



Unconventional Dentistry in India – An Insight into the Traditional Methods

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ABSTRACT

Unconventional medicine (UM) has been known and practised since the recorded history of civilization. Some unconventional practices may be viewed as “the continuity of traditions, religious beliefs, and even quackery that non-specialists practice.” These practices have been associated with religious beliefs and the spiritual domain as well as with the physical domain. In ancient Old World civilizations, UM was performed by skilled experts or wise men; in today’s Western civilization, practitioners may or may not be licensed, and some are charlatans. Dentistry, like medicine, is a traditional, science-based, highly regulated healthcare profession that serves increasingly sophisticated and demanding clients. Today, traditional dental practice is dealing with an array of challenges to the established professional system; these challenges are generally termed “alternative” (or complementary, unconventional, or integrative). Genuine alternatives are comparable methods of equal value that have met scientific and regulatory criteria for safety and effectiveness. Because “alternative care” has become politicized and is often a misnomer – referring to practices that are not alternative to, complementary to, or integrating with conventional health care – the more accurate term “unconventional” is used.

Key words: Alternative medicine, Ayurveda, Dental, Herbal, Unconventional

INTRODUCTION

Overview of Indian healing traditions in India

Human populations have migrated to the Indian subcontinent since prehistoric times as evidenced by the archaeological and modern genetic findings. Even the earliest settlers had knowledge of the medicinal value of plants and other substances and their uses. The vast amount of medical knowledge that has come down to modern times is the result of long evolution through trial and error and exchange of know-how between diverse communities and regions. Today, the traditional medical practices are being obliged to accommodate to the norms of modern biomedicine as the awareness grows among the scientific community and general

public as to the intrinsic value of traditional medicine. As a result of these exchanges and assimilations, Ayurveda, Unani, and Siddha have entered the mainstream to compliment biomedicine, giving a more holistic approach to patient management. The challenge is to integrate the best of the different healing traditions to meet the healthcare needs of the contemporary society.^[1,2]

Excavations at different sites suggest that medical interventions such as dentistry and trepanation were practiced as early as 7000 BCE in the Indian subcontinent. Organized forms of agriculture practiced by the people of the Indus civilization, the importance they gave to certain medicinal plants and trees, and the emphasis on hygiene and water sanitation suggest an advanced awareness of health management.^[3]

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Unconventional dentistry

Unconventional medicine (UM) has been known and practised since the recorded history of civilization. Some unconventional practices may be viewed as “the continuity of traditions, religious beliefs, and even quackery that non-specialists practice.”^[1] These practices have been associated with religious beliefs and the spiritual domain as well as with the physical domain. In ancient Old World civilizations, UM was performed by skilled experts or wise men; in today’s Western civilization, practitioners may or may not be licensed, and some are charlatans. Dentistry, like medicine, is a traditional, science-based, highly regulated healthcare profession that serves increasingly sophisticated and demanding clients. Today, traditional dental practice is dealing with an array of challenges to the established professional system; these challenges are generally termed “alternative” (or complementary, unconventional, or integrative). Genuine alternatives are comparable methods of equal value that have met the scientific and regulatory criteria for safety and effectiveness. Because “alternative care” has become politicized and is often a misnomer – referring to practices that are not alternative to, complementary to, or integrating with conventional health care – the more accurate term “unconventional” is used.

Use of herbal products

The term “medicinal plant” is not a taxonomic term, but is based on the utility of the plants. Any plant used in any system of medicine can be categorized as a medicinal plant. In spite of the tremendous progress in the development of medical science, plants continue to be an important source of drugs in many countries around the world. During the past two decades, reliability and usage of herbal product has become of increasing importance due to the side effects and complications of many chemical and synthetic medicines. About 25% of drugs are derived from plants and many others are formed from prototype compounds isolated from plant species.^[4] Kanwar et al.^[5] reported that about 2 million traditional health practitioners use over 7500 medicinal plant species.

A lot of research has been carried out on the utilization of medicinal plants in the treatment of a variety of ailments,^[5-10] especially during the last two to three decades. As a result, the commercial use and exploitation of these herbal medicines has increased markedly as pointed out in the detailed review by Joshi.^[11] However, there are only a few reports on the utility of medicinal plants in the treatment of specific diseases. For example, Sadangi et al.^[12] have reported 10 species of medicinal plants used in the treatment of ear and mouth diseases by the tribal people of Kalandhandi district, Jadhav^[13] has documented 15 species of medicinal plants used in different types of fever, while Kadel and Jain^[14] reported that 34 plant species are being used for the treatment of snakebite in Madhya Pradesh and Chhatisgarh states.

Teeth are very hard but sensitive organs which are implanted in the jaw bones. They not only help in the biting and grinding of food but also aid speech. Any malfunctioning of the teeth or a disease of the gums disturbs the process of digestion. Lack of oral hygiene and an excess of fleshy food and sweets harm our teeth by causing pyorrhea, toothache, bleeding gums, and dental caries. The use of medicinal plants to treat dental problems has been discussed from time to time by many researchers, viz. the use of *Argemone*

mexicana, *Azadirachta indica*, and *Ocimum basilicum* (羅勒 Luó Lè) in dental health care has been reported by Singh and Dhakre,^[9] while the use of *Hedychium spicatum* and *Zanthoxylum armatum* (花椒 Qín Jiāo) has been reported by Arya and Prakash.^[10] Acharya et al.^[15] have reported 26 herbal medicines used to treat dental diseases. In addition, Kanwar et al.^[2] have reported the use of *Achyranthes aspera* (土牛膝 Tǔ Niú Xī), *Aegle marmelos*, and *Vitex negundo* (黃荊 Huáng Jīng) in dental care by the locals of Kangra district, and Tomar^[13] has reported the use of six species of plants by the local people of Meerut district (India) to treat dental caries. Sharma and Joshi^[4] have reported the use of 30 species of medicinal plants in Almora district, with 5 of these plant species being used by the local people for dental health care [Table 1].^[16]

TRADITIONAL ORAL HYGIENE HABITS

Although the importance of dental plaque control was not fully understood, traditional oral hygiene devices were intended not only to cleanse the oral cavity but also to arrest periodontal disease.

Cool tea leaves were used to alleviate heat in the gingiva (thought to be related to stomach heat). Herbs that are commonly used include lotus leaves, tea polyphenols, *Radix Zanthoxyli*, and *Flos Lonicerae*.^[17]

Some of these traditional products have been subjected to *in vitro* and *in vivo* studies to assess their effectiveness. An extract of lotus leaves demonstrated significant antibacterial activity against some of the more common putative periodontopathogens such as *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*, and *Fusobacterium nucleatum*.^[18] Tea polyphenols such as catechins have been shown to have an inhibitory action on the virulence factors of both *Prevotella intermedia*^[19] and *Po. gingivalis*.^[20] In addition, epigallocatechin has been reported to inhibit matrix metalloproteinase activity, osteoclast formation,^[21,22] and osteoclast activity.^[23,24] A local drug delivery system utilizing Green tea (綠茶 Lǜ Chá) catechin has been shown to be effective in improving clinical periodontal parameters.^[25] A direct relationship has also been proposed between the intake of Green tea and periodontal status.^[26]

Chewing sticks

The most commonly used chewing sticks are obtained from neem, mango (*Mangifera indica* (芒果 Máng Guǒ)), babul (*Acacia arabica*), and guava (*Psidium guajava* (番石榴 Fān Shí Liú)). Miswak (*Salvadora persica*) remains popular as a chewing stick, especially among Muslim communities in the Indian sub-continent and the Middle East.^[27] It has been reported that chewing sticks may be as effective as toothbrushes in the mechanical removal of plaque,^[28-31] but this evidence is not conclusive.^[32] Chewing sticks are thought to increase salivation, and thereby assist in flushing out of oral microorganisms. Miswak has been shown to have antibacterial effects against early colonizers in plaque, such as streptococci, and possibly against the periodontopathogen *Po. gingivalis*.^[33] This effect is thought to be partly mediated by the tannins and thiocyanate released during chewing of this stick. The thiocyanate released in this manner is thought to be capable of activating the salivary H₂O₂/peroxidase/thiocyanate system, thereby exerting potent antibacterial effect.^[34] Mango contains

Table 1. Medicinal plants and their traditional uses for the treatment of a variety of dental problems

Binomial	Local/English name	Family	Parts used	Traditional uses/(informants)
<i>Acorus calamus</i> Linn. (菖蒲 Chāng Pú)	Vacha/sweet flag	Araceae	Rhizome	Paste of the rhizome is applied to painful teeth and gums
<i>Allium sativum</i> Linn. (大蒜 Dà Suàn)	Lahsun/garlic	Alliaceae	Bulb	The paste of the bulb is applied to the gums and cavities of infected teeth
<i>Bombax ceiba</i> Linn. (木棉 Mù Mián)	Semal/silk cotton tree	Bombacaceae	Gum	Gum is used to treat toothache
<i>Cinnamomum tamala</i> (柴桂 Chái Gui) Nees and Eberm.	Tejpat/Indian bay leaf	Lauraceae	Stem bark	Stem bark juice is applied to the teeth to treat tooth decay and toothache
<i>Citrus medica</i> Linn. (佛手柑 Fó Shǒu Gān)	Nimbu/lemon	Rutaceae	Fruit	Used to treat bleeding gums in scurvy due to its high content of vitamin C
<i>Datura stramonium</i> Linn. (曼陀羅 Mán Tuó Luó)	Dhatura/mad apple	Solanaceae	Seeds	Seeds mixed with butter are burnt and the smoke is inhaled into the mouth
<i>Juglans regia</i> Linn. (胡桃 Hú Táo)	Akhoda/walnut	Juglandaceae	Oil and fruits	Oil and fruits are used in making traditional tooth powder to cure toothache and pyorrhea
<i>Justicia adhatoda</i> Linn.	Vasing/Malabar nut	Acanthaceae	Twigs	The twigs of the plant are used as tooth picks/brushes to treat pyorrhea
<i>Myrica esculenta</i> Buch.-Ham.	Kaphal/box myrtle	Myricaceae	Bark	The bark is chewed to relieve toothache
<i>Ocimum sanctum</i> Linn. (羅勒 Luó Lè)	Tulsi/holy basil	Lamiaceae	Leaves	Powder of dry leaves along with salt is applied to painful teeth
<i>Phyllanthus emblica</i> Linn. (油柑 Yóu Gān)	Amla/emblic myrobalan	Euphorbiaceae	Fruit	The fruit is a good source of vitamin C and is used to treat bleeding gums
<i>Punica granatum</i> Linn. (石榴 Shí Liú)	Anar/pomegranate	Punicaceae	Fruit	It is very useful in bleeding gums due to scurvy
<i>Ricinus communis</i> Linn. (蓖麻 Bì Má)	Arand/castorbean	Euphorbiaceae	Twigs and leaves	Tender shoots are used as toothbrushes in dental caries. Leaf juice is used to gargle in Pyorrhea
<i>Urtica dioica</i> Linn. (蕁麻 Qián Má)	Kandali/stinging nettle	Urticaceae	Root	Two to three drops of root extract are applied to hollow tooth cavities to treat toothache
<i>Vitex negundo</i> Linn. (黃荊 Huáng Jīng)	Sivali/five-leaved chaste tree	Verbenaceae	Leaves	Leaf decoction is used as a mouthwash to relieve toothache
<i>Zanthoxylum armatum</i> DC (秦椒 Qín Jiāo)	Timbru/bamboo-leaved prinklish ash	Rutaceae	Fruit and twig	Powder of the fruits is used as a remedy for toothache. Small twigs of the branches are used to treat toothache
<i>Zingiber officinale</i> Linn. (薑 Jiāng)	Adrak/ginger	Zingiberaceae	Rhizome	Paste of rhizomes is applied to the teeth to treat toothache and tooth decay

DC: De Candolle

tannins, bitter gums, and resins, while neem contains isoprenoids such as nimbin, nimbinin, and nimbidin, in addition to chloride and fluoride, all of which favor an antibacterial effect against several oral streptococci.^[35-37] In addition to their antibacterial effect, these chewing sticks have also been suggested to exert an antioxidant effect. Most of the chewing sticks analyzed have demonstrated an antioxidant effect comparable to that of vitamin C or vitamin K. Neem has been reported to contain gallic acid, galocatechin, epigallocatechin, and catechin, all of which can reduce the oxidative burst from polymorphonuclear leukocytes.^[38]

Tongue cleaning

Both Indian and Chinese traditional medicine consider that examination of the tongue is important for diagnostic purposes, so much so that an entire chapter of the Charaka Samhita is devoted to this. Both forms of medicine considered tongue cleaning to be an integral part of a personal hygiene program. The Indian practice of tongue cleaning using a variety of implements ranging from coconut leaves to tongue cleaners made from stainless steel and plastic remains prevalent. Periodontopathogens such as *Ag. actinomycetemcomitans* have been shown to colonize parts of the oral cavity in addition to the

gingival crevice.^[39] Current evidence suggests that tongue cleaning could be important for maintenance of periodontal health and control of halitosis.^[40] Tongue cleaning is part of the full mouth disinfection protocol that has been suggested to be effective for plaque control and maintenance of periodontal health.^[41,42] The time-honored practice of tongue cleaning is thus based on sound scientific principles, and may have contributed to control of periodontal disease.

Mouthwashes

Mouthwashes have been described in both Indian and Chinese traditional medicine, but mostly as a form of periodontal therapy rather than a plaque control measure. Use of chemotherapeutic agents such as mouthwashes for plaque control is not popular in traditional Ayurvedic medicine. However, due to differences in socio-cultural habits, Indians traditionally eat with their hands, without using cutlery. As part of the post-eating ritual, an estimated 50% of Indians not only wash their hands but also rinse their mouth after every meal.^[43] This practice is especially prevalent among the older population and those with less exposure to Western civilization and its customs, and is sometimes accompanied by brushing with finger. The mere flushing effect of water, even in the absence

of any chemotherapeutic agent, may play a role in prevention of food accumulation inside the oral cavity.

TRADITIONAL INDIAN METHODS FOR THE MANAGEMENT OF PERIODONTAL DISEASES

The Charaka Samhita describes two types of mouthwashes, gandoosha and kavalagra, which were used for different purposes. Kavalagra consisted of herbal preparations in a paste or bolus form, which was subsequently diluted to form a liquid. The mouth was then filled with the kavalagra, which was retained until nasal discharge or lacrimation occurred. Gandoosha, on the other hand, usually contained liquids, mostly essential oils. The mouth was filled three-quarters full with this form of mouthwash and rinsed vigorously. Commonly used gandooshas consisted of herbal products such as triphala, dasamoola, guggulu, pippali, and sarshapashunti. These were ground, mixed in hot water for gargling, or else mixed in honey or cow's milk before use as a mouthwash. Mouthwashes consisting primarily of essential oils, such as sahacharadi taila and irimedadi taila, were also used for the management of periodontal disease. Sesame oil was used for oil pulling (retaining oil in the mouth without rinsing for a few minutes prior to spitting out), and this continues to be an important oral hygiene practice in rural India. Its effectiveness as an antibacterial agent^[44] and in improvement of gingival parameters^[45] has been documented. The exact mechanism of action is yet to be fully elucidated, but the lignans of sesame (sesamin, sesamol, and sesaminol) have antioxidant properties and can potentiate the action of vitamin E.^[46] The polyunsaturated fatty acids in sesame oil have been reported to affect lipid peroxidation and exhibit anti-inflammatory properties.^[47]

There are many topically applied agents in traditional Indian medicine which are enumerated in Table 2. And Table 3 shows their clinical parameters.

CONCLUSION

The traditional systems of traditional Indian medicine (Ayurveda) relied on their ability to improve endogenous defense systems rather than eliminate the exogenous pathogen. Interestingly, the current concepts of host modulation work on more or less similar principles.^[41] Not all of the traditional practices outlined above are in current use, at least among the educated population. However, a lasting influence of traditional medicine has been on the attitude of patients to disease and treatment. Traditional medicine placed considerable importance on a holistic approach, with emphasis on self-care and lifestyle management. Although these practices cannot be faulted in principle, they have resulted in a reluctance to approach healthcare professionals in the early stages of disease and to attend follow-up visits.^[60,61] As the concept of preventive health checks is alien to traditional Indian medicine, self-reported periodontal disease and seeking of primary dental care is low.^[62] To summarize, even though not every traditional custom has been scientifically validated, they need not be summarily dismissed as quackery. Proponents of both modern and traditional medicine need to shed long-held beliefs and accept existing evidence before

Table 2. Biological effects of traditional Indian medicines

Herbal product	Active ingredients	Mechanism of action	Reference
Neem	Nimbin, nimbinin, nimbidin Catechins	Antibacterial effect against oral streptococci Reduced bacterial adhesion to tooth surface Reduced oxidative burst from polymorphonuclear leukocytes	[48,37] [49] [38]
Guava	Essential oils, pinene, avicularin, and other polyphenols	Anti-inflammatory and antibacterial effect	[50,51]
Triphala	Amalaki, haritaki, and bibhitaki Gallic acid	Antioxidant effect Reduction in matrix metalloproteinase 9 levels	[52]
Sesame oil	Sesamin, sesamol, and sesaminol	Antioxidant property Potentiates the action of vitamin E	[53]
Miswak	Tannins, thiocyanate	Increased salivation Inhibits <i>Po. gingivalis</i> Activates the salivary H ₂ O ₂ /peroxidase/thiocyanate system	[33] [34]

Table 3. Effects on clinical parameters

Product	Mode of delivery	Clinical effect	Reference
Miswak	Chewing stick	Decreased periodontal treatment needs	[27]
Neem	Gels and mouthwashes	Improvement in clinical parameters in gingivitis	[54-57]
Guava	Mouthwash	Plaque inhibitory effect	[50]
Green tea (綠茶)	Systemic intake	Reduced periodontal breakdown	[58]
Lù Chá)	Local drug delivery	Improvement in clinical periodontal parameters	[59]

such practices can be truly integrated into present-day periodontal therapy. Given the enormity of the health problems faced by countries with large populations, it may be practical to devise oral healthcare delivery systems that retain efficacious traditional techniques. However, well-controlled clinical trials are required to validate the use of these traditional therapeutic strategies.

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