The role of aromatherapy in the management of dental anxiety in paediatric patients: A Narrative Review

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ABSTRACT

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| **Aims:** The aim of this study is to carry out a narrative review of the use of aromatherapy in the management of paediatric dental patients, analyzing its advantages, benefits and applicability in relation to dental anxiety, since this practice is low-cost, accessible and has minimal adverse effects.  **Study design:** The study consists of a narrative review through an electronic search of evaluated and unevaluated clinical trials that evaluated aromatherapy as a mechanism for reducing anxiety during pediatric dental care, compared to control (no aromatherapy), other positive control approaches (such as music, games, audiovisual distraction) or pharmacological approaches. Clinical trials were searched in the SciELO, PubMed and Virtual Health Library (BVS) databases, using the descriptors Aromatherapy AND Pediatric Dentistry, published between 2018 and 2025, which were available in full text format, without predicting the language of publication, without country restrictions and within the researched theme. Studies that did not meet the inclusion criteria were excluded. **Results:** The electronic search found 11 studies available in the literature. After reading the titles and abstracts, 04 studies were excluded that did not meet the pre-established inclusion criteria or that did not meet the objective of this review. Therefore, 07 clinical trials were read in full and added to the literature base that supported this study. This evidence shows the benefits of aromatherapy as a complementary alternative in the treatment of pediatric dentistry patients and presents overwhelming results in the management of anxiety and patient behavior. **Conclusion:** Aromatherapy is an important alternative in managing anxiety in pediatric dentistry patients, being safe, of good applicability and low cost. It is suggested that new robust studies be developed that further emphasize the technique, aiming at the benefits of the practice. |

*Keywords:* *(Aromatherapy,* *Anxiety, Pediatric Dentistry,* *Child, Essential Oils)*

1. INTRODUCTION

Dental anxiety is described as a mental disorder, characterized by fear and apprehension regarding dental treatment, and is considered one of the greatest challenges in care, especially pediatric dentistry.1,2 Studies show that the prevalence of anxiety in child patients can reach around 24%, and may be related to individual, family and environmental factors.2,3

In relation to the dental environment, several components are, in most cases, responsible for fear, as fear is a response to the new and/or unknown4. Furthermore, the exposure of materials, lack of familiarity with the environment, instruments, odors and sounds, especially in pediatric dentistry, are great allies in increasing and/or inducing dental anxiety in these patients, directly influencing their behavior and increased sensitivity to pain, highlighting the need for individualized approaches on the part of professionals.3,4,5

According to the American Academy of Pediatric Dentistry (AAPD), the most recent intervention measures for managing child patient behavior are classified into two types: basic behavioral guidance (which includes non-pharmacological techniques such as: positive pre-visit images, say-show-do, voice control, non-verbal communication, positive reinforcement and descriptive praise) and advanced behavioral guidance (which includes protective stabilization, sedation and general anesthesia).6,7 Although there are pharmacological resources, these have limitations such as high costs, low accessibility and adverse effects (nausea, vomiting, dizziness and headaches), and are more accepted by the children's parents.6 Thus, the use of herbal medicines, such as aromatherapy, has emerged as an alternative in the management of anxious pediatric dental patients, due to their low cost, accessibility and minimal adverse effects.3,7,8, 9,10

Various alternative therapies have been recommended to alleviate anxiety in pediatric patients before dental treatment. Aromatherapy has been proven to be a non – pharmacological, non-invasive, cost-effective solution to reduce anxiety. This article provides a review of various essential oils and their effects on anxiety. This can be adopted by clinicians in their day to day practice.7,8,9

Therefore, the objective of the present study is to carry out, through a narrative review, the use of aromatherapy in the management of pediatric dentistry patients, analyzing its advantages, benefits and applicability in relation to dental anxiety.

2. material and methods

An electronic search was carried out in 2025, in the SciELO, PubMed and Virtual Health Library (VHL) databases, using the descriptors: Aromatherapy AND Pediatric Dentistry, referring to studies involving the use of aromatherapy in pediatric dentistry clinical practice.

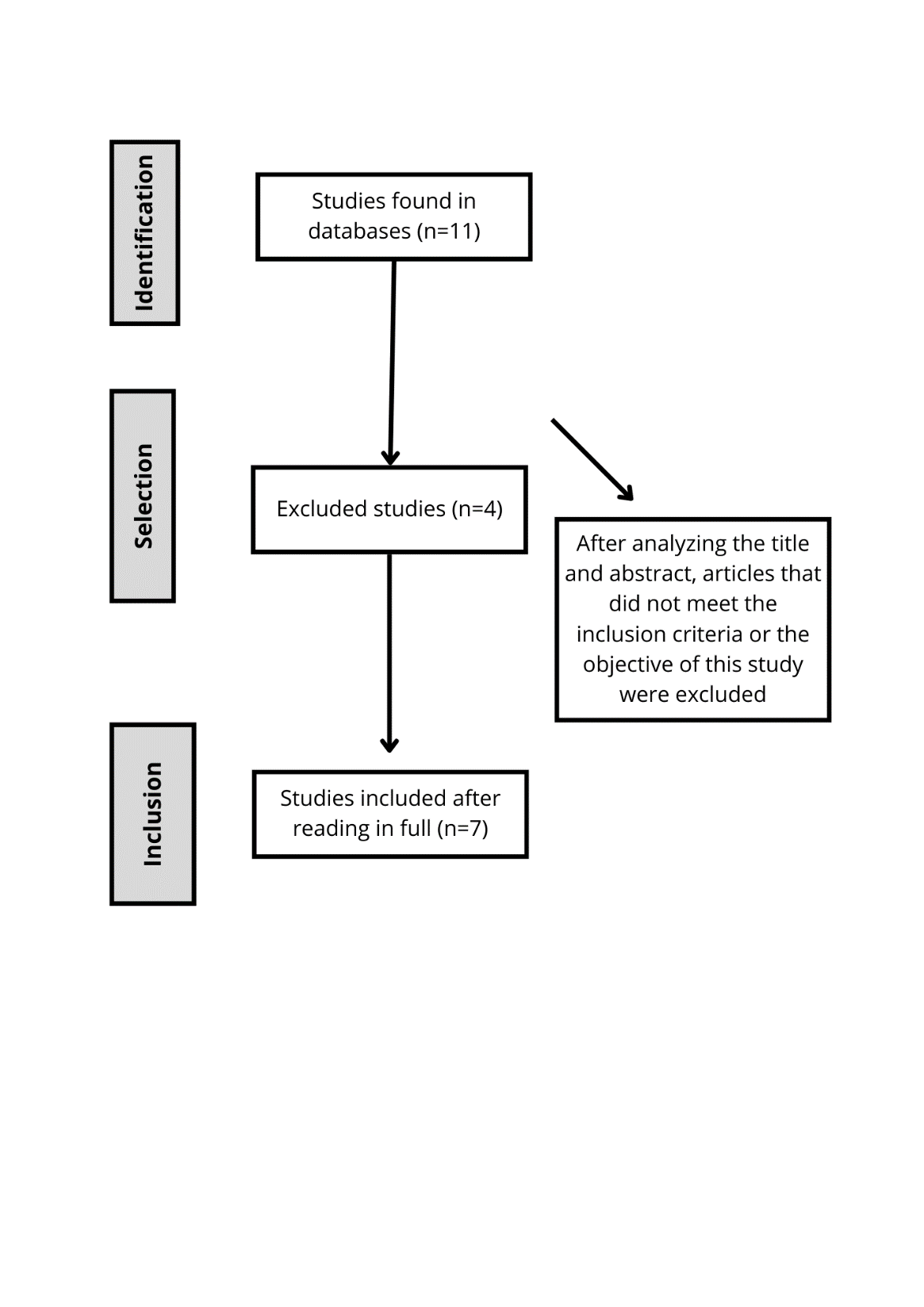
Included in this review were clinical trials (randomized or not), published between 2018 and 2025, available in full text format, without specifying the language of publication, without restriction to the country, which evaluated the use of aromatherapy as an anxiety-reducing mechanism during pediatric dental care, in comparison to negative control (without aromatherapy), other positive control approaches (such as music, games, audiovisual distraction), or pharmacological approaches.

Studies that did not meet the inclusion criteria, such as case reports, reviews, editorial letters, edited publications, or those not available in full, were excluded.

3. results

From the electronic search, 11 studies available in the literature were found. After reading the titles and abstracts, 04 studies were excluded that did not meet the pre-established inclusion criteria or that did not meet the objective of the present review. Therefore, 07 studies were read in full and added to the literary base that formed the basis of this study.

**Figure 01**. Flowchart illustrating the methodological design for the construction of this literature review.



**Table 01.** Electronic search studies compiled after applying the inclusion and exclusion criteria.

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| **Authors/Year** | **Type of Study** | **Purpose of the study** | **Materials and Methods** | **Results** |
| Arslan, Aydinoglu, Karan., 2020 | Randomized clinical trial | To evaluate the correlations between psychological and physiological findings following lavender oil inhalation among children assigned to tooth extraction. | A total of 126 children aged between 6 and 12 took part. The groups were randomly divided into control (without any intervention) and lavender (who inhaled the oil for 3 min before the interventions) groups. Psychological assessments were made using the facial image scale (FIS), Face, Legs, Activity, Cry, Consolability (FLACC) and the Wong-Baker pain rating scale (WBS). Physiological changes were assessed using vital signs evaluations. All parameters were observed before the applications, after inhalation, injection of anesthesia and tooth extraction. | The lavender group had significantly lower anxiety and pain scores after tooth extraction. Significantly lower blood pressure levels and a significant drop in heart rate were also found after inhalation in the lavender group. A statistically significant increase in heart rate was observed after anesthetic injection and tooth extraction in the control group. |
| Tripathy et al., 2023 | Randomized clinical trial | Compare the effectiveness of lavender and patchouli essential oils in aromatherapy and their effect on dental anxiety in children. | 60 children aged between 6 and 12 were randomly assigned to an experimental or control group that received lavender and patchouli before dental treatment. Child anxiety was measured using the Chotta Bheem-Chutki scale. A pulse oximeter was used to record heart rate. | There was a significant reduction in the anxiety score and heart rate between the intervals. Statistical differences were observed in the lavender group compared to patchouli oil. |
| Samani et al., 2024 | Randomized clinical trial | To evaluate the possible anxiolytic effect of jasmine aromatherapy in pediatric dental procedures. | 56 children aged 7 to 12 years who required class 1 restorative treatment were randomized and allocated to two groups. Interventions were defined as 15 minutes of aromatherapy using 2 mL of jasmine extract for the intervention group and with water for the control group. Outcomes were defined as the child's anxiety and pain perception, measured by the modified children's dental anxiety scale (MCDAS), visual analog scale (VAS) and changes in vital signs. | Aromatherapy with jasmine proved to be effective in reducing children's anxiety and perception of pain during dental procedures and can therefore be suggested as an inexpensive and practical complementary method in dental practice. |
| Abdalhai et al., 2024 | Randomized clinical trial | To evaluate the effectiveness of various non-pharmacological interventions in reducing dental anxiety as well as increasing heart rate during pediatric dental treatments. | 6 children aged 6 to 10 who required dental treatment were randomly divided into two groups: Group 1 (Experimental, n = 28) aromatherapy with music group and Group 2 (Control, n = 28) the placebo group. Children in group 1 inhaled aromatic blend of lavender-neroli essential oil using a nasal mask and listening to their favorite music 5 minutes before anesthesia, while in the placebo group children were asked to use an empty nasal mask. Anxiety and pain were assessed before and after anesthesia using the self-report anxiety scale, facial imagery scale (FIS), Face-Legs-Activity-Cry-Consolability (FLACC) observational pain assessment scale, heart rate, SPO2 saturation, diastolic and systolic blood pressure. | Dental anxiety and vital signs, except SPO2 saturation, were significantly lower in the aromatherapy with music group when compared to the control group, with no differences in pain perception between the groups. |
| Ghaderi F, Solhjou N. 2020 | Randomized clinical trial | Determine the effect of lavender aromatherapy on anxiety level during dental treatment and pain perception during dental injection in children. | 24 children aged 7 to 9 received restorative treatment with lavender aromatherapy in the intervention session and without aroma in the control session. Salivary cortisol and heart rate were measured to assess the child's anxiety level and the Face Rating Scale (FRS) was used to assess pain perception during the injection at both visits. | The effect of the treatment on salivary cortisol, heart rate and FRS score was statistically significant. Aromatherapy with lavender can reduce anxiety and pain experienced in the dental office. |
| Nirmala K, Kamatham R., 2021 | Randomized clinical trial | To evaluate the effectiveness of aromatherapy in reducing anxiety and dental pain during local anesthesia procedures. | 150 children aged between 8 and 12 were randomly divided into five groups; Group 1: Lavender essential oil using a nebulizer; Group 2: Lavender essential oil using an inhaler; Group 3: Orange essential oil using a nebulizer; Group 4: Orange essential oil using an inhaler; Group 5: Control (no aromatherapy). For all children, baseline anxiety was recorded followed by aromatherapy (except for children in the control group). Following the standard protocol, AL was administered. Pain from the procedure was assessed using the Faces, Legs, Activity, Cry and Consolability (FLACC) scale and the Faces Pain Scale-Revised (FPS-R). Finally, anxiety was recorded again. | A significant difference was observed in the ANOVA test between the anxiety scores after LA in aromatherapy groups 1, 3 and 4 compared to the control. When the FLACC scores were analyzed using Kruskal-Wallis, there were significantly lower values in the aromatherapy groups compared to the control group. Pain scores, as reported in the FPS-R, were also lower in aroma groups 1, 3 and 4. Aromatherapy with lavender or sweet orange, using a nebulizer or inhaler, decreased children's dental anxiety, while only sweet orange was able to reduce pain as self-reported by the children. |
| Kumar et al. 2024 | Randomized clinical trial | To differentiate the effect of aromatherapy and conscious sedation in reducing dental anxiety among children undergoing extraction. | Children aged 6 to 9 and 30 of them were randomly divided into aromatherapy and conscious sedation groups. A Venham imagery scale was used to assess dental anxiety and a digital pulse oximeter for pulse and oxygen saturation. A sphygmomanometer was used to assess blood pressure. All parameters were assessed before and after extraction. | In both groups, pulse and anxiety levels were significantly reduced after extraction. Also after extraction, oxygen levels were significantly higher in the conscious sedation groups. Both aromatherapy and conscious sedation were effective ways of reducing anxiety and heart rate in children undergoing dental procedures. |

**4. LITERATURE REVIEW**

**4.1 DENTAL ANXIETY**

According to Nirmala et al., 2021, anxiety during dental treatment is prevalent in around 5% to 20% of children, which is relevant data since the presence of this disorder can increase the patient's perception of pain, making the moment unpleasant and consequently destabilizing their emotions.9

Studies show that anxious dental patients tend to avoid necessary treatments, which negatively affects their oral health and quality of life. Furthermore, anxiety can make care difficult, leading to negative behaviors and creating an often traumatic moment for the pediatric dentist patient.5,11,12,13

The mechanism of action of aromatherapy, which reduces heart rate, dental anxiety and pain levels, comes from the effect of inhaling scents that result in the location of volatile oil molecules in the lungs, which leads to rapid diffusion these molecules do not have blood. This action causes brain activation via systemic circulation, and thus, as molecules that bind to olfactory receptors create an electrophysical effect that reaches the brain. This effect can generate the activation of the neocortex, which affects perception of odors and affects regions of the limbic system, where hormone levels and emotions are controlled. Thus, global levels of anxiety and subjective biomarkers are suspended.14,15

In the dental environment there are several sensory stimuli and situations that can be a great potential for fear and/or anxiety in patients, especially in pediatric dentistry patients, since they are a public with a higher level of sensitivity and less knowledge, thus, anxiety in these cases can be more intense.5,6,9,16

This anxiety, which most often develops in childhood when left untreated, continues with the patient into adulthood, generating a series of negative impacts on their oral health.6 Therefore, controlling this disorder in the face of dental treatment through techniques that help minimize sensory triggers in the dental clinic are extremely useful in patient management, providing less traumatic dental visits.17

4.2 AROMATHERAPY

Although there are several methods already consolidated to control the patient's anxiety and behavior, such as the use of pharmacological drugs, these have limitations, high costs, can have adverse effects, in addition to non-acceptance by family members.6,8

From this, the use of complementary alternative medicines emerges as an alternative in the management of anxious pediatric dentistry patients. Studies show that aromatherapy has benefits such as low cost, minimal side effects, low cost and easy applicability.3,5,9,11,16

Bartolome et al. 2021 says in his study, that aromatherapy consists of the use of certain aromatics, which can produce positive effects both physically and emotionally, through the release of neurotransmitters that induce relaxation, in many individuals changes in the level of anxiety, heart rate and breathing can be observed.23

Lavender essential oil is one of the most used in aromatherapy. This is extracted by hydrodistillation of Lavandula angustifolia flowers, and has a sedative, anxiolytic and analgesic effect.24

Currently, aromatherapy is recognized worldwide and the application of essential oils is guaranteed to be safe. They can be applied in different ways, including application to the skin, baths, massage and inhalation.9

According to Nirmala K, Kamatham R. 2021, inhalation is, among these forms, the most basic of use. The oils can be inhaled through a humidifier or with moistened gauze/cotton. The relatively low cost and minimal side effects are the factors that indicate this practice by health professionals as an excellent therapeutic intervention in patient management.9

**4.3 AROMATHERAPY IN PEDIATRIC DENTISTRY**

In the pediatric dentistry scenario, the use of aromatics appears as an important alternative in behavioral management and anxiety control, offering greater comfort and safety to children and their families.25

The findings of the study by Arslan et al. (2020), led the authors to suggest that lavender oil could be used to treat anxiety in pediatric dentistry patients, since in their study, children who inhaled the aromatic oil had lower anxiety, pain, blood pressure and heart rate scores after tooth extraction.26

A recent randomized clinical trial that aimed to evaluate the correlations between psychological and physiological findings after inhaling lavender oil among children assigned to tooth extraction, concluded that children who used aromatherapy had significantly lower anxiety and pain scores after tooth extraction.27

Ghaderi and Solhjou (2020), evaluating the effect of aromatherapy, with indicators of childhood anxiety in salivary cortisol and pulse rate during treatments that could potentially cause stress, observed that aromatherapy with lavender essential oil can generate a significant reduction in physiological parameters in children during dental care, in addition to reducing the perception of pain during the anesthesia procedure.4

It is important to highlight some limitations of this study, such as the quality of the literature, since in some studies, blinding of non-pharmacological interventions did not occur, in addition to the lack of information about concealment, which can cause bias. A wide variety of methodologies adopted in our studies also constitutes another limiting factor, which can hinder the reproducibility of studies. Furthermore, the impact of dental anxiety on children receiving dental treatment can vary significantly between different age groups, including preschoolers, schoolchildren, and adolescents, so it is important to note that the effectiveness of various interventions can also vary based on the age of the children. Robust studies, with rigorous methodologies, are further reinforced in order to evaluate and confirm the role of aromatherapy in the management of pediatric dentistry patients.

Aromatherapy emerges as a complementary alternative therapeutic approach that uses essential oils as its main product, which induce satisfactory pharmacological and physiological effects in users.3,11 Thus, this treatment method has strong potential in terms of the ability to reduce anxiety during dental treatment, in order to provide comfortable care for patients, professionals and families.11,13,25,27

5. Conclusion

Given the findings, it is concluded that aromatherapy is an important alternative in managing anxiety in pediatric dentistry patients, being safe, of good applicability and low cost. It is suggested that new robust studies be developed that further emphasize the technique, aiming at the benefits of the practice.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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