

EFFECT OF FLAXSEED OIL IN PLAQUE INDUCED GINGIVITIS- A RANDOMIZED CONTROLLED DOUBLE-BLIND STUDY

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ABSTRACT

BACKGROUND

Oil pulling has been used extensively as a traditional remedy for many years. It is supposed to cure oral and systemic diseases, but the evidence is minimal. Intraorally it is supposed to cause strengthening of teeth, gums, and the jaw and to prevent decay, oral malodour, bleeding gums, dryness of the throat and cracked lips. The aim of this study was to evaluate the effect of oil pulling with flaxseed oil on plaque induced gingivitis and to compare its efficacy with chlorhexidine mouthwash.

MATERIALS AND METHODS

A total of 20 teenaged individuals attending the Out Patient - Department of Dentistry 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 selected individuals of both the groups. The study group was subjected to oil pulling with flaxseed oil every day in the morning before brushing whereas the control group used chlorhexidine mouth rinse. Reassessment of the index scores was done after 30 days in both the groups.

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 ($P < 0.001$).

CONCLUSION

The oil pulling therapy with flaxseed oil is thus an effective adjuvant in reducing plaque-induced gingivitis.

KEYWORDS

Oil pulling, Plaque-induced gingivitis, Flaxseed oil, Chlorhexidine.

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BACKGROUND

Oil pulling 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. Oil pulling has been used extensively as a traditional Indian folk remedy for many years to prevent decay, oral malodour, bleeding gums, dryness of the throat, and cracked lips and for strengthening teeth, gums, and the jaw. But it was Dr. F. Karach who familiarized the concept of oil pulling in the 1990s in Russia (Asokan S et al 2009).¹

Oil pulling therapy can be done using edible oils like sunflower, coconut or sesame oil. It is described as a procedure in which an individual takes a comfortable amount of oil and holds it or swishes it in the mouth. When the oil turns thin and milky white it is spit out without swallowing. Oil pulling therapy should be followed by brushing the teeth and is preferably done on an empty stomach in the morning (Sooryavanshi S 1994).²

There is no literature or scientific proof to accept oil pulling therapy as preventive adjunct. Flaxseed is a functional food valued for its pleasant, nutty taste, unique nutrient profile, and health benefits. It is a rich source of ALA, the essential ω -3 fatty acid, and the lignan, SDG. It also provides protein and dietary fibre (Morris DH 2003).³ At the same time, flaxseed can contain considerable amounts of cyanogenic diglycosides, primarily linustatin and neolinustatin that are generally not detectable in processed flaxseed oil. Newer research suggests that flaxseed may help in the prevention and management of chronic diseases (Ballhorn DJ 2011).⁴

Hence this study was planned to evaluate the effect of oil pulling with flaxseed oil on plaque-induced gingivitis and to compare its efficacy with the use of chlorhexidine mouthwash.

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MATERIALS AND METHODS

A randomized, controlled, double-blind study was planned to evaluate the efficacy of oil pulling therapy on plaque induced gingivitis. A total of 30 teenaged individuals attending the Outpatient Department of Dentistry, 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

Teen aged individuals with plaque-induced gingivitis.

Exclusion Criteria

Use of antibiotics in the past 3-4 weeks, history of dental treatment/use of mouthwash.

The plaque index and modified gingival index scores were recorded by a dental examiner. A total of 20 subjects with almost equal baseline mean scores were chosen for the study. Simple random sampling technique was used to include 10 individuals in Group I (study group-oil pulling) and another 10 individuals in Group II (control group-chlorhexidine).

The study group was subjected to oil pulling with flaxseed oil (Piping Rock) and the control group was given 0.12% chlorhexidine mouthwash (Rexidine, Warren India) for 1 minute every day in the morning before brushing for 30 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 was done by the same examiner after 30 days.

The pre- and post-values of the plaque and modified gingival index scores 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 and the statistician were blinded as to the division of the groups.

RESULTS

There was no statistically significant difference in the pre-therapy index scores in either group indicating that the baseline Mean values of the study as well as the control groups were almost the same (Table 1). The comparison of the post therapy Mean values of the plaque index scores, modified gingival index scores between the two groups showed no significant difference (Table 2).

Baseline values	Group	No. of patients	Mean	P value
Plaque index scores	Group I	10	1.186 ± 0.220	0.488
	Group II	10	1.278 ± 0.341	
Modified gingival index scores	Group I	10	1.260 ± 0.324	0.750
	Group II	10	1.306 ± 0.311	

Table 1. Comparison of the Baseline Values of Plaque Index and Modified Gingival Index Scores between Group I and Group II

Post therapy values	Group	No. of patients	Mean	P value
Plaque index scores	Group I	10	0.200 ± 0.169	0.280
	Group II	10	0.294 ± 0.206	
Modified gingival index scores	Group I	10	0.210 ± 0.155	0.318
	Group II	10	0.289 ± 0.187	

Table 2. Comparison of Post Therapy Values of Plaque Index and Modified Gingival Index Scores between Group I and Group II

	P value	
	Group I	Group II
Pre and Post Plaque index	<0.001	<0.001
Pre and post Modified gingival index	<0.001	<0.001

Table 3. Comparison of the Pre and Post-Values of Plaque Index, Modified Gingival Index, Within Group I and Group II Respectively

The comparisons of the pre- and post-therapy values of Plaque index scores and Modified gingival index scores showed a statistically significant difference in the study group (P <0.001). 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) (Table 3).

DISCUSSION

The primary cause of gingival inflammation is plaque. Dental plaque is defined clinically as a structured, resilient substance that adheres to intraoral hard surfaces and is composed of bacteria in a matrix of salivary glycoprotein and extracellular polysaccharides (Newman MG 2006).⁵ Plaque induced gingivitis is the result of an interaction between plaque and the tissues and the inflammatory response of the host. It is associated with the subtle microbial alterations as the plaque matures. 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 (Marsh PD 2005).⁶ The effects of the local factors, systemic factors, or both; medications; and malnutrition can influence and alter the plaque-host interaction (John Nowak M 2006).⁷

Clinical assessment in this study 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 (Ciancio 1986)⁸ and thus was used in this study. Oil pulling with sunflower oil was found to significantly reduce Plaque index and Gingival index after 45 days (Amith HV et al 2007).⁹ Asokan et al., found oil pulling therapy with sesame oil was equally effective as chlorhexidine in decreasing plaque induced gingivitis. In our study also there was a significant decrease in the plaque and the gingival index at the end of 30 days.

The gold standard mouthwash - chlorhexidine 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.¹⁰ Menendez and Santos have shown that chlorhexidine is very effective against the formation of dental plaque and it remained still as a gold standard.¹¹

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. 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 (Ambika S 2001).¹² Flaxseed 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.¹² Flaxseed oil has almost similar saponification value as that of sesame oil and is a rich source of omega-3 fatty acids. Kesavalu L et al conducted a study that supported omega-3 fatty acids as useful adjunct in the treatment of periodontal disease.¹³ These mechanisms could have been the reason for the reduction of plaque scores in this study. But more studies have to be done to check and prove the antibacterial effect of the components of the flaxseed oil.

In this study, oil pulling therapy has been as equally effective as chlorhexidine against plaque-induced gingivitis. Chlorhexidine on long term use alters taste sensation and produces brown staining on the teeth which is very difficult to remove. The mucous membranes and the tongue can also be affected and may be related to the precipitation of

chromogenic dietary factors on to the teeth and mucous membranes (Leard and Addy 1997).¹⁴ Flaxseed oil has the following advantages over chlorhexidine: no staining, and no allergy. 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.

CONCLUSION

Oil pulling therapy promises to be a better preventive home therapy in developing countries like India. Further studies on flaxseed oil with a large number of subjects and comparative studies using various chemotherapeutic agents can improve the quality of evidence.

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