Research Article

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Comparative Evaluation of 0.2% Chlorhexidine and Aloe Vera Mouthwashes as an Antiplaque agents in the treatment of Chronic Gingivitis Patients

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ABSTRACT

Background: The mainstay of prevention of gingival disease is a regular and adequate plaque control using personal oral hygiene protocol, periodic professional review and maintenance wherever indicated. Recently, Various herbal and natural products used for the treatment of oral and periodontal conditions. **Aim:** To compare the antiplaque efficacy of chlorhexidine and Aloe Vera mouth rinses in the treatment of gingivitis.

Material and Methods: A total of 30 subjects with generalized chronic gingivitis were selected for the study. They were randomly divided into two groups: group A (0.2% chlorhexidine gluconate mouthwash; n=15) and group B (Aloe vera mouthwash; n=15). Plaque index, gingival index and modified sulcular bleeding index recorded at baseline 14th and 21st day. Phase I therapy have been done, followed by both mouthwashes distributed to patients. **Statistical analysis:** Student 't' test was used for comparative analysis. The P value was considered significant at ($P < 0.005$) level.

Results: The results of the study showed statically significant reduction in plaque index, gingival index and modified sulcular bleeding index but on comparison there was no statically significant difference among the groups at different time interval.

Conclusion: Aloe vera mouthwash has comparable antiplaque efficacy with 0.2% chlorhexidine gluconate and can be considered as a alternative for the treatment of chronic gingivitis.

Keywords: Dental Plaque, Gingivitis, Aloe Vera, Chlorhexidine, Antiplaque Efficacy.

INTRODUCTION

Dental plaque is the major etiologic agent for initiation of gingivitis. Gingival disease can progress to periodontitis which if left untreated, may eventually results in loss of teeth.[1] This correlation of dental plaque accumulation and development of gingivitis suggests proper plaque removal which can lower the risk of gingivitis.[2] Mechanical plaque control remains the gold standard of periodontal therapy. However, which is not always completely effective as it is based on the dexterity and motivational level of individual.[3,4] The bacteria present in the soft tissues can recolonize the tooth surfaces even after mechanical plaque control.[5] Clinical trials showed that self-administered plaque

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control program alone is not beneficial until periodic professional reinforcement for providing long term inhibition of gingivitis. Adjunctive use of chemical plaque control agents had shown better efficacy in the control of plaque and gingival inflammation.[6]

Chemical plaque control forms an effective adjunct to mechanical plaque therapy in treatment of gingivitis. Several antibacterial chemicals, such as chlorhexidine digluconate (CHX), Triclosan, etc have been successfully used in prevention and treatment of gingivitis.[6] The long-term use of chlorhexidine is burdened by some side-effects that could affect patient which includes brown discoloration of dentition and restorative material, dorsum of the tongue, taste perturbation, oral mucosal ulceration, unilateral/bilateral parotid swelling and enhanced supragingival calculus formation. Now a day, most of the people are turning to the nature by using the natural herbal products in both prophylaxis and treatment of different diseases. [7,8]

Since ancient times, herbal medicines have been used to treat periodontal diseases. The use of natural herbal products in prevention and treatment of oral conditions has increased recently and could be beneficial to urban and rural communities of lower socio-economical strata. The beneficial effects of the natural products along with the lower prevalence of side effects could enhance patient compliance and long-term usage.[9]

Aloe Vera, a cactus like plant has been extensively used and has shown to significantly reduce gingivitis. Aloe Vera shows antibacterial, antiviral, antifungal, antioxidant and anti-inflammatory properties. It is incorporated in a dentifrice, locally applied gel, mouth washes which showed a significant reduction of plaque accumulation.[10] Hence, the purpose of this study is to compare the efficacy of chlorhexidine and Aloe Vera mouth rinses in the treatment of chronic gingivitis.

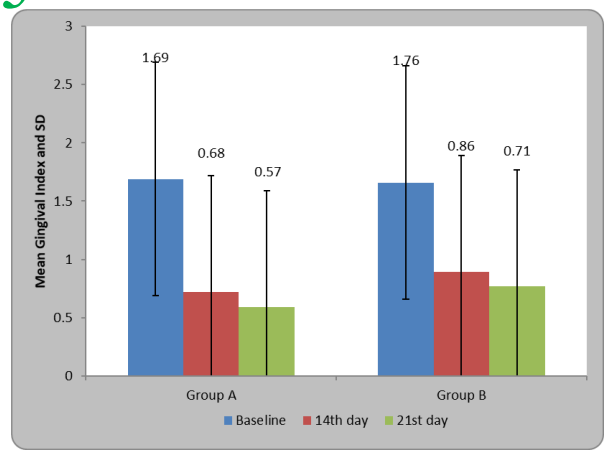
MATERIALS AND METHOD

A total of sixty patients for the proposed study were selected from the outpatient Department of Periodontology. The study was approved by institutional ethical committee. Patients of age in between 18-40 years with chronic gingivitis having plaque index and gingival index score ≥1 were included in study. Patients with fixed or removable prosthesis, having any type of restorations, on medications or prescribed antibiotics & anti-inflammatory drugs from last six months and taken periodontal treatment within 6 months were excluded from study. A brief case history & informed consent was taken from all patients who were ready to participate in this study. The study was double blinded with examiner and patients were blinded.

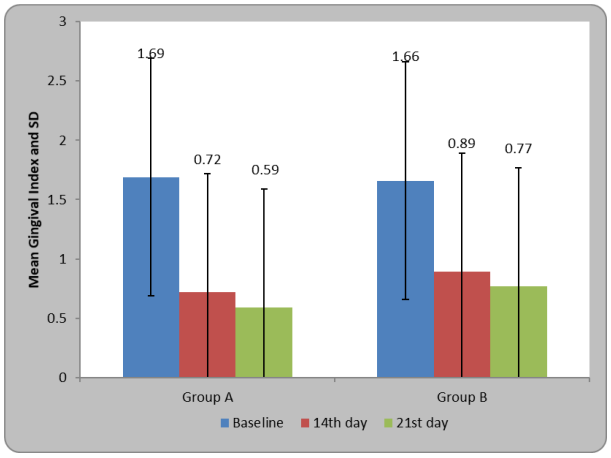
Fig 1: 0.2% Chlorhexidine mouthwash.

Fig 2: Aloe vera mouthwash.

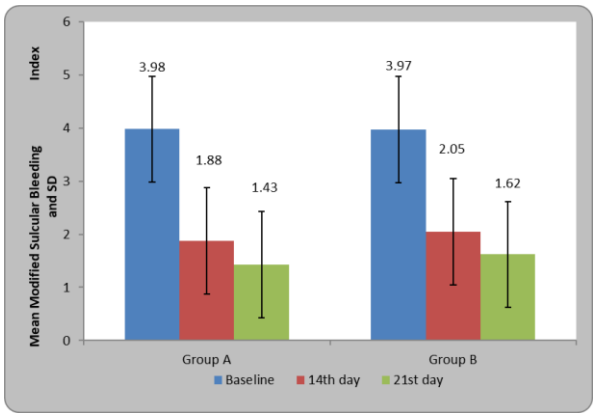
Fig 3: Aloe vera extract powder



Graph I: The mean reduction of plaque index at different time intervals.



Graph II: The mean reduction of gingival index at different time intervals.



Graph III: The mean reduction of modified sulcular bleeding index at different time intervals.

The screening and diagnosis of patients with chronic gingivitis were made by performing intraoral examination. All the selected sixty subjects were randomly divided by lottery method into 2 groups as follows: Group A (n=30): Patients were distributed 0.2% Chlorhexidine gluconate mouthwash [Fig. 1]. Group B (n=30): Patients were distributed Aloe Vera mouthwash [Fig. 2]. Both the mouthwashes were dispensed in similar bottles.

The extract of Aloe vera was procured from Lipra Nutriscience, Umargaon, Gujarat [Fig. 3]. Aloe vera mouthwash was prepared from Sanjivini College of Pharmaceutical Education And Research, Kopargoan, Maharashtra. The composition of Aloe Vera mouthwash: Aloe vera mouthwash contains Aqueous Aloe Vera (100%) Polysorbate 80, Sodium methyl paraben, Sodium Saccharin, Menthol and Camphor. All the chemicals used in present study were of analytical grade.

Ultrasonic Scaling and polishing were performed for selected patients. Each patient was instructed to use 10 ml dose of mouthwash for 1 min twice daily. The patients were instructed not to drink coffee, tea or wine one hour before or after using the mouthwash. The clinical parameters such as Plaque Index, Gingival Index and Modified Sulcus Bleeding Index were evaluated at baseline, 14th day and 21st day. The detailed instructions regarding self-performed plaque control measures were explained and given to patients.

Statistical Analysis:

The results were analyzed using SPSS software version 17.0 (IBM Corporation, Chicago, IL, USA). Unpaired t-test was used to assess the difference between the groups and paired test was used to compare the difference within the groups at different time periods. Clinical changes were expressed using the mean difference from initial recording of parameter at baseline to the final outcome after 14th and 21st day. $P < 0.005$ is considered as level of significance.

RESULTS

The aim of present study was to evaluate the effectiveness and compare the anti plaque effects of 0.2% chlorhexidine gluconate and aloe vera mouthwash on gingival health.

Mean plaque index in group A at baseline was 1.69±0.23, at post-operative 14th day it was 0.68±0.11 and at 21st day it was 0.57±0.10. In group B at baseline was 1.76±0.24, at post operative 14th

Table I: The mean reduction of plaque index at different time intervals.

		Mean	N	Std. Deviation	Std. Error Mean	t-value	p-value
Group A	Baseline	1.69	15	0.23	0.06	-	-
	14th day	0.68	15	0.11	0.02	16.96	0.0001,S
	21st day	0.57	15	0.10	0.02	17.99	0.0001,S
Group B	Baseline	1.76	15	0.24	0.06	-	-
	14th day	0.86	15	0.15	0.03	32.87	0.0001,S
	21st day	0.71	15	0.13	0.03	42.81	0.0001,S

Table II: The mean reduction of gingival index at different time intervals.

		Mean	N	Std. Deviation	Std. Error Mean	t-value	p-value
Group A	Baseline	1.69	15	0.16	0.04	-	-
	14th day	0.72	15	0.09	0.02	36.23	0.0001,S
	21st day	0.59	15	0.08	0.02	45.06	0.0001,S
Group B	Baseline	1.66	15	0.32	0.08	-	-
	14th day	0.89	15	0.16	0.04	15.48	0.0001,S
	21st day	0.77	15	0.16	0.04	17.45	0.0001,S

Table III: The mean reduction of modified sulcular bleeding index at different time intervals.

		Mean	N	Std. Deviation	Std. Error Mean	t-value	p-value
Group A	Baseline	3.98	15	0.62	0.16	-	-
	14th day	1.88	15	0.21	0.05	17.10	0.0001,S
	21st day	1.43	15	0.25	0.06	21.70	0.0001,S
Group B	Baseline	3.97	15	0.67	0.17	-	-
	14th day	2.05	15	0.23	0.06	13.55	0.0001,S
	21st day	1.62	15	0.22	0.05	15.82	0.0001,S

day it was 0.86±0.15 and at 21st day it was 0.71±0.13. Statistically significant difference was found in mean plaque index at 14th day and at 21st day (p=0.0001). But on intergroup comparison there was no statistical significant reduction in plaque index were observed at different time interval. [Table 1 and Graph 1]

Mean gingival index in group A at baseline was 1.69±0.16, at post operative 14th day it was 0.72±0.09 and at 21st day it was 0.59±0.08. In group B at baseline was 1.66±0.32, at post operative 14th day it was 0.89±0.16 and at 21st day it was 0.77±0.16. Statistically significant difference was found in mean gingival index at 14th day and at 21st day (p=0.0001). But on intergroup comparison there was no statistical significant reduction in gingival index were observed at different time interval. [Table 2 and Graph 2]

Mean modified sulcular bleeding index in group A at baseline was 3.98±0.62, at post operative 14th day it was 1.88±0.21 and at 21st day it was 1.43±0.25. In group B at baseline was 3.97±0.17, at post operative 14th day it was 2.05±0.06 and at 21st day it was 1.65±0.05.Statistically significant difference was found in mean modified sulcular bleeding index at 14th day and at 21st day (p-value=0.0001). But on intergroup comparison there was no statistical significant reduction in modified sulcular bleeding index were observed at different time interval. [Table 3 and Graph 3]

DISCUSSION

The present study was carried out to assess the antiplaque efficacy of 0.2% chlorhexidine gluconate and aloe vera mouthwash as an adjunct to scaling and polishing. Chlorhexidine remains the gold standard antiplaque agent due to its superior substantivity and antiplaque effect. The major side effects of chlorhexidine include brownish discoloration of teeth and tongue, formation of supragingival calculus, taste alteration and oral desquamation.[7] The practice of alternate medicine with the use of herbs and herbal products has evolved widely in the form of mouth rinses and toothpastes. They have been shown to possess beneficial effects in the control of plaque and gingival inflammation. [11]

Aloe vera has numerous anti-inflammatory agents like Carboxypeptidase which inactivates bradykinin thereby reducing prostaglandin synthesis and inhibiting oxidation of arachidonic acid, which might decreases inflammation. The reduction in gingival index scores can be attributed to components of Aloe vera which have anti-inflammatory properties. The low plaque index observed in study subjects could be explained by the fact that Aloe Vera is a good antibacterial. The study performed by Heggers et al showed antimicrobial properties of aloe vera against

Candida albicans, Streptococcus pyogens and Streptococcus fecalis.[12] Noskov used aloe vera to treat early stages of periodontitis and got good results.[13]

Aloe vera was considered to be effective in fighting the bacteria, preventing plaque accumulation and gingival inflammation. The mechanism behind reduction of gingival inflammation was inhibition of the cyclooxygenase pathway which leads to the reduction of prostaglandin synthesis form arachidonic acid. Vitamin C present in Aloe vera is involved in collagen synthesis, increases concentration of oxygen at the wound site because of dilation of blood vessels resulting in improvement in gingival health.[10,14]

Bhat et al used sub gingival delivery of aloe vera gel in chronic periodontitis treatment and found significant reduction in plaque index.[14] Villalobes et al observed a significant reduction in plaque with the use of mouth rinse containing aloe vera associated with tooth brushing.[15] Ajmera et al found that reduction in plaque index was more with the scaling and aloe vera mouthwash as compared to the scaling only.[15] Karim et al [17], Chandrahas et al [18] conducted the studies to compare antiplaque effect of aloe vera and 0.2% chlorhexidine mouthwash in gingivitis patients which showed comparable reduction in plaque index by aloe vera. Chhina et al [19] performed comparative evaluation of aloe vera and 0.2% chlorhexidine gluconate mouthwash efficacy on de-novo plaque formation and concluded that aloe vera mouth wash has an efficacy which was comparable to the 0.2% chlorhexidine gluconate mouthwash.

The results of above studies were in accordance with our study where aloe vera and chlorhexidine showed reduction in plaque index which was statistically significant at different time intervals. But on comparison between the groups, no statistically significant results observed.

Similarly, Karim et al (2014) [17], Chandrahas et al (2012) [18] performed the studies to compare antigingivitis effect of aloe vera and 0.2% chlorhexidine mouthwash in gingivitis patients and observed that there was comparable reduction in gingival index, sulcular bleeding index with the use of aloe vera mouthwash. The study done by Ajmeera et al (2013) [19] found that reduction was more with aloe vera mouthwash and scaling as compared to the scaling only in terms of plaque index, gingival index and modified sulcular bleeding index.

The results of above studies were in accordance with present study where chlorhexidine and aloe vera mouthwash showed reduction in gingival and modified sulcular bleeding index which were statistically significant at different time intervals. But on comparison between the groups, no statistical significant results were observed.

CONCLUSION

This study demonstrated that there was reduction in the plaque, gingival and sulcus bleeding score in the subjects using aloe vera and chlorhexidine mouthwash. It was found that the aloe vera mouthwash has a comparable antiplaque efficacy to chlorhexidine gluconate. Aloe vera mouthwash can be recommended as a safe, anti-inflammatory and antimicrobial mouthwash to control gingival inflammation. So, dental professionals should consider the use of aloe vera mouthwash as an adjunct to mechanical plaque control measures and to maintain good oral and gingival health.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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