



COMPLEMENTARY APPROACHES IN DENTISTRY: A REVIEW

Dental Science

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ABSTRACT

Understanding the philosophy behind any health system is significant because this determines the direction and the treatment methods. The term complementary dentistry (CD) is preferable and more consistent than "unconventional dentistry" because the CD meshes very well with conventional clinical practice. Dental practitioners should learn about the CD and be aware of evidence on the safety and effectiveness of treatments and routine procedures. These practices have been associated with religious beliefs and the spiritual domain, and the physical domain. Therefore, improved education in critical thinking, research, science, medicine, behaviour, communication, and patient management is required.

This review aims to focus on the complementary approaches that can be helpful in dental practices.

The article reviews various unconventional approaches based on advanced PubMed Central (PMC), Cochrane database, Wiley online search of the English language literature from the year 2000 to the present in order to help us select the most suitable approach among them fulfilling the desired criteria of being safe, economically viable, having a scope to be used for successful prognosis and possibly not requiring any special considerations to interpret the results.

KEYWORDS

Complementary Dentistry, alternative dentistry, herbal dentistry, holistic dentistry

INTRODUCTION

Complementary or Alternative dentistry analogous to alternative medicine is inseparable from conventional dentistry in the Indian subcontinent. Unconventional medicine amalgamates the rituals, traditions, beliefs, and practices concerning a human life's physical, biological and spiritual realm. (1) Good unconventional practices are similar to the identical significance that have met logical grounds and regulatory criteria for security and efficiency.

"Pseudoscience" and "junk science" are not just mere deceptions but an actual part of the law and order of the "trial" world. With the global expansion of communication in journalism, electronic media, and the World Wide Web, complementary dentistry and complementary medicine have crawled into public knowledge and appeal. The abundance of knowledge and information is available to the public through the internet, which can only be filtered by responsible journalism and clear communication from scientists.

Complementary dentistry meshes thoroughly with a conventional clinical practice that spotlights the security and efficacy of healing and habitual treatment practices. Dental practices should incorporate critical thinking, research, science, medicine, behavior, communication, and patient management to receive the best treatment and prognosis.

The Indian subcontinent was the concoction of populations migrated from around the world since prehistoric times. The knowledge, from diverse populations, of the therapeutic and remedial value of different plants, practices, exercises, and other uses grew over time to unify into a method of living that was more evolved, diverse, and acceptable in general. In the present day, a holistic approach towards medicine has become more constructive. The predicament was solved by incorporating these traditional healing methods and principles of contemporary biomedicine together in a disease-solving amalgamation. Indian traditional encyclopedia of healing includes SIDDHA, UNANI, and AYURVEDA, which gives evidence of preliminary treatments even 7000 B.C. (2) Commencing from personal hygiene maintenance to sewage management and water sanitation, India started its health management as early as the Indus valley civilization.[3]

Complementary dentistry integrates these traditions, beliefs, practices, products, and habits with conventional medicine and dentistry by bringing an "Alternative" and "Integrative" approach towards dentistry. This "Biological" dentistry is a concept that is broadly established. It is a multidisciplinary approach that adopts methods for examination, diagnosis, treatment, prevention, and prognosis of various dental and periodontal disorders. Psychological and behavioral advances with customary practices of conventional

dentistry raise the standard of treatment and patient management. Protecting gum cells. (4)

Complementary Dentistry with medicine revolves around the public due to lack of awareness, deficiency in economic incentive, individual values and thinking, or even monotony. Today, traditional dental practice deals with an array of challenges to the established professional system; these challenges are termed "alternative" (or complementary, unconventional, or integrative). Such products or methods serving the part of complementary dentistry are discussed in the following article.

1. Use of Herbal Medicines

Drugs with active ingredients made from plants such as roots, bark, and leaves treat diseases and maintain improved health. They have antimicrobial agents, Anti-inflammatory agents, Sedative and anxiolytics properties. Herbs with medicinal properties are used for treating various common and rare diseases. Many allopathic medicines have their origin from medicinal plants.

PLANT EXTRACTS AND PHYTOCHEMICALS

• TURMERIC (CURCUMALONGA)

Turmeric, a well-known species of the ginger family, Zingiberaceae, also known as *Curcuma longa*, is an analgesic, anti-bacterial, anti-inflammatory, anti-tumor, anti-allergic, anti-oxidant, cardiovascular, antiseptic, astringent, antispasmodic, appetizer, carminative, cholagogue, digestive, and diuretic (5).

Turmeric is used in the following ways in dentistry to provide relief from dental problems:

- The pit and fissure sealant is actively used in dentistry to prevent or reduce dental caries, consisting of acrylic monomer and colorant of turmeric extract or Annatto extract.
- It Used as a dental plaque staining agent from the yellow pigment of turmeric extract or curcumin.
- Periodontal pain and swelling can be eliminated by massaging the gingiva with roasted turmeric powder.
- Applying the mixture of burnt turmeric pieces and bishop's weed seed maintains the gums and teeth in a healthy state.
- Rubbing the teeth and gums twice daily with a paste made up of turmeric, a pinch of salt, and mustard oil gives instant relief from gingivitis and periodontitis.
- Rinsing the mouth with lukewarm turmeric water consisting of turmeric powder, two cloves, and two dried leaves of guava gives instant relief.[6]

• CLOVE (SYZYGIUM AROMATICUM)

Clove consists of essential oil, β -caryophyllene, and principal phenolic compound eugenol and eugenol acetate. It has analgesic, antibacterial,

antiviral, anti-inflammatory, anti-oxidant properties.

It has the characteristic of topical anesthesia, which is an alternative to benzocaine and can be used in daily practice in areas with limited pharmaceutical availability for toothache and periodontitis.

It is used as a breath freshener and also available as a tincture, lozenges, and mouthwash. [8]

• **TEA TREE OIL (*MELALEUCA ALTERNIFOLIA*)**

It is more commonly known as Australian tea tree oil. It is an antiseptic, antifungal agent, non-irritant, mild solvent, and stimulates the immune system. In addition, tea tree oil is bactericidal and fungicidal because of its highly lipophilic component, **terpinen-4-ol** (30%–40%), which acts against the structural integrity of the cell membrane.

Tea tree oil has been used to relieve mouth soreness and oral antimicrobials before dental surgery and used in mouthwash for its anti-cariogenic and antiplaque properties. It is also used to remove the smear layer as a root canal irrigant and relieve mouth soreness.[10]

• **GERMAN CHAMOMILE**

Chamomile, a species that belongs to the family Asteraceae, also known as chamomilla Recutita, is native to Europe and Western Asia. It is available as table tea. It is used for its anti-inflammatory, analgesic, antimicrobial, antispasmodic, and sedative properties. In addition, chamomile flowers have active ingredients such as apigenin, quercetin, flavonoids, and luteolin, which have a role in medicinal applications.

In the Dental practice, chamomile is used in mouthwash, toothpaste, or ointments to treat mucositis, gingivitis, periodontitis, and mouth ulcers.[11] It is also used to remove smear layers when used as an intracanal irrigant. It is considered to be safe during pregnancy and breastfeeding. However, using at high doses, this herb has some side effects such as vomiting, skin rashes at multiple sites, and anti-platelet action, which could result in uncontrolled bleeding [12].

• **COCONUT WATER (*COCOS NUCIFERA*)**

The coconut palm, with a botanical name as *Cocos nucifera*, belongs to the family Arecaceae.

The name coconut comes from the Spanish and Portuguese word coco, which means "monkey face," with *Nucifera* meaning "Nut-bearing."

Coconut fruit chemically constituted of Lauric acid and caproic acid, a potent antiviral, antibacterial and antiprotozoal agents; Myristic acid, a flavoring agent; Caprylic acid and Caproic acid are potent antifungal agents; Palmitic acid and oleic acid acts as an antioxidant; Linoleic acid, a potent antioxidant, anticarcinogen, and an immune system enhancer; and other components such as Stearic acid Vitamin E, moisture and suspensions of proteins.[13]

Since it is hygienic and sterilized, the most widespread use of coconut water is used to preserve the vitality of periodontal ligament and used as a storage media for an avulsed tooth [14]. Coconut oil is also used in the oil pulling technique to maintain oral health [15]. Coconut water is low in carbohydrates, 99% fat-free, and low in sugar. The electrolyte concentration of coconut is similar to human plasma, and it is also used as a sports drink for oral dehydration.

• **CRANBERRY**

Also known as *Vaccinium macrocarpon*, it is known for its nutrient and antioxidant qualities. The cranberry extract contains numerous biologically active compounds such as phenolic acids, tannins, flavonoids, and antioxidants.

The properties of the polyphenols, specifically the proanthocyanidins, helps in the reduction of caries and controlling the periodontal disease by reducing the production of extracellular polysaccharides and acid production by cariogenic bacteria and function of proteins that bind to glucans and also Reduce the formation of dental biofilm. It also prevents adhesion of periodontopathogenic bacteria and the Inhibition of proteolytic activities of bacteria and cytokine production inhibition by immune and mucosal cells. [16]

However, overconsumption of cranberry can lead to erosion of teeth because cranberry juice is naturally very acidic.

• **GREEN TEA (*CAMELLIA SINENSIS*)**

Green tea is obtained from the leaves of a tree called *Camellia Sinensis*. Green tea contains various bioactive compounds such as carbohydrates, lipids, enzymes, amino acids, dietary minerals and phytochemicals, flavanols, and caffeine.[17]

The essential component of green tea is a polyphenol, mainly epigallocatechin gallate, along with other such as catechins, catechin gallate, epicatechin, epicatechin gallate, galocatechin gallate, epigallocatechingalocatechin. It acts as an antibacterial, antiviral, anti-inflammatory, and antimutagenic.[18]

Green tea is helpful as an antiplaque agent because of its action on both gram-positive and gram-negative bacteria and has shown a good effect on periodontal status.[19] Catechins present in the green tea check the activity of streptococcus mutans by maintains the salivary and plaque pH at about neutral.[20] Green tea also prevents halitosis.

Epigallocatechin gallate is used as a composition of oral health products to protect against bacterial infection and increase tooth-colored restorations' longevity.

• **TULSI (*OCIMUM SANCTUM*)**

The history of the use of tulsi as an herbal remedy is as old as 4000–5000 B.C.

Tulsi is chemically constituted of Eugenol & Essential Oils, Carracrol, and terpene & Sesquiterpene β -*caryophyllene*, Linalool, Polyphenol rosmarinic acid, Vitamin A, C, Zinc & Iron.[21]

Tulsi extract is used in mouthwash and an anti-cariogenic agent because of its antibacterial properties against streptococcus mutans.[22]

Eugenol in the constituent of tulsi acts as a cox-2 inhibitor, which acts as an analgesic in toothache. It is also antifungal due to eugenol and linalool in tulsi extract, which acts against *Candida Albicans*. The powdered *Ocimum sanctum* is mixed with mustard oil and used as a toothpaste to cure halitosis, gingivitis, and periodontitis.[23]

• **TRIPHALA**

Triphala is a novel natural drug prepared by the combination of Amalaki, Haritaki, and Bibhitaki powder. The extract comprises gallic acid, ellagic acid, ethyl gallate, galloyl glucose, chebulagic and chebulinic acid, β -sitosterol, and corilagin.

The extract prevents the adherence and colonization of s. mutans on the surface of the tooth and used as an anti-carries, anti-plaque agent.[24][25]

It is also used as a root canal irrigant and gargling agent to maintain the oral hygiene index.[26][27][28].

• **MARIGOLD (*CALENDULA OFFICINALIS*)**

Calendula officinalis, also known as 'pot marigold,' is a shrub that produces yellow or orange flowers, which are available in extracts, ingredients, liquids, creams, or ointments. This plant contains the phenolic compound, tannins, triterpene alcohol, polysaccharides, flavonoids, glycosides, sterols, carotenoids, saponosides.

C. Officinalis has an antibacterial function.[29] It also promotes wound healing and re-epithelialization and exhibits antioxidant, immunomodulatory, and antimutagenic properties.[30]

A mouthwash of *C. Officinalis* has shown anti-inflammatory action to protect gums against inflammation and irritation, sore throat, mouth sores.[31]

• **GARLIC (*ALLIUM SATIVUM*)**

Garlic, also known as *Allium sativum*, has antimicrobial properties. Garlic extract contains sulfides that have an inhibitory effect on the growth of the salivary microbial population.[32]

• **ALOE (*ALOE ARBORESCENS*)**

Aloe vera, also known as *Aloe Barbadensis*, belongs to the *Liliaceae* family.

It contains many vitamins, anti-inflammatories like Bradykinase,

anthraquinones; minerals such as potassium, calcium, magnesium; amino acids, enzymes, sugar, sterols, and salicylic acid. It has various properties such as antiseptic, anti-viral, antifungal, anti-inflammatory, immunomodulatory, and fastens wound healing. *A. vera* is helpful in the treatment of oral lichen planus, oral submucous fibrosis, recurrent aphthous stomatitis, alveolar osteitis, gingivitis, periodontitis, denture stomatitis, alveolar osteitis, and storage of gutta-percha cones as well.[33]

• NEEM (AZADIRACHTA INDICA)

For centuries, Neem, also known as *Azadirachta indica*, has been used by Indian people to treat various diseases. Neem extract contains Azadirachtin, Nimbin, and Nimbidin, which possess anti-inflammatory, anti-bacterial, antiviral, anti-helminthic, anti-cariogenic, anti-plaque, antioxidant, astringent activity. Thus, every part of the tree has its medicinal value.

Neem twigs are used for cleaning teeth and as toothache reliever; neem bark is used as a constituent in toothpaste and tooth powders due to its antibacterial properties. Oil is used in soaps and leaves in the preparation of various medicines. [34]

• ARCTIUM LAPPA

This plant, commonly known as Greater burdock, has been brought from Japan and is known worldwide because of its medicinal purpose. It has anti-bacterial, anti-viral, antifungal activity. It exhibits antimicrobial activity against oral microorganisms such as *Candida Albicans*, *E. coli*, *L. acidophilus*, *P. Aeruginosa*, and *S. Mutans*. [35]

• EVENING PRIMROSE OIL

Evening primrose is also known as Primrose Seed Oil. It effectively treats nerve damage caused by diabetes and osteoporosis. It is a modulator of inflammation in conditions such as arthritis and Sjögren syndrome. [36]

• GRAPE SEED EXTRACT

Grapes are widely available throughout the world. The grape seed extract contains polyphenols, carbohydrates, flavonoids, and fruit acids. Polyphenols, especially proanthocyanidins, possess anti-cariogenic, antimicrobial, antioxidant, anti-proliferative, anti-apoptotic activity. Various studies have shown the remineralizing effect of grape seed extract. [37]

• PAPAIN

Papain is a natural proteolytic enzyme derived from the latex of the leaves and fruits of papaya. It has antibacterial and anti-inflammatory properties. It is enzyme-specific and acts as a debris removal agent on affected tissue without harming the natural substrate. This characteristic property is used in caries removal as a chemo-mechanical agent. [38]

• SEPTILIN

Septilin is an ayurvedic preparation that contains powder of *Balsamodendron mukul*, *Shankha bhasma*, and extract of *Maharasnadi quath*, *Tinospora cordifolia*, *Rubia cordifolia*, *Emblica officinalis*, *Moringa pterygosperma*, *Glycyrrhiza glabra*. This mixture possesses immunomodulatory, anti-inflammatory, antibacterial, anti-exudative, and immunostimulatory effects. Various studies show that Septilin may aid in improving periodontal treatment outcomes because it has shown beneficial effects on the clinical and biological markers of periodontal disease. [39]

OTHER ALTERNATIVE THERAPIES

• REFLEXOLOGY

Reflexology is a non-intrusive health therapy of pressure application and massage on the reflex points on the legs, arms, and head connected to any part of the body to relieve tension and treat diseases. Reflexology helps to lessen the fear and relaxes both patient and dentist. Reflexology is beneficial for patients with dental phobia and anxiety. [40]

The reflexologist applies pressure to reflex points, massaging and prodding, which supply tension release. Hence, it increases their blood flow and slows breathing rate as the cheeks and tongue relax, and coughing and excessive spitting are decreased. The dentist can perform the dental procedure more efficiently by increasing the patient's comfort. [41]

• AROMATHERAPY

Aromatherapy is an art and science of using highly concentrated essential aromatic oils distilled from grasses, flowers, twigs, wood, roots, and leaves of an aromatic plant to reduce anxiety, Stress, panic attacks, and induces relaxation in the dental office. [42]

Aromatherapy can be done using various ways, such as aerial dispersion via electronic glass diffuser, scented candles, or scented water spray using different essential oils like lavender, rose, sandalwood, cedarwood. [43]

• BIOFEEDBACK

Biofeedback therapy is a non-invasive therapy in which patients self-regulate the body's autonomic functions such as breathing rate, blood pressure, heart rate, or muscle tension.

In the biofeedback mechanism, the patient is provided with continuous information about the autonomic pathways with the help of an external circuit that measures, amplify and feedback the physiological processes of the patients and helping in the acquisition of the ability to voluntarily controlling by acting as a physiological beta-blocker. [44]

Monitoring brain-wave activity using electroencephalographic biofeedback, reducing muscle tension using electromyography, and normalization of respiratory rate are commonly used to reduce anxiety. [45]

Biofeedback is also used in the management of bruxism and drooling in the dental setting. [46]

• CHIROPRACTICS

Chiropractic focuses on the pain in musculoskeletal and nervous systems disorders. During the joint misalignment, inflammation and nerve stress are caused on the surrounding tissues, which may cause irreversible damage to the surrounding area after repetitive stress or chronic conditions. [47] Chiropractic physicians apply controlled force or chiropractic instruments to manipulate the joint, restore the joint functions and loosen the muscles to resolve the pain.

The collaborative effort of dentist and Chiropractors is found to be beneficial in the diagnosis and treatment of various musculoskeletal disorders relating to the field of temporomandibular disorders [48], cranial and mandibular relationships, and conditions affecting condylar positions, migraines, trigeminal neuralgia, facial myalgia, the relationship of occlusion to the stomatognathic system and posture. This practice is prevalent in North America, but various studies need to be carried out to prove its effectiveness in dentistry. [49]

• HYPNOSIS

Hypnosis is a method of nonpharmacological intervention to reduce dental anxiety and increase patient comfort. 'Hypnosis' is derived from the Greek word 'Hypnos' meaning sleep, which is a misconception. It is a modified state of consciousness between complete wakefulness and sleep, with susceptibility to outside influence. The patient is in self-control, unlike other anesthetic and sedation procedures. [50] In hypnosis, the subconscious mind is incited with an effortless response to the hypnotist's suggestions. Special training is taken for dentists performing hypnotherapy.

It is inexpensive and has a low risk of side effects. It is more commonly used for pediatric and geriatric patients, but care should be taken in patients with mental disorders and neurodegenerative diseases. [51]

Hypnosis is used for Behavior Modification, Relaxation, Anxiety Control, Fear Elimination, Tongue Thrust, Reverse Swallowing, TMJ Dysfunction, Bruxism, Clenching, Amnesia, Analgesia, Anesthesia, Prevention of Gagging and Nausea, Restorative Appliance Tolerance, Pretreatment Desensitization. [52]

• HOMEOPATHY

Homeopathy is a safe and natural unconventional medical practice effective in all age groups. Homeopathic medicines are guided by various laws such as laws of similarity, the law of single remedy, the law of minimum dose, and concepts of vital forces. They are made from animal, plant, mineral, and synthetic substances, diluted with alcohol, and made available in tablets, liquids, or spherical pellets [53]. Homeopathy is used as adjunctive therapy in the dental practice for the treatment of various diseases such as ulcers which occurs due to cold

sores, cracked lips, delayed tooth eruption, toothache, fungal and bacterial infections, Temporomandibular joint disorders, gingivitis, periodontitis, abscess, trigeminal neuralgia, bruxism, stress, anxiety, and panic attacks.

Homeopathic medicines have negligible side effects. They also have the least interaction with other drugs[54].

• REIKI.

Reiki is a non-invasive, non-manipulating, safe, gentle healing modality that can be used alongside medical treatment as a complementary therapy practiced by anyone who has received an "attunement." by reiki master [55].

Reiki activates the parasympathetic nervous system by controlling the heart rate, blood pressure, and breathing rate. In the dental office, it is used to reduce the stress and anxiety of patients sitting on the dental chair, lessen pain, promote psycho-spiritual well-being, and improve the quality of life [56]. Reiki can also be used in fragile patients. It is a non-contact procedure in which hands are laying just above or on the clothed body and can also be performed from a long distance.

• APITHERAPY

Apitherapy or bee therapy is the medicinal use of honey bees and their products such as honey, propolis, pollen, royal jelly, and bee venom for holistic healing [57].

Honey and propolis are rich in various amino acids, vitamins, bioflavonoids, and phenols. The constituents of honey have Antimicrobial, Antioxidant, Anti-inflammatory, Antitumor, Antiradiation effects, Immunomodulating effects, Antidiabetic and Antihypertensive, and faster tissue healing properties [58].

In dentistry, they treat Oral Candidiasis, Oral Lichen Planus, Recurrent Aphthous Stomatitis, Denture Stomatitis, Radiation Mucositis, ulcers, and faster socket healing after surgical removal of the impacted molar [59].

Honey in mouth wash has antibacterial properties and also has analgesic and anti-inflammatory effects. Hence, it is an anti-cariogenic, antiplaque agent, pulp capping agent, intracanal medicament, and irrigant. It is also used for the treatment of halitosis, periodontitis [60].

CONCLUSIONS

Today, the escalating costs of drugs and several adverse effects associated with modern medicines have led to the search and revival of alternative, indigenous systems of medicines all over the world.

Integration of traditional medicine with conventional medicine is ever-increasingly sought for the patient's complete wellness. Therefore, on the one hand, scientific validation and evidence-based clinical trials on these allied medicines should be carried out in dental fields; on the other hand, awareness among the general population about the benefits of the same should be highlighted to gain confidence for use in prevention and treatment of dental disorders.

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