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Review Article

Oil Pulling In Dentistry. A Review

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ABSTRACT

Background: Oil pulling (OP) is an ancient Ayurveda technique that has gained popularity as a contemporary non-pharmacological alternative to conventional mouthwashes. Previously traditionally performed for its supposed antibacterial and detox properties, OP involves swishing sesame, coconut, and sunflower oil in the mouth to remove toxins and promote oral health. Anecdotal benefits are claimed for plaque removal and gum condition, but scientific evidence is poor and inconsistent. The review critically examines the clinical, scientific, and historical evidence base of OP and contrasts its efficacy with conventional oral hygiene regimens. It examines its impact on oral microbiota, plaque development, halitosis, and gingival inflammation and assesses patient compliance and dentists' knowledge of its utility and limitations. **Methods:** This narrative integration of literature combines the latest literature on OP mechanisms and oral health application. A search of PubMed, Web of Science, Scopus, and Google Scholar was conducted for studies published from 2010 to February 2025. Meta-analyses, systematic reviews, and randomized controlled trials that examined OP's antibacterial effect, reduction in plaque, and halitosis control were considered. There was no systematic method or risk of bias assessment. **Results:** OP is shown to significantly reduce plaque, control halitosis, and improve gingival health but is less effective compared to chlorhexidine mouthwash. Coconut and sesame oils are antimicrobial and anti-inflammatory in nature, but OP does not contribute substantially to enamel remineralization or act as an alternative to fluoride therapy. **Conclusion:** OP must be viewed as an adjunct oral hygiene procedure and not as a substitute for brushing, flossing, and the use of fluoride. Additional trials are required to develop standardized protocols and clinical guidelines.

Keywords: Ayurveda, chlorhexidine, fluoride mouthwash, gingival inflammation, halitosis, oil pulling, oral hygiene, plaque control

Introduction

Oil pulling (OP) is an age-old Ayurvedic practice that has been rediscovered as people move toward natural and holistic approaches to oral healt-h. It was practiced in ancient India as a way to detox the mouth, eliminate toxins, and promote general health. It is now being adopted as an alternative oral practice by those seeking chemical-free and low-cost means of maintaining oral health. Despite its long history, OP has been met with skepticism in modern dentistry due to the fact that it has not undergone large-scale clinical trials. However, it is reported to leave the mouth feeling clean, decrease plaque, and promote gingival health by those who use it on a daily basis.[1]

The practice originated from Ayurvedic medicine, which views oral health as a critical component of general health.[2] From an Ayurvedic perspective, proper oral hygiene is considered the cause of numerous systemic diseases, and thus, OP becomes a crucial component of daily self-care.[3] As an oral hygiene method, OP involves swishing oil (sesame, coconut, or sunflower oil) around the mouth for 10–20 min and then spitting it out. It is considered to trap and remove toxins, bacteria, and plaque from the mouth, resulting in better oral and overall health.[4] OP is believed to have numerous effects, including a reduction in oral pathogens, prevention of gum disease, and improvement in salivary function.[3,4]

Conventionally, OP has been considered a holistic approach to health, and practitioners have promoted its usage in the management of disorders beyond oral health, such as headaches, migraines, gastrointestinal disease, and cardiovascular disease.[4] While most of this is anecdotal, OP has been used consistently for its potential to reduce oral bacterial load.[3]

As the demand for natural health remedies increases, OP has become a chemical-free alternative to traditional

mouthwash. Despite numerous anecdotal reports of its oral and systemic benefits, evidence is limited and inconclusive.[5]

The aim of this review is to bridge the gap between Ayurvedic theory and dental science by critically evaluating the existing historical, clinical, and scientific evidence and determining whether OP can be incorporated into mainstream dentistry as an adjunctive treatment rather than a definitive therapy.

Ayurvedic perspective of OP

Ayurveda divides OP into two procedures:

1. Kavala graha: Swishing a small amount of oil in the mouth for approximately 3 min, and then gargling and spitting it out. Used primarily for daily mouth cleaning and detoxification.[3]
2. Gandusha: Fill the mouth with oil, hold it for 3–5 min, and then spit out. It is meant to be used for medicinal reasons, particularly for gum disease and oral inflammation.[3]

Different oils are recommended in Ayurveda to restore different Doshas (Vata, Pitta, Kapha) and reveal different medicinal properties:

- Sesame oil: Is traditionally used to tighten gums and soothe Vata imbalance due to its anti-oxidant and anti-inflammatory character.[6]
- Coconut oil: Contains antibacterial lauric acid, which soothes gum inflammation and restores the balance of Pitta.[5]
- Sunflower oil: Is rich in vitamin E, which is reported to detoxify and balance Pitta.[6]
- Olive oil: To lubricate oral tissues and balance Kapha.[6]

Diseases in the mouth are said to mirror the body's three Doshas' imbalances:

- Vata (Air and Space): Imbalance results in dry mouth, receding gums, and sensitive teeth.
- Pitta (Fire and Water): Excess Pitta causes inflammation, bleeding gums, and ulcers.
- Kapha (Earth and Water): Kapha imbalance is associated with excess saliva, overpopulation of bacteria, and plaque.

Ayurveda considers OP the gateway to overall health by rebalancing the oral cavity through detoxification, which is follows the recent oral and systemic literature.[3]

Scientific evidence and mechanisms of action

Scientific literature suggests several mechanisms by which OP can assist in oral health:

1. Lipid absorption: The oil binds to bacterial membranes, pulling them out of oral tissues, thus preventing bacterial adhesion and biofilm formation.[1]
2. Saponification process: The oil acts with saliva to form soap-like molecules that help remove plaque and clean the oral cavity.[1]
3. Volatile sulfur compounds (VSCs) Reduction: OP helps reduce the compounds that cause halitosis.[7]
4. Anti-inflammatory properties: Coconut and sesame oils contain polyphenols and fatty acids that reduce gingivitis and oxidative stress to oral tissues.[8]
5. Disruption of biofilm: OP prevents the development of bacterial biofilms, reducing plaque formation and gingivitis.[9]
6. Oral pH Improvement: A well-balanced oral pH is essential in an attempt to reduce acid erosion, and OP has been suggested to be involved in this.[1]

Key research findings on OP

- Antibacterial effects: OP with coconut possesses a high potential to reduce the number of *Streptococcus mutans*, a major contributor to dental caries.[10]
- Decrease in plaque and gingivitis: A randomized trial concluded that sesame OP lowered plaque index values as significantly as standard mouthwashes over 4 weeks.[9]
- Halitosis control: Systematic review reported that OP led to substantial reductions in VSCs associated with halitosis.[11]
- Comparative studies: While OP has been helpful in certain studies, meta-analyses report that it remains less effective compared to chlorhexidine mouthwash in the removal of oral bacteria and control of gingivitis.[12]

While some research demonstrates promising outcomes, limitations exist:

- Lack of standardization: No agreement on optimal oil type, duration, or frequency.[6]
- Limited large-scale trials: Most studies have limited sample sizes and thus restricted generalizability.[5]
- Short-term results: There are few studies on the long-term effects of OP on oral health.[6]

Scope of this review

This review aims to explore:

- Effect of OP on the oral microbiome and its effectiveness in eliminating disease-causing oral pathogens, especially *S. mutans*, *Porphyromonas gingivalis* and *Candida albicans*.
- The impact of OP on gum health, such as the potential for its anti-inflammatory properties and if it can prevent gingivitis and periodontitis.
- Mouthwashes containing chlorhexidine compared to other mouthwashes for plaque control and antibacterial efficacy.
- The effects of long-term OP on tooth enamel, salivary pH level, and remineralization potential.
- Patient adherence, acceptance, and perception of OP as part of daily oral hygiene.
- The biochemical mechanisms of OP benefit, including the role of VSCs, lipid emulsification, and detoxification pathways.

By addressing these basic domains, this review aims to provide a balanced critique of OP as a dental health practice, both from the perspective of its historical significance and in the context of evidence-based oral health care.

Methods

This narrative review explores recent literature on OP, its mechanism of action, and its effectiveness in oral hygiene. Results of relevant studies were obtained through database searching on PubMed, Scopus, Web of Science, and Google Scholar. This review includes evidence from randomized controlled trials, meta-analyses, and systematic reviews from journals between 2010 up to February 2025 to provide the most recent and up-to-date data. Studies released after February 2025 have not been included in this review.

Search strategy and inclusion/exclusion criteria

The search was conducted using the following keywords:

"oil pulling," "Ayurveda and oral health," "coconut oil pulling," "plaque reduction and oil pulling," "antibacterial effects of oil pulling," "oil pulling and gingivitis," and "oil pulling and halitosis."

Boolean operators (AND, OR) were employed to limit the search results.

The inclusion criteria for study selection were as follows:

- Peer-reviewed studies published in English.
- Systematic reviews, meta-analyses, and original research articles comparing OP's effect on oral health outcomes.
- Studies of human subjects on plaque control, gingivitis, halitosis, or bacterial reduction.
- Comparative studies of OP with other mouthwashes or oral hygiene practices.

The exclusion criteria were:

- Small-sample studies (<10 participants) with or without control groups.
- Editorials, opinion pieces, case reports, and non-peer-reviewed articles.
- Studies of Ayurvedic hypotheses alone, without empirical evidence.
- Study assessing OP's impact on systemic diseases without oral parameters.

Data extraction and analysis

Data extraction targeted the study design, sample size, intervention type, length of OP, intervention oil type, and outcome measured (e.g., plaque reduction, bacterial count change, gingival health improvement). When available, statistical significance (p-values), effect sizes, and confidence intervals were considered when evaluating studies. No meta-analysis-specific software was utilized, as this was a narrative review rather than a quantitative synthesis.

Rationale for narrative review and absence of bias assessment

A narrative review was chosen over a systematic review due to the heterogeneity of the available studies, differing by methodology, intervention length, and oil type. Most of the studies have not been standardized so direct comparison is difficult. In addition, no systematic risk assessment of bias was conducted because the purpose of this review was to provide an overall qualitative overview of OP's reported benefits and mechanisms and not a quantitative or relative meta-analysis. Future studies can incorporate standardized methods to improve comparability and assess bias systematically.

Results

Comparison of OP and traditional oral hygiene practice

OP versus fluoride and chlorhexidine-based mouthwashes

Fluoride and chlorhexidine mouth rinses are evidence-based for efficacy in plaque control, bacterial inhibition, and enamel remineralization.[13,14] OP, on the other hand, offers natural antibacterial activity but at a lower level than fluoride products.[13,14] OP with sesame or coconut oil, as research indicates, decreases bacterial load but is slower than fluoride products in relieving plaque and gingivitis. In addition, fluoride treatments provide long-term caries protection through the strengthening of enamel, an effect that OP does not possess.[3]

A systematic review comparing between OP and fluoride mouthwashes detected that while OP is significantly reducing bacterial load and improving gingival health, its effectiveness is inferior compared to chlorhexidine mouthwashes. Research also highlights the fact that prolonged use of chlorhexidine can result in side effects such as staining of teeth, mucosal desquamation, and alteration in taste, none of which are seen with OP.[15]

Effect of OP on gingivitis and plaque and its antibacterial effects

Plaque-induced gingivitis is a common dental problem caused by oral biofilm accumulation leading to gingival inflammation, redness, and bleeding. OP has also been researched as a substitute for traditional mouthwashes in preventing plaque and gingivitis. Studies have demonstrated that OP with coconut oil reduces plaque formation and gingivitis over a period of 30 days.[9] Similarly, a comparative study detected that sesame OP was significantly more effective than distilled water in reducing plaque after an 8-week period.[9,16]

Several clinical trials have proven that OP decreases plaque scores and improves gingival health, but its effectiveness is still lower than that of chlorhexidine mouthwash.[12] In a randomized controlled trial conducted in 2018, the efficiency of probiotic mouthwash, chlorhexidine mouthwash, and sesame OP was compared in children aged 10–12 years. In the study, it was noted that all three treatments were equally effective in their activity in inhibiting the plaque and gingival health over 30 days.[17]

A meta-analysis in 2022 indicated that OP was able to reduce the salivary bacterial colony counts but did not differ significantly from the control groups in plaque and gingival index scores.[5]

OP and its effects on the oral health

OP is claimed to have positive impacts on oral health by suppressing the growth of pathogenic oral bacteria such as *S. mutans* and *P. gingivalis*, which are associated with dental caries and periodontal diseases. A randomized clinical trial demonstrated that OP using sesame oil reduced *S. mutans* plaque concentration, suggesting its potential role in lowering the risk of dental caries.[18] A meta-analysis further indicated that OP effectively reduced salivary bacterial colony counts; however, variations in gingival and plaque index scores were not significant when compared to control subjects.[5] In addition, OP has been associated with a temporary reduction in total oral microbial load, which suggests a possible role in oral hygiene.[19]

OP has also been investigated for reducing halitosis. A randomized controlled trial revealed that OP with sesame oil significantly reduced oral malodor and microbial load, showing comparable efficacy to chlorhexidine mouthwash.[20]

The comparative effectiveness of coconut and sesame oil for OP has been examined in a number of studies. Research shows that both oils contribute to the decrease in gingival inflammation and plaque but are distinct in their properties:

- Coconut oil: Studies indicate that coconut OP for four to 6 weeks yields significant reductions in plaque index and gingival inflammation scores.[16,21]
- Sesame oil: Is purifying and antioxidant in character. It contains essential nutrients such as vitamin E, vitamin K, magnesium, and zinc, which are accountable for its oral health benefits.[22] It has been proven that sesame oil prevents bacterial adhesion to the tooth surface and stops plaque formation, and it is a potential adjunct oral hygiene regimen.[23] It has weaker antimicrobial action compared to coconut oil.[24]

Awareness and perception among dental professionals

Awareness and perception of OP among dental professionals vary based on their scientific knowledge, patient inquiries, and regional customs. A 2021 questionnaire survey revealed that only 8.6% of dental professionals reported having a good awareness of OP, while 56.3% had moderate awareness and 35.2% had poor awareness. In addition, only 17.2% of respondents had personally tried OP, and 12.5% recommended it to their patients.[25]

Regional practices significantly influence beliefs regarding OP. A comparative study of Ayurvedic and dental students found that 78.3% of Ayurvedic students were aware that OP should be performed before brushing in the morning, compared to only 30.8% of dental students. This reflects that practitioners from regions where Ayurvedic medicine is more prevalent may be more aware and receptive regarding OP as an adjunct treatment.[5,26]

Despite some anecdotal support, concerns still surround dental professionals regarding the lack of scientific evidence for OP. The American Dental Association (ADA) has documented that there is no solid science supporting OP as a sound oral practice in caries prevention, tooth whitening, or promoting overall oral hygiene.[27]

Discussion

Comparison of OP and traditional oral hygiene practice

OP versus fluoride and chlorhexidine-based mouthwashes

Comparing OP to chlorhexidine- and fluoride-based mouthwashes reveals the following important differences:

- Plaque control: Fluoride mouthwashes inhibit plaque formation and enamel remineralization, OP lacks significant remineralizing properties compared to fluoride treatments.[28]
- Antibacterial action: Evidence validates chlorhexidine as more potent to reduce oral pathogens, whereas OP has a moderate antibacterial effect.[12]
- Reduction of halitosis: Both reduce bad breath, but fluoride mouthwashes do it faster.[11,29]
- Safety and side effects: OP is a natural and chemical-free alternative, while fluoride products may result in staining or allergic reactions in some patients.[13]

Although OP has antibacterial properties, fluoride mouthwashes remain the gold standard for caries prevention and enamel remineralization. Therefore, OP should be employed as an adjunctive treatment rather than a replacement for evidence-based dental therapy.[30]

Effect of OP on gingivitis and plaque and its antibacterial effects

While evidence supports the activity of OP in reducing plaque and gingivitis inflammation, it is less effective than chlorhexidine mouthwash. The primary mechanism of action of OP's antibacterial effect is due to the swishing mechanical action that dislodges biofilm bacteria and interdental debris.[7] Coconut oil and sesame oil also contain antimicrobial substances within them that would result in the reduction of inflammation.

- Coconut oil: Tests have shown that medium-chain fatty acids found in coconut oil exhibit 90% activity against *Staphylococcus aureus* and 80% against *Escherichia coli*.[31]
- Sesame oil: Research shows that sesamol is an effective antimicrobial agent, and thus it is an effective natural antimicrobial agent with prospects in oral health.[4,28]

OP can be beneficial in oral health but should be utilized as an adjunct and not a replacement for routine brushing and flossing. The ADA does not recommend OP as an alternative to daily oral hygiene practice. The ADA is emphasizing the requirement of the use of at least twice-daily brushing with fluoride toothpaste and once-daily flossing for optimal dental health.[27,32] Additional long-term studies need to be performed to ascertain the possible role of OP in preventing periodontal disease. Recent studies indicate that OP decreases some oral bacteria, but its long-term impact on periodontal health is unclear.

OP and its effects on the oral health

Although studies show OP reduces bacterial load and gingival health improvement, it is less efficient than conventional chlorhexidine mouthwash. The primary mechanism of action in OP is thought to be the physical elimination of interdental debris and bacterial biofilm by swishing and not by a bactericidal direct action.

- Gingival oil comparison: Coconut oil and sesame oil have been shown to have an effect in reducing gingival inflammation. Coconut oil has, however, shown a relatively greater reduction in gingival index scores after 3 weeks of use.[4]
- Antimicrobial potentiality: Research shows that coconut oil is more potent in its antimicrobial effect compared to sesame oil. Coconut oil has been proven to inhibit action against *S. mutans* and *C. albicans* whereas sesame oil inhibits activity only against *S. mutans*.[4]
- Comparative effectiveness with chlorhexidine: In a meta-analysis and systematic review of 25 trials involving 1,184 patients, it was seen that while OP did enhance gingival health, chlorhexidine mouthwash was more effective in reducing the plaque index score.[5]

Although OP has some oral health benefits, it would be more appropriately considered an adjunct treatment rather than a substitute for evidence-based oral hygiene practice. Additional long-term studies need to be performed to establish its efficacy in the prevention of periodontal disease progression and to determine the most effective oils and protocols of OP therapy.

Awareness and perception among dental professionals

The lack of knowledge among dental professionals and the absence of strong clinical evidence supports the need for further studies and education on OP. The inclusion of OP in present dental practice requires extensive clinical training and scientific validation. Dental professionals must have access to accurate, evidence-based facts so that patients can be appropriately counseled about auxiliary oral hygiene measures.[25]

Research gaps and areas for future studies

Despite the earlier studies that suggest a couple of benefits in OP, there are appropriate gaps in research that have to be explored:

1. Long-term clinical trials: Most studies on OP publish short-term effects. Longitudinal studies should be conducted to establish the impact on oral health over long periods.
2. Standardization of protocols: The present research is inconsistent in methodology. The optimum type of oil, time, and frequency of OP must be scientifically determined.
3. Comparative research: More studies should compare OP with fluoride-based methods across different ages and populations to gain an idea of its comparative efficacy.
4. Mechanistic studies: Mechanisms of biochemical and microbiologic action of OP are still unknown. Further studies are needed to establish how it impacts oral bacteria and overall oral health.

By addressing these gaps, researchers can better define the clinical significance of OP and determine whether or not it can be officially recommended in dental practice guidelines.

Future research directions

To establish the clinical effectiveness of OP, future research should be in the form of:

- Large-scale, multi-centered randomized controlled trials: Present data are skewed by insufficient sample sizes and short trial lengths. Large trials are necessary to determine the efficacy of OP in diverse populations.[6]
- Standardize the optimum oil to use and time to swish for maximum benefits: There is no consensus on what oil is most appropriate or for how long to swish. Trials should attempt to standardize these parameters to optimize the efficacy of the practice.[15]
- Assess the long-term impact of OP on enamel remineralization and gum disease: While some research describes potential benefits, few data exist regarding the long-term impact of OP on enamel status and periodontal status. Prospective longitudinal studies need to assess these outcomes.[1]

Addressing these research questions will further clarify the practice of OP in oral health and result in evidence-based practice recommendations.

Conclusion

OP remains a popular traditional oral care method, particularly where Ayurvedic and holistic health modalities are widely practiced. Its rich history and cultural popularity are both factors contributing to its resurgence as a natural oral care method.

The existing scientific evidence partially supports some of the claims for OP, including its antibacterial effect, ability to reduce plaque, and utility in the treatment of halitosis. However, compared with conventional oral hygiene procedures, that is, fluoride-based mouth

rinses and mechanical methods of plaque control, OP is inferior in reducing bacterial counts, cavity protection, and enamel hardness.

While OP may have promise as an adjunct treatment, it must not be used in place of evidence-based measures such as brushing, flossing, and the use of fluoride. Future large-scale, long-term clinical trials must be conducted to more rigorously determine its efficacy, limitations, and standardization of procedure.

Finally, OP is an innocent, natural, and healthy added habit of oral cleanliness but should be preceded by new oral routines for the most advantage of oral cleaning. Increased consciousness among dentists and humanity regarding its benefits and limitations will take care of appropriate oral habits' choices.

Authors Contributions

EY: Literature search, collected data.
NA: Write up, supervised the study, and carried out the final editing of the manuscript.
NA: review the manuscript.

All authors have read and agreed to the published version of the manuscript and are responsible for the content and similarity index of the manuscript

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Conflicts of Interest

The authors declare no conflict of interest.

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