone, metabolism, gut and skin. Among the human studies, controlled designs and observational studies form the two large groups, followed by reviews and basic research. The most strongly cited controlled study concerns pain and anxiety in burn patients, followed by meta-analyses on anxiety and depression in cancer patients and on sleep quality in the same group. It is striking that dental-treatment anxiety constitutes a separate, well-worked field.

Methodologically the field is more broadly positioned than the talk of scent might suggest: there are several **meta-analyses** and systematic reviews, that is, studies that pool individual trials. These syntheses carry the most robust statements in the field. Their limit lies in the primary studies: when all included trials measure the same soft endpoint, the synthesis is no harder than what it summarises. Added to this is the **heterogeneity** of the applications, because oil, duration and environment differ from study to study, which restricts comparability. The safety data form a separate, more sober block that depends less on expectation.

4. What Is Frequently Claimed — and What the Data Provide

STATEMENT	EVIDENCE BASE
Aromatherapy reduces anxiety and depression in cancer patients	Meta-analyses are available for this, showing a connection across several studies. The endpoints are self-reports; the assignment to the scent remains open.
Aromatherapy improves sleep quality	A meta-analysis on individual essential oils in cancer patients reports improvements. Sleep quality is mostly assessed by questionnaire rather than objective m
Aromatherapy relieves pain	Review articles are available on labour and burn pain. Pain is a reported sensation here, and the studies differ greatly in oil and application.
Aromatherapy acts directly on the brain via the sense of smell	The most cited study in the field examines nasal absorption and is observational in design. This describes a mechanism but has not been tested in humans.

5. The Most Robust Studies

Ordered by strength of evidence, not by familiarity. The complete evaluation comprises considerably more studies; the most robust ones are listed here.

Controlled Human Studies

- ¹ Effects of aromatherapy with Rosa damascene and lavender on pain and anxiety of burn patients: A systematic review and meta-analysis (2023)
- ² Aromatherapy with inhalation can effectively improve the anxiety and depression of cancer patients: A meta-analysis (2022)
- ³ Aromatherapy with single essential oils can significantly improve the sleep quality of cancer patients: a meta-analysis (2022)
- ⁴ Music therapy and aromatherapy on dental anxiety and fear: A randomized controlled trial (2023)
- ⁵ The Effects of Aroma Essential Oil Inhalation on Stress, Pain, and Sleep Quality in Laparoscopic Cholecystectomy Patients: A Randomized Controlled ... (2022)
- ⁶ Effect of Aromatherapy on Dental Anxiety and Pain in Children Undergoing Local Anesthetic Administrations: A Randomized Clinical Trial (2021)
- ⁷ The Effect of Bergamot Essential Oil Aromatherapy on Improving Depressive Mood and Sleep Quality in Postpartum Women: A Randomized Controlled Trial (2022)
- Dental pain perception and emotional changes: on the relationship between dental anxiety and olfaction (2023)
- ⁹ Effects of Inhalation Aromatherapy With Rosa damascena (Damask Rose) on the State Anxiety and Sleep Quality of Operating Room Personnel During the ... (2022)
- ¹⁰ Is aromatherapy associated with patient's dental anxiety levels? A systematic review and meta-analysis (2021)
- ¹¹ The effect of aromatherapy with peppermint essential oil on anxiety of cardiac patients in emergency department: A placebo-controlled study (2022)
- ¹² Benefit of inhalation aromatherapy as a complementary treatment for stress and anxiety in a clinical setting - A systematic review (2023)
- ¹³ The effects of aromatherapy and music on pain, anxiety, and stress levels in palliative care patients (2024)
- ¹⁴ Effects of aromatherapy and music therapy on patients' anxiety during MRI examinations: a randomized controlled trial (2023)
- ¹⁵ The Effectiveness of Neroli Essential Oil in Relieving Anxiety and Perceived Pain in Women during Labor: A Randomized Controlled Trial (2022)

- ¹⁶ Comparing the Effect of Aromatherapy with Peppermint and Lavender Essential Oils on Fatigue of Cardiac Patients: A Randomized Controlled Trial (2021)
- ¹⁷ The effect of lemon inhalation aromatherapy on pain, nausea, as well as vomiting and neurovascular assessment in patients for lower extremity ... (2023)
- ¹⁸ The effects of Rosa damascene aromatherapy on anxiety and sleep quality in burn patients: A randomized clinical trial (2023)
- ¹⁹ Effects of aromatherapy with Matricaria chamomile essential oil on anxiety and hemodynamic indices in patients with acute coronary syndrome, 2021: a ... (2024)
- ²⁰ Effects of lavender essential oil inhalation aromatherapy on depression and sleep quality in stroke patients: A single-blind randomized controlled ... (2024)
- ²¹ Effectiveness of aromatherapy on anxiety and sleep quality among adult patients admitted into intensive care units: A systematic review (2023)
- ²² Effectiveness and Safety of Aromatherapy in Managing Behavioral and Psychological Symptoms of Dementia: A Mixed-Methods Systematic Review (2021)
- ²³ Effect of olfactory stimulation from aromatherapy on the autonomic nervous activity during aerobic exercises (2024)
- ²⁴ Aromatherapy Massage vs. Foot Reflexology on the Severity of Restless Legs Syndrome in Female Patients Undergoing Hemodialysis (2021)

6. Summary

ESTABLISHED The most robust statements in the field come from the meta-analyses. For anxiety before dental procedures, one study summarises six randomised and cluster-randomised trials and showed a reduction in anxiety scores with high certainty of evidence (10). For cancer patients, ten controlled studies showed an effect on anxiety and five on depressive symptoms, with low-rated study quality (2); for sleep quality, a meta-analysis evaluated ten controlled studies with 933 patients (3). After surgery for fractures of the lower extremity, inhalation of lemon oil differed from the control group in pain intensity as well as in nausea and vomiting (17).

PLAUSIBLE Aromatherapy is not a single substance, but a bundle of scent, touch, attention and expectation; the endpoints are predominantly self-reports, and a placebo without odour is usually recognisable to participants. This does not mean that the reported changes are merely imagination, but that part of the difference can be attributed to the treatment situation. **Hypothesis:** If the effects on anxiety occur mainly in the short term and especially in perioperative patients, applications could have their place where an anxiety-laden situation is imminent. **Hypothesis:** The fact that several studies examine aromatherapy together with music raises the question of what proportion is attributable to the scent and what to the attention.

What requires clarification is a design that conceals or masks the scent and compares it against a placebo treatment: In the study on patients after a fracture operation, it remains open whether the control group received a placebo treatment, so that scent perception and expectation cannot be separated (17). Such a study would have to track pain, nausea and neurovascular parameters beyond the inpatient stay. For cancer pain, the quantification of the effect is still outstanding, and the authors call for earlier, more homogeneously designed studies as well as a stepwise testing chain from preclinical to clinical (30). It is also open whether inhaled volatile compounds reach the intestine in relevant quantities (25).

7. What Remains Open

- **Placebo:** How can a scent be concealed so that participants and practitioners do not recognise which group they receive?
- **Endpoints:** Which objective markers could supplement anxiety, sleep and pain without changing the character of the application?
- **Combination:** Music and aromatherapy are tested together; it remains unclear which proportion is attributable to which component.

Frequently Asked Questions

Which essential oils are most frequently tested in the studies?

In the most cited works, lavender, Rosa damascena, peppermint and bergamot appear, sometimes as single oils, sometimes in mixtures. The studies usually test one oil against placebo or against another application. A ranking of the oils cannot be derived from this, because application and endpoint vary between the studies.

How is aromatherapy applied in the controlled studies?

Most frequently via inhalation, where the oil is evaporated or applied to a carrier medium and inhaled. In addition, there are applications on the skin, often as massage. Some studies combine the application with music. Duration and environment differ considerably between the studies, which makes comparison difficult.

Is aromatherapy suitable as an accompaniment in clinical everyday life?

There are studies from nursing practice and from clinical settings on this, among other things on anxiety and stress before procedures and examinations. They are predominantly observational or controlled with soft endpoints. For everyday life, this means: The application is well documented, the attribution of the reported changes to the scent remains open.

Sources

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