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Comparative Evaluation of 4% Cranberry Gel And 1% Chlorhexidine Gel as an Adjunct to SRP in Gingivitis Patients.

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ABSTRACT:

Introduction - Cranberry, a native North American fruit, has lately come into spotlight owing to its multiple beneficial effects on periodontal health.

Aim - To evaluate the anti-inflammatory and anti-plaque efficacy of 4% Cranberry gel as an adjunct to SRP in generalized moderate to severe gingivitis patients.

Methodology - 30 subjects with age range of 17 to 60 years, with moderate to severe gingivitis were chosen for study, After Phase-I therapy, the subjects were randomly allocated to 2 groups: Group 1(Test)(n=15)-4% cranberry gel and Group 2(Control)(n=15)-1% chlorhexidine gel (Hexigel®). Subjects were instructed to apply the pea sized amount of gel topically on the gingival surface, two times a day after brushing and to keep it for 5 minutes during 14-day period. The clinical outcomes plaque index gingival index and modified sulcular bleeding index were recorded at baseline, 7th day and 21st day. Using t-test, stational analysis was performed.

Results – Both the group that received Cranberry gel and Hexi gel showed significant improvement in clinical parameters after 7th and 21st days. However, on inter group comparison, there was no significant difference between two groups.

Conclusion – The 4% Cranberry gel as well as 1% Hexi gel were seen to be similarly efficient in generalized moderate to severe gingivitis patients.

Keywords: Anti-inflammatory, Cranberry gel, Gingivitis, Hexigel

INTRODUCTION

It has been observed that substances resultant from microbial plaque accumulating at or near the gingival sulcus causes gingivitis. All other suspected systemic and

local etiologic factors either enhance plaque accumulation or retention, or enhance the susceptibility of the gingival tissue to microbial attack.¹One of the most important



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etiological factors in gingivitis is the dental plaque which is a structurally and functionally organized biofilm.² Plaque control procedures comprises of several mechanical and chemical methods.³ The main goal of plaque control is to reduce the gingivitis so as to decrease or eliminate inflammation and thereby allow healing of the gingival tissues.⁴In the field of dentistry, Chlorhexidine is broadly used as antiseptics, antimicrobial and anti-plaque agent. It is obtainable as antiseptic ointment, disinfectant, topical gels and mouth rinses, therefore Chlorhexidine is used as gold standard in anti-plaque agent.² prolonged use of it leads to staining of tongue and teeth along with desquamation of intra oral mucosa or taste sensations alteration.⁵ These drawbacks of Chlorhexidine have led to the search of its substitutes.

Cranberry (*VACCINIUM MACROCARPON*) is a North American fruit with its numerous beneficial effects on periodontal health.⁶ The most abundant flavonoids, Proanthocyanidins has anti-inflammatory and anti-plaque properties, which are extracted from cranberry fruit.⁷ In the current study, an effort has been made to evaluate the success of two antimicrobial gels-Hexigel and Cranberry Gel as an adjunct to Phase I in the treatment of chronic gingivitis.

MATERIALS AND METHODS

Study population and selection criteria

Selection of 30 participants with mild to moderate gingivitis was done from the outpatient Department of Periodontics, Pacific Dental College and Hospital, Udaipur, Rajasthan and this single centered, randomized controlled clinical trial was carried out among them. Subjects between 17 to 60 yrs with a minimum complement of 20 teeth who had not undergone periodontal treatment in the last 6 months were included in the study. Subjects having systemic conditions, pregnant and lactating mothers and on medications like anti-inflammatory, antimicrobial therapy and corticosteroids or oral contraceptives, history of Cranberry fruit allergy were excluded from the study. 30 patients satisfying the criteria are divided into two groups: Group I(n-15)– 4% Cranberry gel adjunct to Scaling and root planning. (Test group) and Group II (n-15) – 1% Hexi gel adjunct to Scaling and root planning only (Control group). (Fig 1{a,b})

Ethical clearance

This study was approved by the Ethical Review Committee, Pacific Dental College and Hospital, Udaipur. (PDCH/23/EC-03).

Preparation of 4% Cranberry Gel

The Cranberry gel was prepared by the College of Pharmacy, Udaipur. Cranberry fruits were freeze-dried and crushed to a fine powder. Cranberry powder was extracted overnight with ethanol (100 mL) at 0 °C, after stirring for 1hr at room temperature. The supernatants were combined, evaporated at 28 °C then freeze-dried to eliminate residual water and kept at –20 °C until use. ethanol was used to remove free sugars from the extracts to provide concentrated extracts for anti-inflammatory evaluation and mixed with Carbopol 940p (gelling agent) and distilled water. As a preservative, methylparaben was used. The gel to be kept at a 4% weight/volume concentration. (Fig 1{a})

Study protocol

After phase I therapy, subjects in the test group were instructed to apply cranberry gel and Hexi gel in control group twice daily after brushing with gentle circular motion and to keep it for 5 min during 14-days. Oral hygiene instructions were given and patients were recalled on 7th day and 21st day. The Plaque Index (Silness and Loe 1964) and Gingival index (Loe and Silness 1963) and modified sulcular bleeding index (Mombelli 1987) recorded at baseline, 7th day and 21st day.

Statistical analysis

All the clinical parameters were entered into an Excel sheet and analysis for statistical significance for intragroup and intergroup comparison was performed using the paired t-test and unpaired t-test by the SPSS Statistical Software (version 25, IBM, Chicago, IL, USA). The level of significance was kept at $P \leq 0.05$.

RESULTS AND DISCUSSION

All the clinical parameters i.e., plaque index, gingival index and modified sulcular bleeding index were assessed at baseline, 7th day and 21st day post-scaling. On intragroup comparison for plaque index, gingival index and modified sulcular bleeding index, both test and control groups showed statistically significant difference at 7th day ($p < 0.001$) and 21st day post-scaling ($p < 0.001$). (Table 1,2,3 and Graph 1)

On intergroup comparison of plaque index, it was not statistically significant at baseline($p=0.956$) and 21st days ($p=0.123$) but at 7th days it was significant ($p=0.049$). (Table 1, Graph 2) On intergroup comparison of Gingival index showed no significant difference at baseline ($p=0.398$), at 7th days ($p=0.114$) and 21st day ($p=0.250$). (Table 2, Graph 2) On intergroup comparison of modified sulcular bleeding index showed no significant difference at

baseline ($p=0.530$), at 7th days ($p=0.825$) and 21st day ($p=0.446$). (Table 3, Graph 2)

DISCUSSION

Bioactive flavonoids including flavanols, anthocyanins and proanthocyanidins are derivatives of Cranberry to enhance its beneficial potential human health.^{8,9} The proanthocyanidins have shown to prevent the formation of plaque by caries causing microbes. Polyphenols decrease the inflammatory response and production of proteolytic enzymes adding to the destruction of the extracellular matrix in periodontal disease.¹⁰

In the present study the mean change in the GI, PI, MSBI within the groups when compared at baseline, 7th day and 21st day was found to be statistically significant. Also, the study conducted by Diksha Sayal *et al.* (2016)⁶ showed that the mean change in the PI, GI scores between the groups when compared from baseline to 21st day was found to be statistically significant. .

Weiss EI *et al.* (2004)¹¹ done study in-vivo and concluded that Cranberry component inhibited the adhesion of streptococci to saliva-coated hydroxyapatite and ability to reduce *S. mutans* count. Yamanaka-Okada A *et al.* (2008)¹² showed that NDM fraction of Cranberry juice inhibited 80–95% of biofilm formation among the streptococci species. The anti-adhesion effect of Cranberry on *S. mutans* was also supported by an in-vitro study conducted by Sethi R *et al.* (2011)¹³

Bonifait L *et al.* (2010) showed that the Nondialyzable material fraction of cranberries prevents the secretion of MMP-9 and MMP-3 by the macrophages and gingival fibroblasts and it also inhibits the catalytic activity of both these enzymes and elastase. Again, the NDM fraction showed their action by inhibiting the expression and phosphorylation of numerous intracellular proteins involved in the activation of AP-1 within the fibroblasts. The polyphenols have efficacy to reduce the destruction of tooth-supporting tissues by inhibiting the activity of hydrolytic enzymes secreted by the host's cells.¹⁴

Chlorhexidine (CHX) has been proved to be the most effective compound (gold standard) for plaque prevention and inhibiting formation of gingivitis when used twice daily as mouth rinse. When used orally, Chlorhexidine has been reported to have numerous local adverse effects like taste disturbances, tooth discoloration and mucosal erosions. Many chemical antiplaque agents have been tested but no other chemical plaque agent has shown better results than Chlorhexidine without eliciting unfavourable

side effects.¹⁰ Taking into thought, the adverse-effects of Chlorhexidine and the fondness or faith of people towards the herbal and natural products.

CONCLUSION

This study showed that cranberry gel when used as an adjunct to scaling has shown to have significant results in reducing the PI, GI, and MSB after 21 days. Therefore, Cranberry can prove to be efficient herbal alternatives to chlorhexidine in improving the oral hygiene with no other additional side effects. 4% Cranberry gel was seen to be as efficient as 1% Hexi gel in generalized moderate to severe gingivitis patients. Further possibility lies in the long-term assessment of the advantages and adverse effects of such herbal extracts.

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Conflicts Of Interest- Nil

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REFERENCES

1. Yamahk N, Yavuzyilmaz E, Caglayan F, Ilhan T, Izzet B, Fugen E, and Ozden S. Periodical gingival bleeding as a presenting symptom of periodontitis due to underlying cyclic neutropenia. Case report. Aust dent j. 1993; 38: 272-6.
2. Pradeep A, Kumari M, Priyanka N, Naik SB and Savitha B. Efficacy of chlorhexidine, metronidazole and combination gel in the treatment of gingivitis-a randomized clinical trial. J Int Acad Periodontol. 2012; 14: 91-6.
3. Singh V, Pathak AK, Pal M, Sareen S, Goel K, Sagar S. Comparative evaluation of topical application of turmeric gel and 0.2% chlorhexidine gluconate gel in prevention of gingivitis. Nat J Maxillofac surg. 2015; 6: 67.
4. Sato S, Fonseca MJV, Ciampo JOD, Jabor JR and Pedrazzi V. Metronidazole containing gel for the treatment of periodontitis: an in vivo evaluation. Braz Oral Res. 2008; 22: 145-50.
5. Addy M, Moran J, Newcombe R and Warren P. The comparative tea staining potential of phenolic, chlorhexidine and anti-adhesive mouthrinses. J clin periodontol. 1995; 22: 923-8.
6. Sayal D, Sood R, Yadav N, Jha B and Dodwad V. Comparing the effect of three different mouthwashes

cranberry, HIORA and chlorhexidine on the management of periodontal diseases. *IP Int J Periodontol Implantol*. 2021; 1: 55-62.

7. Feghali K, Feldman M, La VD, Santos J and Grenier D. Cranberry proanthocyanidins: natural weapons against periodontal diseases. *J agric food chem*. 2012; 60: 5728-35.

8. Bodet C, Chandad F and Grenier D. Anti-inflammatory activity of a high-molecular-weight cranberry fraction on macrophages stimulated by lipopolysaccharides from periodontopathogens. *J dent res*. 2006; 85: 235-9.

9. Singh AP, Wilson T, Kalk AJ, Cheong J and Vorsa N. Isolation of specific cranberry flavonoids for biological activity assessment. *Food chem*. 2009; 116: 963-8.

10. Dandekar S, Deshpande N and Dave D. Comparative evaluation of anti-microbial efficacy of cranberry extract and chlorhexidine mouthwash on periodontal pathogens: An in-vitro study. *J Periodontal Practi*. 2017; 2.

11. Weiss EI, Kozlovsky A and Steinberg D. A high molecular mass cranberry constituent reduces mutans

streptococci level in saliva and inhibits in vitro adhesion to hydroxyapatite. *FEMS Microbio Lett*. 2004; 232: 89-92.

12. Yamanaka-Okada A, Sato E, Kouchi T, Kimizuka R, Kato T and Okuda K. Inhibitory effect of cranberry polyphenol on cariogenic bacteria. *Bull Tokyo Dent Coll*. 2008; 49: 107-12.

13. Sethi R and Govila V. Inhibitory effect of cranberry juice on the colonization of Streptococci species: An in vitro study. *J Ind Soc Periodontol*. 2011; 15: 46.

14. Bonifait L and Grenier D. Cranberry polyphenols: potential benefits for dental caries and periodontal disease. *J Can Dent Assoc*. 2010; 76: a130-a.

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Figures

Figure 1. Prepared 4 % Cranberry Gel and 1% Hexi Gel

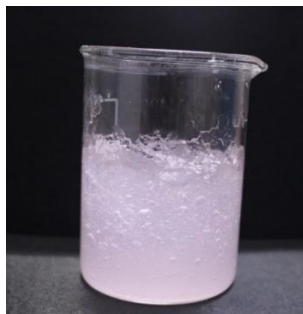


Fig 1(a): Prepared 4% Cranberry Gel



Fig 1(b): 1% Hexi Gel

Figure 2. Scaling with application of Cranberry gel (Test Group)



Fig 2a: Baseline



Fig 2b: 21st day

Figure 3. Scaling with application of Chlorhexidine gel (Control Group)



Figure 3 (a)Baseline



Figure 3(b) 21 day

Tables and Graphs

Table 1: Intragroup and Intergroup comparison of plaque index at baseline, 7th day and 21st day

Plaque index (PI)									
	Baseline			7 th day			21 st day		
	Mean±sd	Mean diff	P value	Mean±sd	Mean diff	P value	Mean±sd	Mean diff	P value
Test	1.97±0.42	0.58	<0.001	1.39±0.29	0.44	<0.001	1.53±0.30	0.14	<0.001
Control	1.97±0.20	0.75	<0.001	1.22±0.16	0.58	<0.001	1.39±0.20	0.17	<0.001
Mean	0.00			-0.18			-0.15		
P value	0.956			0.049			0.123		

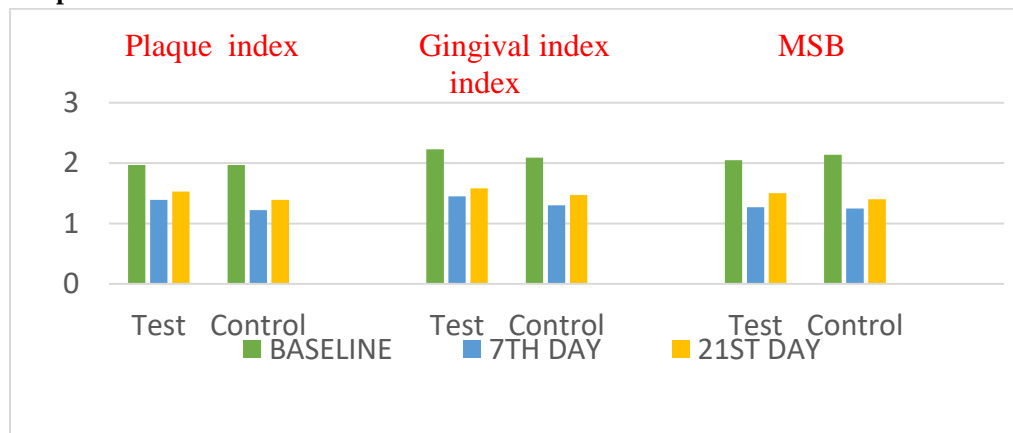
Table 2: Intragroup and Intergroup comparison of gingival index at baseline, 7th day and 21st day

Gingival index (GI)									
	Baseline			7 th day			21 st day		
	Mean±sd	Mean diff	P value	Mean±sd	Mean diff	P value	Mean±sd	Mean diff	P value
Test	2.23±0.52	0.78	<0.001	1.45±0.25	0.65	<0.001	1.58±0.25	0.13	<0.001
Control	2.09±0.31	0.79	<0.001	1.30±0.24	0.62	<0.001	1.47±0.24	0.17	<0.001
Mean	-0.13			-0.15			-0.11		
P value	0.398			0.114			0.250		

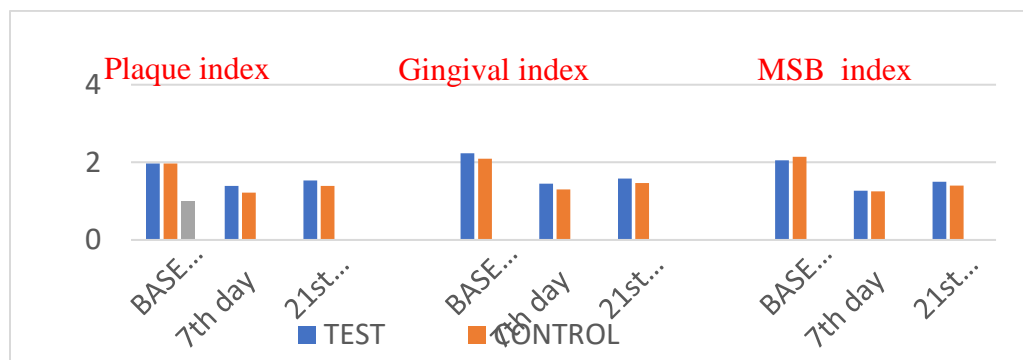
Table 3: Intragroup and Intergroup comparison of MSB index at baseline, 7th day and 21st day

Modified sulcular bleeding index (MSBI)									
	Baseline			7 th day			21 st day		
	Mean±sd	Mean diff	P value	Mean±sd	Mean diff	P value	Mean±sd	Mean diff	P value
Test	2.05±0.45	0.77	<0.001	1.27±0.33	0.55	<0.001	1.50±0.36	0.23	<0.001
Control	2.14±0.34	0.89	<0.001	1.25±0.32	0.74	<0.001	1.40±0.35	0.15	<0.001
Mean	0.09			-0.03			-0.10		
P value	0.530			0.825			0.446		

Graphs



Graph 1: Intragroup comparison of Plaque, gingival and MSB index at baseline, 7th day and 21st day.



Graph 2: Intergroup comparison of gingival index and plaque index and MSB index at baseline, 7th days and 21st day.