



The effect of Topical Application of Honey Based Gel Containing Zingibar Officinale for Non Surgical Periodontal Maintenance

Sneha Puri^{1*}, Rashmi Bele¹, Akhilesh Shewale¹ and Rajvir Malik¹

¹Department of Periodontics, Swargiya Dadasaheb Kalmegh Smruti Dental College, Hingna Nagpur, India.

Authors' contributions

This work was carried out in collaboration among all authors. Author SP designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors RB and AS managed the analyses of the study. Author RM managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Ginger and honey have shown to be effective against pathogens routinely encountered in periodontal infection. However, none of literature has shown antibacterial effect of ginger and honey on the levels of dental plaque when used as a gel.

Aim: To compare the effect of honey with ginger extract on the dental plaque levels and gingival health.

Methodology: Fifteen systemically healthy patients were randomly allocated to either the test group [G1(ginger and honey gel = 15 sites)] or the control group [G2 (Chlorhexidine gel = 15 sites)]. Full mouth Gingival Index (GI) Full mouth Plaque Index (PI) were evaluated at baseline and on 7th day.

Results: The mean PI at baseline was 0.23 ± 0.02 (G1) and 0.29 ± 0.01 (G2) which was increased to 0.36 ± 0.01 (G1) and 0.37 ± 0.01 (G2) on 7th day. However, mean GI at baseline was 0.30 ± 0.04 (G1) and 0.34 ± 0.02 (G2) which was increased to 0.38 ± 0.03 (G1) and 0.43 ± 0.03 (G2) on 7th day.

*Corresponding author: E-mail: sneha.puri@sdk-dentalcollege.edu.in;

Conclusion: The results of this study suggest that the chlorhexidine gel and Natural gel containing Honey and Zingibar officinale both are effective in controlling plaque during the periodontal maintenance period.

Keywords: Zingibar officinale; honey; chlorhexidine; plaque; gingivitis.

1. INTRODUCTION

Periodontal maintenance is an integral part of periodontal therapy for patients with a history of inflammatory periodontal diseases, which starts after completion of active periodontal therapy and continues at varying intervals for the life of the dentition. Because of the difficulty to ensure adequate reduction in inflammation, and removal of plaque by mechanical means, there is a great interest in the use of antimicrobial agents. Chlorhexidine (CHX) is one of the most effective antimicrobial agents for plaque control and to reduce dental inflammation. Local side effects associated with the use of chlorhexidine are unpleasantness, alteration of taste sensation and costly to the patient [1]. Despite the great benefit of chlorhexidine gluconate as an antiplaque agent, the search continues for active ingredients that could prevent dental inflammation without affecting the biological equilibrium within the oral cavity.

Zingibar Officinale (ginger) indicated to have antiinflammatory properties in herbal medicine and also shows effectiveness against pathogens routinely encountered in periodontal infections such as *Prevotella Intermedia*, *Porphyromonas Gingivalis* and *Porphyromonas endodontalis* [2].

Honey has been used since ancient times, against the infectious diseases caused by microorganisms [3-4]. However, few studies are available in literature, which show the effect of honey on the levels of dental plaque, and inflammation. None of the studies had demonstrated the use of honey and ginger as a "gel form" for topical use in gingivitis and periodontitis cases.

2. AIMS AND OBJECTIVE

The purpose of the present study was to compare the effectiveness of honey with ginger extract on the dental plaque levels and gingival health with that of commercially available chlorhexidine gel.

3. MATERIALS AND METHODS

Thirty sites in Fifteen systemically healthy patients (mean age 20-60 years) were randomly selected in this study. The patients who had full component of teeth except 3rd molars, fair oral hygiene, minimal levels of pre-existing gingivitis \leq 0.5 PBI score were included in the study. The patients requiring antibiotic coverage for dental procedures, having adverse habits such as smoking, drinking etc, patients undergoing orthodontic treatment or who have received any complex periodontal therapy 6 months prior to baseline examination. The patients allergic to pollen, bee products or honey were also excluded from the study. Prior to initiating this study, the purpose and design of this clinical trial was explained to the participants and informed consent was obtained from all the participants of the study. The sites were randomly allocated by using coin flip method to either Test sites =15 sites (Honeybased gel containing Zingibar officinale) or Control sites =15 sites (Rexidine™ gel) for 7 days experimental period. All the participants received a professional prophylaxis at the start of the study with the purpose of making the dentition 100% free of plaque and calculus. The scaling was finished with help of hand instruments and polishing was done with rotating cups and brushes. The application of gel was instructed to the subjects and they were asked to use it 4-5 times daily and were not permitted to gargle or drink for at least 20 minutes. The patients were instructed not to use any plaque control measures for 7 days.

3.1 Preparation of Materials

For the test sites, Matured fresh ginger rhizomes were purchased from local town market. The cleaned rhizome of ginger were peeled, weighed (55 g) and homogenized aseptically using a sterile mortar and pestle. The homogenized rhizomes were squeezed using sterile cheese cloth. Out of 100 g ginger bulb, 34.5 g juice which was considered as 100% in concentration was recovered. The juice was then mixed with honey and stirred well until a homogenous mixture has been obtained. The mixture was

inserted in a sterile container and given to the test subjects for application.

For the control sites, commercially available Rexitine M forte gel™ 15gm (containing chlorhexidine 1%, Metronidazole 1%, lignocaine 2%) was used.

3.2 Recording of Clinical Parameters

The plaque levels were recorded on the buccal and lingual surface of every tooth using the Gingival Index [5] Plaque Index by [6] at baseline and 7 days. The intervention was assessed using the single blinding examination method, where the examiner was unaware of the area of application of the gel each participant had used during the experimental period.

Following collection of all data, the results were statistically analyzed using EpiInfo Software ver.21.(USA). The cumulative data were recorded as mean and standard deviation. The inter and intragroup comparison were done using Paired 't' test. The results were deemed significant if p values < 0.05 at 95% confidence interval. The patients feedback were recorded as categorical variables and analyzed using Chi square test.

At 7th day the responses of the study participants were recorded using a patient feedback survey pertaining to the honey based Zingibar officinale gel.

4. RESULTS

No side effect which could restrict the progression of treatment was reported by the

cases who applied natural derivatives gel. The comparison of the mean gingival index, plaque index scores of both the sites was done at baseline, 7th day.

The mean plaque index score at baseline for Test sites was 0.87± 0.12 and at 7th day it was further decrease to 0.64 ± 0.16. The decreased plaque index score was significantly higher (P>0.05) compared to baseline on 7th day. The mean plaque index score at baseline for Control sites was 0.87 ± 0.06 and at 7th day it was decreased to 0.72 ± 0.16. (P>0.05) When comparison was made between Test sites and Control sites, the Test sites showed significantly reduced mean plaque index score compared to Control sites. (P>0.05) (Table1)

The mean Gingival index score at baseline for Test sites was 0.87 ± 0.10 and at 7th day it was further decreased to 0.71 ± 0.14. The decreased Gingival index score was significantly higher compared to baseline as well on 7th day (P>0.05). The mean gingival index score at baseline for Control sites was 0.96 ± 0.06 and at 7th day it was increased to 0.76 ± 0.09 (P>0.05). When comparison was made between Test sites and Control sites, the Test sites showed significantly reduced mean gingival index score compared to Control sites. (P>0.05) (Table 2)

The patient feedback survey showed that all the 15 patients (100 %) were very satisfied with respect to overall use and taste questionnaire, rated too much effective and definitely would choose this gel again in future with the use of honey based gel containing zingibar officinale as compare to control (86.6%). (χ²=0.345 ; p = 0.02) (Table 3)

Table 1. Comparison of the mean plaque index scores between test and control group at baseline, 7th day

Group	Baseline	At 7 th Day	Difference
Test	0.87±0.12	0.64±0.16	0.23±0.14 S
Control	0.87±0.06	0.72±0.16	0.15±0.16 S

P>0.05 as compared to baseline, S- Significant

Table 2. Comparison of the mean Gingival index scores between test and control group at baseline, 7th day

Group	Baseline	At 7 th Day	Difference
Test	0.87±0.10	0.71±0.14	0.16±0.13 S
Control	0.96±0.06	0.76±0.09	0.19±0.10 S

P>0.05 as compared to baseline, S- Significant

Table 3. Patient feedback survey

Sr. No.	Question	Response options	GELS	
			Test	Control
1.	How satisfied are you with the gel?	Not at all satisfied Slightly satisfied Somewhat satisfied Very satisfied Extremely satisfied	15	13
2.	How satisfied are you with the taste associated while using ?	Not at all satisfied Slightly satisfied Somewhat satisfied Very satisfied Extremely satisfied	15	13
3.	How would you rate the amount of effectiveness after using gel?	Too little About right Too much Definitely would not Probably would not	15	12
4.	Having had this overall experience, would you choose to have any gel again?	Probably would Definitely would	15	12

5. DISCUSSION

The purpose of the present study was to compare the effectiveness of honey with ginger extract on the dental plaque levels and gingival health with that of commercially available chlorhexidine gel.

In the present study the use of natural gel containing Honey and Zingibar officinale showed nonsignificant reduction in the plaque score, gingival index score at 7th day when compared to Chlorhexidine gel. Mahyari et al. [7] concluded that use of Polyherbal mouthwash containing hydroalcoholic extracts of *Z. officinale*, *R. officinalis* and *C. officinalis* (5%) was effective in the treatment of gingivitis and its efficacy was comparable to that of chlorhexidine mouthwash. Javid et al. [8]. evaluated the effect of ginger supplementation on inflammatory, antioxidant, and periodontal parameters in type 2 diabetes mellitus (T2DM) patients with chronic periodontitis under non-surgical periodontal therapy (NSPT). He found significant decrease in the mean change of IL-6 (p=0.009), hs-CRP (p=0.049), TNF- α (p=0.049), CAL (p=0.003), and PD (p=0.04) compared with the control group and stated that ginger supplementation along with NSPT may be effective in the improvement of inflammation, oxidative, and periodontal status in T2DM with chronic periodontitis. Javid et al. [9] recommended that ginger supplementation together with NSPT may be effective in control of the glycemic, lipid, antioxidant and periodontal status in T2DM with chronic periodontitis. Also, Singhal et al. [10] stated that Honey-based mouthwash showed a promising antimicrobial effect on dental caries and plaque and gingival scores as compared to Chlorhexidine mouth wash.

However to the best of our knowledge, none of the studies have demonstrated use of combination of honey and Zinger extract as a gel in controlling plaque levels.

6. CONCLUSION

Within the limitations of the study, the results of our present study suggest that the chlorhexidine gel and Natural gel containing Honey and Zingibar officinale both are effective in controlling plaque during the periodontal maintenance period. However, keeping in mind patient's satisfaction and less side effects with the natural gel, it could be a possible substitution to the conventionally used gels. More number of

studies with standardised protocols are necessary to explore the key ingredients of our natural gel.

Clinical Relevance: Despite the great benefit of commercially available chlorhexidine gluconate as an antiplaque agent, Local side effects such as unpleasantness, alteration of taste sensation and costly to the patient have been seen associated with the same. Thus the search continues for active ingredients that could prevent dental inflammation without affecting the biological equilibrium within the oral cavity at an affordable cost.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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