

Oil Pulling Boon for Oral Diseases: A Randomized Controlled Study

Ankita Chandak, Shivangi Shurma, Sathyajith Naik, Vaishnavi Singh

Department of Pediatric and Preventive Dentistry, Institute of Dental Sciences, Bareilly

ABSTRACT

Background: Oil pulling treatment has been utilized broadly as a conventional Indian solution for some years to prevent oral diseases and making teeth, gums, and jaws healthy. **Aims and Objectives:** Comparative evaluation of antiplaque efficacy of sesame oil, coconut oil, and placebo with chlorhexidine mouthwash among schoolchildren of 15–18 years. **Materials and Methods:** A randomized controlled study was carried out among 160 schoolchildren aged 15-18 years. Out of those, 40 subjects each were randomly selected and categorized as Group 1 (sesame oil), Group 2 (coconut oil), Group 3 (chlorhexidine mouthwash), and Group 4 (placebo). Subjects in the study group were given respected constituents and were advised to rinse for 5 min, once daily in the morning for a period of 15 days, and their plaque index (PI) and gingival index were assessed and compared Student's paired *t*-test ($p < 0.05$) (software SPSS version 15). **Results:** The comparisons of the pre- and post-therapy values of PI and modified gingival index were done and there was a marked reduction in the values. **Conclusion:** Oil pulling therapy has shown a positive response toward the reduction of gingival and periodontal diseases.

Key words: Chlorhexidine, coconut oil, oil pulling therapy, sesame oil

INTRODUCTION

Mouth is well thought as the reflection of overall soundness of human body. The World Health Organization has defined oral health as a state of being free from chronic mouth and facial pain, oral and throat cancer, oral sores, birth defects such as cleft lip and palate, periodontal disease, tooth decay and tooth loss, and other diseases and disorders that affect the oral cavity.^[1] The oral cavity is considered to be the passage for microbes into the systemic circulation, thereby strengthening the concept of interconnection between oral health and general health.^[2] It has been stated by various researchers that lack of oral hygiene maintenance permits microbial colonization of the oral biofilm.^[3,4]

Various risk factors responsible for oral diseases are poor oral hygiene, unhealthy diet, tobacco use, and alcohol use. Poor oral hygiene leads to the deposition of dental plaque which in turn promotes tongue coating, halitosis, gingivitis, and periodontitis.^[5-8] Globally, dental caries and periodontal diseases are the two leading preventable oral conditions.

Today, the most reliable technique prevailing for plaque control is cleaning of tooth mechanically. Apart from mechanical tooth cleaning, research has zeroed in on chemotherapeutic agents for diminishing or forestalling plaque initiated oral illnesses.^[9]

Among chemotherapeutic specialists, chlorhexidine is the gold standard in treatment of both caries and periodontal infections, however, it has certain inconveniences such as disagreeable taste,

tooth staining, and alterations in taste sensations.^[10] To overcome these issues, a few different options have been explored, among which oil pulling therapy is the one which has no side effects and is promptly accessible in households.

Oil pulling or oil swishing or oil gargling, an elective medication, is a procedure of rinsing oil in the mouth and has advantageous effects in oral and systemic health. Oil pulling has been utilized widely as a traditional Indian society solution to combat halitosis, draining gums, dryness of throat, chapped lips, and for reinforcing healthy teeth, gums, and jaws.^[11-14] Even though it has been referenced in the Ayurvedic text Charaka Samhita where it is well known as Kavala Gandoosha/Kavala Graha, it was first acquainted by Dr. F. Karach during the 1990s in Russia. This method is claimed to cure around 30 systemic diseases including headache, migraine, diabetes, and asthma.^[15] It is also known to slow down the aging process.

Oil pulling treatment should be possibly done by utilizing edible oils such as sunflower oil, sesame oil, or coconut oil. Sesame plant (*Sesamum indicum*) of the Pedaliaceae family has been viewed as an endowment of nature to humankind for its dietary characteristics and attractive well-being impacts. Another most common is

Corresponding Author:

Ankita Chandak, Department of Pediatric and Preventive Dentistry,
Institute of Dental Sciences, Bareilly. Phone: +91-9778064443.
E-mail: ankitachandak91@gmail.com

coconut oil which contains 92% saturated acids out of which 50% is lauric acid which has confirmed antimicrobial effects.^[15-17]

For proceeding with this therapy, a teaspoon of oil is taken in the mouth, tasted, sucked, and pulled between the teeth for about 5–10 min.^[16,17] The viscous oil turns thin and milky white. The oil should not be gulped as it contains microscopic organisms and toxins. It ought to be followed by tooth brushing and is ideally done on empty stomach early morning. The eyes, nose, and mouth are the main portals of entry of droplets carrying the SARS-COV-2. Ayurveda classics mention several interventions such as oil pulling that are likely to target these entry portals; there are no studies comparing the effect of oil pulling between males and females; 10–15 minutes of oil pulling has been proven to have overall health benefits so a variation of 5 minutes was planned to test the oral health benefits. The current study was hence done to evaluate and compare the antiplaque efficacy of sesame oil pulling, coconut oil pulling, and chlorhexidine mouthwash with placebo amongst school children of 15–18 years.

MATERIALS AND METHODS

Study design and study population

a single-blinded controlled study was carried out among 160 schoolchildren aged 15–18 years.

Ethical approval

This study was approved by the Institutional Ethical Committee before the research. Written consent was obtained from all the participants and their parents.

Inclusion criteria

The following criteria were included in the study:

1. 20 age-matched healthy adolescents
2. 24 permanent teeth with gingival probing depth <3 mm
3. Gingival and plaque index (PI) score = 1 in more than 10% of the sites.

Exclusion criteria

The following criteria were excluded from the study:

1. History of antibiotics in the past month
2. Wearing orthodontic appliance, prosthesis
3. Smokers and participants with deep-fissured tongue.

Oral examination

The study was conducted for a period of 15 days. At the initial visit, baseline score was taken for plaque and gingival index and again repeated on 15th day.

Oil pulling was done by the patients using sesame oil (Group 1), coconut oil (Group 2), chlorhexidine mouthwash (Group 3), and placebo (Group 4).

Comparison was done for the changes in the indices during the study period.

Data collection

Oral prophylaxis was not performed so that the subjects began the regimen with their existing level of plaque deposits. All subjects were instructed to continue their normal home oral hygiene procedures, along with assigned oil pulling. Plaque level and the severity of gingivitis were assessed on day 0 and then after 15 days.

Oil pulling procedure

Patients were asked to take 10–15 ml of assigned liquid using a tea spoon, or till the mouth was half filled. Then, they had to sip, suck, and pull the oil through the teeth, swishing liquid from left to right, front to back, and vice versa for 5 min. At the end, the oil should have milky white appearance, thin, and frothy before spitting.

Clear instructions were given to the participants to not swallow the liquid. They were instructed to refrain from using any other mouth wash during the study period.

Statistical analysis

The comparison of the pre-values and the post-values between the two groups was done using Student's paired *t*-test appropriately at $P < 0.05$ using the software SPSS version 15 (SPSS Inc., Chicago).

RESULTS

The present study was conducted to assess the dental benefits of oil pulling over chlorhexidine mouthwash. The study consisted of 160 subjects (40 in each group) who were assessed and their plaque and modified gingival indices were performed at baseline and 15 days interval. These indices were performed to assess the level of plaque formation and its effects on tooth as well as gingival surfaces. Oil pulling therapy was done by the patients using sesame oil (Group 1), coconut oil (Group 2), chlorhexidine mouthwash (Group 3), and placebo (Group 4).

Comparison was done for all the changes in the indices during the study period. There was no hard and soft-tissue adverse reaction observed in the oral cavity during the study. Intergroup comparisons revealed the resultant changes in the modified gingival index (MGI) summarized in Table 1, accompanied by Graphs 1 and 2. On comparing and analyzing the baseline values of MGI before and after the oil pulling therapy, a drastic reduction in the values from 0.450 to 0.164 in sesame oil (Group 1), from 0.482 to 0.184 in coconut oil (Group 2), and from 0.496 to 0.145 in chlorhexidine (Group 3) was seen. Placebo did not show any significant difference in its values, that is, from 0.489 to 0.475.

Similarly, the PI results obtained showed significant changes in baseline values from 0.831 to 0.261 in sesame oil (Group 1), from 0.856 to 0.254 in coconut oil (Group 2), and from 0.972 to 0.265 in chlorhexidine (Group 3). Placebo did not show any significant difference in its values, that is, from 0.810 to 0.768 concluding that there was a net decline in mean

MGI as well as PI scores from baseline to 15 days. The changes in the PI scores are summarized in Table 2, accompanied by Graphs 2 and 3.

Hereafter, the intergroup results did not show any unique difference among the genders in both the indices, as shown in Graphs 4 and 5. In addition to our assessment parameters, subjects gave positive feedback on relief from headache, chronic cold, and congestion at the end of 15 days regimen.

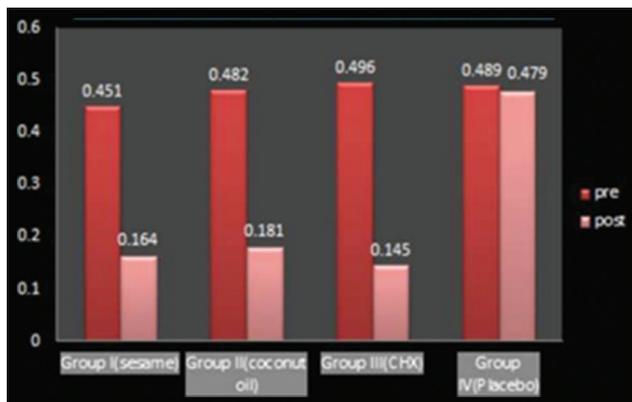
Table 1: Comparison of the baseline values to the post-therapy values of MGI between Groups I, II, III, and IV

Parameter and group	Sample	Pre	Post	P-value
		Mean±SD	Mean±SD	
MGI score				
Group 1 (sesame)	40	0.450±0.146	0.164±0.112	P<0.05 Significant
Group 2 (coconut)	40	0.482±0.152	0.184±0.118	P<0.05 Significant
Group 3 (CHX)	40	0.496±0.156	0.145±0.101	P<0.05 Significant
Group 4 (placebo)	40	0.489±0.162	0.475±0.156	P<0.05 Not significant

MGI: Modified gingival index

Table 2: Comparison of the baseline values to the post-therapy values of plaque index between Groups I, II, III, and IV

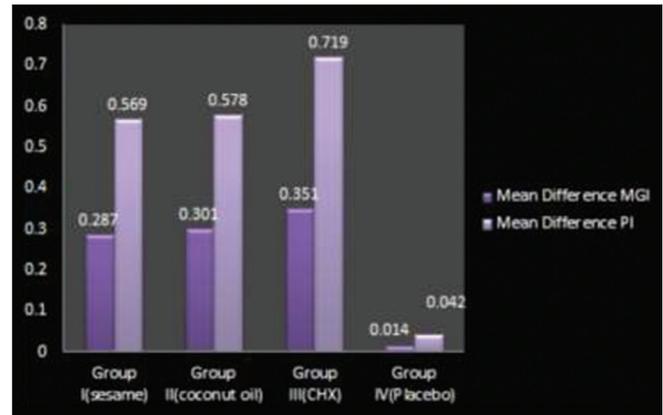
Parameter and group	Sample	Pre	Post	P-value
		Mean±SD	Mean±SD	
PI score				
Group 1 (sesame)	40	0.831±0.352	0.261±0.198	P<0.05 Significant
Group 2 (coconut)	40	0.856±0.319	0.254±0.194	P<0.05 Significant
Group 3 (CHX)	40	0.972±0.390	0.265±0.192	P<0.05 Significant
Group 4 (placebo)	40	0.810±0.359	0.768±0.315	P>0.05 Not significant



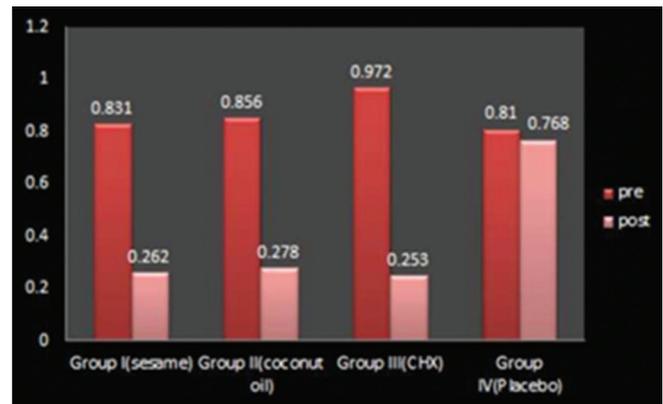
Graph 1: Comparison of the baseline values to the post-therapy values of modified gingival index between Groups I, II, III, and IV

DISCUSSION

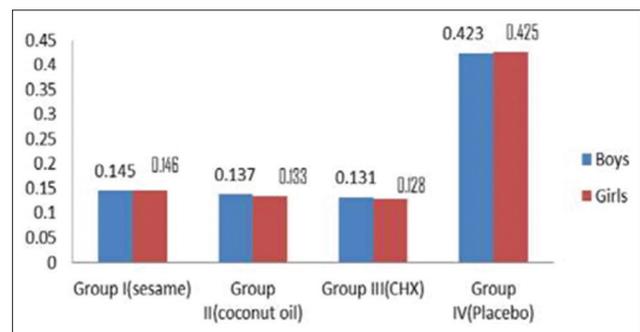
Gingivitis is the inflammation of gingiva and plaque-induced gingivitis is its most common form. Plaque-induced gingivitis arises due to interaction between microorganisms found in the dental plaque biofilm and the tissues and inflammatory cells of the



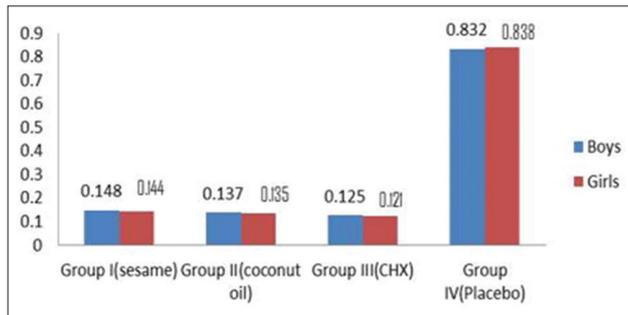
Graph 2: Difference of means of post-therapy values of modified gingival index and plaque index between Groups I, II, III, and IV



Graph 3: Comparison of the baseline values to the post-therapy values of plaque index between Groups I, II, III, and IV



Graph 4: Mean difference of baseline values to the post-therapy values of modified gingival index between Groups I, II, III, and IV in boys and girls



Graph 5: Mean difference of baseline values to the post-therapy values of plaque index between Groups I, II, III, and IV in boys and girls

host which totally depends on local factors, systemic factors, or both; medications; and malnutrition.

Literature has verified that even though there are various effective plaque control methods available in the market like chlorhexidine, that is, the most commonly recommended mouth rinse, oil pulling therapy has also shown holistic positive outcomes as it reduces plaque scores and gingival scores using naturally and commonly available oils.^[18] In this era of COVID-19 pandemic, yoga and Ayurveda as an add on therapy may support patients of COVID-19 by improving the quality of standard care.^[19] To reduce the side effects of modern medicine, people are increasingly shifting toward ancient medicine. Oil pulling has proven to be the home-based remedy due to its beneficial effects on general and oral health.

Oil pulling has also been mentioned in Sushruta's Arthashastra. A specific type of oil pulling called "Roopana Gandoosha" has been mentioned in Ashtanga Sangraha and is said to have dental benefits. Various oils such as refined sunflower oil, sesame oil, olive oil, and coconut oil can be used for oil pulling. Liquids from milk and water to extracts of gooseberries and mangoes have also been used for oil pulling.^[9]

Utilizing edible oils such as sunflower, sesame, and coconut, the oil is swished, applying mechanical shear powers apply on it. The oil's emulsification is prompted and surface zone is expanded, accordingly decreasing plaque adhesion and bacterial coaggregation. When the oil turns milky white and thin, it is spit out. The other conceivable mechanism may be the saponification cycle through antacid hydrolysis of oil by bicarbonates in saliva which is predominantly seen in coconut oil due to its high saponification value.^[11]

Literature has stated that even though the exact mechanism is unclear yet, there are various hypotheses behind this and most common ones are as follows: First, swishing increases the enzymatic activity and therefore helps in withdrawing the toxins out of blood. Second, perhaps, increased viscosity of oil prevents bacterial adhesion and plaque coaggregation. Third, its property of saponification which is the result of alkali hydrolysis of fat, an effective emulsifying agent which improves surface areas and therefore works as cleansing agents. Due to the above-mentioned mechanisms, there may be reduction of plaque scores and modified gingival score in this study.^[20]

The current study was clinically assessed using the PI given by Silness and Loe and MGI given by Lobene.

Conventionally, oil swishing is done for 10–15 min, but in this study, we reduced the time to 5 min and on comparing the results obtained at baseline and after 15 days of rinsing for 5 min, it was seen that there was a marked reduction in plaque and modified gingival indices after using sesame oil and coconut oil which were comparable to chlorhexidine mouthwash. Significant changes in gingivitis score were also found after 15 days.

Results showed no significant difference in gender predilection.

Similar to our study, a significant reduction in plaque and gingival scores was perceived in a study by Amith *et al.*, in 2007, using refined sunflowers oil.^[9]

Similar findings were observed by Asokan *et al.*, in 2009, among Chennai adolescents who used oil and chlorhexidine (0.96 ± 0.431 and 0.845 ± 0.376 , respectively) and there was significant reduction in PI and MGI scores.^[11]

A comparative study was done by Arweiler *et al.* and Lorenz on the efficacy of two commercially available chlorhexidine mouth rinses and their effects were observed on the formation of dental plaque, plaque regrowth, and gingivitis. Their result was not statistically significant.^[11]

Hughes and McNab in his study concluded that on using coconut oil due to saponification process, there is inhibition of bacterial growth by 26%.^[20] The impact of oil pulling utilizing different eatable oils on the biofilm model formed by *Streptococcus mutans*, *Candida albicans*, and *Lactobacillus casei* was done and it was discovered that coconut oil displayed a huge antimicrobial movement against *S. mutans* and *C. albicans* on comparison with different oils.

In another study done by Nagilla *et al.*, 2017, the mean baseline plaque levels were higher among control group (1.74 ± 0.40) on comparison with the study group using coconut oil (1.64 ± 0.37), but no statistically significant difference was noted.^[21] It is similar to our study except the duration was 15 days which may be because of the mechanism of emulsification and saponification of oil, and further, the viscosity of the oil can inhibit bacterial adhesion and plaque coaggregation.^[22]

Many controlled clinical trials using chlorhexidine ranging for a period of 6 months or more have reported the plaque reduction from 16% to 45%.^[21] On the other hand, Amith *et al.* observed 18–30% of plaque reduction on use of sesame oil for 45 days.

Limitations

The current study recognizes certain constraints such as brief term study period and single institutional investigation and results have to be interpreted with care. Despite the fact that this investigation demonstrated prompt beneficial outcomes, changes noticed for brief span cannot be anticipated over the long haul. The most appalling part of this therapy for some individuals may be that it must be performed promptly at the beginning of the day, on empty stomach and time required is long.

CONCLUSION

Oil pulling has shown an enhancing effect on oral hygiene when rehearsed effectively and consistently. Nevertheless, it does not

substitute any dental treatment. Due to this being traditional, inexpensive, easily available, widespread studies have emphasized its role in curing oral diseases, especially in developing countries, where dental care is still not accessible to a large group of people. In light of the present pandemic of COVID-19, the Ministry of AYUSH, Government of India, has advised oil pulling as an Ayurvedic immunity boosting aid for self-care.

REFERENCES

- World Health Organization/Oral Health. Available from: http://www.who.int/topics/oral_health/en. [Last accessed on 2016 Aug 20].
- Xu X, He J, Xue J, Wang Y, Li K, Zhang K, *et al.* Oral cavity contains distinct niches with dynamic microbial communities. *Environ Microbiol* 2015;17:699-710.
- Jenkinson HF. Beyond the oral microbiome. *Environ Microbiol* 2011;13:3077-87.
- Pal SK, Shukla Y. Herbal medicine: Current status and the future. *Asian Pac J Cancer Prev* 2003;4:281-8.
- Persson S, Edlund MB, Claesson R, Carlsson J. The formation of hydrogen sulfide and methyl mercaptan by oral *Bacteria*. *Oral Microbiol Immunol* 1990;5:195-201.
- Persson S, Claesson R, Carlsson J. The capacity of subgingival microbiotas to produce volatile sulfide compounds in human serum. *Oral Microbiol Immunol* 1989;4:169-72.
- Yaegaki K, Sanada K. Biochemical and clinical factors influencing oral malodor in periodontal patients. *J Periodontol* 1992;63:783-9.
- Yaegaki K, Sanada K. Volatile sulfide compounds in mouth air from clinically healthy subjects and patients with periodontal disease. *J Periodont Res* 1992;27:233-8.
- Amith HV, Ankola AV, Nagesh L. Effect of oil pulling on plaque and gingivitis. *J Oral Health Community Dent* 2007;1:12-8.
- Kaur G, Singh A, Patil KP, Gopalakrishnan D, Nayyar AS, Deshmukh S. Chlorhexidine: First to be known, still a gold standard anti-plaque agent. *Res J Pharm Biol Chem Sci* 2015;6:1407-24.
- Asokan S, Emmadi P, Chamundeswari R. Effect of oil pulling on plaque induced gingivitis: A randomized, controlled, triple-blind study. *Indian J Dent Res* 2009;20:47-51.
- Asokan S, Kumar RS, Emmadi P, Raghuraman R, Sivakumar N. Effect of oil pulling on halitosis and microorganisms causing halitosis: A randomized controlled pilot trial. *J Indian Soc Pedod Prev Dent* 2011;29:90-4.
- Thaweboon S, Nakaparksin J, Thaweboon B. Effect of oil pulling on oral microorganisms in biofilm models. *Asia J Public Health* 2011;2:62-6.
- Fife B. *The Healing Miracle of Coconut Oil*. 1st ed. Colorado: Piccadilly Books Ltd., Health Colorado Springs, Wise publications Co.; 2000. p. 1-46.
- Shino B, Peedikayil FC, Jaiprakash SR, Bijapur GA, Kottayi S, Jose D. Comparison of antimicrobial activity of chlorhexidine, coconut oil, probiotics, and ketoconazole on *Candida albicans* isolated in children with early childhood caries: An *in vitro* study. *Scientifica* 2016;2016:7061587.
- DebMandal M, Mandal S. Coconut (*Cocos nucifera* L: *Arecaceae*): In health promotion and disease prevention. *Asian Pac J Trop Med* 2011;4:241-7.
- Srivastava P, Durgaprasad S. Burn wound healing property of *Cocos nucifera*: An appraisal. *Indian J Pharmacol* 2008;40:144-6.
- Peedikayil FC, Sreenivasan P, Narayanan A. Effect of coconut oil in plaque related gingivitis-preliminary report. *Niger Med J* 2015;56:143-7.
- Tillu G, Chaturvedi S, Chopra A, Patwardhan B. Public health approach of ayurveda and yoga for COVID-19 prophylaxis. *JACM* 2020;26:360-4.
- Hughes FJ, McNab RR. Oral malodour-a review. *Arch Oral Biol* 2008;53:1-7.
- Nagilla J, Kulkarni S, Madupu PR, Doshi D, Bandari SR, Srilatha A. Comparative evaluation of antiplaque efficacy of coconut oil pulling and a placebo, among dental college students: A randomized controlled trial. *J Clin Diagn Res* 2017;11:8-11.
- Tomar P, Hongal S, Jain M, Rana K, Saxena V. Oil pulling and oral health: A review. *IJSS Case Rep Rev* 2014;1:33-7.