



Is There a Place for Essential Oils in Patient Care? Fact vs. Fiction

A Peer-Reviewed Publication
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EDUCATIONAL OBJECTIVES

This article will help educate dental providers on essential oils and how they can be used in patient care. This information will enable the dental professional to answer questions from patients regarding the use of essential oils for their dental health. At the conclusion of this educational activity, participants will be able to:

1. Understand the definition of essential oil
2. Identify how essential oils work
3. Know how essential oils can be delivered
4. Understand how essential oils can be used in patient care

ABSTRACT

A "clean living" lifestyle revolution has taken over the country in recent years, with many people limiting or eliminating chemical based products from their homes and bodies. Replacement of these products with those from nature has become very popular, especially those containing essential oils. Consumers are looking for acceptance and the cooperation of health-care providers to incorporate essential oils and products containing them into their home care and treatment plan options. By educating themselves on these alternative therapies, providers can better understand the needs and concerns of this patient population, which will promote trust and better compliance.



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WHAT ARE ESSENTIAL OILS?

Many people, health-care providers included, are unaware of the healing benefits of essential oils. With advancements in pharmaceutical technology over the last 100 years, natural products such as essential oils have been virtually disregarded for their therapeutic purposes. In recent years, due to the overuse of antibiotics and adverse side effects of many medications, consumers are searching for natural alternatives for their health-care needs. This has led to an increased use of essential oils.

Essential oils come from plants and are extracted or distilled from their seeds, leaves, bark, stems, roots, or flowers. They are defined as “volatile” since they quickly evaporate when exposed to air. Essential oils are very concentrated and oftentimes an entire plant must be used to produce just one drop of oil. To put that into perspective, to make one pound of lavender essential oil, about 220 pounds of lavender flowers would need to be harvested and distilled.¹

The use of essential oils dates back centuries ago to the time of the Egyptians. Hieroglyphics found on Egyptian temples display the blending of oils and describe recipes used by them. The Egyptians used essential oils as medicines to treat various ailments, in the embalming process, and in their cosmetics.² Evidence of the dental use of essential oils dates back to 200 BC, when the emperor of China used clove essential oil to improve the breath. Also, in the 10th century, Al-Gazzar referenced the use of clove for halitosis and pain management.³ By 1837, a sedative filling material consisting of magnesium oxide and eugenol had been concocted by Bonastre.⁴ In the 19th century, the use of essential oils in dentistry expanded into endodontics, periodontal therapy, temporary filling/cements, and to treat conditions such as abscesses and stomatitis.⁵

THE CHEMISTRY OF ESSENTIAL OILS

The chemical structure of essential oils is comparable to human cells and tissues, which enables the body to easily identify and accept them.⁶ A unique aspect of essential oils is their ability to penetrate cell membranes and diffuse through blood and tissues. Due to their small molecular makeup, they can be processed by the body very quickly and can travel through the body within minutes.⁷

Terpenes, monoterpenes, phenols, and aldehydes are the main aromatic constituents of essential oils and create a ringlike chemical structure from chains of carbon and hydrogen atoms. Attached to these chains at different points are oxygen, hydrogen, nitrogen, sulfur, and other carbon atoms.⁶ Essential oils can be quite diverse in their effects on the human body due to their complex chemistry and the amount of different molecules present.⁸ The multifactorial nature of an individual oil to produce more than one therapeutic effect in contrast to synthetic chemicals that typically have only one action but many side-effects makes them appealing to consumers.

PURE VS ADULTERATED ESSENTIAL OILS

Use of pure essential oils, those distilled from the plant with no additives, is imperative to achieve therapeutic benefits. Many of the essential oils available on the market today for commercial use have been adulterated or mixed with synthetic compounds to extend their life, to eliminate odors, or to flavor products. Adulterated oils can potentially be dangerous to the consumer resulting in burns, skin irritation, or rashes, and the desired therapeutic effect may not be achieved unless pure essential oils are used.

Specific standards for quality control of essential oils do not currently exist in the United States, and an essential oil product does not need to gain government approval before being brought to market and sold to consumers. This makes it difficult for consumers to determine the quality of essential oils available to them in stores or on the internet. The Food and Drug Administration (FDA) is responsible for regulating foods, food additives, drugs, cosmetics, and dietary supplements.⁹ Depending on the intended use of an essential oil, the FDA makes decisions regarding the regulation of an essential oil on a case-by-case basis. They have the power to enforce guidelines and restrictions over makers and distributors concerning how essential oil products are marketed and any health claims made in connection with the product. Therefore, to ensure that an essential oil is suitable for therapeutic purposes, consumers should consider some important factors before choosing an essential oil supplier, such as: where the plants are grown, method of distillation used, and if there are any statements about purity that can verify that no synthetic solvents or chemicals have been added.⁶

WAYS TO DELIVER ESSENTIAL OILS

After ensuring that the essential oils to be used are pure or unadulterated, the oils can be delivered in three ways: topically, internally, and through inhalation.

Topical Use:

Essential oils can be applied directly to the skin “neat” (undiluted) or by diluting with a carrier oil such as coconut, olive, grapeseed, or almond. Using carrier oils with essential oils helps to extend the oil, lubricate the skin, and facilitate



absorption through the upper layer of skin down into the subdermal tissues.¹⁰

Internal Use:

Essential oils can be consumed by placing drops under the tongue, in capsule form, or by adding to beverages or foods. Ingestion of certain essential oils as dietary supplements or as additives to foods is generally regarded as safe (GRAS) by the FDA, and the oils are listed for consumers in Title 21 in the Code of Federal Regulations.¹¹



Inhalation:

Inhaling essential oils through a diffuser is one of the most popular delivery systems available today. Cold-air diffusers work by atomizing a fine mist of desired essential oil(s) into the air where they remain suspended for several hours. Another method for oils to be diffused is through a humidifier or vaporizer. Direct inhalation of essential oils can also be achieved by placing drops of essential oil in the palm of one hand, then cupping both hands together over the nose and mouth while breathing in deeply.⁶ All three methods for delivery of essential oils can be used individually or synergistically to attain a desired effect.



PATIENT CARE WITH ESSENTIAL OILS

It is becoming more common in recent years for dental practitioners to be confronted with patients who may question current treatment protocols or the use of medicaments due to worry about bacterial resistance and toxicity of ingredients that may be included in recommended products. Alternative options, such as the use of essential oils, to the traditional means for treating oral conditions may be requested by these patients, and it would behoove practitioners to be open to investigating these options and to be able to educate the patient on the pros and cons of implementing them.

Is there evidence to support the use of essential oils in patient care? Yes and no. Despite the many studies available to support the use of essential oils in many areas of health care, there is still a need for more research, knowledge, and training in the chemistry and safety of essential oils.

There have been many studies published to prove the efficacy of essential oils for their antibacterial, antifungal, and antiviral properties. This is advantageous for patients since the oral environment is teeming with bacteria that cannot be eliminated with brushing and flossing alone. In a study of five essential oils—tea tree, lavender, thyme, peppermint, and eugenol—against four common oral pathogens (*Staphylococcus aureus*, *Enterococcus fecalis*, *Escherichia coli*, and *Candida albicans*) tea tree, peppermint, and thyme exhibited substantial inhibitory effects and are considered effective as an intracanal antiseptic solution.¹²

As an antifungal, melaleuca essential oil, otherwise known as tea tree oil, was found to be comparable to fluconazole during a 24-hour period against *Candida albicans*. However, at day seven, melaleuca continued to display antifungal action whereas fluconazole had lost its antifungal properties.¹³ Cinnamon oil was also shown to be effective against oral candidiasis in denture wearers who were being treated for this condition.¹⁴

It is not uncommon in the dental practice for children and adults to present clinically with herpes labialis. This pathogen is difficult to manage and as viral strains become resistant to existing antiviral drugs, it becomes a concern for patients and clinicians alike. The virucidal properties of essential oils for the management of the herpes simplex virus type I are promising and were investigated at the University of Heidelberg Germany. They analyzed ginger, thyme, hyssop, and sandalwood against acyclovir-resistant isolates of herpes simplex virus type I. All four of the essential oils tested were found to exhibit high levels of virucidal activity and reduction of plaque formation.¹⁵ The antibacterial, antifungal, and antiviral properties of essential oils make them conducive to treating many oral conditions.

Clove oil is probably the most well-known essential oil in the dental field. It has been used in the treatment of dry socket and to relieve tooth pain associated with pulpitis or dentinal hypersensitivity for many years. The power of clove oil as a topical analgesic was studied, and researchers found it could be used in lieu of benzocaine topical anesthetic.¹⁶ Patients searching for a natural or drug-free topical analgesic may find this option appealing.

Can essential oils “heal” cavities or “cure” periodontal disease? No scientific evidence supports those claims, but a study performed at the Mahidol University, Department of Oral Microbiology, examined the antimicrobial and antiplaque effects of sweet basil, cinnamon bark, sweet

fennel, kaffir lime, black pepper, peppermint, and spearmint against the cariogenic bacteria *Streptococcus mutans* KPSK2 and *Lactobacillus casei*. The conclusion of the study was that cinnamon bark and sweet basil essential oils had strong inhibitory effects against the tested bacteria and reduction of the pre-established biofilm mass.¹⁷ This evidence supports the use of essential oils in the prevention of caries and biofilm development.



Periodontal disease is caused by pathogens that are constantly multiplying and taking up residence in the periodontal pockets of a susceptible individual. This combination makes it difficult for the patient as well as the dental practitioner to manage and treat. When the periodontal pocket is deep, large amounts of calculus can be deposited there, making removal difficult. The hypothesis that mechanical instrumentation in combination with a seven-day essential oil mouth rinse protocol could reduce the bacterial count of shallow (4-5 mm) and deep (6 mm) pockets was evaluated. The results showed a significant reduction of bacterial counts in the shallow and deep pockets of individuals studied, demonstrating that essential oils can be effective in periodontal therapy.¹⁸

EMOTIONAL SUPPORT FOR HIGH ANXIETY PATIENTS

Dental anxiety prevents many patients from pursuing or completing dental treatment. This condition can be challenging for dental professionals to manage and can lead to frustration for the practitioner and patient. Traditional sedation methods for the management of dental anxiety are not without risks and may be out of the scope of care for many practitioners. Aromatherapy with essential oils has been studied as an alternative method to conscious or general sedation for adults and children.

Inhalation of essential oils through aromatherapy may be effective in the dental setting to reduce anxiety and improve mood by stimulating parasympathetic activity of the autonomic nervous system.¹⁹ Interestingly, this system is involved in the control of the fight or flight response, which can be triggered by dental stimuli.²⁰ When fragrance from essential oils

enters the nose, it activates the olfactory nerve cells in the epithelium that send electrical impulses to the limbic system of the brain.²¹ This area of the brain is responsible for controlling heart rate, blood pressure, breathing, memory, stress, and hormones.⁶

Lavender essential oil is often added to many products to promote a calming effect; therefore, it was used to study its effectiveness on dental patient anxiety in the reception area of five dental clinics. The results showed that there was a significant reduction in anxiety scores for both male and female subjects who were subjected to lavender essential oil for just 15 minutes prior to dental treatment.²² In a controlled clinical trial, orange essential oil was evaluated for its effects on children ages 6-9 during a fissure sealant procedure. Salivary cortisol and pulse rate were obtained for two procedures per child: one with exposure to orange oil and one without. The result was a significant decrease in salivary cortisol levels and pulse rate when using aro-



mathery with orange essential oil.²³ Due to the anxiolytic effect of some essential oils, use of them in the dental clinic can be considered a safe and effective means for reducing dental anxiety in children and adults. Implementation of diffusers in the reception area or operatory of the dental practice may prove beneficial for patients experiencing dental anxiety.

HOME-CARE ALTERNATIVES

Whether a practitioner chooses to implement essential oils in the dental practice or not, patients may want to use them for their home-care regimens. It is common to see cinnamon, peppermint, or wintergreen essential oils already

present in many over-the-counter dental products available to consumers today. Patients seeking products to help with halitosis, gingivitis, and periodontal maintenance may benefit from a mouthwash containing these essential oils. A published review of Listerine mouthwash containing essential oil concluded that it reduced plaque and gingivitis when used in conjunction with daily brushing and flossing.²⁴ Another study showed that mouth rinses containing essential oil can prevent the attachment of bacteria on dental surfaces, contributing to better oral health.²⁵ An important home-care tool for patients is their toothbrush. Bacteria from brushing can remain on the toothbrush and contaminate it.²⁶ Changing manual toothbrushes or the heads of electric toothbrushes every three months has been recommended by the American Dental Association (ADA) for this very reason.²⁷ To reduce the amount of bacteria present on the toothbrush, daily soaking of the toothbrush in a mouth rinse containing essential oil was proven to be effective and can benefit patients, especially those who are immunocompromised, for disinfection of their toothbrushes in between changing cycles.²⁸

Another method that many patients have added to their oral health regimen is oil pulling with the addition of essential oils. This is performed by vigorously swishing oil through the teeth for about 15 to 20 minutes, then expectorating. Oil pulling with coconut or sesame oil has been shown to have antibacterial activity against some oral bacteria.²⁹ Oil pulling has also proved beneficial against plaque-induced gingivitis, halitosis, and oral thrush.³⁰⁻³² This therapy may be suggested as an adjunct to standard oral hygiene methods to improve oral health with no adverse side effects and low cost to the patient.³³

Patients who are not inclined to floss daily may consider the addition of a mouth rinse containing essential oil to the water of an oral irrigator device such as the Waterpik Flosser to reduce bacteria in the oral cavity.³⁴ Waterpik

recommends using a 1:1 ratio of mouthwash to water to prevent damage to the unit. Waterpik also cautions against adding pure essential oils to the unit because it may reduce the performance or shorten the life span of the water flosser.³⁵ Many toothpastes available to consumers are composed of abrasive particles that can damage enamel and increase the risk of dental decay and sensitivity. Another concern for patients is chemical additives in toothpastes to control tartar buildup. For patients seeking alternatives to these products, there are recipes available to make at home that consist of baking soda, coconut oil, and essential oils such as peppermint or wintergreen that will not damage enamel and can be an effective plaque removing dentifrice.³⁶ Dental practitioners can be confident supporting their patients' requests for alternative oral care products containing essential oils due to their antiseptic and nontoxic properties.

HOW TO USE ESSENTIAL OILS SAFELY

In addition to available scientific research, there is a vast amount of anecdotal evidence that has shown essential oils to have minimal or no negative side effects and can be used safely for many types of health conditions. Due to their potent concentration, only small amounts are needed to experience therapeutic effects. Therefore, patients should be urged to start gradually with a desired oil, to read labels, and to check with their health-care professional if they have any condition(s) that may contraindicate the use of essential oils. Patients must keep essential oils away from the eye area and never put them into the ears. If a patient experiences irritation to mucous membranes, they should be encouraged to flush the area with vegetable oil—not water—as essential oils are not water soluble. Essential oils should always be diluted for use on children under 12 years of age.⁶

CONCLUSION

Essential oils are not a replacement for routine dental care but can be considered an addition to a patient's oral health-care routine. It is becoming more widely known among dental as well as medical professionals that oral health has a significant impact on overall wellness. Patients seeking to improve their physical health do well to begin with their oral health. As research continues to emerge on the benefits of essential oils for oral health, the use of them may become commonplace in patient care. Dental practitioners can feel confident with the research available to recommend or support a patient's wishes to use essential oils.

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AUTHOR PROFILE

Amber Pierce began her dental career at the age of 16, training and working her way through the various disciplines of oral surgery, orthodontics, restorative and cosmetic dentistry. She became licensed in Pennsylvania as an Expanded Function Dental Assistant in 2008. She has attended advanced hands-on courses at various prestigious organizations such as The Hornbrook Group, the Mid-Atlantic Center for Advanced Dental Study and the American Academy of Cosmetic Dentistry. She has a special interest in the use of ozone in dentistry having originally trained internationally with one of the leaders in the field of dental ozone and later attending the International Ozone Association's annual conference. Amber has traveled on dental mission trips to Vietnam with Operation Smile in 2009 and to Belize with International Health Outreach in 2014 and 2015.

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QUESTIONS

1. **Essential oils are derived from:**
 - a. seeds
 - b. leaves
 - c. bark
 - d. all of the above
2. **The Egyptians used essential oils for:**
 - a. weight loss
 - b. embalming
 - c. ailments
 - d. b and c
3. **A unique aspect of essential oils is their ability to:**
 - a. penetrate cell membranes
 - b. cure cancers
 - c. replace antibiotics
 - d. none of the above
4. **The FDA is responsible for regulating:**
 - a. food
 - b. drugs
 - c. cosmetics
 - d. all of the above
5. **When choosing essential oils, a consumer should not consider:**
 - a. adulterated oils
 - b. where plants are grown
 - c. method of distillation
 - d. verification of purity
6. **Essential oils can be delivered:**
 - a. topically
 - b. internally
 - c. through inhalation
 - d. all of the above
7. **Using a carrier oil:**
 - a. helps extend the oil
 - b. eliminates effectiveness
 - c. facilitates absorption
 - d. a & c
8. **An essential oil not studied to be effective as an intracanal antiseptic is:**
 - a. tea tree
 - b. orange
 - c. thyme
 - d. peppermint
9. **Melaleuca essential oil can be used to treat:**
 - a. burns
 - b. dry socket
 - c. stomatitis
 - d. oral candidiasis
10. **What oils show virucidal activity against herpes simplex type I?**
 - a. ginger
 - b. thyme
 - c. sandalwood
 - d. all of the above
11. **Clove has been used in dentistry:**
 - a. to treat dry socket
 - b. as a topical anesthetic
 - c. to treat halitosis
 - d. all of the above
12. **Aromatherapy can be used in the dental practice by:**
 - a. a diffuser
 - b. injection
 - c. ingestion
 - d. none of the above
13. **Aromatherapy may be effective in the dental setting for patients who are:**
 - a. anxious
 - b. happy
 - c. calm
 - d. none of the above
14. **The limbic system is responsible for controlling:**
 - a. heart rate
 - b. blood pressure
 - c. memory
 - d. all of the above
15. **Which oils have been studied for their anxiolytic effects?**
 - a. orange
 - b. lemon
 - c. lavender
 - d. a & c
16. **Essential oil mouth rinses can help with:**
 - a. halitosis
 - b. gingivitis
 - c. periodontal therapy
 - d. all of the above
17. **The ADA recommends changing your toothbrush every:**
 - a. day
 - b. week
 - c. 3 months
 - d. year
18. **Oil pulling with which oil(s) has shown antibacterial activity against oral bacteria?**
 - a. coconut
 - b. olive
 - c. sesame
 - d. a & c
19. **Many patients are concerned with traditional toothpastes due to:**
 - a. abrasiveness
 - b. chemical additives
 - c. taste
 - d. a & b
20. **Patients should keep essential oils away from:**
 - a. eyes
 - b. skin
 - c. ears
 - d. a & c
21. **If a patient experiences irritation from essential oils, the area should be flushed with:**
 - a. water
 - b. vegetable oil
 - c. alcohol
 - d. none of the above
22. **Essential oils should always be diluted for:**
 - a. adults
 - b. infants
 - c. toddlers
 - d. b & c
23. **Essential oils can be described as:**
 - a. volatile
 - b. concentrated
 - c. therapeutic
 - d. all of the above

