



Dental Application of Olive Oil: A Review

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ABSTRACT

Olive oil is widely utilised as a natural remedy in many parts of the globe. In traditional dentistry and medicine, oils are often utilised for disease prevention and therapy. Olive oil has a long history of use as both a nutritious and therapeutic food. Plus, it's a huge part of the cuisine of the nations that sit on either side of the Mediterranean Sea, so it's an important part of a healthy lifestyle overall. To prevent and cure oral disorders, olive oil and other edible oils have long been used in both conventional and alternative medicine. Olive oil's antibacterial properties are effective against both Gram-positive and Gram-negative anaerobic microbes. Massaging the gums with olive oil has been shown to decrease the number of Streptococcus mutans, the number of Lactobacillus in the mouth, as well as plaque and gingival scores. As a preventative measure, it may be useful in bettering people's dental health. Unlike fatty acids, the chemicals in olive oil are responsible for its antibacterial properties. In this post, we'll take a look at some of the ways olive oil has been put to use in the field of dentistry. Unfortunately, there is a lack of scientific information on its effects due to the small number of research that have been conducted.

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INTRODUCTION:

Olive oil is an example of a healthful dietary intervention that may be used to both ward against illness and keep the healthcare system running smoothly. When compared to the often convoluted chemical therapy, the use of components of natural origin with fewer side effects seems to be preferable.

The "European olive," or *Olea europaea*, is a tiny tree species of the olive family. Previous research into olive oil has inspired new efforts to demonstrate the oil's potential involvement in the treatment and prevention of a wide range of ailments [1]. Oleic acid is the primary bioactive component of olive oil. It is a monounsaturated fatty acid, a phenolic ingredient, and a squalene. Phenolics are used in dentistry because of their antioxidant, antibacterial, and anti-inflammatory properties [2].

The article explains how ozonated olive oil helps dental care. To make ozonated olive oil, you have to mix ozone gas with olive oil [3]. Because it has potent antibacterial properties, does not promote drug resistance, and promotes wound healing [3, 4], it finds widespread use in dentistry.

Minimally invasive topical ozone treatment has been shown to be effective for these illnesses with no negative side effects [4,5]. The molecule of ozone is composed of three oxygen atoms and exists in the gaseous state. and it has proven useful in the treatment of a number of medical and dental conditions [6]. Vegetable oils are an excellent resource since they are biocompatible, natural, affordable, and readily available all over the globe [2,7]. Therefore, this article aims to give a scholarly overview of the research on the potential benefits of olive oil for dental hygiene.

Antibacterial effect of ozonized olive oil:

Dental caries is a condition associated with biofilms, which implies that cariogenic bacteria in the host's diet interact with the biofilm generated on tooth surfaces [8]. *Streptococcus mutans* is the major causative agent of dental caries [8], and these dental biofilms are made up of a wide variety of complicated oral bacteria. Many important pathogenic bacteria, including *Staphylococcus aureus*, have been shown to be bacteriostatic and resistant to oleic acid's anti-biofilm production activities in recent research [9,10].

Olive oil's particular makeup has been linked to improved oral health by lowering the risk of dental caries and periodontitis [8]. Cai's research demonstrated that the monounsaturated fatty acid found in olive oil,

oleic acid, effectively inhibits the formation of extracellular polysaccharides (EPS) by streptococcus mutants. Both oleic acid and fluoride were shown to decrease bacterial bio-volume without killing the organism. The binding of oleic acid and fluoride altered the suppression of extracellular polysaccharide (EPS) synthesis by Streptococcus mutans. The Biofilms of UA-159 [8].

G. Pietrocola et al. conducted an independent evaluation of ozonized olive oil's antibacterial properties; they compared the ozonated oil to chlorhexidine-based treatments, and found that the ozonated oil was the least effective of the two in killing bacteria [11]. Therefore, ozonized olive oil may be used as a substitute for traditional antibacterial agents [12].

Anti-erosive effect of olive oil containing fluoridated mouth rinse:

The loss of tooth enamel due to chemical etching or dissolving by acids of nonbacterial origin is characteristic of dental erosion [13,14]. Only a small number of research [15,16,17] have looked at olive oil's potential to reduce tooth erosion.

Contrarily, a research conducted in 2020 by Osman et al. shows that olive oil is just as effective as fluoride varnish in preventing tooth erosion in bovine teeth after exposure to citric acid. Olive oil was shown to have an impact on reducing tooth wear, however its effectiveness was less than that of fluoride varnish [18].

The use of olive oil in endodontics :

In order to boost the success rate of endodontic therapy, scientists are always on the lookout for new disinfection materials with antibacterial activity and biocompatibility. Because of this, olive oil has attracted attention as a potential research subject in the field of endodontics.

To demonstrate the efficacy of ozonated olive oil in inhibiting the growth of endodontic pathogens, Elshinawy et al. performed a research in 2018. (*Enterococcus faecalis*, *Streptococcus mutans*, and *Candida albicans*). Comparisons were made between ozonated olive oil (O3-oil), chitosan (Ch-NPs), and silver nanoparticles (Ag-NPs). According to the findings, chitosan is more effective in killing bacteria and fungus than ozonated olive oil. Both Ch-NPs and O3-oil reduced fibroblast adhesion, and the latter also reduced biofilm development by 94%. Root canal therapy using a combination of Ch-NPs and O3-oil has been shown to be effective against mixed mature biofilms species with a quick death rate [19].

When using ozonized oil as an intracanal medicament, Silveira et al. (2007) reported an impressive 77% success rate in root canal therapy. Accordingly, olive oil may be a useful tool in endodontics.

Oil pulling :

For millennia, people in India and other parts of southern Asia have studied oil pulling or swishing with oil as a comprehensive Ayurvedic approach [21,22]. Swish oil around in your mouth to keep your teeth and body healthy [21]. It is also a detoxifying agent for the mouth and throat, where it is used to prevent the growth of pathogenic bacteria, fungus, and other organisms [23]. But Hanning et al. [21] found olive oil oil pulling did not alter the microbial colonisation of tooth enamel. According to the results of this research, oil pulling should not be utilised in place of conventional dental hygiene practises like brushing and flossing, but rather as an adjunct to such methods.

Now let's talk about how oil pulling treatment works: by releasing antioxidants, it kills bacteria by rupturing their cell walls [24]. In addition, it encourages the production of enzymes in the tongue that help remove poisons by olfactory exclusion. Teeth and gums will be protected from plaque and tartar buildup, warding off cavities and gum disease. If the proper oil pulling method is followed, results may be seen in as little as two weeks. For this reason, olive oil has been utilised in emulsions [15] and mouthwashes [25].

Effect of ozonated olive oil in oral lesions and prevention of chemotherapy-induced oral mucositis:

Head and neck radiation therapy and chemotherapy, especially when administered in a rapid succession, may cause oral mucositis [26]. In 2019, Alkhouli et al. did a research in Syria to examine the efficacy of topical olive oil in treating acute lymphoblastic leukaemia in children and postponing the development of oral mucositis as a side effect of chemotherapy (OM). Olive oil was observed to delay the onset of oral mucositis (OM) [27]. Olive leaf extract was reported to be useful in reducing the incidence and severity of oral mucositis in a study done in Iraq by Ahmed KM in 2013 [26]. There has been a lot of research on how olive oil may help protect the oral mucosa from the side effects of chemotherapy. People with radiation-induced hyposalivation have had success using olive oil topical formulations to alleviate xerostomia symptoms [28,29]. Topical use of ozonated olive oil was shown to be effective in treating oral candidiasis, angular cheilitis, aphthous ulcers, and herpes labialis. Olive oil used topically before beginning chemotherapy medications or during dry mouth is safe and useful.

Dentin hypersensitivity:

For chronic periodontitis, Patel P. V. et al. (2012) Opinions on whether or not ozonated olive oil is beneficial when used alone or in combination with scaling and root planing were analysed [30]. Whether compared to alternative treatments for periodontal disease, they discovered that ozonated olive oil worked just as well when administered alone or as part of an adjunctive therapy regimen for chronic periodontitis. Dentinal hypersensitivity was reported after patients had scaling and root planing followed by ozonated

olive oil [30]. Consistent with the previous study's findings, Indurkar and Verma [[31]] assert that ozonated olive oil is the most effective method for enhancing and sustaining gingival health. However, after using ozonated olive oil, dentin hypersensitivity significantly increased, eliminating this treatment option. A separate trial found that ozonated olive oil alone was ineffective in reducing postoperative hypersensitivity to root dentin [32]. However, postoperative root dentin hypersensitivity may be reduced with the use of a mineral wash containing calcium phosphosilicate. So, it's safe to say that ozonated olive oil doesn't do much to avoid dentin hypersensitivity, and that additional therapies are needed to get rid of it.

Periodontal health:

Olive oil that has been ozonized is an effective tool for combating gum disease and restoring gum health. There have been previous studies looking at the effectiveness of subgingival use of ozonated olive oil gel in assisting with scaling and root planing in severe periodontitis. The study's authors draw the conclusion that ozonated olive oil gel may be effective as an adjunct to scaling and root planing in the treatment of advanced periodontitis [5]. Olive oil, sesame oil, coconut oil, and chlorhexidine gel were all shown to be effective preventative agents against plaque-induced gingivitis and improved oral health in a separate research [33] by Singla et al. When used in conjunction with conventional methods like scaling and root planing, ozonated olive oil may improve treatment success. Olive oil massages may help alleviate plaque-induced gingivitis, too.

Prevention of enamel demineralization (caries) by application of ozonized olive oil:

An in vivo study investigated the effect of ozonized olive oil gel on enamel the phenomenon of demineralization in people undergoing orthodontic treatment. The reversal of enamel demineralization after orthodontic treatment has been shown to be facilitated by the use of an ozonized olive oil gel. The most effective method for preventing enamel demineralization was the administration of ozonized olive oil in combination with regular oral hygiene [3]. Similar findings were found in another research that looked at ozonated olive oil and its ability to prevent caries. Antibiofilm and antibacterial action against *S. mutans* [34] has been demonstrated in ozonated olive oil. To determine whether or not olive oil is effective in preventing caries, further studies are needed. The greatest approach for preventing enamel demineralization has been shown to be frequent teeth cleaning and flossing, however the research has yet to show that this is really possible. Ozone-treated olive oil may be effective against *S. mutans* and may have a role in preventing caries, but this has to be studied in a large number of clinical trials, both in vitro and in vivo.

CONCLUSION

Olive oil's dental applications are restricted. Multiple signs of the advantages of utilising olive oil are provided in the various discussions of its possible applications found in the literature. Ozonated olive oil is a great preventative measure for your teeth and body. Standard dental prophylaxis alone may not be enough to prevent gingivitis, periodontitis, and caries, but adding a lipophilic component may be beneficial, while further research is required to support the use of olive oil for oral illnesses.

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