

Herbal Mouthwash Post-Implant Surgery: A Natural Shield against Plaque and Gingivitis

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ABSTRACT

Background: The key aspect of preventing gingivitis and associated problems is effective plaque reduction. There are several chemical agents on the market that prevent plaque formation. Herbal remedies have been utilized in dentistry recently to counteract the adverse effects associated with chemical agents. This study compares the antiplaque and antigingivitis properties of herbal and chemical mouthwash following implant surgery. **Materials and Methods:** A prospective clinical study was conducted among 50 patients who had undergone dental implant surgery. 50 individuals, among 20 to 50 years of age, were divided into two groups: Group A (Herbal mouthwash) and Group B (Chemical mouthwash). Silness and Loe Plaque Index (PI) and Loe and Silness Gingival Index (GI) were evaluated at baseline and after 1 month. Paired and independent t-tests were used for statistical analysis. **Results:** A statistically significant improvement in PI and GI was observed in both the groups on intragroup comparison ($p < 0.05$). Nevertheless, the results of the intergroup comparison showed that there was no statistically significant difference in PI and GI scores ($p > 0.05$). **Conclusion:** Following implant surgery, herbal mouthwash was equally effective to chemical mouthwash in preventing plaque formation and gingivitis.

Keywords: Bacterial plaque, Chemical plaque control, Gingivitis, Mouthwash, Phytotherapy.

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INTRODUCTION

In recent times, dental implants have emerged as a revolutionary solution for replacing lost teeth, offering enhanced functionality and aesthetic restoration. Yet, ensuring the longevity and success of these implants remains a formidable challenge, primarily due to complications arising from peri-implant diseases. Among these, peri-implant mucositis and peri-implantitis are particularly noteworthy, as they pose significant threats to the stability and health of dental implants. Peri-implant mucositis, the milder of the two conditions, manifests as a reversible inflammatory response in the soft tissues surrounding the implant. It is characterized by clinical symptoms such as redness, swelling and tenderness, indicating localized infection.^[1] Left unaddressed, peri-implant mucositis has the potential to escalate into peri-implantitis, a far more severe and irreversible pathology.^[2,3] Peri-implantitis is distinguished by progressive bone loss around the implant, leading to its structural instability and, ultimately, failure. This condition shares many etiological and pathological parallels with

periodontitis, including the involvement of bacterial biofilms, inflammatory mediators and risk factors.^[4-8]

The cornerstone of successful dental implant therapy lies in achieving and maintaining primary stability, which is critical for proper osseointegration. Adequate wound healing following implant placement is indispensable for this process, as it ensures the formation of a stable interface between the implant and the surrounding bone. However, the delicate equilibrium required for this healing can be significantly disrupted by external factors, chief among them being insufficient oral hygiene management. Emerging research highlights the detrimental role of plaque biofilms during the early stages of implant healing.^[9] These biofilms, composed of a diverse array of bacterial species, adhere to the implant surface and initiate a cascade of inflammatory responses. This can impede tissue repair and lead to complications, such as peri-implant mucositis and, eventually, peri-implantitis.^[10] Notably, the process of bacterial colonization begins almost immediately after implant placement, facilitated by the formation of a pellicle—a thin layer of salivary glycoproteins that coats the implant surface. While this pellicle is a natural physiological occurrence, it inadvertently creates a substrate for microbial adherence, acting as a gateway for pathogenic colonization.^[11] The interaction between salivary pellicle and microorganisms plays a pivotal role in the pathophysiology of peri-implant diseases.^[12]



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Plaque control remains pivotal for peri-implant health, with Chlorhexidine (CHX) being a commonly used antiseptic due to its antibacterial properties.^[13] However, its prolonged use is limited by side effects such as mucosal irritation and dysgeusia. Many natural therapeutic remedies are becoming more and more popular as a means of counteracting the adverse consequences of chemical agents. Literature evidence reveals herbal remedies have been sought to achieve antimicrobial, antioxidant, antiseptic, anti-inflammatory effects against oral pathogens.^[14-16] In this context, this study was undertaken to evaluate the antiplaque and antigingivitic effects of an herbal mouthwash after implant surgery.

MATERIALS AND METHODS

Study Population

The current study was a prospective clinical study conducted at the Department of Periodontology, Saveetha Dental College and Hospitals, Chennai, India. It included 50 patients who had undergone dental implant surgery between the ages of 25 and 50. The institution's Ethical Review Committee granted ethical approval and study participants provided written consent in advance after being fully informed about the study.

Inclusion Criteria and Exclusion Criteria

All the individuals were periodontally and systemically healthy, aged 25-50 and with at least one missing tooth were included in the study. Those who were allergic to mouthwash ingredients, smokers, pregnant or lactating women, those on recent antibiotic therapy or with systemic illnesses were excluded.

Study Design

A pilot study was conducted to assess the acceptability and adherence to the mouthwashes, as well as to assess the viability and accuracy of the investigation. 80% of the participants in the pilot research had gingivitis. The sample size was expanded by 20% to account for possible dropouts, yielding 52 individuals (rounded to 50), with 25 in each group. The subjects were divided into two groups: Group A: Herbal mouthwash (Hiora® mouthwash, Himalaya Drug Company, Bangalore, India), Group B: Chemical mouthwash (Clohex Plus® mouthwash, Dr. Reddy's Lab Ltd., Hyderabad, India). Subjects were instructed to use it after 3 days of implant surgery. Subjects were instructed to use 10 mL twice a day for 1 min for a period of 1 month.

Clinical Parameters

Full mouth Silness and Loe Plaque Index (PI) and Full mouth Loe and Silness Gingival Index (GI) were measured at baseline and after 1 month.

Statistical Analysis

The collected data were methodically compiled. The data obtained was coded, computerized and analyzed with the Statistical Package for Social Sciences (SPSS Software, Version 23.0; IBM Corp., Armonk, NY, USA). The data was analyzed for its normality using the Shapiro-Wilk test. The results followed parametric distribution and so to summarize and present the data, descriptive and inferential statistics were used. For intragroup and intergroup comparisons, the paired and independent t-tests were done respectively, with $p < 0.05$ denoting statistical significance.

RESULTS

The mean GI score for group A decreased to 0.4 ± 0.05 from 0.98 ± 0.01 . A statistically significant decrease in GI from baseline was found using a paired *t* test ($p = 0.000$). The mean gingival index score for group B decreased to 0.3 ± 0.02 from 0.80 ± 0.07 . A statistically significant decrease in GI from baseline was found using a paired *t* test ($p = 0.000$) (Table 1). There was no statistical significance in the GI assessed ($p = 0.89$) between the two groups at 1 month follow up (Table 2). The mean PI for group A decreased from 0.89 ± 0.02 to 0.14 ± 0.04 . A statistically significant decrease in PI from the baseline was found using a paired *t* test ($p = 0.004$) (Table 1). The PI score for group B decreased from 0.78 ± 0.05 to 0.12 ± 0.01 . A statistically significant decrease in PI from the baseline was found using a paired *t* test ($p = 0.003$) (Table 1). The results of the independent *t* test showed that there was no statistically significant difference in the PI between the two groups ($p = 0.96$) at one month follow up (Table 2).

DISCUSSION

Controlling the spread of dental plaque is an important first step in preventing periodontal and peri-implant disorders. Effective plaque removal is often accomplished using mechanical and chemical approaches. The present study was conducted to compare the antiplaque and anti-gingivitis properties of a mouthwash containing herb versus chlorhexidine following implant surgery.

Table 1: Intragroup comparison of GI, PI.

Group	Mean±SD		p value	Mean±SD		p value
	GI			PI		
	Baseline	2 weeks		Baseline	2 weeks	
Group A	0.98 ± 0.01	0.4 ± 0.05	0.000*	0.89 ± 0.02	0.14 ± 0.04	0.004*
Group B	0.80 ± 0.07	0.3 ± 0.02	0.000*	0.78 ± 0.05	0.12 ± 0.01	0.003*

Statistically significant at $p < 0.05$ (Paired *t* test).

Table 2: Intergroup comparison of GI, PI at 1 month follow up.

Variable	Mean±SD		p value
	Group A	Group B	
GI	0.4±0.05	0.3±0.02	0.89*
PI	0.14±0.04	0.12±0.01	0.96*

Statistically insignificant at $p>0.05$ (Independent t test).

It was clear from the current study that both herbal and chemical mouthwashes were equally effective at lowering gingival inflammation and plaque. Alzoman H *et al.*, compared the effectiveness of herbal oral rinse and chlorhexidine oral rinse as adjuncts to non-surgical mechanical debridement in the treatment of peri-implant mucositis and suggested that herbal oral rinse is an effective alternative to chlorhexidine oral rinse.^[17] Similarly, Alqutub MN *et al.*, in a randomized control trial observed similar outcomes while comparing 2% sodium chloride, 0.12% chlorhexidine mouthwash, herbal mouthwash with distilled water with peppermint flavor and evaluated the modified plaque, modified gingival index and probing depth at baseline and after 12 weeks as an adjunct to mechanical debridement. The authors concluded that there was no statistical significance in the indices and probing depth after 12 weeks for the management of peri-implant mucositis.^[18]

Solderer A *et al.*,^[19] conducted a systematic review to assess the possible benefits of chlorhexidine rinse following periodontal or implant surgery in terms of reducing inflammation and plaque. Additionally, the study examined if any addition or concentration adjustment in chlorhexidine solution lessened the adverse consequences of usage. According to the findings, rinsing with chlorhexidine after surgery may help lessen the production of biofilm and gingival irritation. Regardless of the use of chlorhexidine or not, there was no change in periodontal probing depth over any placebo or control solution. While maintaining efficacy, the inclusion of supplements such herbal extracts may minimize adverse effects. Our findings concur with those of the earlier research.

Furthermore, Laugisch O *et al.*,^[20] investigated the early wound healing, tooth discoloration and patient acceptance of two distinct post-surgical maintenance programs. Patients were randomly assigned to receive either a 0.1% chlorhexidine solution or a 0.05% chlorhexidine digluconate/ herbal extract combination for two weeks after dental implant insertion. Clinical and immunological evaluations were conducted on early wound healing. With a visual analogue scale, tooth staining and patient approval were evaluated. The wound healing profiles of both groups were similar. The results showed that the two different concentrations of chlorhexidine produced similar healing and plaque inhibition. Tooth discoloration and subjective discomfort associated with taste sensitivity were more common in patients receiving less than 0.1% chlorhexidine solution.

According to our research, the plaque index and gingival index scores improved with both the herbal and chlorhexidine mouthwashes. Our study's findings support earlier research, which showed that herbal mouth rinses were as effective as chlorhexidine mouth rinses in preventing gingivitis and plaque after implant surgery. Nevertheless, additional extended experimental investigations are required to validate the current results.

CONCLUSION

Herbal mouth rinse was equally effective to chlorhexidine mouth rinse as an anti-plaque and anti-gingivitis agent following implant surgery.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

CHX: Chlorhexidine; **PI:** Plaque index; **GI:** Gingival index.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The Saveetha Dental College and Hospital's Ethical Review Committee granted ethical approval and study participants provided written consent.

SUMMARY

The herbal mouth rinse proved to be as effective as chlorhexidine mouth rinse in combating plaque and gingivitis following implant surgery.

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