

## Original Article

# Oil pulling as an adjunct to improve oral health in orthodontic patients: A clinicomicrobial study

### ABSTRACT

**Introduction:** Oil pulling is an Indian folk remedy with both systemic and dental benefits ranging from the strengthening of teeth, gums and jaws, preventing decay, oral malodor, and bleeding gums. However, there are limited scientific data illustrating the role of oil pulling as an adjunct to improve the oral health in orthodontic patients.

**Aim:** The aim of this study was to evaluate the effect of oil pulling with sesame oil to improve oral health in orthodontic patients as compared to chlorhexidine (CHX) mouth wash.

**Settings and Design:** Twenty patients undergoing fixed orthodontic treatment were randomly selected. They were divided randomly into the study or oil pulling group and the control or CHX group with ten subjects in each group.

**Methods and Material:** Colony forming unit counts of bacteria were assessed at baseline and after 14 days. Furthermore, patient acceptance from either group was evaluated using a questionnaire.

**Conclusion:** The oil pulling therapy showed a reduction in total colony counts of aerobic microorganisms in the patients undergoing fixed orthodontic treatment.

**Keywords:** Clinical microbial study, oil pulling, oral health, orthodontic patients

### INTRODUCTION

It is well known that orthodontic treatment has the potential to cause damage to the hard and soft tissues.<sup>[1,2]</sup> It is difficult to effectively educate, train, and encourage patients to reduce plaque solely by mechanical means since mechanical methods of plaque removal require time, motivation, and manual dexterity.<sup>[3]</sup> This is especially true with fixed orthodontic appliances, in which a high plaque accumulation has been described.<sup>[4-7]</sup> Plaque, in association with fixed appliances, can result in clinical problems such as demineralization of the adjacent enamel<sup>[5,8,9]</sup> and gingival inflammation.<sup>[4,9,10]</sup>

It is generally accepted that gingival health is jeopardized when orthodontic bands are worn.<sup>[7,11-13]</sup> However, an increase

of periodontal-pathogenic bacteria and a subsequent enhancement of inflammation have been observed around orthodontic bands and brackets in comparison to nonbanded or bonded teeth.<sup>[14,15]</sup> It has also been shown that periodontal pathogens are significantly more prevalent in orthodontic

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Received: 23-Oct-2019      Revised: 25-Nov-2019  
Accepted: 18-Nov-2019      Published: 17-Dec-2019

Access this article online	
Website: <a href="http://www.orthodrehab.org">www.orthodrehab.org</a>	Quick Response Code 
DOI: 10.4103/ijor.ijor_34_19	

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**How to cite this article:** Kolhe SA, Patani S, Gulve N, Pawar R, Dhope SV, Gajeshwar H. Oil pulling as an adjunct to improve oral health in orthodontic patients: A clinicomicrobial study. *Int J Orthod Rehabil* 2019;10:152-5.

patients.<sup>[14]</sup> Recent studies confirm that fixed orthodontic appliances impede correct hygiene, resulting in more plaque accumulation, inflammation, and bleeding.<sup>[15]</sup> In previous studies, plaque accumulation and levels of gingivitis were higher for banded than for bonded teeth.<sup>[11,12]</sup>

Antibacterial mouth rinses like chlorhexidine (CHX) are used as an adjunct to mechanical plaque control. CHX is considered as the “gold standard,” but there are a few disadvantages associated with the long-term use such as altered taste sensation, staining of the teeth, and altered taste sensation.<sup>[16]</sup> There is a requirement for a long term, home-based remedy which is also economical.

The concept of oil pulling really is not new, but it is a modified version of oil gargling, which comes from Ayurveda medicine and dated thousands of years ago.<sup>[17]</sup> Oil pulling has been used extensively as a traditional Indian folk remedy for many years to prevent decay, oral malodor, bleeding gums, and dryness of throat, and cracked lips and for strengthening teeth, gums, and jaws.

There is no literature or scientific proof to accept oil pulling therapy as a preventive adjunct for orthodontic patients. 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:

1. To evaluate the effect of oil pulling with sesame oil to improve oral health in orthodontic patients.
2. To compare the efficacy of oil pulling with the use of CHX mouthwash to improve oral health in orthodontic patients.

## SUBJECTS AND METHODS

### Subject selection

The study included twenty systemically healthy patients undergoing orthodontic treatment from the Department of Orthodontics and Dentofacial Orthopaedics, MG V's KBH Dental College and Hospital, Nashik. Patients were included in the study after having signed an informed consent. Patients were randomly divided equally into two groups, which were test group consisting of oral hygiene measures along with sesame oil pulling (SOP) and control group consisting of oral hygiene measures along with CHX mouthwash.

### Materials used

1. Sesame oil containing 150 ml
2. CHX mouthwash bottles of 100 ml.

### Inclusion criteria

Individuals undergoing orthodontic treatment were included in the study.

### Exclusion criteria

The use of antibiotics or mouthwash in the past 3 months.

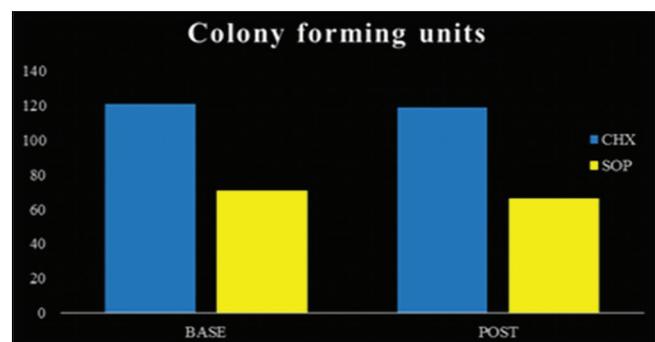
The following clinical parameters were assessed at baseline and at 14 days:

1. Total colony count colony-forming units (CFUs)
2. A common, self-administered questionnaire to evaluate patient acceptance (after 14 days follow-up)

All clinical measurements were made at four sites per tooth: mesiofacial, midfacial, distofacial, and palatal/lingual by the same examiner.

### Study design

The study performed was a randomized clinical trial. Each subject was assigned a specific number and simple random sampling was done using a table of random numbers. All subjects were undergoing orthodontic treatment. The test group was instructed to perform oil pulling with sesame oil, one tablespoon of sesame oil on an empty stomach first thing in the morning for the next 14 days. The sesame oil was provided to them. The control group was instructed to rinse with 0.2% CHX mouthwash for 30 s, twice a day for next 14 days. CHX mouth wash was provided to them. At baseline, all subjects were instructed to wash their mouths with physiological saline (0.85% NaCl). This saline is collected in a sterile container and is serially diluted and plated in blood agar plates. The plates were incubated aerobically at 37°C for 48 h. After this incubation period, the number of colonies present in 1 ml of the saline was calculated by the formulae number of bacteria/ml = number of colonies dilution amount plated. The participants of both groups were instructed to brush their teeth as per their daily home oral hygiene schedule. The pre- and post-procedural values of the plaque and gingival index scores and the total CFU count were compared. At the end of 14 days, patient acceptance of



Graph 1: Colony-forming unit

oil pulling as well as CHX mouthwash from either group was evaluated using a common, self-administered questionnaire.

## RESULTS

CFUs were 11.9K CFU/ml for the test group and 12.1K CFU/ml for the control group.<sup>[2]</sup> CFUs were also reduced to 66K CFU/ml and 71K CFU/ml in both test group and control group, respectively, as depicted in Graph 1.

### Patient acceptance

As shown in Figure 1, patient acceptance was evaluated through a survey in the form of a questionnaire that contained common questions for both the test group and the control group on topics ranging from burning sensation to altered taste. As depicted in Figure 2, around 80% of patients from control group (CHX) complained of burning sensation while none of the patients in the test group had any such discomfort. Altered taste was also highlighted by 60% patients of control group (CHX) as opposed to only 20% patients of test group (SOP) who basically complained of the oily-bland taste rather than any taste alteration or altered taste. Even where compliance was concerned, 80% patients of test group (SOP) showed better compliance as opposed to 60% with the control group patients (CHX). The probable reason could be the once-daily format for oil pulling. Finally, 60% of patients on oil pulling test group were willing to continue the regimen, but we cannot advocate the same for CHX users control group.

## DISCUSSION

Oil pulling is a folk remedy which is not widely practiced; furthermore, it lacks the scientific basis. Through this study,

we can evaluate if oil pulling can be developed as an oral hygiene habit through its effect on plaque, gingivitis, and mouth residing bacteria. The evaluation in this study included both clinical and microbiological assessment as well as patient acceptance survey. The microbiological assessment aimed at the total colony count of aerobic microorganisms in the pre- and post-procedural sample of both test and control groups. Various oils can be used for performing oil pulling such as sesame oil, coconut oil, and sunflower oil. We have used sesame oil in this study. In this study, oil pulling therapy has been as equally effective as CHX against plaque-induced gingivitis. As depicted in Table 1, the CFUs of the test group had reduced, and it showed a mean difference of 44.5%, while in the control group, there was a reduction of 41.3% compared to the initial scores. Patient acceptance survey revealed that 60% of patients were willing to continue oil pulling as part of their daily oral hygiene regimen.

Amith, Ankola and Nagesh<sup>[2]</sup> showed that oil pulling therapy with sunflower oil significantly reduced plaque scores after 45 days. In this study, there was a considerable reduction in the colony count of microorganisms, but it was not statistically significant. Hence, in this study, oil pulling therapy was very effective against both in the clinical and microbiological assessment. CHX “The gold standard” mouthwash was used as the control in this study to assess and compare the effect of oil pulling therapy on oral health of orthodontic patients. Sesame oil is obtained from the seeds of the plant *Sesamum indicum* (*Pedaliaceae* family) largely by pressing methods. Sesame oil is relatively high in unsaponifiable substances, which contains sesamin, sesamol, and sesamol, not found in other fats. Sesamol is a potent antioxidant, not freely available in the oil, and is formed as a result of hydrolysis of sesamol. Sesame oil has increased polyunsaturated fatty acids, and the lipid peroxidation is reduced thereby reducing free radical injury to the tissues.<sup>[8-11]</sup> A study conducted by Asokan *et al.*(2008) showed a definitive reduction in *Streptococcus mutans* count in plaque and saliva after oil pulling

**QUESTIONNAIRE**

**YES/NO & COMMENT**

1. HOW MANY TIMES IN A DAY DO YOU HAVE TO USE THE GIVEN SAMPLE?
2. IN THE LAST 14 DAYS HAVE YOU EVER FORGOTTEN TO USE THE GIVEN SAMPLE?
3. DID YOU EXPERIENCE ANY ALTERED TASTE AFTER USING THE SAMPLE?
4. IS THERE ANY TINGLING/BURNING SENSATION IN THE MOUTH AFTER USING THE SAMPLE??
5. HAVE YOU EXPERIENCED ANY PROBLEM WITH THE TASTE OF THE MEDICATION?
6. ANY EFFECT YOU HAVE FELT ON MOUTHBREATH AFTER USING THE GIVEN SAMPLE??
7. WOULD YOU LIKE TO CONTINUE TO PERFORM THE PROCEDURE AS PART OF YOUR ORAL HYGIENE REGIMEN??

Figure 1: Questionnaire used to evaluate the patient acceptance

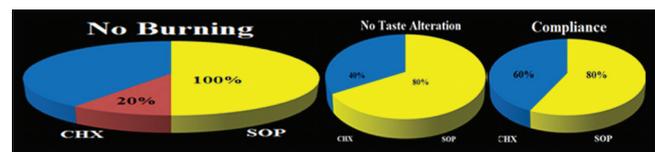


Figure 2: Representation of the results of patient acceptance

Table 1: Comparison between the test and control group

Parameters	Group							
	Test group (SOP)				Control group (CHX)			
	Baseline	14 days follow-up	Mean difference	Percentage difference	Baseline	14 days follow-up	Mean difference	Percentage difference
CFUs	11.9K CFU/ml	66K CFU/ml	53K CFU/ml	44.5	12.1K CFU/ml	71K CFU/ml	58.9K CFU/ml	41.3

SOP: Sesame oil pulling, CHX: Chlorhexidine, CFUs: Colony-forming units

therapy. Hence, oil pulling therapy has shown to reduce the incidence of dental caries.<sup>[12]</sup> Another study by Asokan *et al.* (2009) showed that oil pulling therapy was very effective against plaque-induced gingivitis both in clinical and microbiological assessment.<sup>[13]</sup> Asokan *et al.* (2011) have also demonstrated that the emulsification process of oil started in 5 min after oil pulling therapy. The emulsification was a result of the agitation of the oil in the mouth because of the swishing process, and this process may be responsible for the formation of a soapy layer. The emulsification process could alter the adhesion of the bacteria on the tooth surface, remove the superficial worn-out squamous cells and improve the oral hygiene, thus indicating a possible saponification and emulsification process during oil pulling therapy, which enhances the cleansing action of the sesame oil during oil pulling therapy. These mechanisms could have been the reason for the reduction of colony count of the microorganisms in this study.<sup>[14]</sup> Sesame oil has the following advantages over CHX: no staining, no lingering aftertaste, and no allergy. Sesame oil is 5–6 times more cost effective than CHX 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 CHX. Although 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.<sup>[15]</sup>

## CONCLUSION

- Oil pulling has a significant effect on improving oral health in fixed orthodontic patients; hence, if practiced daily it can be developed into a healthy oral hygiene habit
- A household remedy like oil pulling which saves time and money and enhances general health needs exploration
- Thus, we can promote awareness among people of the long lost practice of oil pulling which is a good preventive home therapy in developing countries like ours.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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