Herbal Home Remedies for Toothache during the COVID-19 Pandemic: A Review

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REVIEW ARTICLE

Abhishek Kumar*, Akash Kumar Giri, Bibek Kattel

College of Dental Surgery, B.P. Koirala Institute of Health Sciences, Dharan, Nepal

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ABSTRACT

The COVID-19 pandemic resulted in the halt of proper dental care in most of the world, except for emergency cases. And, this resulted in a lot of people seek some home remedies for relieve in dental pain. So, this article aims to list down herbal home remedies which can be very helpful in such conditions. The use of medicinal herbs for dental pain can be traced back to history in some form or the other in almost every country. These herbal home remedies have no significant side effects as compared to other chemical-based alternatives, are also easy to obtain and cheaper as well. Clove, Olive, Miswak, Babool and other herbs listed in the article have significant dental properties which have been validated scientifically through various researches. These plant products can be hence used in commercial products as well but only after proper clinical trials. Further research should be encouraged in this field as herbal alternatives can be very beneficial with no such side effects. However, these home remedies are only useful for symptomatic treatment and undergoing proper dental care is advised.

Keywords: Coronavirus Disease 2019 (COVID-19); Home Remedies; Herbal; Toothache.

1. Introduction

The COVID-19 pandemic resulted in the halt of proper dental care in most of the world, except for emergency cases. And, this resulted in a lot of people seek some home remedies for relieve in dental pain. So, this article aims to list down herbal home remedies which can be very helpful in such conditions. The use of medicinal herbs for dental pain can be traced back to history in some form or the other in almost every country. These herbal home remedies have no significant side effects as compared to other chemical-based alternatives, are also easy to obtain and cheaper as well. Clove, Olive, Miswak, Babool and other herbs listed in the article have significant dental properties which have been validated scientifically through various researches. These plant products can be hence used in commercial products as well but only after proper clinical trials. Further research should be encouraged in this field as herbal alternatives can be very beneficial with no such side effects. However, these home remedies are only useful for symptomatic treatment and undergoing proper dental care is advised.

Toothache is defined as an orofacial pain originated from a dental element and/or adjacent structures in consequence of several diseases or conditions, like a cavity, periodontitis, trauma, occlusal dysfunction, and abscess. (1) Toothache results from a variety of etiologies, both odontogenic and non-odontogenic. (2) Dental pain may occur at any age, in any gender, and any geographic region. (3) Because of the pandemic spread of COVID-19 have made people be under lockdown situations in many parts of cities and rural areas the public gathering is prohibited to control the virus spread. In this situation, even dental clinics are closed. For mild tooth pain, the people visiting the doctor can minimize the spread of infection. So, in this situation, home remedies can play a key role in minimizing dental pain and spread of infection. (4)

The use of medicinal herbs for dental pain can be traced back to history in some form or the other in almost every country. According to the WHO, the use of

medicinal plants as remedies is somewhere between 65% and 80% of the populations of developing countries in rural areas (5) and the use of traditional medicine is expanding at a rapid pace all across the world. (6) The use of clove, olive, turmeric and many other herbs for dental pain relief has been mentioned in the Ayurvedic literature. (7) The Meena community in Rajasthan, India also has a history of using folk herbal medicine for the treatment of Toothache. (8) *Bryophyllum pinnatum* (9), *Capsicum frutescens* (10), *Argemone Mexicana* L. has been used in Mexican dentistry as a traditional herbal medicine for dental pain. (11) In the Ivory Coast, *Parkia biglobosa* (Mimosaceae) is used in traditional medicine as an analgesic drug, against dental pain. (12) A total of 130 medicinal plants have been reported for the treatment of Toothache in Ethiopia. (13) However, home remedies simply treat the symptoms, to reduce discomfort and pain and cannot be used as a substitute for dental treatment, few of them do have some scientific basis. Further clinical trials are required for the appropriate use of these herbal remedies on a commercial basis. Lately, there has been a rise in the demand for herbal products in every sector, so these herbs can result in commercially successful products as well. These home remedies can prove to be of great significance in this time of COVID-19 pandemic when we all can play a huge role in containing this viral outbreak by not stepping out because these herbal alternatives can help us with a mild toothache.

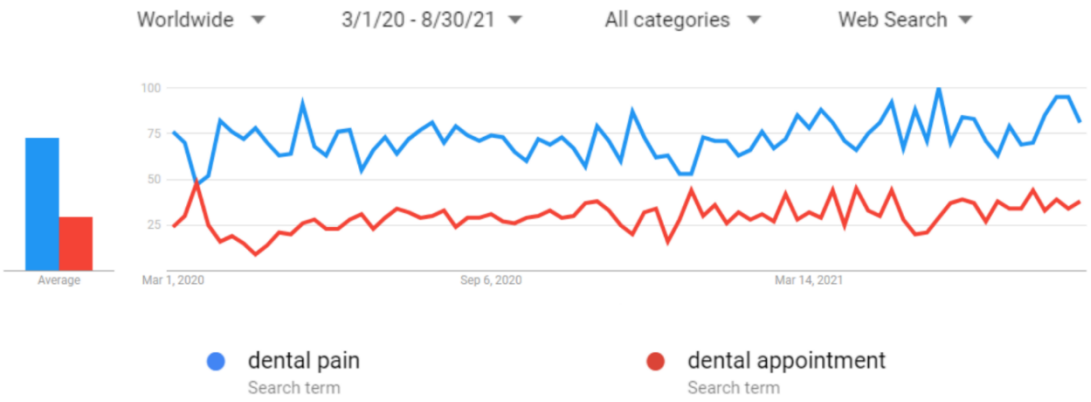

Figure. 1: A graph of worldwide google search trends from 1st March of 2020 to 30th August of 2021 showing an appreciable increase in search interest for ‘‘dental pain’’ and a decrease in searches for ‘‘dental appointment”.

The outbreak of COVID-19 and its impact on our daily lives is rapidly evolving. This pandemic has presented new challenges for dentistry. Most of the procedures performed in a dental clinic have the potential to create contaminated aerosol and splatters. Dental handpieces, ultrasonic scalers, and the air-water syringes used in common dental practice are capable of producing aerosols, which are usually a mix of air and water derived from these devices and the patient’s saliva. (14) The pandemic has made it difficult to practice dentistry even if we follow all the newly prescribed guidelines (hand hygiene, PPE, strategies and caution in performing aerosol-generating procedures) because there’s always a chance of transmission which can result in an increased spread of the virus. Almost all of the major dental associations have urged dental offices to treat only emergency patients. The safety of the dental team and patients or people accompanying patients

is essential while treating emergency patients and following this crisis. The ADA (American Dental Association) has recently developed a guideline that can help us in determining a patient's need for urgent or emergency care. (15)

We can also see an increase in the Google search trends for 'dental pain' and a decrease in 'dental appointment' from mid of March 2020 (Fig.1). The lockdown came into significance from around the mid of March 2020, hence the changes in the graph are pretty visible. The search trends were based on the worldwide search from 1st March 2020 to 30th August 2021 in all categories under web search. This shows that people faced dental problems in the lockdown, but there wasn't proper dental health service available for them. Some patients even attempted to treat themselves at home in extreme circumstances. (16) So, this article aims to list down some home remedies for dental pain which can be easily followed by any individual, especially at this time of COVID-19 pandemic. The information provided in the article has been collected from trusted scientific sources to discuss the use of herbal medicine for dental disease and proper references have been provided wherever possible. These home remedies are for symptomatic treatment only, we suggest the patients seek proper health care in case of any dental emergency. Few herbal home remedies carrying significant dental properties have been hence listed below in the article.

2. Herbal Home Remedies

Clove *(Syzygium aromaticum)*

Clove oil has anti-microbial, anti-oxidant, anti-fungal, anti-viral, analgesic, local anaesthetic and anti-inflammatory activity. (17-20) Clove is used broadly in dental care for aid in toothache, sore gums and oral ulcers. Gargling with clove oil has been reported to be effective in sore throat conditions and halitosis. (21) The anodyne properties of clove oil on the dental pulp is well known but its overenthusiastic use can lead to mucosal irritation. (22) Clove oil might also be an effective anti-carcinogenic agent due to its antioxidant properties as reported by Lee and Shibamoto; further research should be done to find out more about the anti-carcinogenic activity of clove. (23) Eugenol, the principal chemical component of clove oil, is also used in the form of a paste or mixture as dental cement, filler and restorative material. (24)

Clove oil showed strong activity against periodontopathogenic bacteria, *F. nucleatum, P. Intermedia,* and *P. Gingivalis*. (24) Aneja and Joshi investigated the anti-microbial activity of clove oil against five dental caries causing microorganisms namely *Streptococcus mutans*, *Staphylococcus aureus*, *Lactobacillus acidophilus* (bacteria), *Candida albicans* and *Saccharomyces cerevisiae* (yeast) and the results indicated potent antimicrobial activity against the tested dental caries causing microorganisms. Clove oil emerged to be a potent agent exhibiting even better anti-bacterial and anti-fungal activity than Ciprofloxacin and Amphotericin-B respectively. (25)

However, clove oil is found to be toxic to human cells. If injected or ingested in sufficient amount, it has been shown to cause life-threatening complications, including ARDS (Acute Respiratory Distress Syndrome), Fulminant Hepatic Failure and CNS Disorders. (26)

Olive *(Olea europaea)*

Olive *(Olea europaea)* is an effective antimicrobial agent used for the treatment of Dental Pain. (27) Kumar et al. revealed that the stem extracts of *O. europaea* using petroleum ether, acetone, methanol, and water successively showed a broad spectrum of activity against microorganisms liable for foremost dental diseases. Methanol extracts of *O. europaea* showed the maximum activity against *S.*

mutans and *C. albicans*. (28) Phytoconstituents analysis of the plant extract revealed the presence of alkaloids, flavonoids, glycosides, steroids, tannins, terpenoids and saponins which might be the reason behind its antimicrobial potential.

Similarly, the antimicrobial potential of five natural constituents of *O. europaea* (oleuropein, maslinic acid, hydroxytyrosol, oleocanthal, oleacein) was investigated against ten representative oral bacterial species and a *Candida albicans* strain, in which maslinic acid exerted the most significant inhibitory activity against the tested oral pathogens. (29) Olive oil is rich in oleic acid which is useful for enhancing the fluoride inhibition of EPS formation by *S. mutans* and has a role in preventing biofilm formation. (30) Therefore, olive oil may be useful in the prophylaxis of dental caries and periodontitis.

Olive oil can be used to prevent Dental erosion. Emersion of teeth in olive oil for 6 hours was found to be effective in reducing enamel erosion when exposed to citric acid 1% at 15 min. (31) A study by Wiegand et al. aimed to analyse the impact of olive oil on enamel and dentin erosion, olive oil offered protection against enamel and dentin erosion when applied as 2% emulsion or 2% olive-oil-containing mouthrinse, but is not effective when applied as pure oil (100%). (32)

Golestannejad et al. found out that the methanolic, ethanolic, and hydroalcoholic extracts of olive leaf extracts (OLE) have appropriate antibacterial activities due to their high phenolic content and can also reduce bacterial adhesion in dental plaque formation, as well as increases the pH of the oral environment. (33) Therefore, OLE can be used in the production of commercial products such as chewing gum, chocolate, and toothpaste to prevent dental caries.

Babool (*Acacia arabica*)

Figure. 2: *Acacia arabica* (Babool Tree)

The gum of *Acacia arabica* (Babool) has been studied for its effect on plaque and gingivitis and has been found to have the potential to inhibit early plaque formation and its action on suspected periodontal pathogens like *P. gingivalis* and *P. intermedia* has also been reported which is of significant clinical value. (34,35) *A. arabica* leads to better clinical outcomes in patients with mild to moderate chronic periodontitis with effective chemical plaque control and anti-gingivitis action. (36,37) Clinical improvement in probing pocket depth, clinical attachment level, plaque index, gingival index and bleeding on probing has also been reported. (37) Based on all the findings, it is suggested that *Acacia arabic*a-containing toothpaste could be a useful approach for prevention of gingivitis and that it may be as well recommended for daily oral hygiene procedures.

Turmeric *(Curcuma longa)*

Turmeric has a lot of roles to offer in dentistry. The benefits of turmeric include analgesic, antibacterial, anti-inflammatory, anti-tumour, anti-allergic, antioxidant, antiseptic, antispasmodic, astringent, cardiovascular, carminative, cholagogue, digestive, and diuretic properties. (38) Curcumin is the main constituent from

clinical aspect which comprises around 0.3-5.4% of raw turmeric. It has been utilised broadly in Ayurvedic medication for quite a long time, as it is nontoxic and carries a variety of therapeutic properties. (39) Chlorhexidine gluconate as well as turmeric mouthwash can be utilized effectively as an adjunct to mechanical plaque control in prevention of plaque and gingivitis. (40) Turmeric mouthwash is well accepted by nearly all subjects without any significant side effects because of its bio-compatible nature.

1% curcumin solution when used as subgingival irrigant result in better resolution of the inflammatory signs than chlorhexidine and saline irrigation. (41) Curcumin oil application resulted in healing of ulcers (RAS); there was also an early reduction in pain. (42) The topical application of turmeric at the site of injury also promotes healing of wounds. (43) So, turmeric can be used in varying forms for treating several ailments including surgical wounds.

In a study by Pandit et al., a fraction separated from turmeric showing anti-biofilm activity was obtained having inhibitory effects on the virulence characteristics of *S. mutans* biofilms, such as bacterial adherence, aciduricity and acidogenicity. (44)

The use of turmeric is pretty varied in dentistry; it is also a dental-plaque staining agent. Plaques undergo staining in the dental-plaque detection system that also contains turmeric extracts and curcumin. (45)

Due to its free radical and antioxidant properties, turmeric inhibits the early stages of carcinogenesis. Turmeric arrests carcinomatous cells in the G2/M phase of the cell cycle. (46) Thus, it can be useful against different types of malignancies. Besides, curcumin has reported in protecting healthy cells from the damaging effects of radiation and chemotherapy without decreasing the effectiveness of the therapy. (47)

Neem *(Azadirachta indica)*

Extracts from Neem sticks or bark have been shown to inhibit the growth of Streptococcus mutans and other Streptococcus species such as *Streptococcus salivarius*, *Streptococcus mitis* and *Streptococcus sanguis* and cause significant reductions in bacterial adhesion in vitro, suggesting that it can reduce the ability of some streptococci to colonize tooth surfaces and thus prevent further tooth decay. (48) Various studies have demonstrated that Neem (*Azadirachta indica*) based mouth rinses are highly efficacious and may be used as an alternative therapy in the treatment of Chronic Gingivitis and periodontal diseases. (49) Neem oil have bactericidal activity independent of the temperature and energy. This bactericidal activity is mainly due to the inhibition of cell-membrane synthesis in the bacteria. (50)

Miswak *(Salvadora Persica)*

Miswak, a twig of the *Salvadora persica* tree, shows an immediate antimicrobial effect on cariogenic bacteria esp. *S. fecalis*, *S. mutans* and *Lactobacillus*. (51) The miswak twig as a chewing stick appeared to be as effective as the toothbrush, if not more. (52) In addition, practicing the proper use of chewing stick as an oral hygiene aid, significantly lower plaque scores in comparison to the use of commonly used toothbrushes by inhibiting growth and acid production properties of cariogenic bacteria. (53,54) The usage of chewing sticks can also assist in the reduction of gingival inflammation. However, chewing sticks can cause occlusal tooth wear and a small degree of gingival inflammation if used improperly or excessively. (55) It also possesses analgesic effect to thermal stimuli, thus, suggests effective in the management of dentinal hypersensitivity. (56) Gazi et al. found in his study that

Miswak produce significant increases in calcium (22-fold), chloride (6-fold), significant decreases in phosphate and pH which lead to inhibition of demineralization and promotion of remineralization of tooth enamel because of the calcium saturation of saliva. (57)

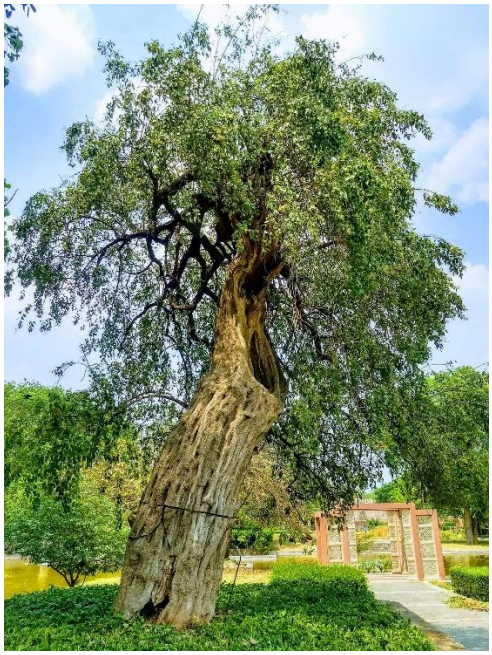

Figure. 3a: *Salvadora persica* (Miswak Tree); **Figure. 3b:** Miswak Toothbrush

Aloe Vera

Aloe Vera has been used since ancient times for its various medicinal values. Pure Aloe Vera juice and mouthwashes have role in reduction of dental plaques and plaque induced gingivitis. It destroys the plaque formation by bacteria called *Streptococcus* and prevents fermentation of oral fungi. (58) For patient suffering from oral lichen planus or oral ulcers, topical application of Aloe vera 3 times a day, provides pain relief, improves the oral lesions and the quality of life of patients. (59,60) The Aloe Vera gel wound healing action is due to increased blood supply, which increases oxygenation as a result and stimulates fibroblast activity and collagen proliferation. (61,62) Aloe vera shows antifungal actions against *Candida albicans*. Aloe vera leaf extracts can inhibit both the germ tube formation and hence the growth of *C. albicans*. (63,64) It also shows antiviral action, a purified sample of Aloe emodin had effects on the infectivity of Herpes simplex virus type 1 and type 2, Varicella-Zoster virus, Pseudorabies virus, Influenza virus, Adenovirus, and Rhinovirus leading to their inactivation and disruption of the envelopes at the microscopic level. (65,66)

Oregano *(Origanum vulgare)*

Figure. 4: *Origanum vulgare* (Oregano Plant)

Oregano essential oil is extracted from air-dried leaves and shoots of the plant *Origanum vulgare* and concentrated by steam distillation. (67) Oregano contains

compounds like phenols, terpenes, and terpenoids. (68) Carvacrol is the most abundant phenol in oregano which shows potent antibacterial properties. (69) Thymol is the natural antifungal agent in oregano oil which supports the immune system and protects against toxins. (70) Rosmarinic acid is a powerful antioxidant that helps to guard against harm caused by free radicals. (71) In test-tube studies, it has been discovered that oregano essential oil is effective against five different types of Candida that cause infections within the mouth. (72) Test-tube studies conjointly found that carvacrol which is one of the main compounds of oregano oil is incredibly effective against oral Candida. (73) A test-tube study on the effectiveness of oregano essential oil on Sixteen different strains of Candida concluded that oregano oil may be a good alternative treatment for Candida yeast infections. (74) Avicenna in his book "The Canon of Medicine" mentioned that Oregano is a drug of choice for oral ulcers. Chewing oregano is effective in reducing bad breath odours. (75)

Sesame *(Sesamum indicum)*

Oil pulling or oil swishing has been used extensively as an ancient Ayurvedic remedy that has both dental and systemic effects. (76) Though the purported mechanism is unclear, the viscosity of the oil probably inhibits plaque coaggregation and bacterial adhesion.

Another possible mechanism might be a saponification process that occurs as a result of alkali hydrolysis of fat. (77) The sesame seed oil also contains lignans (sesamin, sesamolin, and sesamol) possessing anti-oxidant and health-promoting properties. (78) Its antioxidant effect may detoxify toxins, potentiate the action of tocopherol (Vit. E), prevents oxidative degradation of lipids. (79)

It also has antibiotic effect i.e. it significantly reduces *S. mutans* counts in plaque and saliva within 1 week. (80)

Garlic *(Allium sativum)*

Garlic shows antibacterial effect against human dental plaque microbiota and the antibacterial activity of garlic is widely attributed to allicin (a compound that gives garlic its odour). (81,82) *S. mutans* is one of the most important oral bacteria which plays a major role in dental caries and bacteremia and garlic extract was found to inhibit and kill all oral streptococci strains tested. (83) The garlic solution mouthwash exhibited antimicrobial properties against oral microorganisms and streptococci *in vivo*. (84)

Tulsi *(Ocimum sanctum)*

Many research and studies suggest that due to its significant amount of eugenol, Tulsi may be a COX-2 inhibitor, like many modern painkillers. (85)

Tulsi is as an effective herbal mouth wash for treating bad breath, mouth ulcers and gum diseases because of its activity against *Streptococcus mutans*, the organism majorly responsible for tooth decay. (86) It is a preferred constituent for herbal mouth wash because of its taste and convenience as well. (87) In a study by Agarwal P and Nagesh L, rinsing with Tulsi resulted to be as effective as 0.2% Chlorhexidine and Listerine in reducing the levels of *Streptococcus mutans*. (88)

Tulsi demonstrated effective antimicrobial property against *A. actinomycetemcomitans* and *P. gingivalis*, so its use as an effective and affordable "adjunct" would be useful along with the standard care in the management of periodontal conditions. (89)

Onion *(Allium cepa)*

Toothache is often allayed by placing a small piece of onion on the tooth or gum. The anti-inflammatory agents (Vitamin C, Quercetin and active components like Isothiocyanates) in onions help reduce the severity of symptoms associated with conditions such as the pain and swelling. (90) Onion shows bactericidal properties

and chewing raw onion for three minutes is sufficient to kill all the germs in the mouth. (91) Due to presence of Vitamin C, onions also strengthen and firm the gums. (92)

Some Additional Herbs

Mangiferin, a compound present in Mango leaves, possesses antibacterial activity in vivo against specific periodontal pathogens such as *P. intermedia* and *P. gingivalis*. (93) Eucalyptus Oil significantly retards biofilm formation, and thus can contribute to the development of novel anticaries treatments. (94) The ethanolic extracts of Guava leaves and Licorice roots produces anti-bacterial and anti-cariogenic activities against *S. mutans*. (95) Green Tea is effective in reducing acid production in dental plaque and mutans streptococci. (96) Amla *(Phyllanthus emblica)* is useful in ulcer prevention. (97) Cranberry reduces the formation of biofilms by *S. mutans* in vitro and dental caries development in vivo. (98) German Chamomile reduces both plaque accumulation and gingival inflammation. (99)

3. Conclusion

In this COVID-19 pandemic, providing proper dental care isn't an easy task for the dental professionals in many parts of the world because of the lack of protective equipment, these herbal alternatives can be very beneficial for the patients undergoing dental pain. WHO has also recommended for the incorporation of the traditional systems of medicine to be included into the primary health care system in those communities where it is accepted, such as Ayurveda. But these herbal home remedies are only useful in the symptomatic treatment and undergoing proper dental care is advised if it is feasible for the patient as well as the practitioner with full precautions.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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