

## Power of Ancient Ayurvedic Plants in Treating Periodontal Infections an Holistic Approach - A Review

Sanjeevini A Hattarki\*, Vibha R Hegde and Pushpa SP

Reader, Department of Periodontology and Implantology, Maratha Mandal's Dental College and Research Centre, Belgaum, Karnataka

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#### \*For Correspondence

Sanjeevini A Hattarki, Reader, Department of Periodontology and Implantology, Maratha Mandal's Dental College and Research Centre, Belgaum, Karnataka, Tel: +543814227589.

E-mail: drsanju\_amar@yahoo.com

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### ABSTRACT

Oral diseases are one of the foremost necessary issues in developing countries, as public health demands are on the increase. Ayurveda is one such ancient Indian system of health-care and longevity. A number of plants are known to significantly delay the development of plaque, calculus, and caries as shown by many in vitro studies which indicate that many Asian botanical formulae exhibit antibacterial and antifungal properties that include their individual herbal compounds and chemical constituents. Despite many chemical agents being commercially accessible and known to alter oral accumulation they will have undesirable side-effects to some extent. Use of safe, quality products and practices should be ensured based on available evidence the traditional medicine has to be acknowledged. Hence publicity of Ayurvedic plants would benefit the general population, they by preventing tooth decay and Gum infections leading eventually to tooth loss with the use of appropriate methods.

### INTRODUCTION

Most of the oral diseases are caused due to the bacterial infections. Dental caries and periodontal diseases are among the most important global oral health problems. The link between oral diseases and the activities of microbial species that form part of the micro biota of the oral cavity is well-established [1]. There are numerous Ayurvedic drugs, which can be used in prevention as well as in management of oral diseases as shown by their use several hundred to several thousand years. Traditional medicine is an evolutionary process as communities and individuals continue to discover new techniques that can transform practices.

It has been well documented that the botanicals in the Ayurvedic material medica have been proven to be safe and effective. There are approximately 1250 Indian medicinal plants [2] that are used in formulating beneficial measures according to Ayurvedic or other ethnicity. Medicinal plants confer considerable anti-bacterial activity against various microorganisms [3]. The dentist needs to be more informed regarding the use, safety and effectiveness of the various traditional medicines and over-the-counter products, as the area explored in this sector of dental medicine is very less and there is a requirement for integration of skilled dental treatment modalities.

#### Ayurvedic Plants/Herbs That Can Be Used in Management of Periodontal Infections

Infections of the structures around the teeth are called periodontal diseases. The Untreated periodontal disease like gingivitis and periodontitis can eventually lead to tooth loss and in recent years, gum disease has been linked to a number of other health problems recent research has shown possible connections between gum disease and Atherosclerosis and heart disease, Stroke, diabetes, Respiratory disease. Herbs with medicinal properties are a useful source of treatment and have been used since long to heal and cure various disease processes. The Medicinal plants play an important role in meeting the demand of the traditional medicine .One of the richest herbal medicine traditions is found to be in India. About 80% of the population in developing countries depends on plant- based medicine for their health care.

Ayurveda, defines health as “the equilibrium of the three biological humors (doshas), the seven body tissues (dhatus), proper digestion and a state of pleasure or happiness of the soul, senses and the mind” [4]. A balance among the three doshas is necessary for health. Together, the three doshas govern all metabolic activities. Various Ayurvedic herbal plants have immense potential in the management of dental health and their potency has been reviewed, which have shown to possess antimicrobial,

anti-inflammatory, analgesic, activities according to the modern parameters. Following are the list of Medicinal Plants described with their medicinal properties that can be used in preventing and treating gingivitis and periodontitis

**Amala (*Emblica officinalis*):** It has an antioxidant as well as astringent property which has been proven to be effective in the treatment of a toothache, gingival inflammations, <sup>[5]</sup> aphous stomatitis <sup>[6]</sup> and other types of mouth ulcers.

**Anar/Dalima (*Punica granatum*):** Pomegranate preparations when applied topically has been found to be particularly effective for controlling oral inflammation as well as bacterial and fungal counts in periodontal disease <sup>[7-9]</sup>. The ellagitannin, punicalagin, is thought to be responsible for pomegranate's antibacterial activity <sup>[7]</sup>.

**Launga/Clove (*Syzygium aromaticum*):** Clove oil is commonly used to relieve pain of dental caries. Eugenol is considered as an active component (including beta-caryophyllene) <sup>[10]</sup> and also contains a variety of flavonoids hence it is widely used in conjunction with root canal therapy, dental abscesses, as temporary fillings ,gum pain, and other gum diseases <sup>[11]</sup> as Eugenol, being the primary component of clove's volatile oils, functions as an anti-inflammatory substance.

**Datiwan (*Alucita bidentata*):** Datiwan's stem and leaves are mainly used. The stem of the plant is used as a toothbrush and is said to be good in the treatment of pyorrhoea <sup>[12]</sup>. The root juice can be used for the treatment of a toothache also.

**Gotu kola (*Centella asiatica*):** It is effective in the treatment of mouth ulcers. It is known to heal wounds and promote connective tissue growth. According to Sastravaha et al. <sup>[13]</sup> investigated the effect by use of a biodegradable chips impregnated with *Centella asiatica* and *P. granatum* on periodontal disease all the sites showed a significant improvements in decreasing plaque, periodontal pocket depth and attachment level at 3 months compared to placebo.

**Amra/Mango (*Magnifera indica*):** Mango leaf contains ascorbic and phenolic acids shown to be an anti-bacterial properties. And was found to be effective against anaerobic dental microflora such as *Prevotella intermedia* and *Porphyromonas gingivalis* and hence can be effectively used as an adjunct in maintaining the oral hygiene <sup>[14]</sup>.

**Neem (*Azadirachta indica*):** The Anti-bacterial, anti-inflammatory, analgesic, antioxidant, antifungal, antiviral, immunostimulant properties of neem has been well documented in literature <sup>[15]</sup>. The use of neem stick as Anti plaque was demonstrated by Bandyopadhyay et al. It contains both mechanical as well as chemotherapeutic antiplaque agents. In a study by Anirban Chatterjee et al. <sup>[16]</sup> evaluated the antiplaque effect of neem as mouth rinse on gingivitis showed reduction in gingivitis and can be effectively used as an adjunct therapy in treating plaque induced gingivitis as the presence of gallotannins during the early stages of plaque formation could effectively reduce number of bacteria responsible for periodontitis <sup>[17]</sup>.

**Nilgiri (*Eucalyptus globulus*):** Eucalyptus extract is known to have anti cariogenic and anti-plaque property. Chewing gum containing Nilgiri showed a significant positive effect on plaque accumulation, gingival index, bleeding on probing and periodontal depth probing <sup>[18]</sup>.

**Tila/Sesame (*Sesamum indicum*):** It is rich in vitamin E and flavonoids phenolic antioxidants Ashokan et al. found that the oil pulling therapy done by using sesame oil, significantly reduces the plaque index, modified gingival scores and total colony count of aerobic microorganisms in the plaque of adolescents with plaque induced gingivitis <sup>[19]</sup>.

**Triphala:** It contains the dried fruits of three medicinal plants *Terminalia chebula*, *Terminalia belerica* and *Phyllanthus embelica*. Triphala has a strong inhibitory activity against PMN\_type collagenase, espically MMP-9 at 1500 µg/ml conc <sup>[20]</sup>. It has shown anti plaque properties, it is also used for strengthening the gums <sup>[21]</sup>.

**Harita/Turmeric (*Curcuma longa linn.*):** Brushing your teeth with turmeric can also be very effective in treating periodontal disease. Turmeric helps in soothing the gums and removing the plaque because of compounds that have very good anti-inflammatory properties. A study conducted by Mali Amitha et al. in 2012 should significant reduction in the gingival inflammation <sup>[22]</sup> and concluded turmeric mouth wash can effectively use as an adjunct to mechanical plaque control methods.

**Tea tree oil (*melaleuca oil*):** Tea tree oil is well-known oil that will help in curing the infection of periodontal disease because of its antibiotic properties. It has been used to treat severe chronic gingivitis, bleeding gums, halitosis, as they deeply penetrate to the skin. A randomized controlled clinical study by Elgendi et al. where they used tea tree oil gel for local application in patient with chronic periodontitis and showed that local delivery of TTO gel in case of chronic periodontitis may have some beneficial effects to augment the results of SRP. Moreover, it places a focus on the value of monitoring GCF levels of PTX3 as a marker of periodontal tissue healing following various periodontal therapeutic approaches <sup>[23]</sup>.

**Arjuna (*Terminalia arjuna*):** Its active constituents Arjunolic acid, ethyl gallate, flavone, ellagic acid and gallic acid are found to have antimicrobial effects. And this could potentially be used as one of the alternative for the treatment of periodontal diseases <sup>[24]</sup>. Shaswata Karmakar et al. in their study antimicrobial efficacy of *Terminalia arjuna* on potent periodontopathogens: an in vitro study showed antimicrobial properties on key oral pathogens, Arjuna extract could be beneficial as an alternative therapeutic strategy against biofilm-related oral diseases such as periodontitis <sup>[25]</sup>.

**Rumi mastagi/mastic gum (*Pistacia lentiscus*):** It is well known for its antioxidant and anti-inflammatory effects, as well as bactericidal effect. An recent study investigated the potential for the use of mastic gum for periodontal health <sup>[26]</sup> the antimicrobial

effect against the pathogens that are known to contribute to periodontal disease was assessed and was found to have a significantly higher inhibition effect on potential periodontal pathogens namely (*P. gingivalis*, *S. oralis*, *A. actinomycetemcomitans*, *F. nucleatum*, and *P. intermedia*).

**Wheat grass:** Wheatgrass is the young grass shoots of the *Triticum aestivum* plant, more commonly known by the name of wheat plant thought to have antioxidant, antibacterial and anti-inflammatory properties. Wheatgrass juice or wheatgrass supplement is known to prevent gingivitis and periodontal disease (gum disease) there by eliminating bacteria in mouth and on the gums. The Vitamin C, zinc and antioxidants in wheatgrass have anti-inflammatory and antibacterial properties. Thus it prevents gum disease.

**Goldenseal:** Goldenseal herb the compound Bererine in goldenseal is anti-bacterial, viral and fungal. Goldenseal improves the immune system, fights gingivitis and acts as astringent hence it helps in tightening up of loose gum tissue.

**Licorice root:** The American Dental Association consider licorice as an herb that inhibits plaque build-up and gum disease by chewing on a root or drinking steeped dried root and drinking 3 times daily, according to University of Maryland Medical Center. Its anti-bacterial and anti-viral properties can also treat canker sores and oral ulcers.

**Myrrh:** The ancient herb has been used since before that historical time for a lot of medicinal purposes such as inflamed or loosening gums, canker sores, throat and nasal infections, and breathing issues. Hence adding of myrrh oil to warm water and using it as a mouth rinse is one of the best way to alleviate bacteria and maintain good dental hygiene.

**Sage:** The herb Sage has antibacterial properties to mouth. It prevents plaque formation, prevents tooth decay and also helps to clean out oral sores.

**Green tea:** Among the polyphenols Epigallo catechin 3 gallate and Epicatechin 3 Gallate are the most predominant catechins. The antioxidant, antimicrobial, anticollagenase, antimutagenic and hemopreventive properties of these catechins proved to be helpful in the treatment of chronic diseases like periodontal disease. A study by Sanjeevini et al. [27] assess the effect of green tea catechins on the red complex organisms using Polymerase Chain Reaction for microbiological analysis and found Green tea catechins an effective local drug delivery along with scaling and root planing in treatment of chronic periodontitis. As green tea extract application as local delivery systems has so many effects on periodontal pathogens and periodontal tissues when used in various forms like strips, chips, and fibers for the treatment of periodontal disease or in combination with regenerative materials shows improved periodontal regeneration.

**Shiitake mushrooms lentinan:** Scientific studies have proved that shiitake mushrooms have anti-fungal, anti-tumor as well as anti-viral properties. Shiitake is also a very useful herb as it forms the base of several plant extracts like lentinan. Since Shiitake Mushrooms is extremely rich in Polysaccharides (beta-glucan) and lentinan, it helps to stimulate the immune system and promote the natural ability to ward off certain illness. A 2011 study at the UCL Eastman Dental Institute in London tested shiitake's antimicrobial effects on gingivitis the results indicated that shiitake mushroom extract lowered the numbers of some pathogenic organisms without affecting the organisms associated with health, unlike chlorhexidine, which had a limited effect on all organisms [28].

Plaque and gingivitis are important diseases of oral cavity. Various herbs are mentioned in Ayurvedic classics, which can be used for plaque control and treatment of gingivitis. The key to offering you so many options is to figure out what works best for periodontal treatment patient. Further studies are also required to determine how long the plaque-inhibiting effect of such herbal formulation lasts. Herbal products may vary in their effectiveness, therefore it is necessary to select herbal preparations carefully. Herbs and their extracts can be used as adjuvant in periodontal disease treatment [29].

## CONCLUSION

Ayurveda is the ancient Indian system of health care and longevity. In the subgingival plaque the bacteria are organized in a complex microbial biofilm. These biofilms are extraordinarily persistent, difficult to maintain, and play a vital role in periodontal disease and its progression hence it is needed to be eliminated before any periodontal therapy. Herbal preparations have gained popularity among rural and urban communities as natural resources and safety. It is these herbs that will be a major source of new chemicals and raw materials for the pharmaceutical industry in near future. As most of the oral diseases are due to bacterial infections.

Because traditional plant preparations have a significant historical background, it may be ethical to clinically evaluate these first and then collect modern toxicologic data. Due to lack of data on safety and efficacy and meticulous clinical trial evidence therapeutic approaches with herbal medicine are often staggered. It is recommended that more researches should be undertaken as it has been well-documented that medicinal plants confer considerable anti-bacterial activity against various microorganisms.

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