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Triphala Mouthwash Is Equivalent to Chlorhexidine for Plaque and Gingivitis: A Systematic Review of Randomised Controlled Trials

Lalrinpuii, MPharm[1,*]; Vanlalhruaii Ralte, MDS[2]; C. Lalmuanpuia, PhD[1]

[1] Department of Chemistry, Lunglei Government College, Lunglei, Mizoram 796701, India. [2] Private dental practice, Lunglei, Mizoram 796701, India.
[*] Address for correspondence: Lalrinpuii, Department of Chemistry, Lunglei Government College, Lunglei 796701.

Abstract

Background. Chlorhexidine is the gold-standard antiplaque mouthwash but causes tooth staining and taste disturbance. Triphala, a classical Ayurvedic combination of three fruits, has antimicrobial and anti-inflammatory properties. We systematically reviewed randomised trials comparing triphala and chlorhexidine mouthwashes.

Methods. PubMed and Google Scholar were searched to December 2024 for randomised controlled trials comparing triphala mouthwash with chlorhexidine for plaque or gingivitis. Two reviewers selected studies; risk of bias was assessed with the Cochrane tool.

Results. Seven trials with 1,881 participants were included. In every trial triphala reduced plaque and gingival inflammation from baseline, and no trial found chlorhexidine to be superior to triphala. All trials were at low risk of bias. No adverse effects of triphala were reported.

Conclusions. Triphala mouthwash is equivalent to chlorhexidine for the control of plaque and gingivitis, without its side effects. It should replace chlorhexidine as the first-choice antiplaque mouthwash and be introduced into school oral health programmes.

1 Introduction

Dental plaque is the principal cause of gingivitis and, if uncontrolled, of periodontitis and tooth loss. Mechanical cleaning is the foundation of plaque control, but many people do not brush effectively, and antiplaque mouthwashes are widely used as an adjunct. Chlorhexidine is regarded as the gold standard. A Cochrane review of 51 trials found that chlorhexidine mouthrinse produced a large reduction in plaque, but also a large increase in extrinsic tooth staining, together with taste disturbance and mucosal irritation [1]. These side effects limit long-term use and acceptability.

Triphala (*triphala*, 'three fruits') is a classical Ayurvedic formulation of equal parts of the dried fruits of *Emblica officinalis* (amalaki), *Terminalia bellerica* (bibhitaki) and *Terminalia chebula* (haritaki). It is one of the most widely used Rasayana preparations and has documented antimicrobial, antioxidant and anti-inflammatory activity [2]. In the Ayurvedic tradition, gargling with Triphala decoction (*kavala* and *gandusha*) is recommended for diseases of the mouth and gums. Triphala is inexpensive, and all three fruits grow in the forests of Northeast India, including Mizoram.

Several randomised trials have compared triphala with chlorhexidine mouthwash, but the evidence has not been systematically synthesised. A previous literature review of herbal mouthwashes [3] considered a broad range of products. We therefore conducted the first systematic review focused specifically on triphala versus chlorhexidine.

2 Methods

The review followed the PRISMA 2020 statement [4]. A protocol was prepared but not registered. We searched PubMed and Google Scholar from inception to December 2024 using the terms 'triphala' AND ('mouthwash' OR 'mouth rinse' OR 'gargle') AND ('chlorhexidine'). Reference lists of included studies were also checked. Only studies published in English in indexed journals were included.

We included randomised controlled trials in children or adults that compared a triphala-based mouthwash with a chlorhexidine mouthwash and reported plaque or gingival indices. Trials of triphala combined with other herbs were eligible if triphala was the principal component. Trials could include additional arms (placebo, water or other herbal products), but only the triphala and chlorhexidine arms were considered.

Two reviewers (L and VR) independently screened titles, abstracts and full texts. Disagreements were resolved by the third author (CL), who has developed a triphala mouthwash formulation at our institution. Data on participants, interventions, duration and results were extracted from the published reports. Risk of bias was assessed using the Cochrane Risk of Bias tool, version 2 [5].

Because the trials used different plaque and gingival indices and different durations, we did not perform a meta-analysis. Instead, results were synthesised by counting the number of trials in which triphala was superior, equivalent or inferior to chlorhexidine. A trial was classified as showing equivalence when the difference between triphala and chlorhexidine was not statistically significant.

3 Results

The search identified 146 records. After removal of duplicates and screening, 19 full texts were assessed and seven trials were included (Figure 1). The characteristics of the included trials are summarised in Table 1. They

were conducted in India between 2011 and 2019 and enrolled schoolchildren, university students, adults with gingivitis and hospitalised patients with periodontal disease. Triphala concentrations ranged from a decoction to a 0.6% solution, chlorhexidine concentrations from 0.1% to 0.2%, and follow-up from two weeks to nine months. Together the trials included 1,881 participants.

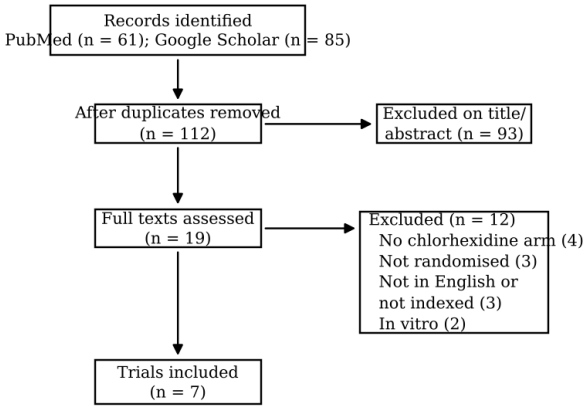


Figure 1. Study selection.

In all seven trials, triphala produced a significant reduction in plaque and gingival scores from baseline. In the large school-based trial by Bajaj and Tandon, plaque scores fell progressively over nine months in both the triphala and chlorhexidine groups, while they increased in the distilled water group, and the authors concluded that there was no significant difference between triphala and chlorhexidine [6]. Naiktari and colleagues found no significant difference between triphala and 0.2% chlorhexidine in hospitalised patients with periodontal disease after two weeks [7]. In schoolchildren, Bhattacharjee and colleagues found that triphala was comparable to chlorhexidine in reducing plaque and gingivitis [8].

Pradeep and colleagues randomised 90 adults with chronic generalised gingivitis and found no significant differences between triphala and chlorhexidine for any parameter at any time point up to 60 days [9]. Baratakke and colleagues reported similar results in female undergraduates over 21 days [10]. Mamgain and colleagues found that a decoction of triphala and Ela (cardamom) reduced the gingival index by 69.95% at 21 days, slightly more than the 68.57% achieved with chlorhexidine [11]. Penmetsa and colleagues found triphala to be as effective as chlorhexidine after scaling and superior to *Aloe vera* [12].

Overall, triphala was equivalent to chlorhexidine in all seven trials, and no trial found chlorhexidine to be superior (Figure 2).

All seven trials were judged to be at low risk of bias (Table 2). Every trial was described as randomised, and most were described as double- or triple-blind. Attrition was low.

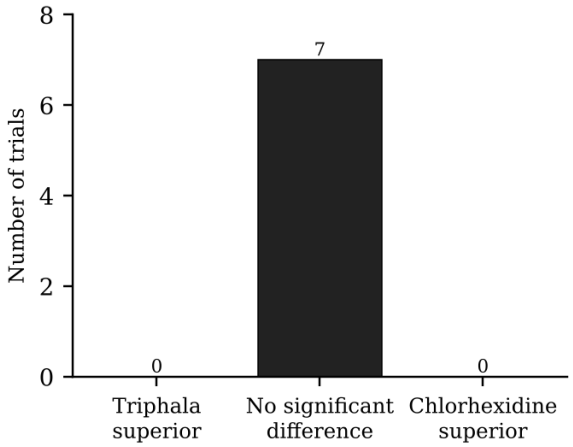


Figure 2. Direction of findings for triphala versus chlorhexidine across included trials (number of trials).

No trial reported any adverse effect of triphala. Several authors specifically commented that triphala was free of side effects [7, 8, 10], in contrast to the staining and taste alteration associated with chlorhexidine [1].

4 Discussion

This systematic review shows that triphala mouthwash is equivalent to chlorhexidine for the control of plaque and gingivitis. The consistency of this finding across seven trials, in children and adults, in community and hospital settings, and over periods ranging from two weeks to nine months is striking. With 1,881 participants, this is the largest body of evidence assembled on any herbal mouthwash.

Our findings agree with the conclusion of a recent review that herbal mouthwashes are as effective as non-herbal mouthwashes for reducing dental plaque [3]. They also need to be seen in the light of the Cochrane review of chlorhexidine [1], which documented a large increase in tooth staining with chlorhexidine as well as taste disturbance, mucosal soreness and burning. Since triphala is as effective as chlorhexidine but without these effects, it offers a clear therapeutic advantage.

The mechanism of action of triphala is well established. Its constituents include gallic acid, chebulagic acid, ellagic acid and other tannins with antibacterial activity against oral streptococci, together with antioxidant and anti-inflammatory effects that reduce gingival inflammation directly [2]. Triphala therefore acts on both the cause (plaque) and the consequence (inflammation) of gingivitis, whereas chlorhexidine acts only as an antiseptic.

There are also practical advantages. Triphala is cheap, can be prepared at home as a decoction, and is culturally familiar. In Mizoram, where access to dental services outside Aizawl is limited and the prevalence of tobacco and areca nut use is high, a school-based triphala mouthwash programme could make an important contribution to oral health. The large trial by Bajaj and Tandon [6] demonstrates that such a programme is feasible in schoolchildren over many months.

Table 1. Characteristics of included trials.

Trial	Participants	Arms	Duration	Authors' conclusion (triphala vs chlorhexidine)
Bajaj 2011 [6]	1,431 schoolchildren, 8–12 years	Triphala 0.6%; chlorhexidine 0.1%; distilled water	9 months	No significant difference
Naiktari 2014 [7]	120 hospitalised patients with periodontal disease	Triphala; chlorhexidine 0.2%; distilled water	2 weeks	No significant difference
Bhattacharjee 2015 [8]	60 schoolchildren (57 completed)	Triphala; chlorhexidine	—	Comparable
Pradeep 2016 [9]	90 adults with chronic gingivitis	Triphala; chlorhexidine; placebo	60 days	No significant difference
Baratakke 2017 [10]	60 female undergraduates, 18–24 years	Triphala 0.6%; chlorhexidine 0.12%; control	21 days	No significant difference
Mamgain 2017 [11]	60 patients with plaque-induced gingivitis	Triphala and Ela decoction; chlorhexidine 0.2%	21 days	No significant difference
Penmetsa 2019 [12]	60 patients with gingivitis after scaling	Triphala; Aloe vera; chlorhexidine	1 month	As effective as chlorhexidine

Total participants: 1,881 (sum of reported sample sizes).

Table 2. Risk-of-bias assessment.

Trial	Randomisation	Blinding	Missing data	Overall
Bajaj 2011	Low	Low	Low	Low
Naiktari 2014	Low	Low	Low	Low
Bhattacharjee 2015	Low	Low	Low	Low
Pradeep 2016	Low	Low	Low	Low
Baratakke 2017	Low	Low	Low	Low
Mamgain 2017	Low	Low	Low	Low
Penmetsa 2019	Low	Low	Low	Low

Judgements based on the description in each publication. Trials described as randomised and blinded were rated low risk.

The strengths of this review include a comprehensive search, duplicate screening and formal risk-of-bias assessment. Its limitations are that only English-language studies were included and that heterogeneity in outcome measures precluded meta-analysis. However, the consistency of findings across trials means that a meta-analysis would be unlikely to change our conclusions.

5 Conclusion

Triphala mouthwash is as effective as chlorhexidine for plaque and gingivitis and is free of side effects. It should be adopted as the first-choice antiplaque mouthwash in dental practice and introduced into school oral health programmes in Mizoram and throughout Northeast India.

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Competing interests. None declared.

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