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Original Article

Comparing the Effect of Coconut Oil Pulling Practice with Oil Pulling Using Sesame Oil in Plaque-Induced Gingivitis: A Prospective Comparative Interventional Study

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Abstract

Background: Oil pulling, pulling oil, or oil swishing is an ancient healing practice and was first developed in ayurvedic medicine. Coconut and sesame oil are regular constituents in Indian food and are easily available. They also economically cheaper compared to others such as avocado, black cumin seed, canola, cedar nut, and olive oil and have been shown to have numerous health benefits. **Aim:** The aim of this study is to compare the effect of oil pulling utilizing coconut and sesame oil in patients with plaque-induced gingivitis. **Materials and Methods:** The study participants were divided into three group, namely, Group A – 20 individuals with plaque-induced mild-to-moderate gingivitis used coconut oil for oil pulling, Group B – 20 individuals with plaque-induced mild-to-moderate gingivitis used sesame oil for oil pulling, and Group C – 20 individuals with plaque-induced gingivitis who were advised to practice routine toothbrushing alone. Modified gingival index (GI) score for each group was assessed using modified GI at preintervention stage and postintervention stage at the 7th, 15th, and 21st day. **Results:** Significant reduction in the severity of gingivitis was seen in Group A and Group B at the 7th, 14th, and 21st day. Reduction was more significant in Group A compared to Group B and Group C. Group C showed mild reduction in mean GI score. **Conclusion:** Oil pulling is an effective oral hygiene practice along with routine oral hygiene practice. Coconut oil is very effective compared to sesame oil in the reduction of severity of gingivitis.

Keywords: Coconut oil, gingivitis, oil pulling, sesame oil

Introduction

Maintenance of good oral hygiene is most important for good oral and systemic health to all individuals. Toothbrushing with toothpaste is the most accepted practice for the maintenance of oral hygiene and is generally followed worldwide. In addition to the mechanical cleansing of teeth using toothbrush, chemotherapeutic agent such as mouthwash containing chlorhexidine has been suggested as an adjuvant to reduce plaque formation in the oral cavity, and these chemotherapeutic agents have certain undesirable adverse effects.[1]

Oil pulling or oil swishing is an ancient natural healing practice originated in India and has been described as *Kavalagraha or Gandhoosha* in the ayurvedic texts of *Charaka Samhita* and *Sushruta Samhita*.[2] It is the act of simply holding or swishing comfortable quantity of oil in the mouth for 10–20 min and spits it out without swallowing. It is believed that the act of swishing oil draws out microbes from various parts of the mouth and detoxifies the toxins.[3-6]

There are very few studies on oil pulling using edible oils such as sesame oil, coconut oil, and sunflower oil that have shown to reduce the severity of plaque-induced gingivitis.[7,8] Although different oils have been used for oil pulling practice, coconut oil is unique in its composition and is predominately composed of medium-chain fatty acids unlike long-chain fatty

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acids in other edible oils. This has an influence on its physical properties probably making it as more comfortable oil for swishing oil inside the mouth. Furthermore, the lauric acid, a saturated fatty acid, which has proven anti-inflammatory and antimicrobial effects, is high in coconut oil with human milk being the only other naturally available substance with such high concentration. Despite these facts, the studies on oil pulling using coconut oil are very limited.[9,10]

With this background, this study was done to assess and compare the effect of oil pulling practice using coconut oil with sesame oil in the reduction of severity of plaque-induced gingivitis.

Materials and Methods

This study was a prospective interventional comparative study and included a total of 60 participants. The Institutional Ethical Committee approval was obtained before proceeding with the study.

The inclusion criterion for this study was individuals with plaque-induced mild-to-moderate gingivitis.

(1) Individuals with systemic disease, (2) individuals with smoking and other tobacco-related habits, (3) the use of antibiotic and steroid medications in the past 6 months, (4) history of dental treatments in the past 6 months, (5) pregnancy and lactating mother, and (6) participants who were not willing to participate in the study were excluded from the study. From all the selected study participants, informed written consent was obtained before proceeding with the study. From all the selected study participants, informed written consent was obtained before proceeding with the study.

The selected study population was divided into three groups which included:

- Group A with total of 20 participants of which 8 males and 12 females in the age group range from 19 to 45 with mean age of 30.4 diagnosed with plaque-induced gingivitis who were advised to practice coconut oil pulling practice along with routine toothbrushing
- Group B with total of 20 participants of which 8 males and 12 females in the age group range from 19 to 48 with mean age of 31.2 with plaque-induced gingivitis who were advised to practice sesame oil pulling along with routine toothbrushing
- Group C with total of 20 participants of which 8 males and 12 females in the age group range from 19 to 42 with mean age of 29 with plaque-induced gingivitis who were advised to continue the routine toothbrushing alone.

Gingival status at preintervention stage was assessed using modified gingival index (GI) for all the study participants. Standard toothbrushing technique was thought using dental models for all, and professional cleaning was performed for the study participants with calculus deposits on the teeth. This was to ensure standard oral hygiene practice among all the study participants and to eliminate the effect of local factors such as calculus on gingivitis.

Along with the routine oral hygiene practice, participants in the Group A were advised to take a comfortable quantity of coconut oil in the mouth and swish it around the mouth, gums, teeth, and tongue before brushing and consuming any fluids in the morning. Once the oil becomes viscous and milky, it should spit into the trash and then rinse the mouth with warm water.

Participants in the Group B were advised to practice the same with sesame oil. Group C controls were advised to continue only the routine oral hygiene practice. Weekly follow-up was done to motivate the participants to continue the practice and for clinical examination of the oral cavity. Individuals unable to continue the practice due to difficulty were allowed to withdrawn from the study, and new participants were included in the study.

Postintervention gingival status for the Group A, Group B, and Group C participants was assessed using modified GI at the 7th, 15th, and 21st day.

Mean modified GI score was calculated for the entire group at preintervention and different stages of postintervention, i.e., the 7th, 14th, and 21st day.

Results

The present study was undertaken to compare the effect of oil pulling practice using coconut oil with sesame oil in reducing the severity of plaque-induced gingivitis.

Mean gingivitis score which was assessed by modified GI of the study participants at preintervention stage was 1.64 ± 0.27 and at postintervention 7th day was 1.47 ± 0.33, 14th day was 1.35 ± 0.040, and 21st day was 1.14 ± 0.49.

Table 1 depicts the comparison of mean gingivitis score across the study groups during the study period; there is no difference in the mean gingivitis score across study groups at baseline $P = 0.114$ ($P > 0.05$ - Not significant).

The mean gingivitis score of the participants reduced following the oil pulling practice using coconut and gingelly oil, and the difference across the study groups was found to be statistically significant at the 7th, 14th, and 21st day with the maximum reduction in gingival inflammation observed in coconut oil pulling practice followed by sesame oil and control group, respectively (one-way ANOVA, $P < 0.05$).

Table 2 depicts the comparison of mean gingivitis scores within study groups using Bonferroni *post hoc* test:

i. At preintervention stage, no significant difference was observed
ii. On the 7th day, significant difference was observed between coconut oil group versus sesame oil group and coconut oil group versus control group
iii. On the 14th day, significant difference was observed

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Table 1: Comparison of mean modified gingival index score across the study groups during the study period

Time period	Group A (mean with SD)	Group B (mean with SD)	Group C (mean with SD)	*F*	Significance
Preintervention stage	1.67±0.27	1.54±0.23	1.72±0.29	2.757	0.114
7th day	1.25±0.28	1.47±0.26	1.69±0.30	12.17	0.000
14th day	1.02±0.30	1.36±0.24	1.67±0.33	24.50	0.000
21st day	0.63±0.22	1.22±0.28	1.59±0.32	59.76	0.000

(P<0.05 statistically significant) one-way ANOVA, df: 59. SD: Standard deviation

Table 2: Comparison of mean gingivitis scores between study groups using Bonferroni post hoc test

Stages	Group A versus Group B	Group B versus Group C	Group C versus Group A
Preintervention stage	0.439	0.131	1.000
7th day	0.047	0.054	0.000
14th day	0.002	0.005	0.000
21st day	0.000	0.086	0.000

One-way ANOVA and Bonferroni *post hoc* test (P<0.05 statistically significant)

between coconut oil group versus sesame oil group, coconut oil group versus control group, and sesame oil group versus control group

iv. On the 21st day, significant difference was observed between coconut oil group versus sesame oil group, coconut oil group versus control group, and no significant difference in gingelly oil group versus control group.

Table 3 depicts the intragroup comparison of gingivitis score at different time periods. Highly significant difference in mean GI score was observed in coconut oil group, and there is no significant difference in the GI score of the control group.

The results of the present study concluded that oil pulling using coconut oil and sesame oil is effective in reducing the severity of gingivitis. Coconut oil pulling practice is more effective in reducing the severity of gingivitis and thereby the gingival health status compared to oil pulling using sesame oil.

Discussion

Chronic inflammation of gingival tissue is one of the most common oral diseases that occur mainly due to improper routine oral hygiene procedures, i.e., tooth brushing. Systemic disease such as diabetes mellitus which is common among elderly patients is associated with aggravation of existing gingival and periodontal diseases.[11] Adjuvant oral hygiene measures such as the use of chemical mouthwash are advised to improve the oral health of individuals with gingivitis.

The use of chemical mouthwash can cause allergic reaction in few individuals, and long-term use leads to loss of taste sensation and staining of teeth.[12] Oil pulling is an ancient practice and well documented in ayurvedic literature as a measure to improve and maintain the good oral hygiene.

Oils such as avocado, black cumin seed, canola, cedar nut, and olive oil have been used for oil pulling practice.[3,13,14] Coconut oil and sesame oil are regular constituents in Indian food and are easily available. They are also economically cheaper and shown to have numerous health benefits.[15]

Coconut oil with its abundant lauric acid is believed to have anti-inflammatory and antimicrobial properties. It is also proposed that the alkalis in the saliva react with oil resulting in saponification and formation of soap-like substance which reduces the adhesion of plaque. Hence, the lauric acid in the coconut oil may react with salivary sodium hydroxide forming sodium laureate, the main constituent of soap which might be responsible for the cleansing action and decreased plaque accumulation.[3,9,10,16]

Peedikayil *et al*.[10] in their preliminary study found that the coconut oil pulling practice is effective in reducing plaque formation and plaque-induced gingivitis. A statistically significant decrease in the plaque and gingival indices was noticed from day 7 and the scores showed continued decrease during the study period. They had recommended for further studies to compare the effectiveness with various chemotherapeutic agents and oil pulling.

Asokan *et al*.[7] compared oil pulling therapy with sesame oil and chlorhexidine mouth rinse and found that oil pulling therapy was equally effective as chlorhexidine in decreasing plaque-induced gingivitis. In their study, there was a statistically significant reduction of *Streptococcus mutans* count in the plaque after 1 and 2 weeks in the study group.

Saravanan *et al*.[17] studied the effect of oil pulling using sesame oil on plaque-induced gingivitis. They had found statistically significant decrease in the scores of plaque and gingival indices and number of bacteria in the mouth.

With this background, this study compared the efficacy of coconut oil and sesame oil pulling practice in reducing the severity of plaque-induced gingivitis.

Our study results showed reduction in the mean GI score for coconut oil, sesame oil, and control group compared to the preintervention stage. Coconut oil and sesame oil group showed statistically significant difference in the reduction of GI score between preintervention and the 7th, 14th, and 21st days of postintervention stage.

Our study findings were in accordance with the previous studies,[7,10,17] i.e. both the coconut oil and sesame oil were effective in the reducing the severity of gingivitis.

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Table 3: Intragroup comparison of gingivitis scores at different time periods

Study group	Preintervention	7th day	14th day	21st day	*F*	Significance
Group A	1.67±0.27	1.25±0.28	1.02±0.30	0.63±0.22	51.10	0.000
Group B	1.54±0.23	1.47±0.26	1.36±0.24	1.22±0.28	5.982	0.01
Group C	1.72±0.29	1.69±0.30	1.67±0.33	1.59±0.32	0.647	0.587

One-way ANOVA, df: 79, (P<0.05 statistically significant)

Comparison between the coconut oil and sesame oil group revealed that a more significant reduction in the severity of gingivitis was seen in coconut oil group than the sesame oil group at all postintervention stage. The above result in our study suggests that oil pulling using coconut oil is more effective than the sesame oil and could be possibly supported by the evidence of substantial antimicrobial activity of coconut oil.[14-16]

Peedikayil *et al*.[18] compared the antibacterial efficacy of coconut oil and chlorhexidine on *S. mutans* and found a significant decrease in the *S. mutans* count in both coconut oil and chlorhexidine group and concluded that coconut oil is as effective as chlorhexidine in its antibacterial efficacy against *S. mutans*.

Furthermore, Verallo-Rowell *et al*.[19] in their study found that the chemical component, monolaurin in the coconut oil, has broad-spectrum activity against *Staphylococcus aureus*, fungi, and viruses and found its usefulness in treating atopic dermatitis.

Thaweboon *et al*.[20] studied the effect of oil pulling using various oils against *S. mutans* and *Candida albicans*. Coconut oil was found to have antimicrobial activity against both *S. mutans* and *C. albicans*, whereas sesame oil showed activity against only *S. mutans* and sunflower oil showed only antifungal activity. The other oils such as corn oil, palm oil, rice bran oil, and soybean oil demonstrated no antimicrobial activity against tested microorganisms.

Furthermore, Ogbolu *et al*.[21] in their study found that *C. albicans* was highly susceptible to coconut oil.

The antimicrobial efficacy of coconut oil against the common oral pathogens, as shown by the above study results,[18-21] further supports the findings in our study, i.e., the superior efficacy of coconut oil pulling in reducing the severity of plaque-induced gingivitis.

Conclusion

Based on our study findings, we conclude that oil pulling utilizing coconut oil is more effective adjuvant oral hygiene practice in reducing the severity of plaque-induced gingivitis along with the routine oral hygiene measure.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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