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Research Article

EVALUATE THE COMPARATIVE EFFECTS OF HERBAL ORAL RINSE AND 0.12% CHLORHEXIDINE ON DENTAL PLAQUE INDUCED GINGIVITIS: A RANDOMIZED CLINICAL TRIAL

Jawahir Ahmad Ganai*¹, Suhail Majid Jan², Roobal Behal³ and Falak Naz⁴

¹ Department of Periodontics, Government Dental College, Srinagar, J&K

² Department of PERIODONTICS, Government Dental College, Srinagar, J&K

³ Government Dental College, Srinagar, J&K

⁴ Department of Prosthodontics, Crown & Bridge, Government Dental College, Srinagar, J&K

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ABSTRACT

Background: Chlorhexidine (CHX) is considered as a gold standard of antimicrobial rinses. Various herbal oral rinses are available in the market. However, little is known of its effectiveness. **Aim:** The aim of this study was to evaluate the clinical changes after the usage of herbal oral rinse and 0.12% CHX. **Materials and Methods:** In a randomized clinical trial, 72 patients with dental plaque-induced gingivitis were assigned to Group I (Herbal Oral Rinse - Hiora®) and 72 patients with dental plaque-induced gingivitis to Group II (0.12% Chlorhexidine-Peridex®). Gingival index and Plaque index scores were recorded at baseline and 21 days after scaling. **Results:** Intragroup comparison in both groups showed that plaque index and gingival index scores were statistically significant after 21 days as compared to baseline. Intergroup comparison showed that plaque index scores and gingival index scores were statistically significant in Group II as compared to Group I. **Conclusion:** When herbal oral rinse was compared to 0.12% CHX, 0.12% CHX mouth rinse effectively reduced the clinical symptoms of plaque-induced gingivitis.

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INTRODUCTION

Gingivitis is defined as the "marginal inflammation of the gingiva comprising an inflammatory cell infiltrate, reversible destruction of collagen, and the clinical appearance of redness and swelling (Van Dyke). Bacterial plaque is the primary etiological cause of gingivitis. Current research indicates that plaque biofilm, a complex three-dimensional arrangement of bacteria in a self-sustaining community, has been associated with the initiation and progression of gingivitis and the onset of periodontitis.^{1,2} Plaque-induced gingivitis begins at the gingival margin, and the virulent pathogens can progress throughout the gingival unit. Irreversible damage may occur when microbes migrate deeper into the epithelium.³

Regular plaque control helps in preventing and controlling the progression of the disease. Mechanical plaque control is considered to be the gold standard of periodontal therapy.⁴ It includes toothbrush, interdental floss, interdental brushes and woodsticks.⁵ However, mechanical plaque control does not always suffice completely as its efficacy is dependent on the

dexterity and motivation level of the patient.⁴ Thus, chemical agents are advocated as adjuncts to mechanical methods to augment the plaque control. Mouthwashes are most commonly used for chemical plaque control. A mouth wash is a medicated liquid which is held in the mouth and swished by the action of perioral musculature to eliminate the oral pathogens.⁶ They provide a means of depositing an active material for slow release in the mouth. So, they have antiplaque effect for a long period of time.⁷

Chlorhexidine is a cationic bisbiguanide with a very broad antimicrobial spectrum. It is the most widely used over the counter mouth wash. It is effective in reducing gingival inflammation. It is considered to be the gold standard and the major advantage is its long substantivity which is of 12 hours.⁸ It binds to soft and hard tissues in the mouth, enabling it to act over a long period after application. However, chlorhexidine has several side effects, such as staining and taste alteration, which limit its long-term use.

*Corresponding author: Jawahir Ahmad Ganai,
Department of Periodontics, Government Dental College, Srinagar, J&K

Herbal medicine is both preventive and promotive in its approach. The naturally occurring active ingredients in these herbal products offer a gentle and enduring way of restoring health in a most trustworthy and least harmful way. Herbal mouthwashes usually do not contain alcohol or any added sugars or preservatives. This fact gives the herbal mouthwashes an edge over chlorhexidine mouthwashes.⁸

The aim of the study was to evaluate the comparative efficacy of commercially available herbal mouthwash and 0.12% chlorhexidine as an anti-plaque and antigingivitis agent.

MATERIALS AND METHODS

This randomized controlled clinical trial was carried out in the Department of Periodontology Government Dental College and Hospital, Srinagar, Jammu and Kashmir. The study population consisted of 144 individuals, who were systemically healthy, between 20 and 50 years of age and with moderate to severe plaque-induced gingivitis were enrolled in the study. They were equally distributed in the test ($n = 72$) and the control group ($n = 72$). Participants were excluded from the study if they suffered from nonplaque induced gingivitis or periodontitis, history of antibiotic use and use of any form of herbal products in the last 90 days, need for antibiotic premedication, patients using mouth rinse within the last 3 months, pregnant women, habit of smoking or any form of smokeless tobacco and with systemic diseases. Patients were selected on the basis of inclusion and exclusion criteria and were randomly assigned using a coin toss to:

1. Group I (Test Group): Hiora® herbal oral rinse that consists of *Piper betle* (Nagavalli), *Bhibhitika* (*Terminalia bellerica*), *Pilu* (*Salvadora persica*) commonly known as meswak, Gandharpura tailum, Yavani, Ela, Peppermint satva
2. Group II (Control group): Peridex® that consists of 0.12% CHX.

The examiner and participants were blinded to product allocation. The clinical examination included gingival index (Loë and Silness, 1967) and plaque index (Silness and Loë, 1964) which were recorded at baseline and postoperatively after 21 days. Oral hygiene instructions were given to all the participants at the baseline. The selected individuals underwent scaling following the baseline measurements. All the patients in Group I and Group II were instructed to use the assigned mouth rinse 15 ml twice daily for 30 seconds in conjunction to their normal oral hygiene routine. Patients were recalled at weekly interval to check for the oral hygiene and the oral hygiene was reinforced in noncompliant patients. Thus, the compliance of the patient was assessed.

The Plaque Index (PI) was used to measure plaque accumulation. A score of 0-3 was assigned to six sites per tooth using the following criteria:⁹

0 = No plaque on gingival margin.

1. A film of plaque is supragingival, and adheres to the free gingival.
2. Moderate plaque is present supragingivally and subgingivally.

3. Heavy plaque is present supragingivally and subgingivally.

The Gingival Index (GI) was used to determine severity and location of gingivitis. A score from 0-3 was assigned to six sites per tooth, using the following criteria:⁹

0 = Normal gingiva. Pale pink color, normal stippling, gingiva firm when probed. Gingival margin located on enamel or apical to CEJ.

1. Mild inflammation. Slight changes in color of gingiva more reddish than normal, slight edema. No bleeding on probing.
2. Moderate inflammation. Gingiva is red to reddish-blue with moderate edema present and glazing. Bleeding on probing is present.
3. Severe inflammation. Marked redness, edema, and ulceration. Tendency towards spontaneous bleeding.

Statistical Analysis

Data were statistically analyzed. Between group statistical comparison of all the parameters is done using independent sample *t*-test after confirming the underlying normality assumption. Within group statistical comparison of all the parameters is done using paired sample *t*-test after confirming the underlying normality assumption of differences. The relative percentage change in both the parameters is calculated using following the formula: $(\text{Baseline} - 21 \text{ days}) \times 100 / (\text{baseline})$. $P < 0.05$ is considered to be statistically significant.

RESULTS

Group I did not yield statistically significant results than Group II in the proportion of gingival index scores and plaque index scores of baseline parameters [Table 1].

Plaque index scores

When within group comparison of pretreatment and posttreatment scores was done, plaque index scores of posttreatment were statistically significant [Table 2]. When between group comparison of relative percentage change in study parameters was done Group II results were statistically significant as compared to Group I [Table 3].

Gingival index scores

When within group comparison of pretreatment and posttreatment scores was done, gingival index scores of posttreatment were statistically significant [Table 4]. When between group comparison of relative percentage change in study parameters was done Group II results were statistically significant as compared to Group I [Table 3].

Table 1 Intergroup comparison of baseline parameters

Baseline parameters	Group I (n-72)	Group II (n-72)	P
Plaque Index	1.74 ±0.6	1.76 ±0.4	0.976
Gingival Index	1.86 ±0.4	1.92 ±0.6	0.924

Values are mean±SD. *P* values are obtained using independent sample *t*-test. $P < 0.05$ is considered to be statistically significant. SD – Standard deviation

Table 2 Intragroup comparison of pre- and post-mouthwash treatment (Plaque Index)

Study groups	Plaque Index (Baseline)	Plaque Index (after 21 days)	P
Group I	1.74 ±0.6	1.02 ±0.12	0.001
Group II	1.76 ±0.4	0.12 ±0.05	0.001

Values are mean±SD. P values are obtained using paired sample t-test. P<0.05 is considered to be statistically significant. SD – Standard deviation

Table 3 Inter group comparison of relative percentage change in study parameters

% Change in parameters	Group I (n-72)	Group II (n-72)	P
Plaque index	40.06 ±12.3	90.6 ±4.4	0.001
Gingival index	40.08 ±12.4	92.1 ±3.8	0.001

Values are mean±SD of relative percentage change. Percentage change is calculated using the formula: (Baseline-21 days) ×100/(baseline). P values are obtained using independent sample t-test. P<0.05 is considered to be statistically significant. SD – Standard deviation

Table 4 Intragroup comparison of pre- and post-mouthwash treatment (Gingival Index)

Study groups (n-10)	Gingival index (Baseline)	Gingival index (After 21 days)	P
Group I	1.88 ± 0.4	1.08 ±0.17	0.001
Group II	1.90 ±0.6	0.18 ±0.09	0.001

DISCUSSION

The purpose of this study was to determine the comparative effects of herbal oral rinse (Hiora®) to 0.12% CHX (Peridex®) on gingival health and plaque accumulation over time. Hiora® herbal oral rinse consists of *P. betle* (Nagavalli), Bhibhitika (*T. bellerica*), Pilu (*S. persica*) commonly known as Meswak, Gandharpura tailum, Yavani, Ela, Peppermint satva. Research by Kaim *et al.* suggests that there are certain ingredients in herbal oral rinses that exhibit evidence of anti-inflammatory and anti-fungal therapeutics effects.¹⁰ *S. persica* (Meswak) prevents dental plaque accumulation and subsequent gingival inflammation. It is a medicinal plant that has been used by many people in Africa, South America, Middle East and Asia. *S. persica* contains a number of identified antimicrobials and prophylactic components including fluorides, alkaloids, sulfur compounds and volatile oils such as benzyl isothiocyanate. They alter the characteristics of the early plaque settlers *Streptococcus sanguinis*, *Streptococcus mitis* and *Actinomyces* species and make them less adherent. This could account for a significant reduction in the binding capacity by the extracts. The anionic components *S. persica* has an antimicrobial activity against *Streptococcus aureus*, *Streptococcus mutans*, *Streptococcus fecalis*, *Lactobacillus*, *Pseudomonas Aeruginosa*, and *Candida albicans*. In this regards, Almas *et al.* compared antimicrobial activity of eight commercially available mouth rinses and 50% Miswak extract against seven microorganisms. They found that mouth rinses containing CHX had the maximum antibacterial activity while Miswak extract had low antibacterial activity.¹¹ Hydrochavicol in *P. betle*

inhibits expression of pro-inflammatory cytokine, tumor necrosis factor- α , disrupts the permeability barrier of the microbial membrane of *S. mutans* and *Actinomyces* species and also has an astringent action. Gallic acid in bibhitika has an astringent action. Methyl salicylate in Gandharpura taila, cineole in Ela, thymol in Yavani and menthol in Peppermint satva impart a fragrant and refreshing effect. Additional research conducted by Scherer *et al.* demonstrated that herbal oral rinse reduced gingival bleeding after 3 months of use as compared to placebo.¹² Chlorhexidine is effective against an array of microorganisms including Gram-positive and Gram-negative organisms, fungi, yeast and viruses. It is bacteriostatic at low concentration and bactericidal at high concentrations. The ability of an oral rinse to be retained in the oral cavity and maintain potency over an extended length of time has been debated. Lang stated the substantivity of an antimicrobial agent needs sufficient contact time with a microorganism in order to inhibit or kill it.¹³ CHX, with a substantivity of 12 h is considered to be highly effective; whereas, the substantivity of herbal mouth rinse is unknown. Hence, in the present study, comparison was made between herbal oral rinse (Hiora®) and 0.12% CHX (Peridex®) to see their effectiveness. In this study, there was a statistically significant reduction in the proportion of gingival index scores and plaque index scores in the CHX group. These results correlate with studies done by Southern *et al.*, 2000¹⁴ and Malhotra *et al.*, 2011.¹⁵ However, in a study done by Chatterjee *et al.*, 2011¹⁶ herbal oral rinse is equally effective in reducing periodontal indices as CHX. However, there is not enough statistically significant evidence to suggest that herbal oral rinse had a greater effect in reducing gingival index scores. With the proliferation of herbal oral care products, it is important for clinicians to make evidence-based decisions when making product recommendations. Research needs to be conducted to determine the substantivity of herbal mouth rinse as well as to determine its antimicrobial effects on gingivitis, plaque biofilm accumulation, and related bacteria.

Suggestions for future studies include

1. Expand study population to include broader disease status, and varied age group.
2. extend study to 6 months.
3. add stains and calculus indices.

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CONCLUSION

Within the limitations of the study when herbal oral rinse was compared to 0.12% CHX, 0.12% CHX mouth rinse effectively reduced the clinical symptoms of plaque-induced gingivitis, and had a statistically significant effect on the reduction of plaque scores.

References

1. Van Dyke TE, Offenbacher S, Pihlstrom B, Putt MS, Trummel C. What is gingivitis? Current understanding of prevention, treatment, measurement, pathogenesis and relation to periodontitis. *J Int Acad Periodontol*. 1999;1: 3-15.
2. Walker C, Karpinia K, Baehni P. Chemotherapeutic Agents and Other Antimicrobials. *Periodontology* 2000. 2004; 146-165.
3. Research, Science, and Therapy Committee of The American Academy of Periodontology. Informational Paper. The Pathogenesis of Periodontal Diseases. 1999;70: 457-470.
4. Priya BM., et al. "Efficacy of chlorhexidine and green tea mouthwashes in the management of dental plaque induced gingivitis: A comparative clinical study". *Contemporary Clinical Dentistry* 6.4 (2015): 505-509.
5. Bagchi S., et al. "Evaluation of efficacy of a commercially available herbal mouthwash on dental plaque and gingivitis: A doubleblinded parallel randomized controlled trial". *Journal of Indian Association of Public Health Dentistry* 13.3 (2015): 222-227.
6. Manipal S., et al. "The Mouthwash War - Chlorhexidine vs. Herbal Mouth Rinses: A Meta-Analysis". *Journal of Clinical and Diagnostic Research* 10.5 (2016): ZC81-ZC83.
7. Kothiwale SV., et al. "A comparative study of antiplaque and antigingivitis effects of herbal mouthrinse containing tea tree oil, clove and basil with commercially available essential oil mouthrinses". *Journal of Indian Society of Periodontology* 18.3 (2014): 316-320.
8. Nagappan N and John J. "Antimicrobial Efficacy of Herbal and Chlorhexidine Mouth rinse-A systematic review". *IOSR Journal of Dental and Medical Sciences (JDMS)* 2.4 (2012): 5-10.
9. Loe H. The Gingival Index, the Plaque Index, and the Retention Index Systems. *J Perio*. 1967;38: 610-616.
10. Kaim JM, Gultz J, Do L, Scherer W. An *in vitro* investigation of the antimicrobial activity of an herbal mouthrinse. *J Clin Dent* 1998;9:46-8.
11. Almas K, Skaug N, Ahmad I. An *in vitro* antimicrobial comparison of miswak extract with commercially available non-alcohol mouthrinses. *Int J Dent Hyg* 2005;3:18-24.
12. Scherer W, Gultz J, Lee SS, Kaim J. The ability of an herbal mouthrinse to reduce gingival bleeding. *J Clin Dent* 1998;9:97-100.
13. Lang N, Brex MC. Chlorhexidine digluconate-An agent for chemical plaque control and prevention of gingival inflammation. *J Periodontal Res* 1986;21: 74-89.
14. Southern EN, McCombs GB, Tolle SL, Marinak K The comparative effects of 0.12% chlorhexidine and herbal oral rinse on dental plaque-induced gingivitis. *J Dent Hyg* 2006;80:12.
15. Malhotra N, Rao SP, Acharya S, Vasudev B. Comparative *in vitro* evaluation of efficacy of mouthrinses against *Streptococcus mutans*, *Lactobacilli* and *Candida albicans*. *Oral Health Prev Dent* 2011;9:261-8.
16. Chatterjee A, Saluja M, Singh N, Kandwal A. To evaluate the antigingivitis and antiplaque effect of an *Azadirachta indica* (neem) mouthrinse on plaque induced gingivitis: A double-blind, randomized, controlled trial. *J Indian Soc Periodontol* 2011;15:398-401.

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