

Review Article

Immense Potential of Ayurveda in Improving Dental Health: A Holistic Approach

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ABSTRACT

There has been a change in thinking of the people across the world with a growing tendency towards “GO NATURAL” especially in the field of health sciences. Ayurveda is the ancient Indian system of health-care and longevity and should be considered as an alternative by integrating it with the modern dentistry. The present review aims to discuss various Ayurvedic plants and their significance in dentistry. Along with the PUBMED, MEDLINE, Medknow indexed journals, peer-reviewed and non-indexed journals were also reviewed using aloe vera, turmeric, honey, licorice, triphala and oral health as the keywords. The incorporation of Ayurveda into modern oral health-care practices will make dentistry much safer, affordable and more accessible for the lower socio-economic groups in society.

Key words: Ayurveda, Oral health, Traditional medicine, Herbal plant.

There has been a change in thinking of the people across the world with a growing tendency towards “GO NATURAL” especially in the field of health sciences. The World Health Organization estimates that around 4 billion people (80% of the world's population) use traditional medicines for some aspect of primary healthcare [1]. This change is because the plant-based therapeutics are natural products, non-narcotic, easily biodegradable, pose minimum environmental hazards, have less adverse effects, and are easily available and affordable [2]. The populations of the two most populous countries in the world, China and India, have practiced traditional medicine for the management of oral diseases, including periodontal disease, for well over 2000 years [3].

Ayurveda, a form of traditional medicine is a combination of two Sanskrit words “Ayur” (life) and “Veda” (Science of knowledge). The Ayurveda being the world's oldest medical system was originated in India

dating back over thousands of years. According to the Shalya tantra and Shala kyantra (one of the branches of Ayurveda), 65 varieties of oral diseases can arise on 7 anatomic locations of oral cavity: 8 on the lips, 15 on the alveolar margin, 8 in connection with the teeth, 5 on the tongue, 9 on the palate, 17 in the oropharynx and 3 in a generalized form [4]. Ayurveda has also suggested various treatment procedures such as oral cleansing, extractions, excisions, flap surgeries etc. and preventive methods like Dant Dhavani (Brushing), Jivha Lekhana (Tongue scrapping) and Gandoosha (gargling) or oil pulling and tissue regeneration therapies for these oral diseases [5].

Despite the advances in the various field of medicine, oral infections and dental caries are still considered a serious public health problem and inflict a major burden to health care services around the world and especially in developing countries. So, there is an urgent need to address the knowledge and importance about traditional methods

by adapting routine oral practices and using herbal remedies for various dental diseases as the influence of these traditional practices should not be ignored, especially in a country such as India where almost 30% of the population have no access to dental care [3]. Hence, the search for alternative products continues as medicinal plants though having slow recovery produce miraculous therapeutic effects. The present review aims to discuss various Ayurvedic plants and their application and significance in dentistry.

ROLE OF AYURVEDA IN MANAGEMENT OF DENTAL HEALTH

Ayurvedic medications have stood the test of time and since time immemorial been used for various ailments. Recently, there has been a renewed interest in the use of various ayurvedic drugs for oral and dental health. Plants and natural products from time immemorial were used for their pharmacological applications viz. anti-ulcerogenic, wound healing, anti-inflammatory, antimicrobial, antioxidant properties etc [6]. In Ayurveda, dental health (called Danta Swasthya in Sanskrit) is very individualistic and varies with each person's constitution (prakriti) and climatic changes resulting from solar, lunar and planetary influences (kala-parinama) [7]. Varieties of ayurvedic and herbal preparation such as chewing sticks, herbal brushes (Babool, miswak, neem and mango), turmeric, amla, aloe vera, triphala, honey, licorice and ginger are used for various oral hygiene procedures as well as for treatment of various gum and oral diseases [8]. There was a long history regarding plants for the improvement of dental health and oral hygiene. Some of them are described below:

ALOE VERA

The Aloe vera plant has been known and used for centuries for its health, beauty, medicinal and skin care properties. The name Aloe vera derives from the Arabic word "Alloeh" meaning "shining bitter substance," while "vera" in Latin means "true." [9]. Aloe vera has a wide variety of effects ranging from anti-inflammatory to immunosuppressive activities. Davis et al. noted that Aloe vera gel improved wound healing by increasing blood supply (angiogenesis), which in turn increased oxygenation [10]. *Streptococcus pyogenes* and *Streptococcus faecalis* are two microorganisms that have been inhibited by aloe vera gel and processed aloe vera gel

preparation reportedly inhibited the growth of *Candida albicans* [11].

Clinical significance in dentistry: Due to its soothing and healing properties, Aloe vera has a great potential to reduce the swelling and instances of gum bleeding, alleviates gum irritation like gum sores (ulcer), improves the periodontal condition and can be used as a local drug delivery system in periodontal pockets [12]. Aloe vera oral gel is not only effective in decreasing the recurrent aphthous stomatitis patient's pain and wound size but also decreases the aphthous wound healing period [13]. US Food and Drug Administration has also found a derivative of Aloe vera for an effective treatment alternative in treating oral ulcers [13]. It can also be used as a denture adhesive such as Fittydent, Bioforce denture adhesive, Protefix adhesive and Secure denture adhesive. Aloe-vera has proved to be a good obturative material for primary teeth and has been found to be effective in decontaminating GP cones within one minute [13]. Its mouthwash is helpful in preventing radiation-induced mucositis by its wound healing and anti-inflammatory mechanism [14].

A number of studies have been done in past to disclose the application of aloe-vera in dentistry. A study done by Karim B [15], Bhat et al [16], George D et al [17] found that Aloe vera gel exerted strong bactericidal activity against periodontopathic bacteria and it can be used in the chronic periodontitis patients. Another study done by Poor MR et al [18] found a reduction in the incidence of alveolar osteitis in patients treated with aloe-vera gel. Hayes SM [19] and Choonhakarn C et al [20] found the utilization of aloe-vera gel in the treatment of oral lichen planus.

HONEY

Honey is defined as a sweet liquid substance produced by bees from the nectar gathered from flowers and stores them for food. The minimum inhibitory concentration (MIC) of the honey was found to range from 1.8% to 10.8% (v/v), indicating that the honey had sufficient antibacterial potency to stop bacterial growth if diluted at least nine times. Important factors which influence the antibacterial effectiveness of honey are its hygroscopic properties, acidic pH, phytochemical factors, increased lymphocyte and phagocytic activity [21].

Clinical significance in dentistry: Honey having an anti-inflammatory activity raises the possibility of it being useful as a therapeutic agent for periodontitis as the anti-

inflammatory activity block the direct cause of the erosion of the connective tissues and bone [22]. It has a stimulating effect on tissue repair and this could possibly benefit the oral conditions resulting from radiotherapy and chemotherapy of cancer [23]. Candy made with honey may also be useful for prevention of halitosis, as honey has been observed to give rapid removal of malodour from infected wounds [24,25].

Various studies have been done to determine the effect of honey on the oral cavity. Chiba et al in 1985 [23] had published a report on using honey to ease the pain of stomatitis during radiotherapy. A study done by Elbagoury et al [26] revealed the antibacterial effect of natural honey against anaerobic *Bacteroides* present in a dental abscess and osteomyelitis. Studies done on honey by English HK et al [27] found the anti-inflammatory activity of honey and also raises the possibility of it being useful as a therapeutic agent for periodontitis. Studies done by Molan PC [28] and Weston RJ [29] found the anticariogenic activity of honey against various oral pathogens causing dental caries.

TURMERIC

Turmeric is an ancient spice derived from the rhizome of *Cucurma longa*, a perennial plant belonging to the Zingiberaceae (ginger) family. It is popularly called "haldi" in India and named as curry spice by British.

Clinical significance in dentistry: It has been found that tinted pit and fissure sealant is useful for applying to tooth surfaces for the prevention or reduction of dental caries. This sealant can be produced from a composition comprising a polymerizable resin system containing acrylic monomer and at least one colorant selected from the group consisting of Annatto extract, turmeric extract, and β -Apo-8-Carotenal [30]. Turmeric is used for the treatment of Recurrent Aphthous Stomatitis (RAS) [30]. Curcumin 1% can be used as subgingival irrigant and 2% whole turmeric gel is used for local drug delivery system as an adjunct to scaling and root planning [31].

Lee et al [32] found the inhibitory effect of essential oil isolated from *Curcuma longa* on the cariogenic properties of *S. mutans*. Suhag et al [33] and Behal R et al [31] showed the role of turmeric as subgingival irrigant. Antharjanm R et al [34] and Prackasunand C [35] used turmeric as a treatment modality in recurrent aphthous stomatitis. Antimutagenic and anti-carcinogenic properties of *Curcuma longa* were determined by Nagbhusan et al

[36], Azuine MA et al [37] Kuttan R [38] and Deepa DA et al [39].

GREEN TEA

Green tea is a leading beverage in the far-east for thousands of years. It is one of the most popular beverages consumed worldwide.

Clinical significance in dentistry: Green tea is known for its antiviral properties which are based on the ability of polyphenols to act as antioxidants and prevent binding and penetration of virus to cells. Various studies were done in the past to reveal the anti-cariogenic potential of green tea consumption. Magalhaes et al [40] found that mouth rinsing with green tea extract protect teeth from abrasion and erosion which is similar to rinsing with fluoride extract or chlorhexidine extract. Zhang et al [41], Xu X et al [42] and Hamilton-Miller JMT [43] showed that tea extract reduced α -amylase activity in saliva. Therefore tea extract is likely to be an anti-cariogenic agent which lessens the cariogenic potential of starch-containing foods. Sakanaka S [44] found the effect of green tea consumption on gingivitis and periodontitis. Antifungal and antiviral effectiveness of green tea was demonstrated by Friedmann M [45].

LICORICE

Licorice, the name given to the roots and stolons of *Glycyrrhiza* species, has been used since ancient times as a traditional herbal remedy. It has been traditionally known and used as medicine in Ayurveda for rejuvenation. It is called 'mulethi' in Hindi.

Clinical significance in dentistry: Licoricidin and licorisoflavan A, two major isoflavonoids isolated from the licorice extract, have been shown to be responsible for the anti-inflammatory effect [46]. Anticariogenic effects of licorice against *Streptococcus mutans* was shown by Edgar WM [47], Gedalia I et al [48], He J et al [49], Hu CH et al [50], Peters MC et al [51]. Bergeron C et al [52] and Goultshin J et al [53] showed the effect of licorice on dental plaque reduction and gingivitis. Anti-fungal activity of licorice and its use in candidiasis was revealed by Fatima A et al [54].

TRIPHALA

Triphala has been extensively used in Ayurveda because of its various properties and therapeutic uses. Triphala is a combination of three medicinal plants, Amalaki

Phyllanthusemblica (syn. *Emblicaofficinalis*) Phyllanthaceae family, Haritaki (*Terminalia chebula*) Combretaceae family, and Bahera (*Terminalia bellirica*) Combretaceae family [55].

Clinical significance in dentistry: *Terminalia chebula* is valuable in the prevention and treatment of several diseases of the mouth such as dental caries, spongy and bleeding gums, gingivitis, and stomatitis. According to the *Sushruta Samhita*, *Triphala* can be used as a gargling agent in dental diseases. Anticaries activity of *Triphala* was revealed by studies done by Jagtap AG et al [56] and Tambekar DH et al [55]. Abraham et al. reported the strong inhibitory activity of *Triphala* against the polymorphonuclear leukocytes-type collagenases, particularly matrix metalloproteinase-9, and confirmed the use of *Triphala* in periodontal diseases [57]. Studies done by Desai A et al [58], Jagdish L et al [59] and Maurya DK et al [60] concluded that *Triphala* mouth rinse when combined with scaling and root-planing showed significant reduction in the plaque, gingival, and oral hygiene indices without any evidence of staining of teeth. The anti-plaque effect is may be due to the tannic acid in *Triphala*, which is adsorbed well to the groups on the surface of the bacterial cells, which result in protein denaturation and ultimately to bacterial cell death. It has a strong antioxidant activity due to *T. belerica*, which is the most active antioxidant followed by *E. officinalis* and *T. chebula* [57].

CONCLUSION

Since oral diseases continue to be a major health problem worldwide, there is a global need for alternative prevention and treatment options. Ayurveda should be considered as an alternative by integrating it with the modern dentistry. For this, the active principles of plants should be incorporated into modern oral health-care practices and dentists should be encouraged to use natural remedies in various oral health treatments. This will make dentistry much safer, affordable and more accessible for the lower socio-economic groups in society.

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