



EFFECTS OF TURMERIC (CURCUMA LONGA) IN DENTISTRY

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ABSTRACT

Since centuries ago turmeric (also known as Curcuma Longa) has been used as an ancient spice in food and has remained popular in most southasian countries. Turmeric belongs in the ginger family and is a spice derived from the root of the curcuma longa plant. Thus, curcumin (also known as curcuminoids or phenolic compounds) is the active ingredient in turmeric powder or turmeric essential oils, and is known to communicate with 160 mechanisms and pathways in the body to support a wide range of processes, including brain health, cardiovascular health, tissue health. Since turmeric has anti-inflammatory, antimicrobial and antioxidant property, its application in dentistry needs to be discussed. The main objective of this article is to highlight the effects of turmeric (Curcuma-longa) in dentistry.

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INTRODUCTION

Among the innumerable species of medicinal herbs, turmeric (also known as "Curcuma Longa") is one of the most popular medicinal plant used to treat various diseases. The name for turmeric is derived from the latin name "Curcuma Longa", which comes from the Arabic name for the plant, "Kurkum." In Sanskrit it is called "Haridra" ("The Yellow One"), "Gauri" ("The One Whose Face is Light and Shining"), "Kanchani" ("Golden Goddess"), and Aushadhi ("Herb"). It is called "Jiang Huang" in Chinese, and "Haladi" ("Yellow") in Hindi, the most common name in India. Turmeric comes from the Zingiberaceae family (same as ginger) and is a spice derived from the root of the curcuma longa plant. Thus, curcumin (also known as curcuminoids or phenolic compounds) is the active ingredient in turmeric powder or turmeric essential oils, and is known for its strong anti-oxidant properties. Curcuminoids are the main phytochemicals that give turmeric its most impressive and wide-ranging health benefits. There are three main phytochemicals in the curcuminoid family that are responsible for turmeric's health benefits: diferuloylmethane (or curcumin,

the primary curcuminoid responsible for turmeric's vibrant Yello wish color), demethoxycurcumin, and bisdemethoxycurcumin. In addition to these three chemicals, turmerone is a potent volatile oil found in the root. There are two main varieties of turmeric: one with hard, rich colored, oval rhizomes, called "Lokahandi Halad" that is used mostly for dyeing, and a second variety which is softer, larger, lighter colored with long rhizomes used mostly for eating. Turmeric became valuable to humans when it was discovered that the powdered rhizome preserved the freshness and nutritive value of foods. It was originally used in curries and other food to improve storage conditions, palatability, and preservation. Because of its preservation properties, turmeric played a vital role in survival and sustainability in South Asia and was valued more than gold and precious stones. However, turmeric was eventually replaced by cheaper, synthetic preservatives. The most well known medicinal action of turmeric is its use as a powerful anti-inflammatory, the effectiveness of which is comparable to pharmaceutical medicines. However, it also acts as an alternative, analgesic, antibacterial, anti-inflammatory, anti-tumor, anti-allergic, anti-oxidant, antiseptic, antispasmodic, astringent, carminative, cholagogue, digestive, diuretic and as a stimulant. Modern science is beginning to recognize and understand the amazing healing qualities of

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turmeric and much research is currently being conducted to prove its efficacy in both systemic and dental health.

Effects of turmeric in dentistry

Gingivitis and Periodontitis: One of the most significant property of turmeric is its anti-inflammatory action. According to study conducted by Roobal *et al.*, (2011) 30 patients with chronic or localized periodontitis with a pocket depth of 5 to 7 mm were selected in a split mouth design. The control site received scaling and root planning alone whereas the experimental site received 2% whole turmeric gel in addition to scaling and root planning. They concluded that 2% whole turmeric used as an addition to scaling and root planning can be effective in treating periodontal pockets. Another study conducted by Waghmare *et al.*, (2011) stated that turmeric is definitely a good adjunct to mechanical plaque control. Chatterjee *et al.*, (2017) conducted a double-blinded randomized controlled clinical study to do a comparative evaluation of the efficacy of curcumin and chlorhexidine mouthrinses on clinical inflammatory parameters of gingivitis and concluded that since curcumin has both antiplaque and antigingivitis properties, it can be used as an adjunct to chlorhexidine mouthwash in treating chronic gingivitis.

Anticariogenic property: A study was conducted by Lee *et al.*^[4] to evaluate the effect of essential oil in Curcumin Longa plant to inhibit the cariogenic property of Streptococcus mutans. He concluded that C. longa essential oil inhibited the growth and acid production of S. mutans at concentrations from 0.5 to 4 mg/mL. The study also stated that, at a concentration of more than 0.5 mg/ml this essential oil inhibited the adherence of streptococcus mutans to the saliva coated hydroxyapatite beads and also inhibited the formation of S. mutans biofilm, thus proving that Curcumin essential oil consists of anticariogenic properties.

As an Analgesic: Turmeric oil contains sesquiterpenes which has anti-inflammatory action. Jacob *et al.*, (2014) conducted a study to evaluate the anti-inflammatory and analgesic property of turmeric oil and fish oil in comparison to aspirin. He concluded that turmeric oil and fish oil both possess optimum analgesic activity. Numerous animal studies and reviews (John *et al.*, 2009; Susan *et al.*; Sangita *et al.*, 2017) have been carried out to study the analgesic property of curcumin and have concluded that *curcumin* can be considered as a safe and effective analgesic with less side effects compared to the commercially available NSAID's.

Prevention of dry socket and Wound Healing: Lone *et al.*, 2018 conducted a randomized clinical study to evaluate the role of turmeric in the management of dry socket. He divided 178 patients with dry socket into group A and group B and dressing of turmeric with mustard oil (group A) and ZOE (group B) was given simultaneously and concluded that turmeric accelerated wound healing process. An animal study was conducted by Meizarini *et al.*, 2018 on Wistar rats by dividing them into 4 groups and excising about 6 mm×6 mm square of skin in the area of the vertebralis thoracis and later dressing the wound with a dressing of zinc oxide and turmeric extract and concluded that this combination improved the healing process due to its anti-inflammatory action.

Intracanal Medicament: An in-vitro study was carried out by Chamele *et al.*, 2014 on the efficacy of turmeric extract as an

intracanal medicament in deciduous teeth against *Enterococcus faecalis*. He divided 60 deciduous teeth into three groups and infected them with *Enterococcus faecalis*. He treated these canals individually with a paste of turmeric extract, calcium hydroxide and saline and concluded that Curcumin has better antibacterial effect and can be used as an alternative to calcium hydroxide as an intracanal medicament. Another in-vitro study conducted by Upadhaya *et al.*, 2015 concluded that turmeric in combination with calcium hydroxide increases its antibacterial efficacy and can be effective against all root canal pathogens proving it as an excellent intracanal medicament.

As a Mouthwash: A clinical trial conducted by Mali *et al.*, 2012 stated that 0.1% turmeric can be used as an effective mouthwash due to its anti-plaque, anti-microbial and anti-inflammatory properties. Another study by Nagpal *et al.*^[14] Another study by Waghmare *et al.*, 2011 stated that turmeric mouthwash prepared by dissolving 10 mg of curcumin extract in 100 ml of distilled water and 0.005% of flavouring agent peppermint oil with pH adjusted to 4 is found to be as effective as most widely used chlorhexidine mouth wash.

Head and Neck Cancer: Rao *et al.*, conducted a randomized controlled clinical trial on patients undergoing treatment for head and neck cancer. He concluded that gargling the mouth with 10ml turmeric solution 6 times a day reduced and delayed the severity of Radiation induced - oral mucositis which is the cause of acute morbidity in patients undergoing treatment for head and neck cancer. Another study by Zhen *et al.*, 2014 stated that curcumin reduced SCC-25 cells proliferation and invasion through inhibiting the phosphorylation of EGFR and EGFR downstream signaling molecules Akt, ERK1/2 and STAT3 thus preventing oral squamous cell carcinoma. Perrone *et al.*, 2015 from his review of previous studies concluded that due to its wide range of antiplatelet, antioxidant, antitumor and anti-inflammatory properties curcumin can be used effectively as an anticancer agent.

Subgingival Irrigant: A pilot study conducted by Suhag *et al.*, 2007 concluded that 1% curcumin reduces the inflammatory signs and can be used as adjuvant therapy to chlorhexidine and saline irrigation. Gottumukkala *et al.*, 2013 conducted a pilot randomized clinical trial on 23 patients with non- adjacent probing depth of more than 5mm and compared the efficacy of 1% curcumin solution on clinical and microbiological parameters in chronic periodontitis patients. He concluded that curcumin solution has a beneficial effect in treating patients with chronic periodontitis. However he insists on further clinical trials required with different dosages to prove its efficacy.

Oral Submucous Fibrosis(OSMF): A clinical and histopathological study was conducted by Deepa *et al.*, 2010 on the efficacy of Curcumin and Turmeric Oil as Chemopreventive Agents in Oral Submucous Fibrosis. In the study forty-eight patients who were diagnosed with oral submucous fibrosis were selected and divided into three groups. Group I, II and III were given Curcumin, turmeric oil and muttinal capsules for 3 months respectively. The study concluded that Turmeric oil and Curcumin are beneficial and noninvasive in treating patients with OSMF. Hazarey *et al.*, 2015 conducted a randomized clinical trial by dividing 15 patients into 2 groups receiving Curcumin lozenges and Tenovate ointment respectively and concluded that Curcumin lozenges are a promising treatment method in treating

patients with oral submucous fibrosis. Another randomized interventional study conducted by Yadav *et al.*, 2014 stated that Curcumin tablets (Turmix 300 mg) given for three months are beneficial in treating patients with OSMF.

Oral Lichen Planus (OLP): Singh *et al.*, 2013 conducted a pilot study on 10 patients diagnosed with OLP. The subjects were given turmeric extract in ointment form and were advised to apply twice daily for 3 months with review for every 15 days. The study concluded that due to activation of host macrophages and natural killer cells and modulation of lymphocytes mediated function in turmeric, it can be used safely to treat OLP with minimal side effects compared to steroids. Another case report by Prasad *et al.*, 2014 on treating patients with recurrent oral lichen planus revealed that Curcumin can be used as an alternative to topical steroids in treating patients with OLP. A randomized clinical trial conducted by Keshari *et al.*, 2015 on the efficacy of Curcumin in treating patients with oral lichen planus revealed that Curcumin fared better in reducing inflammatory signs and can be used as an alternative to steroid in managing the signs and symptoms of OLP with minimal side effects as compared to commercial steroids with similar efficacy.

Recommended Dosages for Adults

According to University of Maryland Medical Center

The permissible dosages of various forms of turmeric (for adults): Cut root: 1.5 – 3 g per day. Dried, powdered root: 1 – 3 g per day. Standardized powder (curcumin): 400 – 600 mg, 3 times per day. Fluid extract (1:1) 30 – 90 drops a day. Tincture (1:2): 15 – 30 drops, 4 times per day.

Adverse Effects of Turmeric: Although turmeric and its active ingredient Curcumin is considered a safe herbal medicine for both systemic and dental problems, consuming a high quantity can possess few side effects. Turmeric contains 2% oxalate, hence at high doses can lead to kidney stone formation (Tang *et al.*, 2008). Commercially available turmeric powders contain high levels of contaminated fillers with can lead to lead exposure in children (Gleason *et al.*, 2014) as well as allergy in patients (Parvathy *et al.*, 2015). Other side effects reported include gastric irritation, low blood sugar in diabetic patients, nausea, gall bladder problems and diarrhoea.

Conflict Of Interest: None.

Conclusion

Turmeric (*Curcuma Longa*) has been used as a herbal medicine since centuries ago. All the forms of turmeric has been proven beneficial in both systemic and dental problems if taken at recommended dosages. Due to its anti-inflammatory, anti-oxidant, anti-bacterial properties, it can be termed as a safe alternative to the commercially available medicines and gels with fewer side effects. However further clinical trials have to be carried out to determine its optimal dose, bioavailability and its pharmacokinetics to further enhance the efficacy of this “Magic herb”.

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