

Original Article

Aloe vera and Probiotics in Treatment of Chronic Periodontitis Patients: A Clinicoradiographic Study

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ABSTRACT

Introduction: Periodontitis describes a chronic inflammatory disease resulting in destruction of the tissues that support the teeth. In recent years, various host-response modulation therapies and local drug therapies have been developed to block the pathways responsible for periodontal tissue breakdown. The objective of this study was to compare and evaluate the efficacy of aloe vera gel as local drug delivery and probiotic as lozenges in treatment of chronic periodontitis using clinical and radiographic parameters.

Methodology: The study involved 32 chronic periodontitis patients visiting the Department of Periodontics in a dental college of Karnataka. The patients were randomly allotted into two groups; A and B and were irrespectively subjected to routine Scaling and Root Planing. As an adjunct, aloe vera gel in group A and probiotic lozenges in group B were adopted as schemes for treatment. The clinical parameters and radiographic assessments were performed using appropriate techniques. The values in clinical parameters were recorded at baseline, one month and two months. Radiographic assessment was done using ProImage digital radiography software appreciating difference in terms of bone density and noting the gain, loss or similar levels post treatment at two months in both groups. The collected data for clinical and radiographic parameters was assessed by statistical analysis using independent t test for intergroup comparison and paired t test for intragroup comparison and Chi square test using a statistical package SPSS version 20.0.

Results: The intergroup results did not show any statistical significance but results indicated aloe vera apparently better over probiotics in the present study. The radiographic assessment revealed 57.1% gain in bone density in both the groups though statistically non

significant.

Conclusion: Both aloe vera and probiotic in the light of present observation have unfolded as novel and effective treatment modalities in controlling the extent of damaged periodontium. However, prospective studies with larger sample size comparing both modalities are encouraged in future.

INTRODUCTION

Periodontitis describes a chronic inflammatory disease resulting in destruction of the tissues that support the teeth. It results from extension of the inflammatory process initiated in the gingiva to the supporting periodontal tissues. In the era of widespread antibiotic resistance where treatment to chronic inflammatory conditions have become a challenging task, shifting the paradigm to nature's healing ability is emerging as an alternative field. In recent years, various host-response modulation therapies and local drug therapies have been developed to block the pathways responsible for periodontal tissue breakdown.¹

Aloe vera has an unlimited future in dentistry for its anti-inflammatory and antiviral properties along with immunological benefits for the patients.² The antimicrobial properties are attributed to its diverse phytochemical constitution and biochemical nature. The lignins have the properties to penetrate the tissues while saponins are responsible for the antibacterial properties. Varied vitamins Vitamin A, C and E are necessary for maintaining the integrity of epithelial cells along with antioxidant properties and periodontal tissue regeneration.^{3,4}

Also, the application of health promoting bacteria for therapeutic purpose is one of the strongest emerging fields. Shift in the paradigm of the treatment from specific bacteria elimination to alteration of the bacterial ecology by using probiotics has been made.⁵

Several local and systemic effects of probiotics are hypothesized due to the properties of adhesion, co-aggregation, presence of bacteriocin like products and immunomodulation.^{6,7,8,9.}

The objective of this study was to compare and evaluate the efficacy of aloe vera gel as local drug delivery and probiotic as lozenges in treatment of chronic periodontitis using clinical and radiographic parameters.

METHODS

A total of 32 patients were recruited from outpatient department of a Dental College and Associated Hospital, Sullia, Dakshin Kannada in this randomized clinical trial. These patients were of the age group of 35-49 years and divided into two groups. Two patients from each group were excluded during the study due to non compliance of treatment. The inclusion criteria was systemically healthy generalised chronic periodontitis patients with pocket probing depth (PPD) of >5mm <7 mm at 2 and/or more sites with no history of allergies to the drugs being used and with at least 20 fully erupted teeth. Pregnant women and lactating mothers, patients on antibiotics within three months prior to study and patients with history of any periodontal therapy within six months to trial were excluded from the study. An informed consent was obtained from each patient enrolled in the study. Institutional ethical clearance was obtained. Subjects were randomly grouped using lottery method into: Group

A patients received aloe vera gel as intrapocket medicament twice at day zero and day fourteen. Group B-receiving the probiotic lozenges containing *Lactobacillus brevis* CD2 in concentration of 1×10^8 CFU were distributed at the baseline with a dosage of three lozenges twice a day, one in the morning and two at night for one month from baseline.

At baseline, all the patients were assessed clinically by recording bleeding index (BI)¹⁰, gingival index (GI)¹¹ and calculating periodontal probing depth (PPD) and clinical attachment level (CAL). Radiographic assessment was done using intraoral periapical (IOPA) radiograph by digital radiography technique using ProImage software in the Department of Periodontology. All the patients underwent scaling and root planing (SRP) procedure using ultrasonic (piezostriuctive) and hand instruments (Gracey Curettes-Hufriedy®).

After the SRP, the patients were instructed to practice regular oral hygiene habits (modified Bass technique) including tooth brushing twice a day by using toothbrush and toothpaste which they had been using before, and none of the teeth received any other periodontal surgical therapy during the course of the study. The participants followed their routine dietary habits, but they were instructed to refrain from use of any other commercial mouth rinses.

Evaluation of clinical parameters was done in both the



Figure 1A : Clinical parameters at baseline



Figure 1B: Digital radiograph at baseline



Figure 1C : Clinical parameters at one month



Figure 1D : Clinical parameters at two months



Figure 1E : Digital radiograph at two months

Figure 1 : Probiotic Group.



Figure 2A : Clinical parameters at baseline



Figure 2B : Aloe vera gel placement and coe pack



Figure 2C : Digital radiograph at baseline



Figure 2D : Clinical parameters at one month



Figure 2E : Clinical parameters at two months



Figure 2F : Digital radiograph at two months

Figure 2 : Aloe vera Group.

groups after one month and two months from the day of initiation of the study. Radiographic assessment was done post treatment at two months in both groups (Figure 1A-E and 2A-F). Statistical analysis was performed using independent t test for intergroup comparison and paired t test for intra group comparison and Chi square test with statistical package SPSS version 20.0.

RESULTS

Radiographic changes at two months in aloe vera and

probiotic groups are shown table 1 and a gain of 57.1% was noted in both the study groups.

Gingival index difference at baseline (GI BL1) is higher in aloe vera group and is statistically non significant with a p value of 0.122. Comparison of the difference between gingival index at baseline and 2 month (GI BL2) between the two groups shows that GI BL2 difference is higher in aloe vera group and is statistically non significant with a p

value of 0.172. However, comparison of the GI difference between the two groups shows that GI difference is higher in probiotic group though it is statistically non significant with a p value of 0.608 (Figure 3).

Table 1: Radiographic changes at two months in probiotic and aloe vera groups

		Probiotic	Aloe vera
Gain	Count	8	8
	% within group	57.1%	57.1%
Same	Count	6	6
	% within group	42.9%	42.9%
Total	Count	14	14
	% within group	100.0%	100.0%

Bleeding index difference at baseline (BI BL 1) was higher in aloe vera group and found statistically non significant with a p value of 0.935. Comparison of the difference between bleeding index at difference between bleeding index at baseline and 2 month (BI BL 2 difference) between the two groups was higher in probiotic group and is statistically non significant with a p value of 0.99. Comparison of the BI difference between the two groups shows that BI difference is higher in probiotic group with a t value of 0.184 and is statistically non significant with a p value of 0.855 (Figure 4).

Difference between periodontal pocket depth at baseline and one month (PPD BL1) between the two groups was higher in aloe vera group and was statistically non

significant with a p value of 0.49. Comparison of the difference between periodontal pocket depth at baseline and two month (PPD BL 2) between the two groups shows that PPD BL 2 difference was higher in probiotic group and was statistically non significant with a p value of 0.971. Comparison of the PPD difference between the two groups shows that PPD difference was higher in probiotic group and was statistically non significant with a p value of 0.436 (Figure 5).

Difference between clinical attachment level at baseline and one month (CAL BL 1) between the two groups was higher in aloe vera group and was statistically non significant with a p value of 0.276. Comparison of the difference between clinical attachment level at baseline and two month (CAL BL 2) between the two groups shows that CAL BL 2 difference was higher in aloe vera group and was statistically non significant with a p value of 0.792. Comparison of the CAL difference between the two groups shows that CAL difference was higher in probiotic group and was statistically non significant with a p value of 0.541 (Figure 6).

DISCUSSION

Earlier studies have been carried out independently on probiotics¹²⁻¹⁷ and aloe vera^{18,19} respectively, as an adjunct to scaling and root planing (SRP) and had shown beneficial effects in improving periodontal health. However, relative studies comparing their efficacy on clinical and radiographic parameters have not been reported. Contemplating this, the present study was undertaken to compare and evaluate the efficacy of aloe vera gel as an intrapocket medicament and probiotic as lozenges in generalised chronic periodontitis patients

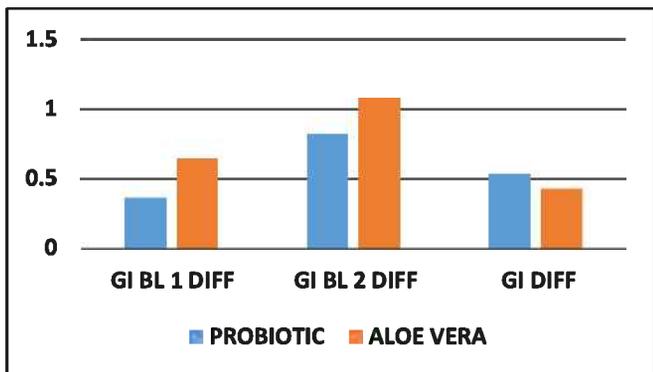


Figure 3: Comparison of Gingival Index (GI) between probiotic and aloe vera groups.

GI BL 1 difference: gingival index at baseline and one month difference
 GI BL 2 difference: gingival index at baseline and two month difference
 GI difference: gingival index difference

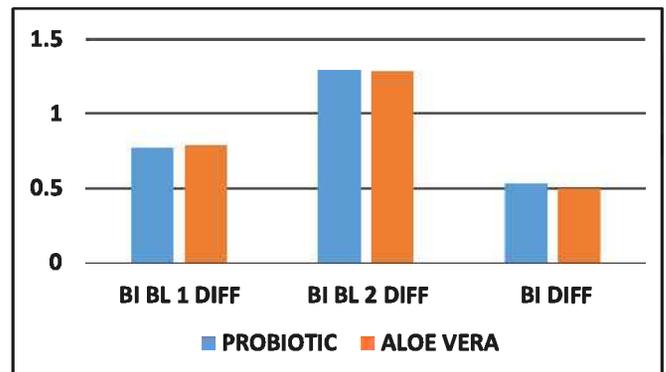


Figure 4: Comparison of Bleeding Index (BI) between probiotic and aloe vera groups.

BI BL 1 difference: bleeding index at baseline and one month difference
 BI BL 2 difference: bleeding index at baseline and two month difference
 BI difference: bleeding index difference

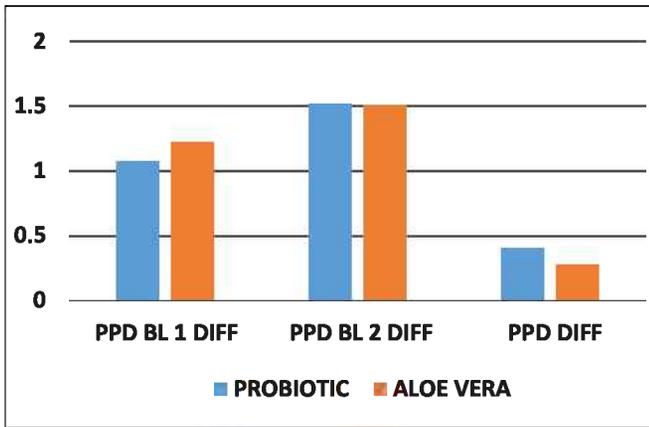


Figure 5: Comparison of Pocket Probing Depth (PPD) between probiotic and aloe vera groups.

PPD BL 1 difference: Periodontal Pocket Depth at baseline and one month difference
 PPD BL 2 difference: Periodontal Pocket Depth at baseline and two month difference
 PPD difference: Periodontal Pocket Depth difference

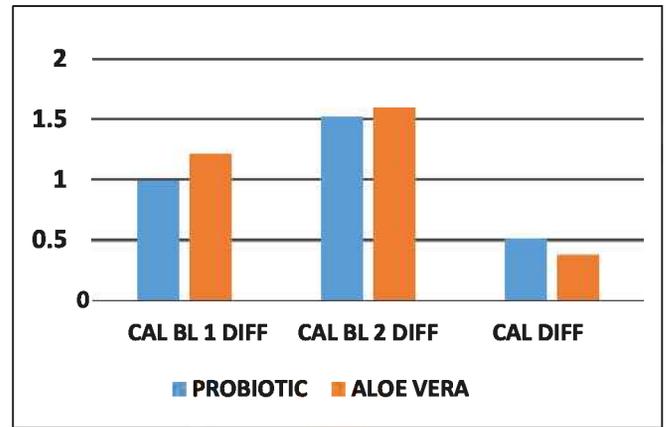


Figure 6: Comparison of Clinical Attachment Level (CAL) between probiotic and aloe vera groups.

CAL BL 1 difference: Clinical Attachment Level at baseline and one month difference
 CAL BL 2 difference: Clinical Attachment Level at baseline and two month difference
 CAL difference: Clinical Attachment Level difference

using clinical and radiographic parameters.

It has been reported earlier that naturally fermented aloe vera had colonization of *Lactobacillus brevis* species called probiotics originating from aloe leaf (POAL).²⁰ This recent development has led to an important discovery in intergroup comparison attempted in this study where the superior results of aloe vera group, though non-significant, could have been attributed to the colonization of probable *Lactobacillus* species found in the gel. Consequently, studies evaluating the role of *Lactobacillus brevis* as local drug delivery agent could be beneficial in future.

An additional compelling finding in the present study has been its radiographic assessment appreciating the difference in the density of bone from baseline to two months using ProImage digital radiography software. Though statistical significance has not been obtained in intergroup results, gain of 57.1% has been reported in group A and B. The basis of insight to this finding could be related with the reference of a past study conducted by Narvaet al²¹ where *Lactobacillus* species through its short peptides acted on osteoblasts and increased their activity in bone formation. These findings have extended the scope for prospective investigations in field of periodontal regeneration.

Lactobacilli and other probiotics colonize human mucosal tissues only transiently.²² However adherence of probiotics²³ recolonization of bacterial flora²⁴ and proper installation techniques of local drug delivery agent with

many other known mechanisms⁶ may have contributed to a possible shift from state of disease to health in current study. The non significant intergroup results could be in regard to the significant intragroup results implying nearly equitable outcome of both modalities as shown in figures 1-4.

Potential adverse effects of probiotic bacteria and herbal products used in the oral cavity have not been a subject of intensive research. Nevertheless, total four dropouts were reported (two in each group). Three out of the four pointed towards non-compliance and one reported gastric discomfort, the exact aetiology of which is out of the scope of discussion in this current study.

Every scientific research comes with a limitation, irrespective of whether such research limitations are anticipated or not, they should be acknowledged and discussed for the improvisation of subsequent researches. In the present study, small sample size of 32 patients and lack of radiographic stent tools were few addressed limitations. In today's era where the threat of widespread antibiotic resistance is rendering many antibiotics useless¹⁶, there is an increased necessity not only to minimize antibiotic use but also to raise the profile of disease prevention as beyond everything "prevention is better than cure".

CONCLUSION

Both aloe vera and probiotic in the light of present observations have unfolded as novel and effective treatment modalities in controlling the extent of damaged

periodontium. However, prospective studies with larger sample size comparing both modalities are encouraged in future. Thus, the present clinical trial encourages the use of naturotherapy in the treatment of chronic periodontal diseases through aloe vera gel and probiotic based treatment modalities.

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