Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Comparative evaluation of clinical effectiveness of probiotics and aloe vera gel on periodontal health: A Randomized Clinical Trial

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***ABSTRACT*:**
Aim: To evaluate and compare the effectiveness of combination of probiotic with aloe vera gel and aloe vera gel only in the treatment of chronic periodontitis. **Materials & Methods:** 30 patients with average age group of 35-60 yrs were selected and divided into two groups following inclusion and exclusion criteria. Probiotics and aloe vera gel were used as a local drug delivery system for the treatment of mild to moderate chronic Periodontitis cases. **Results:** There was significant difference in between probiotics with aloe vera gel and plane aloe vera gel on gingival health. **Conclusion:** Statistically significant differences were observed between group 1 and 2, whereas suggesting that probiotics have added advantages with AV gel and are effective adjuncts to nonsurgical periodontal therapy for the treatment of Chronic Periodontitis.
Keywords: Dental Plaque, Gingivitis, Probiotics, Aloe Vera Gel (AVGel), Chronic Periodontitis.

Received: October 20, 2020 Accepted: November 27, 2020

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This article may be cited as: Yawale P, Thakare K, Wankhade S, Rathi N, Agrawal A, Ganvir M. Comparative evaluation of clinical effectiveness of probiotics and aloe vera gel on periodontal health: A Randomized Clinical Trial. J Adv Med Dent Scie Res 2020;8(12):193-197.

INTRODUCTION:

Among dental diseases, the dental caries and periodontal diseases are more common caused by dental plaque, which is a complex microbial community[1]. Periodontitis implies a chronic inflammatory disease resulting in destruction of supporting tissues of the teeth. It results from adjunct of the continuous inflammatory process initiated in the gingiva involving the supporting periodontal tissues**.** In recent years, various local drug therapies have been developed and documented with good results to block the pathways responsible for periodontal tissue breakdown[2]. Thus, plaque control is basic and pivotal part of the daily routine of every individual as the onset of dental diseases is primarily prevented by regular and careful plaque removal. Tooth-brushing, when accomplished properly, results in effective plaque control. However, mechanical plaque control methods have certain inherent limitations hence other options are also used[3]. Due to availability of a variety of herbal products with different active ingredients is considered to be the most effective anti-plaque agent[4,5,6]. Hence, an effective and safe alternative of using various herbal products in dentistry have been increased without any major side effects, besides being cheap and locally available. Natural herbs when used have shown significant advantages over the chemical ones.[6] Aloe vera has a deep future in dentistry for its anti-inflammatory and anti-viral properties along with immunological benefits for the patients.[7] The antimicrobial properties are accredited 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 like A , C

and E are necessary for maintaining the integrity of epithelial cells along with antioxidant properties for periodontal tissue regeneration.[8,9] Probiotics, another potential tool of anti-plaque activity have been reported to have beneficial effects on oral health[10]. Also, the application of this health promoting bacteria as therapeutic purpose is one of the strongest upcoming fields. Still, probiotics are not widely used in clinical dental practice due to lack of awareness about probiotics knowledge[11]. Several local and systemic effects of probiotics are hypothesized due the the properties of adhesion, co - aggregation, presence of bacteriocin like products and immunomodulation.[12,13,14]Hence in dentistry this period is crucial to take the actions in correct direction with the use of probiotics as they can be concomitantly beneficial for oral as well as systemic health of the human body and can apparently prove to be used as a universal cure in health promotion.[11] Hence, the present study was designed with an aim to compare and evaluate the clinical effectiveness of probiotics and aloe vera gel on the gingival health.

MATERIALS AND METHODS:

The present study was randomized controlled trial with two parallel groups. Ethical clearance for the present study was obtained from Institutional Ethical Committee.The study was conducted at Department of Periodontology,V.Y.W.S. Dental College and Hospital Amravati Maharashtra for one month. Two different products used were probiotics with aloe vera and aloe vera gel alone. A total of 30 (16 males and 14 females) patients were selected from departmental OPD with informed consent enrolled in study, between age group of 35-60 years following the inclusion and exclusion crieteria. Inclusion criteria were Mild to moderate chronic periodontitis with PPD >5 mm, Systemically healthy patients and No any pervious periodontal therapy in last 6 months. Exclusion criteria were Systemically or medically compromised patients, Pregnant women and lactating mother, Smokers, Patients who had undergone any systemic or topical antibiotic therapy or antioxidants such as vitamin C, E and B-carotene within last 6 months and Allergic Patients

ALOE VERA GEL PREPARATION:

AV gel was developed by the procedure described by Velam et al[15] The central parenchymatous pulp from aloe leaves was washed thoroughly with water and then with 0.1N sodium hydroxide (NaOH) solution. Juice was then obtained from the treated pulp.This juice was prefiltered using a cotton bed and then to repeated vacuum filtration until a clear liquid was obtained. To this, 1% w/v carbopol 934 and 0.5% w/v methyl paraben were added. Carbopol gellifies under alkaline conditions. A 0.5N NaOH solution was added drop by drop until a gel was formed. The prepared AV gel was stored in air tight containers in a dark room to prevent photo-oxidation.

CLINICAL PROCEDURE:

All patient underwent scaling and root planning 1 weeks of following completion initial therapy , a reevaluation was performed to confirm that the patient met the inclusion criteria and final selection was done if the PPD remains ≥5 mm. Selected patients were randomly divided into 2 groups. The following clinical parameters were recorded at baseline and 6 weeks treatment post

1. Gingival index(GI); Loe and Sillness (1963)
2. Plaque index (PI); Sillness and Loe
3. Probing pocket depth
4. Clinical attachment level

Group A: Patients were treated with Probiotics containing aloe vera gel. Group B : Patients treated with Aloe vera gel alone. For both the groups application was done using syringe and blunt needle. The pockets were filled until the materials were detected at the gingival margin. Periodontal dressing (Coe pak) was placed over the treated site to ensure long stay of the gel and avoid spillage of the material into the other areas of the mouth. The results were subjected to statistical analysis. The differences in the parameters were assessed at baseline and 6 weeks post-operatively by using student t test.

RESULTS:

The study consisted of 30 patients divided into two groups i.e group A patients were treated with probiotics containing aloe vera gel and group B patients were treated with aloe vera gel alone. The present study compared the efficacy of combination of probiotic with aloe vera gel and aloe vera gel only in the treatment of chronic periodontitis using following variables PI, GI, PPD and CAL. On intra-group comparison before and after treatment results obtained in group I were change in PI within probiotic + AV gel group shows that there was as significant reduction in PI from baseline to 6 weeks (p=0.001). Change in GI within probiotic + AV gel group shows that there was as significant reduction in GI from baseline to 6 weeks (p=0.001).Change in PPD within probiotic + AV gel group shows that there was as significant reduction in PPD from baseline to 6 weeks (p=0.001). Change in CAL within probiotic + AV gel group shows that there was as significant reduction in CAL from baseline to 6 weeks (p=0.001). Whereas, results obtained in group II were change in PI within Aloe vera group shows that there was as significant reduction in PI from baseline to 6 weeks (p=0.001). Change in GI within Aloe vera group shows

that there was as significant reduction in GI from baseline to 6 weeks (p=0.001). Change in PPD within Aloe vera group shows that there was as significant reduction in PPD from baseline to 6 weeks (p=0.001). Change in CAL within Aloe vera group shows that there was as significant reduction in CAL from baseline to 6 weeks (p=0.001). On intergroup comparison of plaque index at baseline among both the groups showed significant difference (p=0.001). Comparison of plaque index at 6 weeks among both the groups showed non-significant difference (p=0.577). (Table No 1 & 2)

Table No. 1 Comparison of change within Probiotic + AV.gel group

Variable	Interval	Mean	Std. Deviation	Difference	t value	p value
PI	Baseline	1.35	0.36	0.29	0.601	0.001*
	6 weeks	0.60	0.16			
GI	Baseline	1.43	0.32	0.35	17.848	0.001*
	6 weeks	0.69	0.17			
PPD	Baseline	5.27	1.03	21.07	13.484	0.001*
	6 weeks	3.20	0.68			
CAL	Baseline	2.87	0.83	2.00	11.832	0.001*
	6 weeks	0.87	0.35			

Paired t test; * indicates significant difference at p≤0.05

Table No. 2 Comparison of change within Aloe vera gel group

Variable	Interval	Mean	Std. Deviation	Difference	t value	p value
PI	Baseline	0.86	0.08	0.75	12.096	0.001*
	6 weeks	0.57	0.10			
GI	Baseline	1.00	0.22	0.73	9.805	0.001*
	6 weeks	0.65	0.21			
PPD	Baseline	6.13	0.83	1.47	8.876	0.001*
	6 weeks	4.67	0.90			
CAL	Baseline	3.00	0.76	1.40	10.693	0.001*
	6 weeks	1.60	0.74			

Paired t test; * indicates significant difference at p≤0.05

Table no. 3 Comparison of variables at each interval among both the groups

	Groups	Mean	Std. Deviation	Difference	t value	p value
PI-Baseline	**Probiotic+AV**	1.35	0.36	0.49	5.110	0.001*
	Aloe vera	0.86	0.080			
PI-6 weeks	**Probiotic+AV**	0.60	0.16	0.03	0.565	0.577 (NS)
	Aloe vera	0.57	0.10			
GI-Baseline	**Probiotic+AV**	1.43	0.32	0.43	4.276	0.001*
	Aloe vera	1.00	0.22			
GI-6 weeks	**Probiotic+AV**	0.69	0.17	0.04	0.619	0.541 (NS)
	Aloe vera	0.65	0.21			
PPD-Baseline	**Probiotic+AV**	5.27	1.03	-0.86	-2.529	0.017*
	Aloe vera	6.13	0.83			
PPD-6 weeks	**Probiotic+AV**	3.20	0.68	-1.47	-5.047	0.001*
	Aloe vera	4.67	0.90			
CAL-Baseline	**Probiotic+AV**	2.87	0.84	-0.13	-0.459	0.650 (NS)
	Aloe vera	3.00	0.76			
CAL-6 weeks	**Probiotic+AV**	0.87	0.35	-0.73	-3.479	0.002*
	Aloe vera	1.60	0.74			

Independent t test; * indicates significant difference at p≤0.05; NS: Non-significant

Table No.4 Comparison of reduction in each variable from baseline to 6 weeks among both the groups

	Groups	Mean	SD	% reduction	t value	p value
PI	**Probiotic+AV**	0.75	0.27	54.49	6.183	0.001*
	Aloe vera	0.29	0.09	33.38		
GI	**Probiotic+AV**	0.73	0.16	51.60	6.944	0.001*
	Aloe vera	0.35	0.14	35.77		
PPD	**Probiotic+AV**	2.07	0.59	39.05	2.662	0.013*
	Aloe vera	1.47	0.64	23.97		
CAL	**Probiotic+AV**	2.00	0.66	70.56	3.649	0.001*
	Aloe vera	1.40	0.51	48.33		

Independent t test; * indicates significant difference at p≤0.05; NS: Non-significant

DISCUSSION:

Comparison of gingival index at baseline among both the groups showed significant difference (p=0.001). Comparison of gingival index at 6 weeks among both the groups showed non-significant difference (p=0.541).Comparison of PPD at baseline among both the groups showed significant difference (p=0.017). Comparison of PPD at 6 weeks among both the groups showed significant difference (p=0.001).Comparison of CAL at baseline among both the groups showed non-significant difference (p=0.650). Comparison of CAL at 6 weeks among both the groups showed significant difference (p=0.002). And intergroup comparison representing reduction in each variable from baseline to 6 weeks among both the groups Probiotics + AV gel showed more reduction (54.49%) in PI as compared to aloe vera gel alone (33.38%) and the difference in reduction among the two groups was significant (p=0.001). Probiotics + AV gel showed more reduction (51.60%) in GI as compared to aloe vera gel alone (35.77%) and the difference in reduction among the two groups was significant (p=0.001). Probiotic + AV gel showed more reduction (39.05%) in PPD as compared to aloe vera gel alone(23.97%) and the difference in reduction among the two groups was significant (p=0.013). Probiotics + AV gel showed more reduction (70.56%) in CAL as compared to aloe vera gel alone (48.33%) and the difference in reduction among the two groups was significant (p=0.001). (Table No 3 & 4) Earlier studies have been carried out independently on probiotics[16-21] and aloe vera[22,23] respectively, as an adjunct to scaling and root planning (SRP) and had shown beneficial effects in improving periodontal health. In recent days, probiotics have strained the attention of researchers worldwide for its potential benefits in maintenance of oral health. Natural beneficial bacteria are administered to compete and provide a natural defense against the harmful microorganism. Probiotics strains contain bacterial strains which are not harmful, do not develop antibiotic resistance and nontoxic.[24]

CONCLUSION:

Both aloe vera and probiotic in the beam of present observations have extended 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 study 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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