

Efficacy of Herbal Mouthwash in Maintaining Gingival Health in Patients Undergoing Orthodontic Treatment- A Scoping Review

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Abstract:

Objective: This scoping review aims to investigate the evidence about herbal mouthwashes' efficacy in preserving oral health during orthodontic treatment.

Methodology: The criteria considered in this review were as follows: population: studies with participants in good health; Intervention: mouthwash composed of natural components; Comparison: herbal mouthwash, placebo, and chlorhexidine; Improvements in oral hygiene, suppression of microorganisms, and plaque and gingival indices are the outcomes. Research publications that are pertinent are chosen from PubMed and Web of Science.

Introduction: Reduced use of antibiotics and antibacterial mouth rinses for gingivitis has been the goal of clinicians. Recently, natural items that promote health have received a lot of attention. Because fixed orthodontic appliances are large and encourage the buildup of plaque, patients receiving fixed orthodontic treatment (OT) are more likely to experience gingival inflammation. Chemicals such as triclosan and chlorhexidine are known to be effective at preventing the development of plaque. The antibacterial and anti-inflammatory qualities of herbal medications may increase patient compliance because they don't have any negative side effects.

Conclusion: The little data that is currently available suggests that mouthwashes with a herbal component can help individuals receiving fixed orthodontic treatment control their gingivitis. More carefully planned clinical studies are required.

Keywords: Mouthwash, chlorhexidine, oral health, gingivitis.

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INTRODUCTION

Dental health education efforts have been in high demand recently, with the main goal being to increase the adoption of good oral health practices that are expected to transition to better oral health.¹ Furthermore, there have been a rise in the demand for data that can support the decisions that

people and policymakers alike can make regarding their oral health.¹ Orthodontic devices hinder plaque removal and promote bacterial adhesion. As a result, patients who don't practice good dental hygiene are more likely to develop gingival disorders.

Numerous studies have demonstrated that fixed orthodontic devices elevate the risk of gingival

irritation by introducing new sites for plaque retention. Oral biofilm undergoes significant changes during orthodontic treatment, which puts periodontal tissues at risk for clinical and inflammatory changes³.

The occurrence significantly rises during puberty, particularly between the ages of 9 and 14, which is significant for orthodontists. Gingivitis is perhaps caused by poor dental hygiene, which is why fixed orthodontic equipment that promote mechanical plaque retention are one of the main causes of greater incidence of marginal gingivitis in orthodontic patients.⁴

Since ancient times, oral rinses produced with ayurvedic medicines have been employed in periodontal therapy⁵. These days, herbal medications, which include active substances that are "naturally occurring," are increasingly popular since they provide a safe, dependable, and long-lasting method for restoring health. Ayurvedic medications use a comprehensive approach to treating the whole person. It can preserve the harmony between both overall and oral wellness as well as the environment, both of which are essential in this day and age for human well-being.

METHODOLOGY

This study covered trials with healthy subjects in which the use of natural mouthwash components as an intervention was used. Other oral hygiene-maintaining substances including chlorhexidine and a placebo were compared. Included were studies that reported on changes in bacterial load, impact on dental hygiene, and plaque and gingival indices.

A literature search was done using Google Scholar and PubMed's electronic databases. Boolean operators "AND," "OR," and combinations of MeSH phrases were used to construct a PubMed search strategy. (((("orthodontic treatment"[Title/Abstract] AND "gingival health"[Title/Abstract] AND "maintenance"[Title/Abstract] AND "herbal"[Title/Abstract]) OR "natural"[Title/Abstract]) AND "mouthwash"[Title/Abstract]) filters: from 2018 to 2022. Then, the search approach was modified for use

with different databases. The screening method covered articles published during 2018 onwards. After that, duplicate articles were eliminated by importing the articles into the reference manager program Zotero, version 6.0.15. The papers' complete texts were obtained and assessed before being included in the review. Any data duplication reported in research was acknowledged.

The inclusion and exclusion criteria for admittance in the review are reported in table 1. Table 1 - Study selection criteria

Inclusion criteria	Exclusion criteria
Intervention consisted of the use of natural ingredients as mouthwash	Studies reporting on toothpaste and varnish formulations
In vivo experimental studies, randomized clinical trials	Abstracts
Studies on healthy individuals	opinions, commentaries,
Studies reporting outcomes on gingival and plaque index	review articles
Comparative studies	Studies on animals
Full text articles	Non orthodontic population

Data extraction from the chosen articles was done using the 'PICOS' technique. Tables that included the characteristics of each study's participants, the kind of intervention, the comparator, the study's outcomes and the design were used to extract data. (Table 2)

RESULTS

Study Selection

This review's flowchart displays the selection process for the studies. Through the use of electronic databases and a literature search, 352 possibly relevant documents were found. 327 entries were eliminated from the 340 records that were evaluated for title and abstract content after duplicates were eliminated. 7 articles and one article for the population were omitted due to the unavailability of full texts. Based on the inclusion/exclusion criteria, 5 of the articles that were assessed for eligibility evaluation were included in the review. The figure shows the rationale behind the exclusion of eight articles.

PRISMA flow diagram for scoping reviews which included searches of data bases and registers only

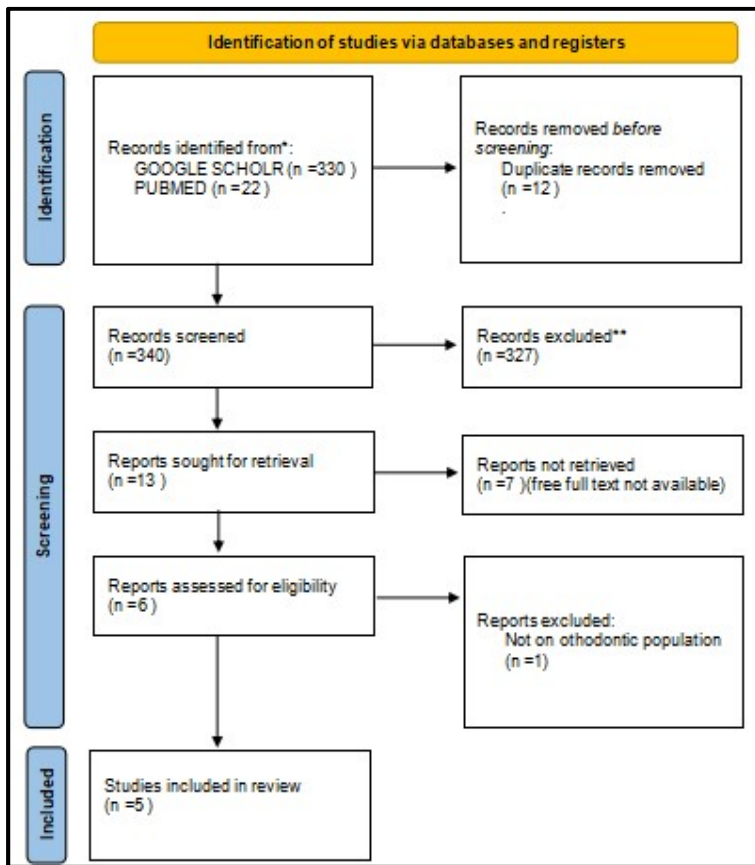


Fig1. PRISMA flow chart

Study Characteristics

Table 2 displays the study features of the included studies. The 5 included articles in this review were *in vivo* randomized clinical trials. And populations were patients undergoing orthodontic treatment.

Plaque and gingival indices

Plaque and gingival indices were assessed in four studies. When mouthwash with a herbal component was used instead of treatments without, the findings of these investigations showed a substantial improvement in plaque buildup and a decrease in sulcular or papillary gingival bleeding (Table 2).

Author, year	Study design	Population	intervention	Comparison	Duration	Outcome
Aysha et al., 2022 ⁸	Randomized clinical trial	90 fixed orthodontic patients	3 groups: chlorhexidine (group I), Aloe vera (group II), and control (group III).	Plaque index (PI) and gingival index (GI).	20 days	Aloe vera could be an alternative to chlorhexidine in patients who are seeking a chemical-free, indigenous, and patient-friendly oral hygiene aid
Goes et al., 2016 ¹⁰	Randomized clinical trial	30 patients (age, 10-40 years)	3 groups: placebo (group 1) Chlorhexidine (group 2) MTC (group 3)	Visual plaque index (VPI) and gingival bleeding index	15 days	1% MTC group did not report side effects commonly associated with CHX. MTC reduced biofilm accumulation and gingival bleeding.
Kawale et al., 2021 ⁷	Randomized clinical trial	6 Subjects	2 groups: group 1 (green tea mouthwash) and group 2 (chlorhexidine)	sulcus bleeding index and Turesky-gilmore-glickman modification of quigley hein index	45 days	Green tea mouthwash showed similar efficacy as chlorhexidine in terms of reduction of gingival inflammation and reduction of plaque without any side effects
Asmita et al., 2021 ¹¹	Randomized clinical trial	60 patients	5 groups: herbal antiseptic mouth rinse (Pomegranate: Group A; Cranberry: Group B; Noni: Group C; Guava: Group D) and sterile water (Group E: Placebo Control).	O'Leary plaque index (PI) using a disclosing agent and Loe and Silness gingival index (GI)	1 week	effective reduction in plaque and gingivitis score

Changes in Pathogenic Bacterial Load

Herbal mouthwash was found to be beneficial in changing the bacterial load in one investigation. In comparison to other treatments, the results indicated that it assisted in lowering the pathogenic number of bacteria (Table 3).

Abirami et.al., ¹²	Randomized clinical trial	20 patients	Group I (experimental group - Herbostra oil pulling mouthwash) and Group II (reference group-0.2% Chlorhexidine mouthwash)	The plaque index and microbial analysis	3 weeks	There was a reduction in plaque scores and <i>S. mutans</i> count with Herbostra oil pulling mouthwash but it was not as effective as Chlorhexidine mouth rinse.
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DISCUSSION

Based on the current research, it may be suggested that individuals receiving orthodontic treatment benefit from using ayurvedic mouthwashes. It is clear from the study findings shown in the tables that herbal mouthwashes significantly improve oral cleanliness, gingival health, and the decrease of harmful microorganisms.¹ Many beneficial qualities of herbal mouthwashes have been attributed to their peculiar chemical composition.

Plaque index, gingival indices, and oral hygiene

Studies revealed that tannins and fluoride both had an inhibiting impact. When compared to chlorhexidine, respondents in the Kawale et al. trial had the highest intended benefit from green tea. At the 45th day, the gingival level scores for Green Tea mouthwash decreased. From poor to good, the state of oral hygiene improved.⁷

A mouth rinse containing extract from fructus mume (FM) and another mouth rinse containing essential oil (EO) were used in a research by Chen Y et al. to examine the effects of natural compounds-containing mouth rinses (NCCM) on patients undergoing fixed orthodontic appliance therapy.

The duration of this trial was six months. It was a parallel-controlled, randomized, single-blinded study. 90 individuals receiving treatment with fixed orthodontic appliances participated in the clinical trial. A control group, an FM group, or an EO group was selected from among the subjects. Plaque index, bleeding index, and modified gingival index were

recorded, and baseline, third, and sixth-month microbiological investigations were carried out. They came to the conclusion that both NCCMs could effectively stop gingival bleeding without changing the microbiological profile.²

Changes in pathogenic bacterial load

Various products are frequently used to stop the growth of potentially dangerous oral germs, including mouthwashes, irrigating agents, sodium hypochlorite, cetylpyridinium chloride, and amine fluoride. These antimicrobial medications are often utilized; nonetheless, reports of acute hypersensitivity responses, toxicity, tooth discoloration, and other adverse effects have been reported.

A range of antibiotic types with better antimicrobial efficacy and less toxicity have been required because of the possibility of drug-resistant oral bacteria emerging as well as the negative consequences of current antibacterial therapies.

Only one research that used microbiological analysis was found in this review. In the study by Abirami et al.¹² colony morphologies were assessed, numbered, and quantified in colony forming units following the inoculation of a swab containing a sample. This procedure allowed for a calculation of the bacterial count. The antibacterial and anti-plaque properties of a novel, commercially available oil pulling mouth rinse were compared with those of chlorhexidine mouth rinse in a study conducted by Abirami et al. According to the study's findings, oil pulling mouthwash reduced plaque scores just as well as chlorhexidine did, but it had no effect on the number of *S. mutans*.

Many medicinal plants and their compounds are used extensively for the prevention and treatment of oral infections. Out of all of these, Aloe vera is particularly noteworthy and has been used medicinally for a very long time.⁸

According to Haffajee AD et al.'s study, *Veillonella parvula* decreased most in the essential oil and chlorhexidine groups of antimicrobial mouth rinses, whereas streptococcus and *Capnocytophaga* species decreased in the herbal rinse group.⁹

Given the comprehensive outcomes of this analysis, it is suggested that future investigators in this

domain use randomized controlled trials (RCTs) with appropriate sample sizes to enhance the study's power for impact estimation. It will be impossible to create a therapeutic dosage for preserving gingival health in orthodontic patients without this knowledge.

Limitations and gaps in the literature

It is important to acknowledge several limitations in the research, even with the data indicating the therapeutic effectiveness of herbal mouthwash in preserving dental health. A worry is that earlier research used follow-up times that varied from two weeks to two months. Future research must look at the dosage-benefit relationship and safety concerns, with a focus on determining the therapeutic dose required to eradicate the target bacteria.

CONCLUSION

Oral health may be initiated, sustained, and maintained with the help of herbal mouthwash, as evidenced by the literature study. The existing gaps in the literature point to the need for more research on the side effects, comparison studies with other conventional products, and studies with bigger sample numbers and longer follow-up periods.

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