



New Concept of Oil Pulling as an Adjunct to Mechanical Plaque Control. A Literature Review.

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Received Date: July 26, 2022

Published Date: August 05, 2022

Abstract

Oral cavity harbors more than 150 microorganism species, out of which some are known as periodontal pathogens causing periodontal disease. To maintain proper oral hygiene many practices have been advocated by individuals such as mechanical and chemical plaque control measures. Recently because of the occurrence of side effects to modern medicines and oral hygiene products, people are increasingly attracted towards complementary and traditional practices. One such practice is the use of oil pulling which when used is believed to reduce the effect of plaque induced gingivitis. Oil pulling is a traditionally used Indian folk remedy practiced in ancient times for many years to prevent bad breath, cavity formation, bleeding from gums etc. It is believed to cure more than thirty systemic diseases when practiced regularly and as directed. Oil pulling in addition to offering several oral health benefits has also beneficial effects on overall health. This article is focused on the use of oil pulling as an adjunct to other oral hygiene methods.

Keywords: Oil pulling, Sesame oil, Coconut oil, Oral hygiene

Introduction

As microorganisms form plaque, which is further considered as the main etiological factor for periodontal diseases. Some oral microorganisms are also believed to cause certain systemic diseases. Therefore, oral health and general health are most often interrelated. Proper maintenance of oral hygiene is important to reduce plaque formation and is also necessary for the long-term success of periodontal treatment. Effective plaque control measures are mainly the mechanical and chemical plaque control measures. Tooth brushing with toothpaste is the most commonly practiced mechanical plaque control aid around the world for the maintenance of oral hygiene. However, traditional mechanical plaque control aids such as a manual toothbrush, chewing sticks, and dental flosses need manual dexterity and are time-consuming.[1] Other than that oil pulling nowadays is also claimed to improve oral health. The concept of oil pulling really is not new, but it is a modified version of oil gargling, which comes from Ayurveda medicine and dated thousands of years ago.[2] Oil pulling has been used extensively as a traditional Indian folk remedy for many years to prevent decay, oral

malodor, bleeding gums, and dryness of throat, and cracked lips and for strengthening teeth, gums, and jaws. Most of the studies have been done using coconut oil, sunflower oil and sesame oil. Since they have many health effects such as boosting the immune system and antimicrobial properties, therefore are helpful in fighting against various pathogens of oral cavity that will in turn act as an effective plaque control agent. Oil pulling in addition to offering several oral health benefits has also beneficial effects on overall health. According to the study conducted by the World Health Organization, 80% of people in India have been using herbal medicine to improve their health.[3] This article is focused on the use of oil pulling as an adjunct to other oral hygiene methods.

Historical Background

Oil pulling is an ancient ayurvedic therapy for maintaining oral hygiene. Oils for oil pulling are easily available in household.⁴ Oil pulling is mentioned in the ayurvedic text Charak Samhita and Sushruta Samhita as ‘Kavala Graha’ or ‘Kavala Gandoosha’.^{5,6} In Gandoosha mouth is completely filled with oil such that gargling is impossible whereas in Kavala Graha comfortable lesser quantities of oil is used such that gargling is possible.[4]

Dr. F. Karach popularised this procedure as oil pulling. He claimed that oil pulling can cure several illnesses including oral diseases, but his claims were not supported by evidence. Recent studies of oil pulling therapy using sunflower oil and sesame oil were found to decrease plaque induced gingivitis.[5]

Procedure of oil pulling

In the procedure of oil pulling, one full tablespoon of oil is taken and swished around the mouth in the morning before breakfast. One should do it empty stomach for about 15-20 minutes. For children above five years of age, a teaspoon of oil is recommended. The oil is ‘pulled’ and forced in between all the teeth by swishing it all around the mouth. This is done until the viscous oil becomes milky white and thinner in consistency. After this the oil is spit out and mouth is thoroughly rinsed with clean warm saline water or tap water and teeth are cleaned with fingers or routine tooth brushing is performed.[7] In case the individuals are difficulty to swish for 15-20 minutes due to pain in the jaws, then the procedure can be done just for 5–10 min. One should avoid spitting the oil into the sink as it can cause clog the pipes. Instead, the oil should be spit into a trashcan.

Oil pulling should be ideally performed daily morning on empty stomach before brushing teeth and care should be taken that oil is not swallowed.[5,8,9] Swallowing of oil during oil pulling should be

avoided as the oil contains bacteria and toxins.[10] Oil pulling is best practiced in sitting position with chin up. It can be practiced thrice daily in empty stomach before meals to fasten the healing effects. It is contraindicated for children below 5 years due to risk of aspiration. Individuals should take care not to aspirate the oil while performing rigorous oil pulling.

Mechanism of action of Oil pulling

One of the mechanism of oil pulling is, it activates salivary enzymes which absorb toxins such as chemical toxins, bacterial toxins and environmental toxins from the blood and remove them from the body through the tongue.[12] Thus oil pulling detoxifies and purifies the entire body in general. However it is argued that since oral mucosa is not a semipermeable membrane, toxins of the body from the blood cannot pass through it.

Certain organic oils such as coconut oil, sunflower oil, and sesame oil are helps in “pulling” the bacteria, viruses and protozoa from the oral cavity. Traditionally sesame oil is documented to be preferred oil for practicing oil pulling.[6] Oil pulling using olive oil, milk, extracts of gooseberry and mangoes is also documented.[13] Sesame oil and sunflower oil has been found to reduce plaque induced gingivitis.[5] Root of Sesame (*Sesamum indicum*) contains chlorosesamone which has antifungal activity. Also polyunsaturated fatty acids present in sesame oil reduces free radical injury occurring in oral cavity.

The process of oil pulling generates antioxidants which in return damage the cell wall of the microorganisms and destroy them.[14] These oils stick to the cell wall of bacteria and are attracted as well pulled to the oil. During the procedure of oil pulling, the oil gets emulsified and surface area of the oil gets increased.[5] The process of emulsification of oil begins upon 5 min of oil pulling. The oil thus coats the surfaces of teeth and gingiva and inhibits bacterial co-aggregation and thus preventing the plaque formation on tooth structure.[5] As a result, the plaque building bacteria which initiate caries formation, gingivitis, periodontitis and bad breath are removed from the oral cavity. Gums become pink, healthier, and problem of bleeding gums is also solved. Oil pulling is also of help to resolve symptoms of dry mouth/throat and chapped lips. Also teeth become whiter; breath becomes fresher; oral cavity muscles and jaws become stronger with excellent achievement of oral hygiene.[7] Oil pulling prevents dental caries, gingivitis, oral candidiasis and periodontitis from occurring, helps to reduce tooth pain, fixes mobile teeth and achieves vigorous oral hygiene. Oil pulling when practiced regularly is believed to freshen and stimulate the mind and strengthen the senses. It is also beneficial in sore throat, dry face, impaired vision, taste loss and anorexia.

Evidence showed that coconut oil has significant antimicrobial activity against *Escherichia vulneris*, *Enterobacter* spp., *Helicobacter pylori*, *Staphylococcus aureus*, and *Candida* spp., including *Candida albicans*, *Candida glabrata*, *Candida tropicalis*, *Candida parapsilosis*, *Candida stellatoidea*, and *Candida krusei*.^[11] It was hypothesized that monolaurin and other medium-chain fatty acids have the capacity to alter bacterial cell wall, penetrate and disrupt cell membranes, inhibit enzymes involved in energy production and nutrient transfer, causing death of the bacteria thus explaining the antibacterial action of coconut oil. Literature has shown that simply holding or swishing comfortable amount of oil in the mouth for 10–15 min and spitting it out has an antibacterial effect. Although studies have reported systemic health benefits of coconut oil, there is a dearth of evidence reporting the oral health benefits of coconut oil pulling.

Out of all the organic oils used for oil pulling, coconut oil has significantly high saponification index. It contains lauric acid which can react with alkalis present in saliva such as sodium hydroxide and bicarbonates to form sodium laureate-soap like substance, which reduces plaque adhesion and accumulation, and possesses cleansing action. Lauric acid has antimicrobial, anti-inflammatory properties, prevents dental caries and is beneficial to oral health. In addition to this it also has a pleasant taste.⁵ Coconut oil does not have adverse effects produced by chlorhexidine such as brown staining and altered taste sensation. [5,10]

Olive oil on the other hand contains 70% monounsaturated fatty acids with oleic acid as predominant constituent. It also contains plant phenolic compounds, squalen, phytosterols; vitamin A, E and K. All these constituents present in virgin olive oil have excellent antimicrobial, immunomodulatory and antioxidative effect. Oil pulling with olive oil is presumed to prevent oral malodor.¹⁵ Almond oil containing mouth rinse is suggested to result in low gingival scores whereas olive oil-based mouth rinses is believed to inhibit plaque formation and inhibition.¹⁶ Sesame oil contains sesamin, sesamol and sesaminol and has detoxification, antioxidant, and antibiotic actions. It also prevents lipid peroxidation. Also cost of sesame oil is 5–6 times cheaper than chlorhexidine.^[17]

Oil pulling is thus considered a good adjunct to mechanical plaque control measures. In addition to maintaining oral hygiene it has been also claimed to have systemic health benefits and cure systemic diseases. Oil pulling is also believed to improve the metabolism of the body. Evidence based literature review to prove the effect of oil pulling as an adjunct to mechanical plaque control.

A study by Peedikayil et al observed a statistically significant decrease in plaque and gingivitis indexes after coconut oil pulling therapy. The subjects performed the mouth rinses in the early morning before eating, together with their daily oral hygiene routine (toothbrush and floss). They have been evaluated

after 4 hours and PI and modified gingival index have been measured on day 1, 7, 15, and 30. From day 7 and on a continuous decrease in the indexes was reported and they were significantly reduced after 30 days of treatment. This study observed a 50% drop in the indexes after 4 weeks compared with the ones obtained with chlorhexidine, concluding that coconut oil pulling is effective in reducing formation of plaque and gingivitis.[5]

In 2014, Sood et al in their three-week randomized controlled trial involving sixty subjects observed that oil pulling with sesame oil was equally efficient when compared with chlorhexidine mouthwash in reducing oral malodor and the causative microorganisms. Reduction in mean gingival index scores and mean plaque index scores were observed in this study. The authors noted that sesame oil reduces volatile sulfur compounds and mean anaerobic bacterial count in the oral cavity and hence resulting in reduced mean objective and subjective organoleptic scores. One hindrance for oil pulling noted was the long duration of time required to perform the procedure.[14]

In 2015, Dani N et al assessed the antiplaque effect of oil pulling using sesame oil in a randomized controlled trial. Also the effect of sesame oil pulling on plaque induced gingivitis was studied. Forty subjects with plaque induced gingivitis were treated by scaling and root planing. Thereafter randomly 20 subjects were instructed to perform oil pulling for 14 days; remaining 20 subjects were given chlorhexidine mouth wash for 14 days. Plaque index scores, gingival index scores and total colony counts of aerobic bacteria were reduced in oil pulling group after 14 days. Sesame oil was found to be as effective as chlorhexidine against plaque induced gingivitis.[18]

Five researchers in a randomized controlled pilot trial involving 20 adolescent subjects concluded that oil pulling with sesame oil is as effective as chlorhexidine to reduce halitosis and microorganisms associated with it. The subjects performed oil pulling once daily for 10–15 min before tooth brushing for 14 days. Modified gingival index score, plaque index score, organoleptic breath assessment score, self assessment of breath score and BANA test scores from tongue coating samples reduced in both chlorhexidine and oil pulling groups.[19]

In a randomized controlled triple blind study involving 20 age matched adolescents, the effect of sesame oil pulling on plaque induced gingivitis and its efficiency when compared to 0.12% chlorhexidine mouth wash was evaluated for a period of ten days. Oil pulling was performed everyday for 1 min in the morning after tooth brushing. Plaque index scores and modified gingival index scores were recorded at the baseline and after ten days. Plaque samples were collected to evaluate the microorganisms present and to calculate the total colony count of aerobic microorganisms after ten days. The study found statistically significant reduction in the pre- and post-values of the plaque and

modified gingival index scores in both groups. Reductions in the total count of aerobic microorganisms were detected in both groups.[20]

Three authors carried out a microbiological study on the effect of sesame oil pulling on plaque, gingivitis and colony forming bacteria. Twenty subjects of the study performed oil pulling for 15–20 min daily for a period of forty five days. The study observed that oil pulling resulted in statistically significant decrease in plaque, gingival scores and bacterial counts. Plaque scores, gingival scores and number of bacterial colonies increased after forty five days in the twenty subjects of the control group who practiced routine oral hygiene practices. The authors concluded that oil pulling with sesame oil is an effective preventive oral hygiene method when practiced daily.[21]

In 2019, Menaka V et al to evaluated the benefit of oil pulling along with normal brushing techniques in adults under the age group of 35–44 years. In this study the researchers included 40 healthy subjects belonging to both the sexes who presented with plaque-induced gingivitis and divided them into control and study groups. There was no significant difference between the scores at baseline indicating that the baseline mean values of both the groups were the same. The comparison was again done after 6 weeks of study between the mean gingival index and plaque index in Groups A and B, where the graphs show a significant difference between the two groups. There was a significant reduction in both mean gingival index and plaque index of Group A with mean ranging from 1.496 to 0.68 (mean gingival index) and 1.885 to 1.102 (mean plaque index) whereas in Group B, the mean value showed no statically significant reduction.[22]

In 2020, Ripari F et al evaluated the role of coconut oil in treating patients affected by plaque-induced gingivitis. In this study of 20 patients aged between 18-35 years clinical parameters for plaque formation and gingivitis—plaque index (PI), bleeding index (BI)—were evaluated during the recalls. (Baseline, 7th day, 15thday and 30 day) after coconut oil pulling. They divided the subjects in study and control group. The results of this study showed that the comparison of the pre- and post-treatment values of the single study group and the single control group showed a statistically significant result for $p < 0.01$.[23]

In 2022, Gheorghe I et al, studied 45 Mild to moderate cases of plaque-induced gingivitis aged between 18-35 years were enrolled in the study. All the subjects after that were advised to take 10 ml of edible coconut oil and were instructed to follow this procedure of oil pulling for 5-10 minutes after brushing the teeth, preferably in the morning on empty stomach for 30 consecutive days. The parameters were recorded at baseline, 7th day, 15th day and 30th day, for which the patients were

recalled at these days for reevaluation of parameters used for assessment. The researchers found statistically significant difference was found Gingival Index and Plaque Index.[24]

Conclusion

Recent studies and literature regarding the use of “oil pulling” have resulted in reduction of plaque-induced gingivitis and many more benefits. There are still a few evidences in literature of studies regarding the effect of oil pulling on oral health. More studies on the antimicrobial potency of coconut oil on microorganisms causing oral diseases is required to authenticate the use of coconut oil as an effective oral antimicrobial agent.

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