Indian Journal of Dental Research

ORIGINAL RESEARCH

Previous Article ToC Next Article

Year : 2009 | **Volume** : 20 | **Issue** : 1 | **Page** : 47-51

Effect of oil pulling on plaque induced gingivitis: A randomized, controlled, triple-blind study

Sharath Asokan[1], Pamela Emmadi[2], Raghuraman Chamundeswari[3]
[1] Department of Pediatric Dentistry, Meenakshi Ammal Dental College, Chennai, India
[2] Department of Periodontics, Meenakshi Ammal Dental College, Chennai, India
[3] Departments of Microbiology, Meenakshi Ammal Dental College, Chennai, India

Click **here** for **correspondence address** and email

Date of Submission	21-Feb-2008
Date of Decision	13-Jun-2008
Date of Acceptance	01-Oct-2008

Download Article (pdf) Email Article Print Article Read / Write a Comment Citation Manager

Abstract

Background: Oil pulling has been used extensively as a traditional Indian folk remedy for many years for strengthening teeth, gums, and the jaw and to prevent decay, oral malodor, bleeding gums, dryness of the throat, and cracked lips.
Aims: The aim of this study was to evaluate the effect of oil pulling with sesame oil on plaque-induced gingivitis and to compare its efficacy with chlorhexidine mouthwash.
Materials and Methods : A total of 20 age-matched adolescent boys with plaque-induced gingivitis were selected for this study. They were divided randomly into the study or oil pulling group (Group I) and the control or chlorhexidine group (Group II) with 10 subjects in each group. Plaque index and modified gingival index scores were recorded for the 20 subjects and baseline plaque samples were also collected. The plaque samples were used to identify the microorganisms and to measure the total colony count of the aerobic microorganisms present. The study group was subjected to oil pulling with sesame oil and the control group was given chlorhexidine mouthwash everyday in the morning before brushing. Reassessment of the index scores and collection of plaque for measuring the colony count of the aerobic microorganisms was done after 10 days.
Results: There was a statistically significant reduction of the pre- and post-values of the plaque and modified gingival index scores in both the study and control groups ($P < 0.001$ in both). There was a considerable reduction in the total colony count of aerobic microorganisms present in both the groups.
Conclusion: The oil pulling therapy showed a reduction in the plaque index, modified gingival scores, and total colony count of aerobic microorganisms in the plaque of adolescents with plaque-induced gingivitis.

Keywords: Oil pulling, plaque-induced gingivitis, sesame oil

How to cite this article:
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

How to cite this URL:
Asokan S, Emmadi P, Chamundeswari R. Effect of oil pulling on plaque induced gingivitis: A randomized, controlled, triple-blind study. Indian J Dent Res [serial online] 2009 [cited 2017 Jun 8];20:47-51. Available from: http://www.ijdr.in/text.asp?2009/20/1/47/49067

Search SEARCH

Similar in PUBMED
Search Pubmed for
- Asokan S
- Emmadi P
- Chamundeswari R

Search in Google Scholar for
- Asokan S
- Emmadi P
- Chamundeswari R

Related articles
- Oil pulling
- plaque-induced gingivitis
- sesame oil

Email Alert *
Add to My List *
* Registration required (free)

Abstract
Materials and Me...
Results
Discussion
Summary and Conc...
Acknowledgments
References
Article Figures
Article Tables

Article Access Statistics

Viewed	94278
Printed	1340
Emailed	75
PDF Downloaded	1269
Comments	[Add]
Cited by others	18

Oil pulling or oil swishing, in alternative medicine is a procedure that involves swishing oil in the mouth for oral and systemic health benefits. It is mentioned in the Ayurvedic text Charaka Samhita (Sutrasthana 5, 78-80) where it is called Kavala Gandoosha/Kavala Graha and is claimed to cure about 30 systemic diseases ranging from headache and migraine to diabetes and asthma. [1],[2],[3] Oil pulling has been used extensively as a traditional Indian folk remedy for many years to prevent decay, oral malodor, bleeding gums, dryness of the throat, and cracked lips and for strengthening teeth, gums, and the jaw. [2],[3],[4],[5] But it was Dr. F. Karach who familiarized the concept of oil pulling in the 1990s in Russia. [1],[2],[3]

Oil pulling therapy can be done using edible oils like sunflower or sesame oil. The sesame plant (Sesamum indicum) of the Pedaliaceae family has been considered a gift of nature to mankind for its nutritional qualities and desirable health effects. [6] Sesame oil is considered to be the queen of oil seed crops because of its beneficiary effects. [7]

For oil pulling therapy, a tablespoon (or teaspoon for children between 5-15 years of age) of sesame oil is given in the mouth and is sipped, sucked, and pulled between the teeth for 10 to 15 minutes. The viscous oil turns thin and milky white. The oil should not be swallowed as it contains bacteria and toxins. Oil pulling therapy should be followed by brushing the teeth and is preferably done on an empty stomach in the morning. [1],[2],[3]

There is no literature or scientific proof to accept oil pulling therapy as preventive adjunct. Online searches in pubmed and other databases do not provide any scientific articles on oil pulling therapy except for testimonies and literature on personal experiences. This study was planned with the following aims and objectives:

To evaluate the effect of oil pulling with sesame oil on plaque-induced gingivitis

To compare the efficacy of oil pulling with the use of chlorhexidine mouthwash on plaque-induced gingivitis

Materials and Methods

top

A randomized, controlled, triple-blind study was planned to evaluate the efficacy of oil pulling therapy on plaque-induced gingivitis. The study protocol was analysed and approved by the Institutional Review Board of Meenakshi University. A total of 80 adolescent males from Arulmigu Meenakshi Amman Matriculation Secondary School, Chennai, India were screened. Written consent was obtained from the participants and their parents. Personal details such as medical history including any recent antibiotic exposure, dental history including recent fluoride treatment, frequency of brushing, sweets/snacks intake, consumption of sugared/energy drinks, and the brand of toothpaste (to know its fluoride content) were obtained from parents using a specially prepared questionnaire to reduce confounding bias. Twenty students were included in the study based on the following inclusion and exclusion criteria.

Inclusion Criteria

1. Subjects with plaque-induced gingivitis [Figure 1]
2. All 20 subjects were age-matched (16-18 years old)

Exclusion Criteria

1. Use of antibiotics in the past 3-4 weeks
2. History of dental treatment/use of mouthwash

The plaque index and modified gingival index scores were recorded in individual case records by a periodontist (Examiner A). A total of 20 subjects with almost equal baseline mean scores were chosen for the study. Each subject was assigned a specific number and simple random sampling was done using a table of random numbers. Group I (study group-oil pulling) included 10 subjects and Group II (control group-chlorhexidine) included 10 subjects. The plaque samples were collected using sterile toothpicks 1-2 hours after eating/brushing, as it could affect the growth of the bacteria. A baseline plaque sample was collected [Figure 2] by the periodontist (Examiner B) from the following four sites a) the buccal surface of the maxillary right molar, b) the labial surface of the maxillary incisor, c) the lingual surface of the mandibular incisor, and d) the lingual surface of the mandibular left molar for both the control and study groups. These samples were immediately transferred to the laboratory in a brain heart infusion broth. The samples were inoculated in blood agar, MacConkey agar, and nutrient agar and were incubated at 37°C for 24 hours. Identification of the microorganisms was done using biochemical tests like catalase, oxidase, IMViC (Indole Methyl red Voges Proskauer Citrate) reactions and sugar fermentation tests. The microbiologist (Examiner C) assessed the total colony count of the aerobic microorganisms present in the plaque sample using the spread plate technique and the colony counter (Joshibha, India). The specimen was diluted serially and then spread on the culture media with sterile loops [Figure 3], which was incubated at 37°C for 24 hours. The colonies were counted using a colony counter [Figure 4] and the number of colonies was multiplied by the dilution factor. The colony count was categorized into 3 different classes [Figure 5]:

Class 1 - $< 10^3$ colony-forming units

Class 2 - 10^3 to 10^5 colony-forming units

Class 3 - >10^5 colony-forming units

The study group was subjected to oil pulling with sesame oil (Idhayam Oil, VVV Sons India) and the control group was given 0.12% chlorhexidine mouthwash (Rexidine, Warren India) for 1 minute every day in the morning before brushing for 10 days. The participants of both the groups were allowed to brush their teeth once daily as per their daily home oral hygiene schedule. Reassessment of the index scores (Examiner A) and collection of plaque (Examiner B) for measuring the colony count of the aerobic microorganisms was done after 10 days. Among the 20 plaque samples collected in this study, 3 samples that were contaminated with a confluent growth of Bacillus spores were not included in the study. Hence, only 8 samples from the study group and 9 samples from the control group were assessed.

The pre- and post-values of the plaque and modified gingival index scores and the total colony count within the same group were compared using a paired t-test. The comparison of the pre- and post-values between the two groups was done using a student t-test. In the present study, $P<0.05$ was considered as the level of significance. The statistical analysis was done using SPSS software, Version 15 (SPSS Inc, Chicago). The examiner who assessed the index scores (A), collected the plaque samples (B), and interpreted the microbiological results (C), and the statistician were blinded as to the division of the groups.

Results

[Table 1] shows a comparison of the baseline (pre) values of the plaque index scores, modified index scores, and total colony count between the study and the control group. There was no statistically significant difference in all the three scores indicating that the baseline mean values of both the groups were almost the same. The comparison of the post therapy values of the plaque index scores, modified index scores, and total colony count between the two groups showed no significant difference [Table 2].

The comparisons of the pre- and post-therapy values of plaque index score and modified gingival index score showed a statistically significant difference in the study group($P< 0.001$). The total colony count scores had considerably reduced but there was no statistically significant difference between the pre- and post-mean values as shown in [Table 3]. There was a statistically significant difference between the pre and post values of the plaque index score and the modified gingival index score in the control group ($P < 0.001$), but there was no significant reduction in the total colony count of aerobic microorganisms as shown in [Table 4].

Discussion

Plaque-induced gingivitis is the most common form of gingival disease and is the result of an interaction between microorganisms found in the dental plaque biofilm and the tissues and inflammatory cells of the host. The effects of the local factors, systemic factors, or both; medications; and malnutrition can influence and alter the plaque-host interaction. [8]

The evaluation in this study included both clinical and microbiological assessment. Clinical assessment was based on the plaque index given by Silness and Loe and modified gingival index given by Lobene. The modified gingival index is the most widely used index in clinical trials of therapeutic agents [9] and was used in this study. Microbiological assessment aimed at identification and the total colony count of aerobic microorganisms in the plaque sample. In this study, the microorganisms identified were the normal oral flora including Streptococcus, Staphylococcus, Klebsiella, Pneumococci, Enterococci, and E.coli sp. Amith, Ankola and Nagesh [10] showed that oil pulling therapy with sunflower oil significantly reduced plaque scores after 45 days. In this study, there was a significant reduction in the plaque index and modified gingival index scores after oil pulling therapy. There was a considerable reduction in the colony count of microorganisms but it was not statistically significant. This could be due to the fact that normal oral flora was also counted and mean values were assessed for the total colony count. Hence, in this study, oil pulling therapy was very effective against plaque-induced gingivitis both in the clinical and microbiological assessment.

The gold standard mouthwash was used as the control in this study to assess and compare the effect of oil pulling therapy on plaque-induced gingivitis. Axelsson and Lindhe have shown that chlorhexidine mouthwash is effective in the reduction of plaque and gingivitis. [11] Menendez and Santos have shown that chlorhexidine is very effective against the formation of dental plaque. [12],[13] Salehi and Momeni Danaie have compared the antibacterial effects of persica mouthwash with the standard chlorhexidine on Streptococcus mutans sp ed that the chlorhexidine still remained the gold standard. [14] Arweiler, *et al.* and Lorenz compared the efficacy of two commercially available chlorhexidine mouthrinses on the development of dental plaque, plaque re-growth, and gingivitis and showed that there was no statistically significant difference between both commercially available mouthrinses with respect to plaque inhibition. [15],[16]

The exact mechanism of the action of oil pulling therapy is not clear. It was claimed that the swishing activates the enzymes and draws the toxins out of the blood. The bottom line is that oil pulling actually cannot pull toxins out of the blood as claimed because the oral mucosa does not act as a semi-permeable membrane to allow toxins to pass through. Sesame oil has three lignans - sesamin, sesamolin, and sesaminol - that have antioxidant properties and potentiate Vitamin E action. Sesame oil has increased polyunsaturated fatty acids and the lipid peroxidation is reduced thereby reducing free radical injury to the tissues. [17],[18],[19] The mechanism by which oil pulling therapy causes plaque

inhibition is not known. The viscosity of the oil probably inhibits bacterial adhesion and plaque co-aggregation. The other possible mechanism might be the saponification or the 'soap-making' process that occurs as a result of the alkali hydrolysis of fat. [20] Sesame oil is a vegetable fat and when it is acted upon by the salivary alkali, like the bicarbonates, the soap making process is initiated. Soaps are good cleansing agents because they are effective emulsifying agents. Emulsification is the process by which insoluble fats like sesame oil can be broken down into minute droplets and dispersed in water. Emulsification greatly enhances the surface area of the oil thereby increasing its cleansing action. [20] Sesame oil is relatively high in unsaponifiable substances. The unsaponifiable fraction, a class of substances not found in other fats (sesamin or sesamolin) can probably protect the oral cavity from infection and inflammation by its antioxidant property. These mechanisms could have been the reason for the reduction of plaque scores and colony count of the microorganisms in this study. But more studies have to be done to check and prove the antibacterial effect of the components of the sesame oil.

In this study, oil pulling therapy has been as equally effective as chlorhexidine against plaque-induced gingivitis. Sesame oil has the following advantages over chlorhexidine: no staining, no lingering after-taste, and no allergy. Sesame oil is 5 to 6 times more cost effective than chlorhexidine and is readily available in most households. There are no disadvantages for oil pulling therapy except for the extended duration of the procedure compared with chlorhexidine. Though oil pulling therapy cannot be used as a treatment adjunct as of now, it can be used as a preventive home therapy to maintain oral hygiene. Extensive studies with larger samples, varying time periods, and long follow-up times should be carried out to establish the efficacy of oil pulling therapy in prevention of plaque-induced gingivitis. More studies with sesame oil can open new doors in the field of research in oral health care. [6]

Summary and Conclusion

The following conclusions were derived from this study:

1. A statistically significant reduction in the plaque index score was seen in both the oil pulling and chlorhexidine groups ($P < 0.05$ in both groups).
2. A statistically significant reduction in the modified gingival index score was seen in both the oil pulling and chlorhexidine groups ($P < 0.05$ in both groups).
3. A considerable reduction in the total colony count of the microorganisms was seen in the plaque sample in both groups. Though the reduction was more in the oil pulling group, there was no statistically significant difference between the groups.

Oil pulling therapy promises to be a better preventive home therapy in developing countries like India.

Acknowledgments

We would like to thank Dr. R. Saravana Kumar MDS, MS and Dr. Shakeer BDS for helping us carry out this study. Our sincere thanks to Dr. Gnanavendhan M.D., Ph.D, Professor, Department of Microbiology, for his guidance and support throughout the study. Special thanks to Mr. V.R. Muthu B.Com (Hons), Idhayam Group, Virudhunagar for his financial support and encouragement. We would like to extend our thanks to Mr. S. Sriram (Warren Pharmaceuticals) for supplying the chlorhexidine used for this study and all the subjects who willingly participated in this study.

References

1. Available from: http://en.wikipedia.org/wiki/Oil_pulling.com. [last accessed on 2007 Oct 2].
2. Available from: http://www.maharishi-european-sidhaland.org.uk. [last accessed on 2006 Jan 23].
3. Available from: http://www.oilpulling.com. [last accessed on 2005 Dec 25].
4. Available from: http://www.indiaids.org/alt_ther/ayurveda.asp#a4.com. [last accessed on 2007 Jan 2].
5. Available from: http://www.ayurvediccure/mouthcare.htm. [last accessed on 2007 Jan 2].
6. Asokan S. Oil pulling therapy. Indian J Dent Res 2008;19:169. [PUBMED] Full Text
7. Available from: http://www.healthstores/sesameoil.com. [last accessed on 2006 Jun 13].
8. John Novak M. Classification of diseases and conditions affecting the periodontium. In: Newman, Takei, Klokkevold, Caranza, editors. Clinical periodontology. 10 th ed. Saunders -An imprint of Elsevier; 2006. p. 100-9.
9. Ciancio S. Current status of indices of gingivitis. J Clin Periodontol 1986;13:375.
10. Amith HV, Ankola AV, Nagesh L. Effect of oil pulling on plaque and gingivitis. J Oral Health Comm Dent 2007;1:12-8.
11. Axelsson P, Lindhe J. Efficacy of mouthrinses in inhibiting dental plaque and gingivitis in man. J Clin Periodontol 1987;14:205-12.
12. Menendez A. Comparative analysis of the antibacterial effects of combined mouthrinses on Streptococcus mutans. Oral Microbiol Immunol 2005;20:31.
13. Santos A. Evidence-based control of plaque and gingivitis. J Esthet Restor Dent 2003;15:25-30.
14. Salehi P, Momeni Danaie Sh. Comparison of antibacterial effects of persica mouthwash with chlorhexidine on Streptococcus mutans in orthodontic patients. DARU J Faculty Pharma 2006;14:169-74.
15. Arweiler NB, Boehnke N, Sculean A, Hellwig E, Auschill TM. Differences in efficacy of two commercial 0.2% chlorhexidine mouthrinse solutions: A 4-day plaque re-growth study. J Clin Periodontol 2006;33:334-9.

16. Lorenz K, Bruhn G, Heumann C, Netuschil L, Brecx M, Hoffmann T. Effect of two new chlorhexidine mouthrinses on the development of dental plaque, gingivitis, and discolouration: A randomized, investigator-blind, placebo-controlled, 3-week experimental gingivitis study. J Clin Periodontol 2006;33:561-7.
17. Sankar D, Sambandam G, Rao R, Pugalendi KV. Modulation of blood pressure, lipid profiles and redox status in hypertensive patients taking different edible oils. Clin Chim Acta 2005;355:97-104.
18. Namiki M. The chemistry and physiological functions of sesame. Food Rev Int 2002;11:281-329.
19. Suja KP. Chemical and biochemical studies on natural antioxidants from sesamum species. PhD thesis 2003 - Cochin University of Science and Technology (CUSAT), Kerala, India.
20. Ambika Shanmugam. Lipids. In: Fundamentals of biochemistry for medical students. 7 th ed. Kartik Offset Printers: 2001. p.50-4.

top
Correspondence Address:
Sharath Asokan
Department of Pediatric Dentistry, Meenakshi Ammal Dental College, Chennai
India
Login to access the email ID

Source of Support: None, **Conflict of Interest:** None

crossref Citations Check | PMC Citations 9

DOI: 10.4103/0970-9290.49067

Figures

[Figure 1], [Figure 2], [Figure 3], [Figure 4], [Figure 5]

Tables

[Table 1], [Table 2], [Table 3], [Table 4]

This article has been cited by

1 **Lipids in preventive dentistry**
A. Kensche,M. Reich,K. Kümmerer,M. Hannig,C. Hannig
Clinical Oral Investigations. 2013; 17(3): 669
[Pubmed] | [DOI]

2 **Lipids in preventive dentistry**
Kensche, A. and Reich, M. and KÃ¼mmerer, K. and Hannig, M. and Hannig, C.
Clinical Oral Investigations. 2013; 17(3): 669-685
[Pubmed]

3 **Natural compounds containing mouthrinses in the management of dental plaque and gingivitis: a systematic review**
Yong Chen,Ricky WK Wong,Colman McGrath,Urban Hagg,C Jayampath Seneviratne
Clinical Oral Investigations. 2013;
[Pubmed] | [DOI]

4 **Fatty Acid Profile of the Initial Oral Biofilm (Pellicle): an In-Situ Study**
Marco Reich,Klaus Kümmerer,Ali Al-Ahmad,Christian Hannig
Lipids. 2013; 48(9): 929
[Pubmed] | [DOI]

5 **Effect of Safflower Oil on the Protective Properties of the in situ Formed Salivary Pellicle**
C. Hannig,C. Wagenschwanz,S. Pötschke,K. Kümmerer,A. Kensche,W. Hoth-Hannig,M. Hannig
Caries Research. 2012; 46(5): 496
[Pubmed] | [DOI]

6 **Clinical applicability of natural product(s)-containing mouthwashes as adjunctive treatment of biofilm-induced gingivitis: A systematic review [Aplicabilidade clÃnica de colutÃ³rios Ã¡ base de produtos naturais como tratamento adjuvante da gengivite induzida por biofilme: Uma revisÃ¡o sistemÃ¡tica]**
Freires, I.A. and Silva, I.C.G. and Alves, L.A. and Bezerra, L.M.D. and Castro, R.D.
Revista Brasileira de Plantas Medicinais. 2012; 14(4): 700-711
[Pubmed]

7 **Effect of safflower oil on the protective properties of the in situ formed salivary pellicle**

Hannig, C. and Wagenschwanz, C. and Ptschke, S. and Kmmerer, K. and Kensche, A. and Hoth-Hannig, W. and Hannig, M.
Caries Research. 2012; 46(5): 496-506
[Pubmed]

8 **Herbal mouthwashes - A gift of nature**
Kukreja, B.J. and Dodwad, V.
International Journal of Pharma and Bio Sciences. 2012; 3(2): P46-P52
[Pubmed]

9 **Do edible oils reduce bacterial colonization of enamel in situ?**
Christian Hannig, Jasmin Kirsch, Ali Al-Ahmad, Anna Kensche, Matthias Hannig, Klaus Kümmerer
Clinical Oral Investigations. 2012;
[VIEW] | [DOI]

10 **Effect of vegetable oil (Brazil nut oil) and mineral oil (liquid petrolatum) on dental biofilm control**
FilogÃ´nio, C.F.B. and Soares, R.V. and Horta, M.C.R. and Penido, C.V.S.R. and Cruz, R.A.
Brazilian Oral Research. 2011; 25(6): 556-561
[Pubmed]

11 **Traditional therapies in the management of periodontal disease in India and China**
Surathu, N. and Kurumathur, A.V.
Periodontology 2000. 2011; 56(1): 14-24
[Pubmed]

12 **Traditional therapies in the management of periodontal disease in India and China**
Nitish Surathu,Arun V. Kurumathur
Periodontology 2000. 2011; 56(1): 14
[Pubmed] | [DOI]

13 **Effect of oil pulling on halitosis and microorganisms causing halitosis: A randomized controlled pilot trial**
Asokan, S., Saravana Kumar, R., Emmadi, P., Raghuraman, R., Sivakumar, N.
Journal of Indian Society of Pedodontics and Preventive Dentistry. 2011; 29(2): 90-94
[Pubmed]

14 **Tooth brushing, oil pulling and tissue regeneration: A review of holistic approaches to oral health**
Singh, A., Purohit, B.
Journal of Ayurveda and Integrative Medicine. 2011; 2(2): 64-68
[Pubmed]

15 **Mechanism of oil-pulling therapy -In vitro study**
Asokan, S., Rathinasamy, T.K., Inbamani, N., Menon, T., Kumar, S.S., Emmadi, P., Raghuraman, R.
Indian Journal of Dental Research. 2011; 22(1): 34-37
[Pubmed]

16 **Effectivity of essential oils on chemical control of dental biofilm and caries prevention [A efetividade de Ã³leos essenciais no controle quÃmico do biofilme e na prevenÃ§Ã£o da cÃ¡rie dentÃ¡ria]**
FilogÃ´nio, C.F.B. and Penido, C.V.S.R. and Soares, R.V. and Cruz, R.A.
Pesquisa Brasileira em Odontopediatria e Clinica Integrada. 2011; 11(3): 465-469
[Pubmed]

17 **Jumping the gun**
N. Ravikumar, S. Suhas, Taylor, A.
BDJ. 2009; 207(11): 518
[Pubmed] | [PDF] | [DOI]

18 **Folk remedy**
S. Asokan
BDJ. 2009; 207(12): 568
[VIEW] | [DOI]