

Herbal formulations: The next level in oral care

Ramandeep Singh Gambhir¹, Jagjit Singh², Arvind Bhardwaj³,
Amanpreet Kaur⁴, Jagjit Singh Dhaliwal³

¹Department of Public Health Dentistry, Rayat Bahra Dental College and Hospital, Mohali, Punjab, India,

²Department of Periodontology, Himachal Institute of Dental Sciences, Paonta Sahib, Himachal Pradesh, India,

³Department of Periodontology, Rayat Bahra Dental College and Hospital, Mohali, Punjab, India, ⁴Private Practitioner, Amloh, Punjab, India

Abstract

Since ancient times, India has used its rich knowledge of traditional medicine to prevent and cure diseases. Herbal medicines have fewer side effects in comparison with traditional medicines, but side effects do occur. There are many species of medicinal plants belonging to various families which are being used, traditionally, to control and cure a variety of dental problems by the Indian population. A literature review was conducted using databases such as PubMed, MEDLINE, and search engines-like Google Scholar. We found "Ayurveda," "herbal medicines," and "dentistry" as relevant key words; these were entered into Medical Subject Headings controlled vocabulary. After doing necessary exclusions, finally 42 articles were included in the present review. The present paper focuses on various herbs that are used in dentistry such as clove oil, *Aloe vera*, turmeric, sesame, cranberry, Meswak, sesame, red clover, and evening primrose. Dental professionals should have adequate knowledge regarding common herbal formulations so that they safely prescribe or use them on their patients. However, there is a need for more research to justify their use as good alternatives to current preventive and curative treatments for oral health problems.

Key words: Dentistry, herbs, oral care, research, safety

INTRODUCTION

Herbs are those remedial agents which are created by nature for curing human illness. Herbal extracts have been used since ancient times in traditional medicine.^[1] The earliest reported literature on the practice of Indian system of medicine was during the Vedic period. This system of medicine (Ayurveda, Unani, and Siddha) is 5000-year-old and recommends a combination of lifestyle management (which includes diet, exercise, and meditation) and treatment with specific herbs and minerals to cure various diseases.^[2] Approximately 1250 Indian medicinal plants are being used to formulate beneficial measures according to ayurvedic or other ethnicity.^[3] About one-fourth of drugs are manufactured from plants, and many other are formulated from prototype compounds isolated from plant species.^[4]

Use of herbal and dietary supplements (HDSs) is a well-documented trend among consumers of all age groups.^[5] Many useful properties such as anti-inflammatory, antioxidants,

antibacterial, and astringent action have been found in several plants and their parts. These properties are being utilized to treat dental disorders.^[6] Every day dental health professionals encounter patients who use these products on daily basis. Dental professionals often recommend herbal extracts which are successfully used as tooth cleansing and antimicrobial agents.^[7] As majority of the orodental diseases are due to bacterial infections, it has been well documented that medicinal plants provide significant antibacterial action against various micro-organisms.^[7,8]

During recent times, there has been an increase interest to study medicinal plants and their uses in different parts of the globe to prevent side effects that are often associated with the use of allopathic medicines.^[9,10] Health professionals are

Address for correspondence:

Dr. Ramandeep Singh Gambhir, Department of Public Health Dentistry, Rayat Bahra Dental College and Hospital, Mohali, Punjab, India. Phone: +91-9915646007. E-mail: raman2g@yahoo.com

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often challenged to explore relevant information to advise their patients about using these products safely. A dental health professional needs to be more informed regarding the use, safety, and effectiveness of the various traditional medicines and sale of over-the-counter products. As this is hardly explored in dentistry, the present review was conducted to explore and report various medicinal herbs used in dentistry:

1. To provide the best and exclusive from each system as a complimentary therapy with minimal side effects
2. To report their safety and precautions to be followed by dental professionals while prescribing or administering them to their patients.

METHODS

Data search for the present review was done both electronically as well as manually. Electronic search was conducted using databases such as PubMed, MEDLINE, and articles published in peer-reviewed journals. Web-based search engines such as Google Scholar were also used to extract relevant articles using various key words and their combinations. We found “Ayurveda,” “herbal medicines,” and “dentistry” as relevant key words, these were entered into Medical Subject Headings (MeSH) controlled vocabulary. The terms such as traditional, oral health, India, and herbs were combined with the MeSH terms by Boolean “AND” or “OR” and entered in both PubMed and Google Scholar. More information on the topic was also gathered from PGIMER, library, Chandigarh. The collected documents included original articles, reviews, editorials, guest editorials, letters to editor, interviews, short reports, and short communications. Some data were also obtained by cross checking the reference lists of the articles accessed. A total of 58 articles were obtained during initial search which was conducted keeping in view the papers published in last few decades. However, after scrutinizing all data, only 42 relevant articles were included in the final analysis. Finally, included articles were categorized based on indexation.

DATA EXTRACTION AND ANALYSIS

After completing the search, the selected documents were summarized and categorized based on the topic and its implications. Finally, included articles were categorized based on indexation [Table 1].

Table 1: Distribution of articles based on indexation

Indexation	Number of articles
PubMed	37
Non-PubMed	4
Non-indexed	1

VARIOUS HERBS AND THEIR USES IN DENTISTRY

A large majority of naturally occurring herbs are being studied for their potential uses in dentistry, but only few have been approved for their commendable medicinal properties due to the lack of clinical trials in this field. Some of the important herbs and their use in dentistry and oral care as follows.

Clove Oil (*Syzygium aromaticum*)

Ancient Hindu texts have described the use of clove oil in dentistry. The main components of this herb are eugenol and β -caryophyllene. It has got excellent analgesic and antiseptic properties which inhibit growth of all disease causing bacteria while leaving the beneficial bacteria unharmed.^[11,12] It is frequently used by dentists to relieve toothache, patients having periodontitis and also in treating bleeding gums. Due to its topical analgesic action, it is being incorporated in dental cements and restorative materials. The formulations of clove oil are available as tincture, lozenges, and mouthwash.^[13] It can provide dental professionals with an alternative to other anesthetic materials for topical anesthesia in their routine practice especially in treating children and in areas where it is not economically feasible to use other costly topical anesthetics.^[14]

Aloe Vera (Grita Kumari)

It is a tropical plant which is grown in North Africa and most parts of Asia. The chemical constituents in *Aloe vera* are anthraquinones, saccharides, prostaglandins, and fatty acids.^[15] It is analgesic, antibacterial, antiviral, antifungal, and antiseptic in nature. Gel from the aloe leaf has been used for centuries as a topical remedy for minor burns, cuts, and other skin infections. It is mainly used on the sites of periodontal surgery, toothpick injuries, chemical burns, aphthous ulcers, gum abscesses, dry socket, lichen planus, benign pemphigus and gingival problems associated with anti-inflammatory drugs (AIDs), leukemia, migratory glossitis, geographic tongue, and burning mouth syndrome. Xerostomia cases are also benefitted by using *Aloe vera*.^[16]

Tea Tree Oil (*Melaleuca alternifolia*)

This particular plant is a native of Australia having antiseptic and antifungal properties and a mild solvent.^[17] It is useful for treating throat irritation, stings, burns, wounds, and skin infections of all kinds. Orally, rub the tree tea oil directly on sore, inflamed gum for temporary relief. Use tree tea mouthwash to soothe oral inflammation. It also has mild solvent action, and hence could hold potential applications in root canal treatment for dissolving the necrotic pulp tissue. Mouthwash containing tea tree oil has proved effective for patients suffering from oral candidiasis.^[18]

Chamomile (*Matricaria recutita*)

Chamomile or German Chamomile is a plant which is native to Europe and Western Asia, and is used in most parts of the world as table tea. It has got a significant anti-inflammatory, antispasmodic, smooth muscle relaxation, antibacterial, and antiviral property.^[19] Orally, major uses of chamomile are in gingivitis, periodontal disease, and in oral ulcers when used as a mouthwash. However, some allergic skin reactions with topical use and bronchial constriction with systemic use have been noted in persons who are allergic to *Asteraceae* family.^[20] Therefore, it should be used cautiously.

Garlic (*Allium sativum*)

It is one of the most extensively researched medicinal plants with a typical odor. Its antibacterial activity depends on allicin produced by enzymatic activity of alliinase (a cysteine sulfoxidelyase) on allicin after crushing or cutting garlic clove.^[21] Garlic extract significantly inhibits the growth of *Streptococcus mutans*, and therefore, can be used as an effective remedy in the prevention of dental caries when used it is used as a constituent in toothpaste or mouthwash.^[22]

Evening Primrose (*Oleum Oenothera biennis*)

The main constituent of primrose is linoleic acid (65–80%). It has antiallergic and antiulcer activity. Combination of primrose oil with Vitamin B complex was found to have a positive effect on Sjogren's syndrome after 8 weeks of treatment.^[23] It is also used during orthodontic tooth movement and dental caries. Some adverse effects were noted such as headaches, nausea, loose stools, and diarrhoea in some individuals.^[13]

Myrrh (*Commiphora molmol*)

Myrrh is best known as one of the gifts the Wise Men brought to the Infant Jesus. The main constituents of this herb are the resin, gum, and volatile oil.^[24] It helps promote healing in cases of pyorrhea. It can be applied topically for the treatment of and of for local application as an anodyne to treat infections of the oral cavity. Rinse the mouth with myrrh tea and brush with the powder when gum disease exists.^[25]

Neem (*Azadirachta indica*)

This tree occupies a special place in the Indian community as far as its medicinal value is concerned. The leaves of this special tree are high in fibers, carbohydrates, calcium, fluoride, and many amino acid proteins.^[26] Preparations of neem are used to improve general health but are widely known for its marvellous powers of preventing and healing gum diseases and other dental problems.^[27] According to a study reports, significant reduction of gingival, bleeding, and

plaque indices was found after using neem based mouth rinse for 21 days.^[28]

Thyme (*Thymus vulgaris*)

It is mainly composed of volatile oils namely phenol, thymol, and carvacrol. A salve made of thyme, myrrh, and goldenseal is used to treat oral herpes; it contains fluoride used in toothpaste. *Thymus vulgaris* extract is effective against *S. mutans*.^[29] However, it should be used with caution in young children, pregnant, and lactating mothers and persons allergic to thyme oil.

Turmeric (*Curcuma longa* Linn.)

Turmeric has been used for over 2500 years in India. It is used historically as an antiseptic, antibacterial, anti-inflammatory, pain killer, and hepatoprotector.^[30] According to a recent research, turmeric extract and turmeric oil have shown to reverse precancerous changes in oral submucous fibrosis in humans.^[31] Rinsing the mouth with turmeric water (5 g of turmeric powder, two cloves, and two dried leaves of guava in 200 g of water) gives an instant relief from pain. Applying the powder of burnt turmeric pieces and Bishop's weed seed on teeth and cleaning them makes teeth and gums strong.^[32] Massaging the aching teeth with roasted, ground turmeric eliminates pain and swelling. It is also used as a colorant in pit and fissure sealant.

Cranberry (*Vaccinium macrocarpon*)

It is composed of various biologically active compounds such as antioxidant flavonoid and phenolic acids having antimicrobial property.^[33] Some researchers found that many of these substances can not only inhibit the enzymes associated with the formation of the dental plaque polysaccharide matrix film but can stop the bacteria sticking to surfaces thereby, inhibiting plaque formation. They also have anticaries properties as they prevent acid formation. However, since cranberry juice is acidic in nature and can lead to erosion of teeth, the above finding should be treated with caution.^[34]

Meswak (*Salvadora persica*)

Chewing sticks have been widely used in the Indian subcontinent, the Middle East and Africa since ancient times. Meswak, a derivative from Arak tree, is used by many people in different cultures and in many developing nations as a traditional toothbrush for oral hygiene.^[35] It is suitable for cleansing teeth, comparatively cheap, possesses various medicinal properties and is easily available in rural areas of developing countries. The Meswak extract has also found its way into the dentifrices in the recent years as antiplaque and anti-gingivitis agents.^[36] Chewing sticks should be obtained

from fresh stems of medicinal plants. It is believed that chewing on these stems facilitate salivary secretions which possibly help in oral cleaning and control of plaque.

Red Clover (*Trifolium pratense*)

Red clover is a very versatile herb with uses in blood health, hormone health, digestive health and even protecting against certain types of cancer. Red clover mouthwash is healing for irritated and diseased gums. After making red clover tea, prepare an ointment from the strained blossoms and leaves. Rub the ointment, which has antibiotic properties, on gums that are abscessed from disease or sore and inflamed from root canal therapy or other dental procedures.^[37]

Propolis

It is a mixture of plant-derived and bee released compounds. It has got a wide range of activities such as antibacterial, esthetic, and antifungal. It has been used in dental caries, gingivitis, storage medium, intracanal medicament, dentinal hypersensitivity, relief from denture ulceration, stomatitis, halitosis, mouth freshener, periodontal pocket/abscess, dentinal sensitivity, lichen planus, candidal infections, angular cheilitis, and xerostomia.^[38]

Sesame (*Sesamum indicum*)

This sesame plant (*Sesamum indicum*) has been considered a gift of nature to mankind for its nutritional qualities and desirable health effects. Oil pulling is an ayurvedic practice that involves swishing of oil in the mouth for oral and systemic health benefits.^[39] Sesame seed oil is used most commonly because of several medicinal properties and desirable health benefits. Oil pulling therapy with sesame oil has many advantages over chlorhexidine like no staining, no prolonged after taste, and no allergy. Sesame oil is 5-6 times more cost-effective than chlorhexidine and is readily available in most households.^[40]

Peppermint (*Mentha piperita*)

This particular mint grows in moist, green leaves and has dark green, lance-shaped leaves and purple flowers. Peppermint leaves yield approximately 0.1–1.0% volatile oil. Peppermint contains menthol, methyl acetate, tannic acid, and Vitamin C. Peppermint oil is used to relieve toothache by soaking a cotton ball in the oil and placing it in the cavity or rubbing it on the tooth. Peppermint mouthwash can be used to relieve gum inflammation.^[41]

Lavender Oil

It is obtained from the flowers of *Lavandula angustifolia*. It is reported to reduce stress, anxiety, and improve mood when

inhaled or orally administered but is not very effective in cases of high anxiety. It can be used in dental clinics to reduce patients' anxiety. It is found to be useful as an anxiolytic agent when used in waiting area. It is also helpful during surgical procedures, as it has been shown to reduce the pain of needle insertion.^[42,43]

SAFETY AND EFFICACY OF HERBAL REMEDIES

Herbal medicines are believed to be benign and to not cause severe toxicity. Now-a-day, there is large industrial mass production of herbal medications. Moreover, the lower costs as compared to those of conventional medications, is the major attraction of these treatments. However, some of the herbal medicines can cause severe toxicity and even death.^[44] Many herbal products act similarly to antiplatelet or anticoagulant drugs, the effects of which can be additive to those produced by traditional medications, such as aspirin, clopidogrel, or warfarin. Patients and practitioners alike are often unaware of these effects or may only know of certain products that are associated with causing an altered bleeding response. This issue is further confounded by the fact that many herbal products contain multiple herbs, making it difficult to attribute these blood altering effects to a specific ingredient contained within a given supplement.^[44] In many countries, prescriptions are not required to obtain herbal medicines since these are categorized as non-prescription medicines or products suitable for self-care. Providers of herbal medicines in this category are not normally physicians. They include providers of traditional and complementary or alternative medicine as well as community pharmacists and nurses.^[45] These people may have little training in and understanding of how herbal medicines affect the health of their patients, who are often also taking other medicines, prescription, or non-prescription. Therefore, there is a need to ensure the public safety and effective quality control of these preparations. This can be done by ensuring the standardization of the several aspects such as nomenclature of common medicinal plants and other resources, their collection practices, semi processes and final processing, packaging, preservation, storage, product life, labeling and modes of distribution including clinical application to ensure quality, safety, and efficacy.^[46]

ROLE OF DENTAL PROFESSIONALS IN IMPROVING SAFETY

Patients should be asked about their use of HDS as a component of the pharmacologic history review at every appointment about consuming these as a substitute to their traditional medications, frequency of usage, side effects, and sudden stoppage of any herbal product recently. Patients should be encouraged to discuss their supplement use to prevent lack of disclosure in the dental setting. Reported

HDS use must be documented in the treatment chart. Dental professionals should consult a drug database to check for compatibility before administering, dispensing, or issuing a prescription for another medication to patients who are using supplements. It is important to remember that synergistic adverse bleeding effects may occur with aspirin and non-steroidal AIDs and many HDS.^[47] Caution should be used with sedation in patients using herbal supplements that produce central nervous system effects. Herbs that alter liver function have the potential to alter the metabolism of drugs used in dentistry. As different HDS possess specific safety windows that range anywhere from 24 h to 7–14 days, it is recommended that all patients discontinue the use of HDSs for 14 days before undergoing surgery, including dental surgery.^[48]

CONCLUSION

The use of herbal extracts in various forms is entirely consistent with the primary health-care principles. These aid in healing and are effective in controlling microbial plaque in gingivitis and periodontitis. Studies for assessment of safety and efficacy of herbal remedies are in its infancy. Herbal remedies are expected to be widely used in future. Researchers should be encouraged to conduct controlled studies to prove the effectiveness and safety of natural dental products. The low toxicity and low cost of these herbs should encourage further investigation leading to a better understanding on traditional Asian medicine and their application to oral health. Moreover, health educators must consider the challenge to ensure that people participate in making decisions about the herbal medicine to protect the public health.

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