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Effect of Ayurvedic herbs *Neem (Azadiracta indica)*, *Khadir (Acacia catechu)*, *Madhuk (Madhuka indica)* on Periodontal Disease

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ABSTRACT

Periodontal diseases continue to be a major health problem world-wide with the incidence of oral cancer and other disorders are on the rise in developing countries. Oral health also reflects the body health and mental health. For prevention and the treatment of periodontal diseases, Ayurveda may lead to the development of novel preventive, therapeutic and holistic strategies for oral health. This Indian ancient system of medicine not only recommends treatments with specific herbs and minerals to cure various oral diseases but also recommends some daily use therapeutic procedures for the prevention of and maintenance of oral health. Various Ayurvedic herbs and natural products have been used for their pharmacological applications viz. antiulcer, wound healing, anti-inflammatory, antimicrobial and antioxidant properties and have been proven to be safe and effective for oral disease and hygiene including various therapeutic Ayurvedic procedures. Scientific validations of the Ayurveda oral health practices could justify their incorporation into modern oral care. In this paper, an attempt has been made to scientific evidence based therapeutic procedure *Dantapavan* (tooth brush) of neem (*Azadiracta indica*) for the prevention and maintenance of oral health and hygiene mentioned in Ayurveda.

Key words: Ayurveda, Oral health and hygiene, *Dantapavan*.

INTRODUCTION

Periodontal diseases are one of the most important problems in public health. Oral health is integral to general well-being and relates to the quality-of-life that extends beyond the functions of the craniofacial complex. Oral health's also affect the body health.

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There is evidence that oral biofilm-associated diseases may affect systemic health by mechanisms such as spreading infections to adjacent tissues and spaces, hematogenous dissemination of oral biofilm organisms or inflammatory mechanisms.^[1] Further, evidence suggests that oral biofilm-associated chronic periodontitis enhances the risk of coronary heart disease and cerebrovascular disease and that poor glycaemic control in diabetic patients with periodontitis is a concern for clinicians.^[2-3]

Hence the prevention and treatment of oral diseases is important for maintenance of good oral health and also for general health. Oral hygiene is the practice of keeping the mouth and teeth clean for dental health and to avoid bad breath. There are numbers of indigenous natural medicinal products which deserve recognition for their contribution in the improvement of oral health.^[4] Various plants and natural products

have been used for their pharmacological applications viz. antiulcer, wound healing, anti-inflammatory, antimicrobial and antioxidant properties etc.^[5]

Ayurveda is an ancient system of medicine and is a rich reservoir of resources even for the dental science, that and may lead to the development of novel preventive or therapeutic strategies for oral health. This 5000-year-old system of medicine not only recommends treatments with specific herbs and minerals to cure various oral diseases but also recommends some daily therapeutic procedures for the prevention and maintenance of oral health and these have been proven to be safe and effective. Recently, there is renewed interest in use of various Ayurvedic drugs and therapeutic procedures for oral and dental health. Bacterial infections are considered as causative factors in most of the dental diseases and it has been well-documented that Ayurvedic medicament produce considerable antibacterial activity against microorganisms, including bacteria responsible for periodontitis and dental caries.

Ayurveda recommends and insist on the use of herbal brushes. Chewing sticks have been widely used in the Indian subcontinent, the Middle East and Africa since ancient times. *Datuna* can be a good alternative to the toothbrush as a means of preventing oro-dental diseases. It is suitable for cleaning the teeth, possesses various medicinal properties and is easily available in the rural areas of developing countries including India. According to World Health Organization (WHO) 75% of the world's population uses herbs for basic health care needs. WHO has recommended for the incorporation of the traditional systems of medicine like Ayurveda into the primary health care system, for those communities where it is accepted.

All the Ayurvedic medicines and local remedies are easily available in the rural areas where socioeconomic condition of the people is not good enough to buy costly toothpaste or curative medicines. Ayurved *Samhitas* explains the treatment of periodontal diseases and mentioned various types of *Datun* (tooth brushes) for use. Ayurveda recognizes

nine openings of physical body and oral cavity as one of them. It suggests cleaning these openings frequently and regularly. Hygiene of oral cavity is more important due to the chief entrance and digestion process begins in the mouth itself. For the treatment of oral diseases Ayurveda advocates procedures such as oral cleansing, extractions, excisions, flap surgeries etc.

Ayurveda and Oral hygiene

Ayurveda emphasis upon the maintenance and promotion of positive health which is its primary objective whereas cure of diseases are only secondary. *Ayurveda* includes the preventive health care in "*Swasthya Samrakshana*". It well explains the importance of hygiene, *Dinacharya* (daily routines) the regimens which should be followed every day is known as *Dinacharya in Ayurveda* which includes oral hygiene, food hygiene, personal hygiene etc. Under the *Dinacharya* (daily routines) various procedures for maintaining oral hygiene are well explained in all classical texts of *Ayurveda*. These include procedures like *Danta-dhavana* (brushing the tooth), *Pratisarana* (Massaging the teeth and gums), *Jivha nirlekhana* (tongue cleaning), *Gandoosha* and *Kavala* (gargling) etc. Oral hygiene is not described as a separate chapter in Ayurveda but it comes under the different chapters of Ayurvedic literature. *Acharya Charak* described it under the topic "*Swasthyavrat*" which means personal hygiene in "*Mattrashitiyaadhyaye*". *Acharya Sushruta* had told about oral hygiene in the "*Anagatabhadraprathished*" chapter, while *Acharya Vagbhatta* described it in "*Dincharya*" chapter.

Here we have given emphasis on *Dantapavan/Dattuna* (Chewing sticks/brushing teeth) which should be done by each individual strictly.^[7] *Dantapavan/Dattuna* (Brushing of teeth) helps to remove dental plaque and tartar from teeth to prevent cavities, gingivitis, and gum disease. According to Ayurvedic texts, it is recommended that *Dattuna* (Chewing Sticks) in the morning as well as after every meal prevents oral diseases. The method of use is to crush one end, chew it and brush with it slowly. It is better to take from fresh plant. The stems

used for *Dantapavan* should be healthy, soft, without leaves and knots. After cleaning the teeth with *Dattuna* it is torn into two parts and used to scrap the tongue coatings.

Acharya Sushruta, mentioned that *Dantapavan* should be fresh and straight. Its length should be 12 *Angul* (9 inches), while thickness should be equal to *Kanshtika Anguli* (little finger).^[8] These herb sticks should be either *Kashaya* (astringent) *Khadira* (*Acacia catechu*), *Katu* (pungent) *Neem* (*margosa* or *Azadirachta indica*), or *Tikta* (bitter) *Karanja* (*Pongamia glabra*), in *Rasa*.^[9] *Acharya Sushruta* also includes *Madhura Rasa*. *Madhuka* (*Bassia longifolia* Koen),^[10] various plants those are not suitable for brushing are also mentioned in Ayurveda as follows.

Twigs of *Sleshmathaka* (*Cordia dichotoma*), *Arishta* (*Sapindus trifoliatus*), *Bibhithaka* (*Terminalia bellerica*), *Dhava* (*Anogeissus latifolia*), *Dhanwan* (*Grewia tiliifolia*), *Bilwa* (*Aegle marmelos*), *Nirgundi* (*Vitex negundo*), *Sigru* (*Moringa oleifera*), *Tilwaka* (*Simplocus racemosus*), *Tinduka* (*Diospyros melanoxylon*), *Kovidara* (*Bauhinia variegata*), *Sami* (*Accacia suma*), *Pilu* (*Salvadora persica*), *Pippali* (*Piper longum*), *Ingudi* (*Puthranjiva roxburgh*), *Guggulu* (*Commiphora mukul*), *Paribhadra* (*Erythrina indica*), *Amlika* (*Tamarindus indica*), *Salmali* (*Bombax ceiba*), *Palasa* (*Butea monosperma*) and *Sana* (*Crotalaria retusa*) should not be used as *Dattuna* (Chewing Sticks).

The benefit of *Dantpavan* is to get rid from bad odour of mouth along with increase interest towards food due to removal of *Mala* from tooth, tongue and mouth.^[19] Research has shown that *Dattuna* (chewing sticks) described in ancient *Ayurveda* literature, have medicinal properties and have the role in the maintenance of oral health. Chewing on these stems facilitate salivary secretion and help in plaque control while some stems have an anti-bacterial action.^[11] Present day research has shown that all the chewing sticks described in ancient *Avurveda* have medicinal and anti-cariogenic properties.^[12]

Neem (*Azadirachta indica*) is most commonly used herb for *Dattuna* all over the India. Some studies are done

on *Neem* (*Azadirachta indica*) related to tooth brushing are as follows. *Saimbi et al.* (1994) have reported that *Neem* extract had significant and higher antiplaque efficacy as compared to *Ayurvedic* tooth powder and commercial toothpastes.^[13] *Venugopal et al.* had found that the children (1-4 year of age) using *Neem* were less affected with dental caries. *Neem* contains the alkaloids margosine, resins, gum, chloride, fluoride, silica, Sulphur, tannins, oils, saponins, flavonoids, sterols and calcium.^[14] *Khalid* (1999) examined the antimicrobial activity of aqueous extract of *Neem* at various concentration and found antimicrobial activity at all the concentrations.^[15] *Vanka et al.* (2000) conducted a study to know the effect of indigenous *Neem* (*Azadirachta indica*) mouthwash on *S. mutans* and *lactobacillus* growth. Initial data of the study revealed that it has inhibiting effect on *S. mutans* which has reversed incipient carious lesions.^[16] *Baswa et al.* (2000) conducted a study which revealed that *Neem* oil have bactericidal activity independent of the temperature and energy. The activity was mainly due to the inhibition of cell-membrane synthesis in the bacteria.^[17]

A study was done in Department of Periodontology, Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia. *Amelia Priscilla Sugiarta, et al.* (2018), and the Objective of the study was to evaluate that effect of an herbal toothpaste containing neem leaves extract against gingivitis because *Neem* leaves are known to have antibacterial, anti-inflammatory, antifungal, antiseptic, antitumor, antihyperglycemic, antiulcer and antiviral effects. In addition, they can reduce the counts of plaque-forming bacteria in the oral cavity. And after the completion of study authors found Significant reductions in PI and PBI were noted between the test and control groups. The findings of their clinical study provide evidence that neem leaf extracts are effective in reducing gingivitis.

An another comparative study was done on *Khadira Kastha Churna* and *Madhuka Kastha Churna* for *Dantadhavan Upakrama* in maintainance of oral hygiene, the result or conclusion of the study was that *Khadira Kastha Churna* and *Madhuka Kastha Churna* showed significant results, but *Khadira Kastha Churna*

had better result as compared to *Madhuka Kastha Churna* for *Dantadhavana* because *Khadira* (*Acacia catechu*) has *Kashaya*, *Tikta Rasa*, *Katu Vipaka* and *Kaphanashana* properties and also the antibacterial, antifungal, anti-inflammatory antioxidant activity probably helped in relieving the symptoms and thereby maintaining the oral hygiene. *Madhuka* (*Madhuka indica*) has *Madhura*, *Kashaya Rasa*, *Madhura Vipaka* and *Kaphanissaraka Karma* and proven antimicrobial, antiulcer, antifungal activities which were beneficial in reducing the symptom of improper taste perception. Rubbing of *Churna* with help of finger on teeth may also have helped in *Chhedan* (scrubbing) of *Kapha*. *Khadira Kastha Churna* showed better results in *Mukhdaurgandhya* (bad odour), *Dantamala* (debris), *Dantamalinta* (plaque) and after taste which might be due to *Tikta*, *Kashaya* rasa of *Khadira* and also due to the proven activity of *Khadira* i.e., antimicrobial, antifungal, anti-inflammatory, and antibacterial. *Madhuka Kastha Churna* showed better results in *Mukhasyavairasya* which may be due to the *Madhura Rasa* *Madhura Vipaka* of *Madhuka* and antibacterial, activity of *Madhuka*.

CONCLUSION

All above review of studies show that *Dantadhavana*, *Dantpavan* (tooth brushing) is one of the important procedures of *Dinacharya* for maintaining the health of oral cavity highlighted in Ayurvedic science.

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