

## EFFECT OF OIL PULLING AS AN ADJUNCT TO SCALING AND ROOT PLANING ON PLAQUE INDUCED GINGIVITIS

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### ABSTRACT

**Background:** Oil pulling has been used extensively as a traditional Indian folk remedy for strengthening the teeth, gums and the jaw and to prevent decay, oral malodor, bleeding gums, dryness of the throat, and cracked lips. It is a widely recommended procedure in Ayurveda. Although chlorhexidine serves as a gold standard in mechanical plaque control, due to its chemical adverse effects, the study stresses on assessing the efficiency of oil pulling as an alternate to chlorhexidine. **Aim:** To compare the efficiency of oil pulling in reducing the colony forming unit (CFU) with chlorhexidine as an adjunct to scaling and root planing (SRP). **Objective:** The objective of the study is to find out whether oil pulling with sesame oil serves effective in controlling plaque accumulation. To assess its efficacy in maintaining gingival health and to compare the effectiveness of oil pulling in reduction of colony forming microorganisms with chlorhexidine as an adjunct to SRP.

**KEYWORDS:** Sesame oil. Oil pulling, chlorhexidine, colony forming units.

### INTRODUCTION

Oil pulling also known as oil swishing is an age old home remedy process mentioned in CharakSamhita and Sushruta's Arthashastra and its use was a widely recommended detoxification technique in Ayurvedic therapy, called as KavalaGandoosha and KavalGraha in Ayurveda.<sup>[1]</sup> It is a traditional method used for oral and systemic health benefits. It was reported that it cured about 30 systemic illness including migraine, asthma and diabetes.<sup>[2,3]</sup> For many decades, it is being used as an alternative medicine in prevention of tooth decay, oral malodor, bleeding gums and throat infections.<sup>[4,5]</sup> Thus oil pulling is an effective preventive as well as curative therapy.<sup>[6]</sup> Various oils that can be used for oil pulling are coconut oil, cone oil, sesame oil, rice bran oil, sunflower oil and soya bean oil.<sup>[7]</sup>

The commonly used oil for oil pulling therapy, sesame oil is reported for its effectiveness in reducing bacterial growth and adhesion.<sup>[8]</sup> It was believed that the viscosity of oil can inhibit bacterial adhesion to the tooth surface and plaque coaggregation<sup>[9]</sup> and or otherwise saponification process due to alkali hydrolysis of oil by bicarbonates in saliva would do the same.<sup>[10]</sup> Sesame oil consists of 3 lignans namely: sesamin, sesamol and sesaminol, which had an antioxidant property and potentiate vitamin E action. They are rich in PUFA, and causes lipid peroxidation, thus reducing the free radical release to the tissues.

Gingivitis, an inflamed condition of gingiva, considered to be one of the most common and highly prevalent periodontal disease. Gingivitis occurs due to the long term effect of microorganisms present in the form of biofilms in plaque. Antimicrobial mouth rinses like chlorhexidine are considered to be the "gold standard" which acts as an adjunct to mechanical plaque control.<sup>[11]</sup> Studies have reported that the long term use of hexidine alters taste sensation and stains the teeth, there is a requirement of home remedy which is economical as well as effective as chlorhexidine.<sup>[12]</sup> Hence this study aims to compare the efficiency of oil pulling in reducing the colony forming unit (CFU) with chlorhexidine as an adjunct to scaling and root planing (SRP).

### MATERIALS AND METHODS

#### Study location

The study was conducted among the patients reported to the outpatient clinics of Saveetha Dental College and Hospitals, Chennai, Tamilnadu, India.

#### Study groups

The study was conducted among 20 patients who reported to the clinic. Study subjects were selected after thorough examination of oral cavity for plaque induced gingivitis. The patients were randomly divided into two groups:

- Group A- Study group comprising of 10 patients, were instructed to use sesame oil for oil pulling everyday for the next 30 days after SRP was done.
- Group B- Control group comprising of 10 patients, were instructed to use chlorhexidine mouth rinse for the next 30 days after SRP was done.

The study was approved by SRB and Patients included in the study were informed about the study and an informed consent was obtained.

#### Inclusion criteria

- Subjects willing to participate
- Subjects with moderate to severe plaque induced gingivitis
- Subjects having atleast 20 permanent natural teeth
- Subjects who hasn't used any mouthwash for the past 3 months
- Subjects with no history of systemic illness

#### Exclusion criteria

- Subjects with chronic or aggressive periodontitis
- Subjects with a history of antibiotic usage in the past one month
- Subjects allergic to the oil used
- Subjects with systemic illness
- Subjects using mouthwash regularly
- Subjects under orthodontic treatment and those having intra oral prosthesis
- Subjects who Smoke

#### Parameters assessed

Parameters assessed in this study are,

- Gingival index [Silness & Loe, 1963]
- Plaque index [Loe & Silness, 1967]
- OHI-s index [Greene & Vermillon, 1963]
- Total colony forming units [CFU]

The study group was instructed to use one table spoon of sesame oil for oil pulling in empty stomach. Swishing

should be done for atleast 15 to 20 mins until the oil turns thin and white after which the oral cavity should be rinsed off completely. The control group was instructed to use 0.02% chlorhexidine mouthwash for rinsing about half an hour after brushing.

#### Sample collection and study methodology

The baseline values of gingival index, plaque index and OHI-s index were recorded and the saliva samples of both the control and study group was collected in a sterile disposable container prior to Scaling and Root Planing (SRP). SRP was done to all the subjects with ultrasonic scaler unit and appropriate oral hygiene instructions were given. The study group was taut to perform oil pulling with sesame oil and was instructed to continue for the next 30 days in empty stomach and the control group was instructed to rinse with 0.2% CHX mouthwash for 30secs everyday. Patients from both the group were instructed to report to the clinic for follow-up on the 15<sup>th</sup> and 30<sup>th</sup> day from the day SRP was done. On the 15<sup>th</sup> and 30<sup>th</sup> day the gingival index, plaque index and OHI-s index were recorded to compare the difference with the baseline values, and saliva samples was also collected for microbiological analysis of total CFUs.

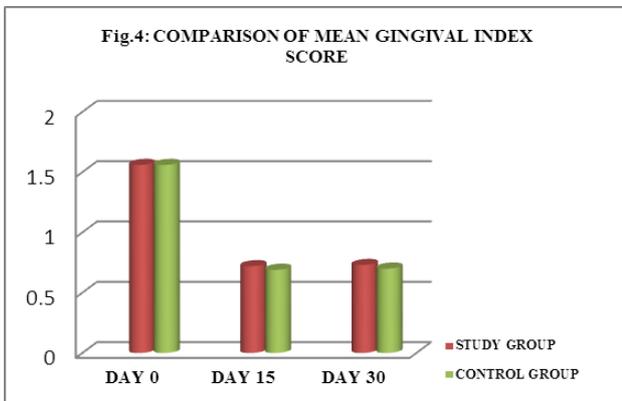
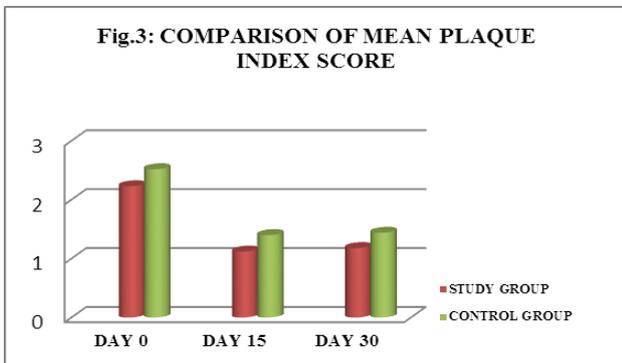
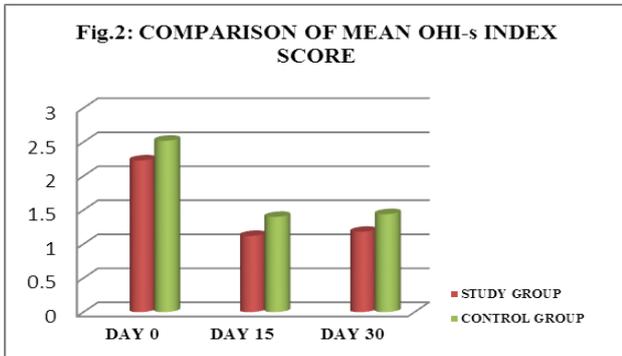
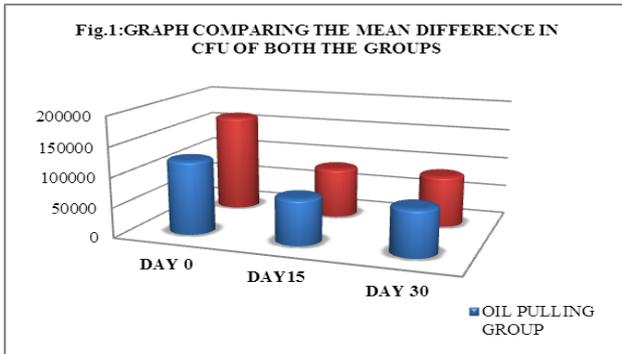
The samples were stored in 8 degree C until inoculation. The saliva samples were serially diluted and inoculated on Muller Hinton agar plates with proper labels to differentiate the sample group. The plates were then incubated for 24 hours at 37 degree C. The total number of colony forming units were counted and tabulated.

#### RESULTS

The plaque index, OHI-s index and gingival index of all the 20 patients was recorded and a mean scores of each was calculated. The total no. of CFU of both the groups was obtained and a mean score of it was calculated. The percentage reduction in all the four parameters that were assessed was derived for both the groups. The results thus obtained is tabulated below.

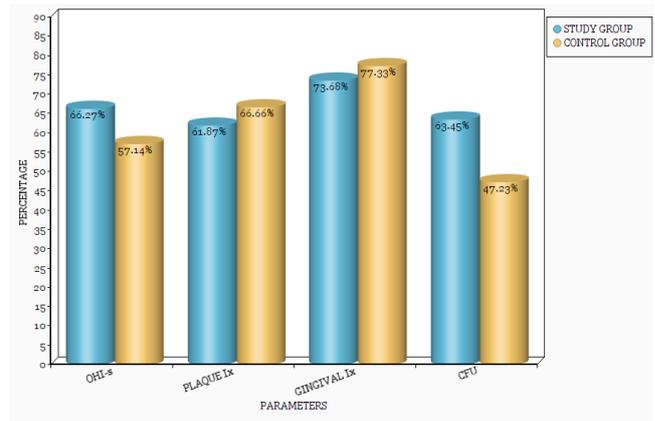
**Table 1: Mean scores of plaque index, OHI-s index and gingival index.**

Parameters	Study Group (Oil Pulling)			Control Group (CHX Mouthwash)		
	Day 0	Day 15	Day 30	Day 0	Day 15	Day 30
Ohi Index	2.23	1.12	1.18	2.52	1.40	1.44
Plaque Index	1.82	0.96	0.98	1.68	0.84	0.88
Gingival Index	1.56	0.72	0.73	1.56	0.69	0.70
CFU/ml	1,64,000	85,000	86,200	1,23,000	76,000	76,800



**Table 2: Pre and post procedural percentage difference.**

Parameters	Study Group	Control Group
OHI-s	66.27%	57.14%
Plaque index	61.87%	66.66%
Gingival index	73.68%	77.33%
CFU	63.45%	47.23%



**Fig 5: Pre and post procedural percentage difference.**

Statistical significance of each parameter assessed in both the groups is calculated using paired Student t- test with p value < 0.05 and the results are tabulated below (Table 3.)

**Table 3: Table showing the statistical significance of all the four parameters.**

Parameters	P value (p<0.05)	Statistical Significance
Plaque index	0.1051	Not significant
Gingival index	0.5000	Not significant
OHI-s	0.0347	Significant
CFU	0.3565	Not significant

**DISCUSSION**

Plaque induced gingivitis is the most common gingival disease and occurs as a result of an interaction between the microbial colonies in dental plaque biofilm and the tissue inflammatory cells of the host. Chlorhexidine has long been recognized as the “gold standard” chemical agent in plaque control. Chlorhexidine acts on the negatively charged bacterial cell. The cationic chlorhexidine molecule is attracted towards the negatively charged bacterial surface to phosphate containing compounds. This leads to the alteration in the bacterial cell membrane and chlorhexidine is attached to the inner cell membrane. It causes increase in the permeability of inner membrane thus permitting leakage through the membrane. At this bacteriostatic stage the effect of Chlorhexidine is reversible. Increasing the concentration causes greater damage to the membrane thus forming phosphates complexes. This bactericidal stage is irreversible.<sup>[13]</sup> Axelsson and Lindhe<sup>[14]</sup> and Menezes and Santos<sup>[15,16]</sup> have shown that chlorhexidine mouthwash is effective in reducing plaque and gingivitis. Although it is considered to be a “gold standard”, long term usage causes alteration in taste sensation and stains the teeth.<sup>[12]</sup> Hence a safer and more economical home remedy is essential to act as an adjunct to chlorhexidine. Oil pulling is an age old folk remedy which lacks scientific basis. The study was conducted to evaluate the efficiency of oil pulling as an adjunct to mechanical plaque control, thereby developing it as a oral habit for

maintaining a good oral hygiene status and control the oral microbial flora. sesame oil is used in this study for performing oil pulling, the oil acts as a cleansing agent. It works around the teeth and gums and pulls out the bacteria and deposits. Oil pulling is done until the viscous oil turns thin and milky white. Oil pulling therapy should be followed by tooth brushing and rinsing of the mouth. Swishing process makes the oil mix thoroughly with saliva and activates the enzymes which in turn extracts the toxins out of blood. This idea is contrary as the oral mucosa is not a semi permeable membrane to allow toxins to pass through.<sup>[17]</sup> Another proposed mechanism states that viscosity of oil and possible saponification and emulsification process prevents bacterial adhesion and promotes mechanical cleansing action.<sup>[3]</sup>

The study includes both clinical and microbiological assessment. Clinical assessments was done by recording the plaque index by silness and Loe, gingival index by Loe and Silness and OHI-s index by Greene and Vermillon. Microbial assessment was done by recording the total CFU in pre-procedural and post-procedural samples of both the control and study group.

In this study oil pulling therapy is as effective as chlorhexidine against plaque induced gingivitis. Table 1 depicts the mean values of OHI-s index, plaque index, gingival index and the number of CFU's. Fig. 1, 2, 3 & 4 shows the graphical representation of the same. Table 2 depicts the percentage difference in plaque score which showed 61.87% reduction in study group and 66.66% reduction in control group and gingival score which showed 73.68% reduction in study group and 77.33% reduction in control group. Similar study done by Dr. Nitin Dani *et al.*<sup>[1]</sup> showed a reduction of 51.6% & 47.61% in plaque score of study and control group respectively and 53.37 & 44.58% in gingival index score of study and control group respectively. Table 2 shows a 66.27% reduction in OHI-s score of study group and 57.14% reduction of the control group. There is no study till date to assess the status of oral hygiene scores to study the benefits of oil pulling. Both the groups were followed up for 30 days at an interval of 14 days which gives a beneficial result in assessing the efficiency of oil pulling in maintaining oral health. The total number of CFU has reduced by 63.45% in study group and 47.23% in control group. This shows that oil pulling therapy is more effective than chlorhexidine therapy in reducing the microbial population adhering to oral cavity. Fig. 5 shows the percentage difference between the pre and post procedural values of both the groups. As the usage of oil therapy or chlorhexidine regularly by the subjects is questionable and cannot be monitored there may be slight variations in proportional decrease in the values.

Sesame oil is advantageous as it overcomes the demerits of chlorhexidine. It does not stain the tooth, alters taste sensation or cause any allergy. It is also more cost effective when compared to chlorhexidine and is easily

available in households. Though it cannot be used as a preventive therapy it works well as an adjunct to mechanical plaque removal. Extended studies with larger sample size and long time follow up should be carried out to establish a strong proof for assessing the effect of oil pulling therapy on plaque induced gingivitis.

## CONCLUSION

Gingivitis when left untreated progresses to severe form of periodontitis. Hence the gingivitis must be treated in the early stages by removing the local factors. Some form of adjunct therapy is also necessary to maintain the oral hygiene status after mechanical plaque removal. With the results obtained from the study it can be concluded that oil pulling with sesame oil has a significant effect on plaque, gingivitis and oral hygiene maintenance. Thus it is advantageous to promote awareness among people to practice oil pulling for maintaining oral hygiene.

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