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ORIGINAL RESEARCH

Effect of Oil Pulling with Sesame Oil on Plaque-induced Gingivitis: A Microbiological Study

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ABSTRACT

'Oil pulling' or 'oil swishing' is a traditional Indian folk remedy that has both dental and systemic effects. This study has been conducted to evaluate the effect of oil pulling with sesame oil on plaque, gingivitis and colony forming bacteria. For this study we selected 40 subjects with mild to moderate plaque and gingivitis. 20 of them performed oil pulling for 45 days, using sesame oil and the rest 20 continued with their normal oral hygiene measures. Their plaque and gingival scores and colony forming unit counts were assessed before and after oil pulling. Oil pulling resulted in a statistically significant decrease in plaque, gingival scores and number of bacteria in the mouth. This paper explains about the dental benefits of oil pulling on plaque, gingivitis and mouth residing bacteria.

Keywords: Oil pulling, Plaque index, Gingival index.

Key messages: Oil pulling is a new boon in chemical plaque control and is 5 to 6 times more cost-effective than commercial mouthwashes. It is readily available in Indian households and has additional systemic effects.

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INTRODUCTION

Gingivitis is a form of periodontal disease and is one of the highly prevalent oral diseases. Gingivitis is a bacterial infection due to long term effects of microorganisms present in plaque. Antibacterial mouth rinses like chlorhexidine are used as an adjunct to mechanical plaque control, but they are accompanied with side effects like staining, allergy and lingering after taste. All these suggest the need of a home remedy that the patient can practice as a preventive habit.

'Oil pulling' or 'oil swishing' is a procedure that involves swishing of oil in the mouth for oral and systemic health benefits. Oil pulling therapy with sesame oil has been extensively used as a traditional Indian folk remedy for many years for strengthening teeth and gums. The history of oil pulling comes from Ayurvedic text Charaka Samhita, where it is referred to as Kavala Graha/Kavala Gandhoosha and is claimed to have cured about 30 systemic diseases ranging from headache and migraine to diabetes and asthma.[1]

In this study we are using sesame oil for oil pulling as it is known to have antioxidants namely sesamin, sesamolin and sesaminol. The mechanism by which the oil pulling therapy causes plaque reduction is not known. The viscosity of the oil probably inhibits bacterial adhesion and plaque coaggregation. Another possible mechanism might be saponification or the soap-formation process that occurs as a result of alkali hydrolysis of fat.[2]

In the experimental study conducted, the parameters selected where plaque index, gingival index and colony forming unit count. These parameters were selected as they are interrelated to each other. Microorganisms cause plaque formation and plaque in turn causes gingivitis.

Gingivitis when left untreated can progress to a more destructive form of periodontal disease. An effective modality of prevention which can arrest the disease progression and ensure healthy tissues is of import. A household remedy like oil pulling which saves time and money, and enhances general health needs exploration. This study intends to find out the dental benefits of oil pulling. If succeeded this study can promote awareness among people of the long lost practice of oil pulling which is a good preventive home therapy in developing countries.

SUBJECTS AND METHODS

Study Sample

Forty subjects were selected and were distributed randomly into group A (20-control) and B (20-experimental) based on inclusion and exclusion criteria. Group B participants were instructed to practice oil pulling for a duration of 45 days daily. The subjects were students of RVS Dental College, Kannampalayam. And the study was conducted in the Department of Periodontology and Microbiology of the same college.

Inclusion Criteria for Groups A and B

Subjects of age group 18 to 21 years with at least 20 permanent natural teeth having mild to moderate plaque and gingivitis were selected. The subjects should not have used any mouthwash/rinses for past 6 months. Group B subjects should be willing to do oil pulling as instructed for 45 days daily.

Exclusion Criteria for Groups A and B

Subjects who are pregnant, lactating or with a history of antibiotic usage for the past 3 to 4 weeks, smokers (past and

current) and having an allergy to the oil used were excluded from the study.

Informed Consent Procedures

The consent form is signed by the subjects before starting the study.

Baseline Index Scoring

The plaque index and gingival index of all the participants were recorded on day 0 (one day before the subjects start oil pulling).

Disclosing solution used is GC Plaque Disclosing Gel (2 Nos).

PLAQUE INDEX

The plaque index by Silness P and Loe H (1967) is used to assess only the thickness of plaque in the gingival area of the tooth on the index teeth 16, 12, 24, 36, 32, 44.[3]

GINGIVAL INDEX

Gingival index by Loe H and Sillness J (1963) is used to assess the severity of gingivitis on the index teeth 16, 12, 24, 36, 32, 44.[3]

Baseline CFU Sampling

On day 0 all the subjects are instructed to wash their mouth with the physiological saline (0.85% NaCl). This saline is collected in a sterile container and is serially diluted and plated in nutrient agar plates. The plates are incubated aerobically at 37°C for 24 hours. After this incubation period, the number of colonies present in 1 ml of the saline is calculated.[4]

Colony count is calculated by the formula

Number of bacteria/ml = Number of colonies dilution × Amount plated

Group A: Participants are requested to continue with their routine oral hygiene practice.

Procedure to Practice Oil Pulling for Group B.

- Take one tablespoon of sesame oil (idhayam sesame oil, 500 ml (20 Nos) in the mouth on an empty stomach in the morning
- With the mouth closed and chin up, without speed or effort, sip, suck, and pull the oil through the teeth in a relaxed way, and also exercise the jaw as if chewing, for a period of 15 to 20 minutes
- Do not gargle in the throat
- Initially the oil is viscous but slowly it turns thin and milky white as you continue
- Spit out as and when the mouth gets full
- Wash your mouth and teeth thoroughly
- Drink 2 to 3 glasses of water.

The subjects are instructed to do oil-pulling for 45 consecutive days in the above mentioned manner.

Plaque Index and Gingival Index at Days 45

On days 45 the PI and GI of all the subjects are recorded as mentioned before.

CFU Score at Days 45

After 45 days, the same procedure is followed for sample collection in both the groups and results are tabulated for statistical analysis.

STATISTICAL ANALYSIS

Students paired 't' test and Wilcoxon signed rank test is used to compare plaque scores, gingival scores and CFU count before and after oil pulling. Correlation test is used to compare these parameters between the two groups.

ACCEPTANCE OF OIL PULLING

The subjects are asked whether they would like to continue oil pulling or will stop practicing it and their opinions were recorded in the data sheet.

RESULTS

Comparison of Plaque Score before and after Oil Pulling using Paired t-test (Fig.1)

The mean plaque score of group B declined from 1.60 to 1.39 after 45 days ($p < 0.01$) amounting a reduction of 13.13% compared to initial scores. However, no significant reduction was seen in the case of group A. Mean scores indicate that there is an increase in plaque score after 45 days in the case of group A.

Comparison of Gingival Index Score before and after Oil Pulling using Paired t-test (Fig. 2)

The mean gingival index of group B declined from 1.26 to 1.01 after 45 days ($p < 0.01$) amounting a reduction of 19.84% compared to initial scores. However, no significant reduction was seen in the case of group A. Mean scores indicate that there is a slight increase in gingival index after 45 days in the case of group A.

Comparison of No. of Colonies before and after Oil Pulling using Paired t-test (Fig. 3)

The mean no. of colonies in the case of group B declined from 37.1×10^3 to 31.0×10^3 after 45 days ($p < 0.01$)

DATA SHEET

Name : Age: Sex:

Willing to do oil pullling for 45 days ? : Yes/ no

Plaque Index

At day 0

16	12	24
44	32	36

Total score=

Rating =

At day 45

16	12	24
44	32	36

Total score =

Rating =

Gingival Index

At day 0

16	12	24
44	32	36

Total score =

Rating =

At day 45

16	12	24
44	32	36

Total score =

Rating =

Baseline CFU Sampling

At day 0

Number of colonies per ml =

At day 45

Number of colonies per ml =

Are you willing to continue oil pulling as a daily habit? : Yes/no

If not state your reason behind that _____

amounting a reduction of 16.44% compared to initial scores. However, no significant reduction was seen in the case of group A. Mean scores indicate that there is an increase in no. of colonies after 45 days in the case of group A.

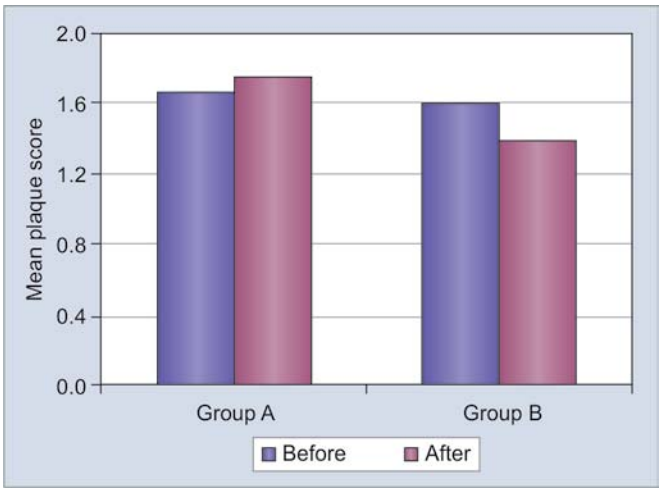

Fig. 1: Comparison of plaque score before and after oil pulling using paired t-test

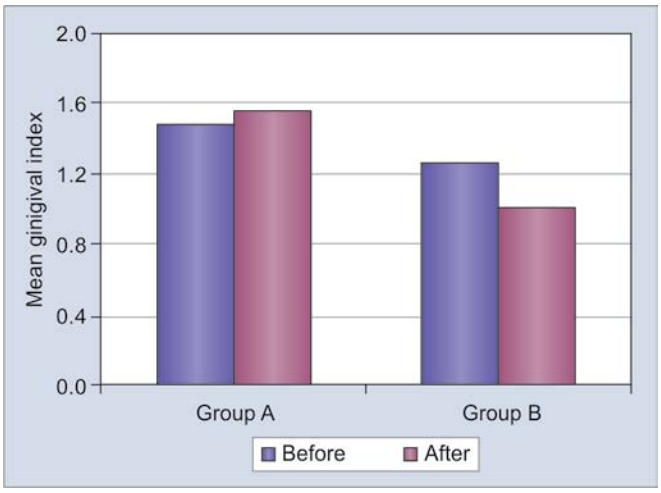

Fig. 2: Comparison of gingival index score before and after oil pulling using paired t-test

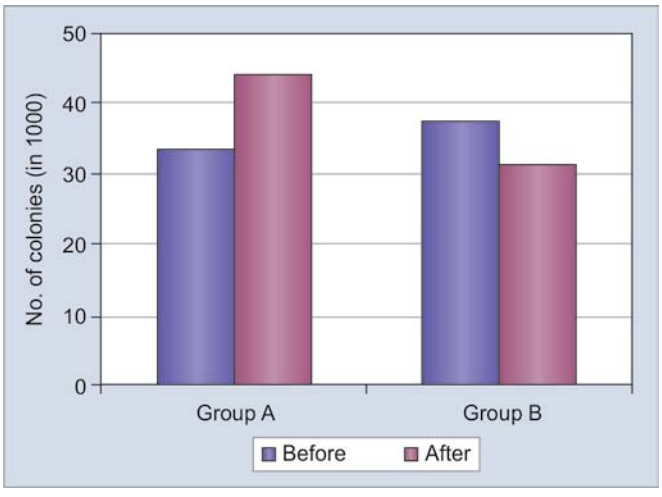

Fig. 3: Comparison of no. of colonies before and after oil pulling using paired t-test

A Comparison of each Parameter before and after Oil Pulling using Wilcoxon Signed Ranks Test (Table 1)

Wilcoxon signed ranks test also reveals the same result as in the case of plaque index and also in the case of gingival index. Comparison of mean scores indicates that there is an increase in the number of colonies in the case of group A and there is a reduction in no. of colonies in the case of group B.

Correlation of Parameters before Oil Pulling in each Group (Table 2)

Correlation of Parameters after Oil Pulling in each Group (Table 3)

ACCEPTABILITY OF OIL PULLING

This is found out by questioning whether the persons who performed oil pulling would like to continue this as a habit or would they like to stop it. Out of the 20 people who performed oil pulling 14 told that they would like to continue oil pulling as an oil hygiene practice. The rest of the 6 people even though benefited with oil pulling said it is difficult to practice this procedure in the early morning and on an empty stomach. And also 4 of them had a vomiting tendency while doing oil pulling which became less as they continued it. Some said it is time consuming as it takes 15 to 20 minutes to do this procedure. The acceptability of oil pulling statistically is 70%.

DISCUSSION

The practice of oil pulling is not much heard of and its effects on dental aspects lack sufficient scientific research. So this study is to find out how a procedure like oil pulling which can be developed as an oral hygiene habit can affect plaque, gingivitis and mouth residing bacteria. This is a type of study that has clinical findings supported by microbiological evidence.

A few studies have been carried out in the literature regarding the role of oil pulling therapy in the maintenance of oral health. A study conducted by Amith et al (2007) have shown that oil pulling therapy with sunflower oil significantly reduced plaque scores after 45 days.[5] Another study conducted by Asokan et al (2008) showed a definitive reduction in the *Streptococcus mutans* count in plaque and saliva after oil pulling therapy. So, oil pulling therapy has shown to reduce the incidence of dental caries.[6] A study carried out by Sharath et al (2009) showed that oil pulling therapy was very effective against plaque induced gingivitis both in the clinical and microbiological assessment.[7] Another study by Anand et al (2008) has shown significant reduction

Table 1: Comparison of each parameters before and after oil pulling using Wilcoxon signed ranks test

Group	*Group A*		*Group B*	
	Z	*Asymp. Sig. (2-tailed)*	*Z*	*Asymp. Sig. (2-tailed)*
Plaque before with plaque after	1.791 NS	0.073	3.542**	<0.001
Gingival index before with gingival index after	1.398 NS	0.162	3.552**	<0.001
No. of colonies before with no. of colonies after	3.119**	0.002	3.937**	<0.001

**Correlation is significant at the 0.01 level (2-tailed), NS: Not significant

Table 2: Correlation of parameters before oil pulling in each group

Groups			*Plaque*	*Gingival index*	*No. of colony*
1	Plaque	Pearson correlation	1	0.713**	0.636**
		Sig. (2-tailed)		0.000	0.003
	Gingival index	Pearson correlation	0.713**	1	0.765**
		Sig. (2-tailed)	0.000	–	0.000
	No. of colony	Pearson correlation	0.636**	0.765**	1
		Sig. (2-tailed)	0.003	0.000	–
2	Plaque	Pearson correlation	1	0.683**	0.774**
		Sig. (2-tailed)	–	0.001	0.000
	Gingival index	Pearson correlation	0.683**	1	0.654**
		Sig. (2-tailed)	0.001	–	0.002
	No. of colony	Pearson correlation	0.774**	0.654**	1
		Sig. (2-tailed)	0.000	0.002	–

**Correlation is significant at the 0.01 level (2-tailed)

Table 3: Correlation of parameters after oil pulling in each group

Groups			*Plaque*	*Gingival index*	*No. of colony*
1	Plaque	Pearson correlation	1	0.748**	0.696**
		Sig. (2-tailed)	–	0.000	0.001
	Gingival index	Pearson correlation	0.748**	1	0.753**
		Sig. (2-tailed)	0.000	–	0.000
	No. of colony	Pearson correlation	0.696**	0.753**	1
		Sig. (2-tailed)	0.001	0.000	–
2	Plaque	Pearson correlation	1	0.441	0.582**
		Sig. (2-tailed)	–	0.052	0.007
	Gingival index	Pearson correlation	0.441	1	0.359
		Sig. (2-tailed)	0.052	–	0.120
	No. of colony	Pearson correlation	0.582**	0.359	1
		Sig. (2-tailed)	0.007	0.120	–

**Correlation is significant at the 0.01 level (2-tailed)

in bacterial count after oil pulling and reduced susceptibility of a host to dental caries.[4]

Oil pulling is an ancient Indian folk remedy which is described in Ayurvedic texts like Charaka Samhita. It is known to have dental benefits and also 30 other systemic benefits. As an oral hygiene practice brushing of teeth with toothpastes is commonly employed. However, commercial mouthwashes like chlorhexidine has several side effects, such as staining and taste alteration, which limit its long term use.[8] So oil pulling can be a solution to all these problems.

Various types of oils can be used for oil pulling like sesame oil, sunflower oil; extracts of gooseberry oil, ground nut oil, etc. We have used sesame oil for this study. Plaque index and gingival index are found out for 40 subjects as clinical evidence. This is done to find out the effect of oil pulling on plaque and plaque induced gingivitis.

The plaque index scores at days 0 and 45 for group A is taken. Based on the results and statistical analysis, no significant reduction in plaque scores was seen in the case of group A. Mean scores indicate that there is an increase in plaque score after 45 days in the case of group A. This indicates that with time without any preventive measures there is increased accumulation of plaque.

The mean plaque score of group B declined from 1.60 to 1.39 after 45 days ($p < 0.01$) amounting a reduction of 13.13% compared to initial scores. This indicates that group B (experimental) has shown significant reduction of scores on days 45 due to oil pulling practice.

The mean gingival index of group B declined from 1.26 to 1.01 after 45 days ($p < 0.01$) amounting a reduction of 19.84% compared to initial scores. This indicates that there is a significant reduction in gingival scores which support our study. However, no significant reduction was seen in the case of group A. Mean scores indicate that there is a slight increase in gingival index after 45 days in the case of group A. Thus, gingivitis when left untreated can progress further.

CFU count is taken to find out the antibacterial effect of oil pulling which provides the microbiological evidence. The mean no. of colonies in the case of group B declined from 37.1×10^3 to 31.0×10^3 after 45 days ($p < 0.01$) amounting a reduction of 16.44% compared to initial scores. This indicates that oil pulling with sesame oil has an antibacterial activity. However, no significant reduction was seen in the case of group A. Mean scores indicate that there is an increase in no. of colonies after 45 days in the case of group A.

CONCLUSION

From the results obtained it can be concluded that oil pulling has a significant effect on plaque and gingivitis. As the results are positive it can be said that oil pulling causes significant reduction in plaque as well as gingivitis even if it is practiced for such a short time like 45 days. If practiced daily it can be developed as a healthy oral hygiene habit. From the CFU count values we can understand that oil pulling has an antibacterial activity as the results showed a reduction in the number of bacteria per milliliter after 45 days of oil pulling. The results of control group show that in some cases when plaque and gingivitis is left untreated, can progress to a more severe form as indicated by an increase in plaque and gingival scores. CFU count also increases when sufficient oral hygiene measures are not taken. Both the plaque and gingival score tally with the CFU count which indicates that the number of bacteria present in the mouth is related to plaque and gingivitis. All these results indicate that oil pulling therapy is a successful preventive method which can be adopted as a daily oral hygiene habit.

REFERENCES

1. Ram KS. Agnivesa's Charaka Samhita Vol I (Sutra Sthana) Varanasi: Chowkhamba Sanskrit Series Office 2002;99-100, 123.
2. Namiki M. The chemistry and physiological functions of sesame. Food Rev Int 2002;11:281-329.
3. Loe H. The gingival index, the plaque index and the retention index systems, J Periodontal 1967;38(Suppl):610.
4. Durai AT, Pothiraj C, Gopinath RM, Kayalvizhi B. Effect of oil-pulling on dental caries causing bacteria. Afr J Microbiol Res 2008 March;2:63-66.
5. Amith HV, Ankola AV, Nagesh L. Effect of oil pulling on plaque and gingivitis. J Oral Health Comm Dent 2007;1:12-18.
6. Asokan S, Rathan J, Muthu MS, Rathna Prabhu V, Emmadi P, Raghuraman, Chamundeswari. Effect of oil pulling on Streptococcus mutans count in plaque and saliva using Dentocult SM Strip mutans test: a randomized, controlled, triple-blind study. J Indian Soc Pedod Prevent Dent 2008 March;12-16.
7. 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(1):47-51.
8. Flotra L, Gjermo P, Rolla G, Waerhaug J. Side effects of chlorhexidine mouthwashes. Scandinavian J Dental Research 1971;79:119-125.

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