



**ORIGINAL RESEARCH PAPER**

**Dentistry**

**PHYTOMEDICINE IN ENDODONTICS:  
EXPLORING HERBAL APPROACHES FOR  
DENTAL CARE—A REVIEW**

**KEY WORDS:**

**Nadi Soundarya  
Subbaiah\***

Intern, Department of Conservative Dentistry & Endodontics, Adhiparasakthi Dental College and Hospital, Melmaruvathur.  
\*Corresponding Author

**Dr. Sujith  
Rajmohan**

Senior Lecturer, Department of Conservative Dentistry & Endodontics, Adhiparasakthi Dental College and Hospital, Melmaruvathur.

**ABSTRACT**

Herbal medicine has a long history of use in traditional medicine, and many plants have been found to possess therapeutic properties. Most common herbs used to treat infection include cloves, ginger, garlic, and turmeric. These herbs are known for their antibacterial, anti-inflammatory, and analgesic properties, which make them effective in treating various dental conditions. This review focusses mainly on various herbal medicine used in endodontics.

**INTRODUCTION:**

Herbal medicine, also known as botanical medicine, involves the use of plants and their extracts for medicinal purposes. In recent years, there has been growing interest in the use of herbal medicine in endodontics, which is the branch of dentistry that deals with the treatment of the dental pulp and periapical tissues.[1]

Herbal extracts such as those derived from garlic and ginger have been found to be effective in killing bacteria that cause infections in the dental pulp. [2,3] Additionally, these extracts can help reduce inflammation and pain, making them useful in managing symptoms associated with root canal infections.

Another application of herbal medicine in endodontics is postoperative pain management. Herbal remedies such as those containing chamomile, lavender, and valerian can help reduce pain and promote relaxation after endodontic procedures. These remedies can be used in combination with traditional pain medications to enhance their effectiveness.[4]

Overall, the use of herbal medicine in endodontics has shown promise as a secure and efficient method to treat a range of dental diseases. [5]

Dental practitioners should collaborate closely with patients to create individualised treatment programmes that take into consideration each person's particular needs and preferences. Table 1 summarizes the uses of herbal medication in endodontics:

**Table 1 Studies related to the properties and uses of herbal medicine:**

Herbal Medication	Properties	Uses of endodontics
Tea tree oil	Antimicrobial	irrigant solution
Propolis	Antimicrobial	intracanal medicament
Neem	Antimicrobial	pulp capping
Aloe vera	Anti-inflammatory	sealer cement to aid in the bonding of gutta-percha and promote healing.
Curcumin	Anti-inflammatory	Intracanal medicament/sealer
Green tea	Anti-inflammatory	Pulp capping
Orange oil	Solvent	Smear layer removal
Eucalyptus oil	Solvent	Smear layer removal
Hawthorn	Promotion of dentin-pulp regeneration	regenerative endodontics

Ginseng	Promotion of dentin-pulp regeneration	regenerative endodontics
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It's vital to remember that the safety and efficacy of these herbal medicines can change based on the application and the individual patient.

**Pulp And Dentin Repair :**

The use of herbal medicine extends beyond the treatment of root canal infections and postoperative pain management. There is also growing interest in the potential of herbal remedies to promote pulp and dentin repair.

Herbs such as aloe vera, propolis, and green tea have been found to possess regenerative properties that can help promote the growth of new pulp and dentin tissue. These herbs contain compounds such as antioxidants, flavonoids, and polyphenols that have been shown to stimulate cell proliferation, enhance angiogenesis, and modulate inflammatory responses.[6]

Aloe vera, for example, has been found to promote the regeneration of pulp tissue by stimulating the production of growth factors and increasing the proliferation of pulp fibroblasts. [7] Similarly, propolis has been shown to enhance the production of dentin matrix proteins and increase the expression of genes involved in dentinogenesis.

Another herb that has demonstrated potential for encouraging pulp and dentin regeneration is green tea. It has catechins, which have been shown to promote the growth and differentiation of dental pulp stem cells as well as the expression of genes essential for the production of dentin. [8]

In general, the use of herbal treatments to encourage pulp and dentin healing is an intriguing field of research that could completely change how endodontic therapy is delivered. [9]

Several herbal substances have been researched for their potential role in supporting pulp and dentin repair, including:

**Aloe vera:** Research has shown that aloe vera has regenerating abilities that can encourage the development of fresh pulp and dentin tissue. [10] Polysaccharides, anthraquinones, phytosterols, and other active substances found in it have been demonstrated to promote angiogenesis and increase cell proliferation.

Bees generate a resinous material called **propolis**, and research has shown that it has anti-inflammatory and antibacterial qualities. It also contains a number of active substances, including flavonoids and phenolic acids, which

have been found to promote the expression of genes related to dentinogenesis and the creation of dentin matrix proteins.[11]

**Green tea:** Catechins, which are contained in green tea, have been shown to increase the growth and differentiation of dental pulp stem cells as well as the expression of genes necessary for the production of dentin. It also possesses strong antioxidant qualities that can aid in preventing inflammation and oxidative stress.

**Cleaning And Disinfection:**

Cleaning and disinfection are essential steps in endodontic treatment to remove bacteria and other microorganisms from the root canal system. While traditional disinfectants such as sodium hypochlorite and chlorhexidine are widely used, there is growing interest in the potential of herbal remedies for cleaning and disinfection in endodontics.[12]

Several herbs, such as neem, tea tree oil, and garlic, have demonstrated antimicrobial properties and have been investigated for their potential use in endodontic disinfection. Here are some examples:

**Neem:** Known for its antibacterial and anti-inflammatory properties, neem has been used for ages in traditional medicine. Neem has been shown in endodontics to be efficient in lowering the bacterial load in root canals and dentin tubules. Numerous active substances found in it, including nimbin, nimbidin, and nimbinene, have been found to have antimicrobial effects.[13]

**Tea tree oil:** Due to its robust antibacterial characteristics, tea tree oil has been researched for its possible application in endodontic disinfection[14]. Many of the active ingredients it contains, including terpinen-4-ol, have been shown to be effective against a variety of microorganisms.

Allicin, one of the active components in **garlic**, has been proven to have antibacterial effects. Garlic extract has been shown in endodontics to be efficient in lowering the amount of bacteria in root canals and dentin tubules.[15]

**Calendula:** Calendula has been researched for its possible use in endodontic disinfection because it has been shown to have antibacterial and anti-inflammatory properties. Numerous active substances, including flavonoids and triterpenoids, which have been demonstrated to have antimicrobial properties, are present in it.[16]

**Removal Of Smear Layer :**

The smear layer is a thin layer of debris that forms on the surface of dentin during root canal instrumentation. It is important to remove the smear layer to achieve optimal disinfection and to facilitate the penetration of root canal sealers into the dentinal tubules. While traditional methods such as sodium hypochlorite and ethylenediaminetetraacetic acid (EDTA) are commonly used for smear layer removal, there is increasing interest in the potential of herbal remedies for this purpose in endodontics.[17]

Several herbs, such as papain, bromelain, and propolis, have demonstrated the ability to remove the smear layer and open up the dentinal tubules.

**Papain** is an enzyme that can degrade the organic matrix of the smear layer and is present in papayas. It has been demonstrated to have proteolytic activity. Papain has been discovered to be useful in endodontics for eliminating the smear layer and allowing access to the dentinal tubules.

**Bromelain:** Research has demonstrated that the enzyme bromelain, which is contained in pineapple, also possesses proteolytic action. In endodontics, it has been discovered that

bromelain works well to remove the smear layer and enhance root canal sealants' penetration of the dentinal tubules.

**Propolis** has been shown to have antibacterial and anti-inflammatory properties. Propolis is a resinous material that bees collect from plant buds. Propolis has been discovered in endodontics to be useful in eliminating the smear layer and lowering the microorganisms in root canals.

While these herbal treatments have demonstrated promise in the removal of smear layers, additional research is required to fully understand their efficacy and safety in clinical settings.

**Root canal Sealer Cement:**

In order to lubricate and aid in the adhesion of the gutta-percha obturation material to the root canal walls, sealer cement is a crucial component of root canal obturation. [18] Several plants, including neem, propolis, and turmeric, have proven to be effective endodontic sealer cements.

**Neem:** Neem is an Indian native tree that has long been utilised for therapeutic purposes. Neem has been discovered to have antibacterial and anti-inflammatory qualities in endodontics, and it can function as a sealer cement. Neem has been shown to reduce bacterial development and strengthen the binding between gutta-percha and root canal dentin.

**Propolis:** Propolis can be used as a sealer cement and has been discovered to have antibacterial and anti-inflammatory qualities. In endodontics, propolis has been shown to strengthen the binding between gutta-percha and the dentin of root canals and can also lower the amount of microorganisms there.

It has been discovered that the **spice turmeric**, which is frequently used in Indian food, has anti-inflammatory and antioxidant qualities. Turmeric has been discovered to function as a sealer cement in endodontics and has the ability to stop bacterial development.

More research is required to fully understand the efficacy and safety of these herbal remedies in clinical settings, despite the fact that they have shown promise as sealer cements.

**Removal of Obturation Material by Softening and Dissolving:**

The removal of obturation material is sometimes necessary in endodontic retreatment, and traditional methods include mechanical instrumentation, solvents, and heat.

Several herbs, such as eucalyptus, orange oil, and tea tree oil, have demonstrated the ability to soften and dissolve obturation material.[19]

**Eucalyptus:** Eucalyptus oil has been found to have antimicrobial and anti-inflammatory properties and can also act as a solvent for gutta-percha. In endodontics, eucalyptus oil has been found to effectively soften and dissolve gutta-percha.

**Orange oil:** Orange oil has been found to have antimicrobial properties and can also act as a solvent for gutta-percha. In endodontics, orange oil has been found to effectively soften and dissolve gutta-percha.

While these herbal remedies have shown promise in the softening and dissolution of obturation material, more research is needed to fully understand their effectiveness and safety in clinical practice.

**Avulsed Teeth Storing Media:**

For a tooth to survive once it has been avulsed, prompt care is essential. The storing medium used to maintain the tooth

healthy until it can be transplanted is one of the crucial elements in this procedure. The potential of using herbal medicines for this purpose is becoming more and more popular despite the widespread usage of standard preserving media like milk and Hank's Balanced Salt Solution (HBSS).[20]

Several plants, including aloe vera, green tea, and propolis, have shown promise as efficient tooth storage media.

**Aloe vera:** Aloe vera has been found to have anti-inflammatory and antimicrobial properties and can also act as a storing media for avulsed teeth. In endodontics, aloe vera gel has been found to maintain the viability of periodontal ligament cells and can also provide a protective environment for the tooth.

**Green tea:** Green tea has been found to have antioxidant and anti-inflammatory properties and can also act as a storing media for avulsed teeth. In endodontics, green tea has been found to maintain the viability of periodontal ligament cells and can also reduce oxidative stress.

**Propolis:** Propolis has also been found to have antimicrobial and anti-inflammatory properties and can act as a storing media for avulsed teeth. In endodontics, propolis has been found to maintain the viability of periodontal ligament cells and can also reduce inflammation.

**Rice water:** After 30 min, rice water contains a large number of live periodontal ligament cells, indicating that the nutritional component of rice water has a favorable influence on the vitality of the cells.

**Honey :**The nutrients contained, including proteins, vital amino acids, vitamins, and minerals, may nourish and sustain the viability of PDL cells in honey milk with an extended shelf life.

**CONCLUSION:**

In several medical specialties, including dentistry and endodontics, herbal therapy is becoming more and more popular. In endodontics, the use of herbal remedies has been investigated for a variety of purposes. Further research is warranted to fully explore its potential in improving endodontic treatments.

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