



## EFFECT OF TRIPHALA CONTAINING GEL AND CHLORHEXIDINE GEL ON PLAQUE INDUCED GINGIVITIS: A RANDOMIZED CONTROLLED TRIAL

Shamila Shetty, ShrinidhiBallal, Nishith and MeghaVanasi

A.J. Institute of Dental Sciences, Mangalore, Karnataka, India – 575006

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### ABSTRACT

The present study was performed to assess the efficacy of triphalacontaining gel and chlorhexidine gel on plaque induced gingivitis patients. A total of 30 subjects, aged from 18 to 50years, with plaque-induced gingivitis were selected from the outpatient Department of Periodontology, A J Institute of dental sciences for this study. They were divided randomly into the test or triphala containing gel group (group I) and the control or chlorhexidine gel group (group II) with 15 subjects in each group. The subjects were instructed to massage their gingiva thrice a day for 3 weeks with triphala containing gel (test), and chlorhexidine gel (control). Plaque index and gingival index scores were recorded of 30 subjects at baseline and after 3 weeks. The results showed a significant difference within the group for plaque and gingival indices, from the baseline to 3 weeks. However, difference between group I and group II was not statistically significant with respect to the plaque and gingival indices.

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### INTRODUCTION

Plaque-induced gingivitis is an inflammatory response of the gingival tissues which results from bacterial plaque accumulation located at and below the gingival margin<sup>(1,2)</sup>. It begins at the gingival margin and may spread throughout the remaining gingival unit. Patients may notice symptoms which include bleeding on tooth brushing, blood in saliva, gingival swelling and redness and halitosis in the case of established forms.<sup>(1)</sup>To prevent gingivitis and its progression to periodontitisand also to maintain dental and periodontal health daily, supra- gingival plaque control methods are considered as the most effective methods.

Chlorhexidine (CHX) is the most commonly prescribed antiseptic mouth wash in the dental field.<sup>(3)</sup>It has a long-lasting antibacterial activity with a broad-spectrum of action. It has been shown to reduce plaque, gingival inflammation and bleeding.<sup>(3)</sup> It is an ideal broad-spectrum antimicrobial which is effective against Gram-positive, gram-negative bacteria and fungi.<sup>(3)</sup>It is considered as a gold standard<sup>(4)</sup>

‘Triphala’ is a well-known powdered preparation in theindian system of medicine, which is used in ayurveda since ancient time. It consists of equal parts of the emblica officinalis, terminalia chebula, and terminalia belerica.<sup>(5)</sup> It also contains tannins, quinones, flavones, flavonoids, flavonols phenols, glycosides, Gallic acid, and Vitamin C which are responsible for its strong antioxidant activity.<sup>(6)</sup>It has antimicrobial,

antistress, purgative, anthelmintic, hypolipidemic, antifungal, antioxidant, antiulcer, immunomodulatory, antitumor, anti – inflammatory, antihistaminic, antibacterial, antispasmodic, antiasthmatic, analgesic, and antimutagenic properties. It has been used in the dental field as a mouthwash because of its antiplaque and antigingivitis properties.<sup>(6)</sup>

Terminalia chebula one of the main ingredients is important in the prevention and treatment of several diseases of the mouth such as dental caries, spongy and bleeding gums, gingivitis and stomatitis. It successfully prevents plaque formation on the surface of the tooth, as it inhibits the sucrose-induced adherence and the glucan-induced aggregation, thereby inhibiting colonization of the organism on the tooth surface.<sup>(6)</sup> In the present study the effect of triphala containing gel and chlorhexidine gel has been evaluated and compared on plaque induced gingivitis based on plaque index and gingival index .

In addition to the antimicrobial properties of both the gels, gingival massage mechanically disruptsthe biofilm present on the teeth and disperses the agents throughout the gingiva.it also stimulates blood circulation to the gingival tissues and strengthen its immune response. Furthermore, it is easy to perform, more acceptable and can have a better patient compliance.<sup>(7)</sup>

### MATERIALS AND METHOD

The present study was conducted in the Department of Periodontology, A.J Institute of Dental Sciences, Mangalore. A randomized controlled clinical trial was performed. A total of 30 subjects both males and females were enrolled for this study based on the following inclusion and exclusion criteria:

\*Corresponding author: Shamila Shetty

A.J. Institute of Dental Sciences, Mangalore, Karnataka, India – 575006

**Inclusion criteria**

- Subjects with plaque-induced gingivitis
- Age range of 18–50years old
- Subjects exhibited no evidence of clinical attachment loss
- Ready to give consent.

**Exclusion criteria**

- Use of antibiotics in the past 3–4 weeks
- History of dental treatment/use of mouthwash
- Individuals with known systemic disease
- Pregnant or lactating women
- Other gingival conditions like necrotising periodontal diseases, gingival enlargement, gingival diseases modified by systemic factors, gingival diseases modified by medications, gingival diseases of bacterial, viral and fungal origin.

Prior to initiating the study written informed consent was taken from all the participants and a complete case history was recorded of all participants taking part in the study. Diagnosis of plaque induce gingivitis was performed by the clinical assessment which was based on plaque index (Silness and Loe 1964) and gingival index (Loe and Silness, 1963). The plaque index and gingival index scores were recorded in each individual at baseline (pre) and after 3 weeks (post). A total of 30 subjects with almost equal baseline mean scores were chosen for the study. A simple random sampling was carried out using a lottery method. Group I (study group-triphala containing gel) and Group II (control group-chlorhexidine gel) included 15 subjects each.

The Study group (Group I) was advised to massage their gingiva with 1 ml of triphala containing gel[H- Gum gel 30 g, Bangalore Pharmaceutical & Research Laboratory Pvt. Ltd]. The control group (Group II) was advised to massage their gingiva with 1 ml of 1% chlorhexidine digluconate gel[HEXIGEL 15g, ICPA HEALTH PRODUCTS LTD]. All the subjects were advised to massage their gingiva by using the index finger thoroughly around all teeth in circular motions for 10 min, thrice a day, for 3 weeks. Patients were instructed not to eat or drink for at least 1/2 h after the gingival massage. No specific instructions on other oral hygiene practices (tooth brushing, flossing) were given in order to eliminate the bias which could have arrived because of modifying their oral hygiene practices.

The pre and post values of plaque and gingival index scores within the same group was performed using Wilcoxon sign test. The comparison of pre- and post-values between the two groups was performed using Mann-whitney test. SPSS (Statistical Package for Social Sciences) version 20. [IBM SPASS statistics (IBM corp. Armonk, NY, USA released 2011)] was used to perform the statistical analysis.

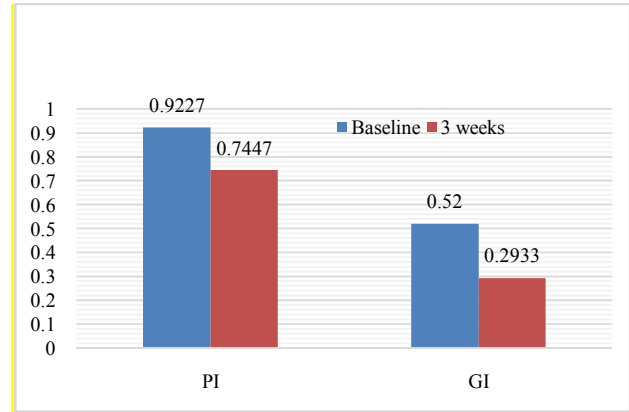
**RESULTS AND DISCUSSION**

The Table 1 shows the comparison of plaque and gingival index scores from baseline to 3 weeks in Triphala group. Mean plaque scores were higher at baseline ( $0.92 \pm 0.27$ ) as compared to plaque scores at 3 weeks ( $0.744 \pm 0.291$ ). Similarly, Gingival scores were higher at baseline ( $0.52 \pm 0.31$ ) as compared to 3 weeks ( $0.29 \pm 0.22$ ). There was a statistically significant difference seen with respect to both

plaque ( $p=0.005$ ) and gingival scores ( $p=0.001$ ). The results are pictorially shown in Figure 1.

**Table 1** Comparison of the plaque and gingival index scores from baseline to 3 weeks in triphala group using wilcoxon sign test

Triphala group	Minimum	Maximum	Mean	S.D	Median	Mean diff	P value
PI	Baseline .40	1.39	.9227	.27691	0.90	0.178	0.005*
	3 weeks .25	1.21	.7447	.29118	0.75		
GI	Baseline .21	1.25	.5200	.31312	0.35	0.226	0.001*
	3 weeks .09	.82	.2933	.22471	0.19		

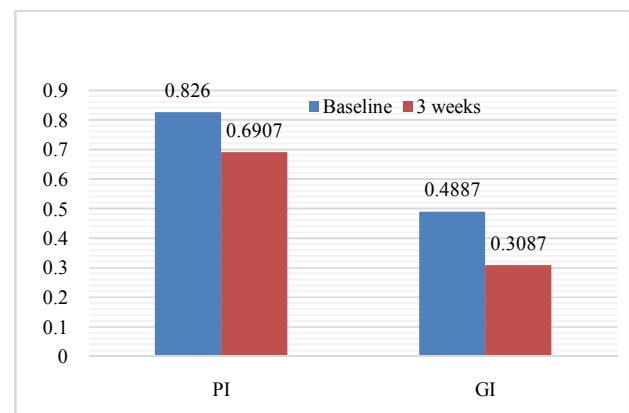


**Figure 1** Comparison of the plaque and gingival index scores from baseline to 3 weeks in triphala group

Table 2 shows the comparison of plaque and gingival index scores from baseline to 3 weeks in CHX group. Mean plaque scores were higher at baseline ( $0.82 \pm 0.36$ ) as compared to plaque scores at 3 weeks ( $0.69 \pm 0.33$ ). Similarly Gingival scores were higher at baseline ( $0.48 \pm 0.31$ ) as compared to 3 weeks ( $0.30 \pm 0.28$ ). Wilcoxon sign test was applied to compare the statistical difference from baseline to 3 weeks for plaque and gingival scores. There was a statistically significant difference seen with respect to both plaque ( $p=0.001$ ) and gingival scores ( $p=0.001$ ). The results are pictorially shown in Figure 2.

**Table 2** Comparison of the plaque and gingival index scores from baseline to 3 weeks in chlorhexidine group using wilcoxon sign test

CHX group	Minimum	Maximum	Mean	S.D	Median	Mean diff	P value
PI	Baseline .35	1.54	.8260	.36787	0.78	0.135	0.001*
	3 weeks .32	1.31	.6907	.33780	0.68		
GI	Baseline .20	1.22	.4887	.31380	0.35	0.180	0.001*
	3 weeks .12	1.04	.3087	.28693	0.17		

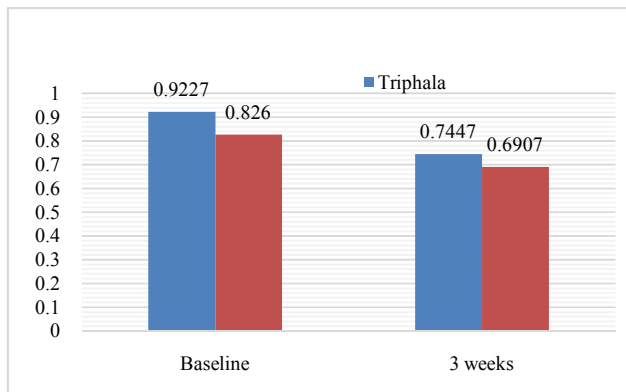


**Figure 2** Comparison of the plaque and gingival index scores from baseline to 3 weeks in chlorhexidine group

Table 3 shows the comparison of Triphala and CHX groups for plaque scores. Mean plaque scores at baseline was higher slightly for Triphala ( $0.92 \pm 0.27$ ) as compared to plaque scores for CHX group ( $0.82 \pm 0.36$ ). Similarly at 3 weeks, plaque scores were higher for Triphala ( $0.74 \pm 0.29$ ) as compared to CHX ( $0.69 \pm 0.33$ ). There was no statistically significant difference seen between the groups both at baseline ( $p=0.36$ ) and at 3 weeks ( $p=0.54$ ). The results are pictorially shown in Figure 3.

**Table 3** Triphala and chlorhexidine groups at baseline and 3 weeks using Mann-whitney test

PI	Minimum	Maximum	Mean	S.D	Median	Mean diff	P value
Baseline	Triphala	.40	1.39	.9227	.27691	0.90	0.36
	CHX	.35	1.54	.8260	.36787	0.78	
3 weeks	Triphala	.25	1.21	.7447	.29118	0.75	0.54
	CHX	.32	1.31	.6907	.33780	0.68	

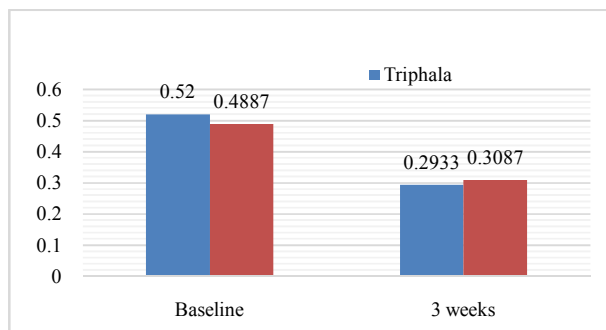


**Figure 3** Comparison of the plaque index scores between triphala and chlorhexidine groups at baseline and 3 weeks

Table 4 shows the comparison of Triphala and Chlorhexidine groups for gingival scores. Mean gingival scores at baseline was higher slightly for Triphala ( $0.52 \pm 0.31$ ) as compared to gingival scores for Chlorhexidine group ( $0.48 \pm 0.31$ ) whereas at 3 weeks, gingival scores were higher for CHX ( $0.30 \pm 0.28$ ) as compared to Triphala ( $0.30 \pm 0.28$ ). There was no statistically significant difference seen between the groups both at baseline ( $p=0.85$ ) and at 3 weeks ( $p=0.86$ ). The results are pictorially shown in Figure 4

**Table 4** Comparison of the gingival index scores between triphala and Chlorhexidine groups at baseline and 3 weeks using Mann-whitney test

GI	Minimum	Maximum	Mean	S.D	Median	Mean diff	P value
Baseline	Triphala	.21	1.25	.5200	.31312	0.35	0.85
	CHX	.20	1.22	.4887	.31380	0.35	
3 weeks	Triphala	.09	.82	.2933	.22471	0.19	0.86
	CHX	.12	1.04	.3087	.28693	0.17	



**Figure 4** Comparison of the gingival index scores between triphala and chlorhexidine groups at baseline and 3 weeks

## DISCUSSION

Plaque-induced gingivitis may exhibit various patterns of observable signs and symptoms of inflammation that are localized to the gingiva and initiated by the accumulation of a microbial biofilm on teeth. The initial changes from health to plaque-induced gingivitis may not be detectable clinically, raising important debates concerning clinical thresholds for defining physiologic vs pathologic inflammation.<sup>(1)</sup> Supragingival plaque control is fundamental to the prevention and management of periodontal diseases, either mechanically or by means of different chemical agents.<sup>(8)</sup>

Plaque-induced gingivitis is exacerbated by sex steroid hormones which increases during puberty, menstruation and pregnancy. The rise in steroid hormone in these conditions has a transient effect on the inflammatory status of the gingiva.<sup>(9,10)</sup> The clinical features of these are similar to plaque induced gingivitis except the presence of signs of inflammation even with the small amount of plaque is the key to distinguish these conditions.

It is also exacerbated by systemic conditions such as hyperglycemia, hematologic malignancies, and nutrient deficiencies. The level of glycemic control may be more important in determining the severity of gingival inflammation than the quality of plaque control.<sup>(11)</sup>

In hematologic malignancies such as leukemia the signs of inflammation in the gingiva include swollen, glazed, and spongy tissues which are red to deep purple in appearance. Nutritional deficiencies like vitamin C deficiency causes scurvy and has similar characteristics as that of plaque induced gingivitis. Other oral factors such prominent subgingival restoration margins and xerostomia can also contribute to plaque induced gingivitis.

In the present study, route of administration of triphala gel and chlorhexidine gel is through gingival massage by which the antiseptic agent disperses throughout the gingiva and it stimulates circulation within gingival tissues, which allows the immune system to fight against the infection.

Triphala has been extensively used in Ayurveda because of its various properties and therapeutic uses. Triphala, meaning “three fruits”.<sup>(12)</sup> Several authors have used triphala as a mouth rinse in healthy controls with gingivitis and periodontitis patients.<sup>(6,13)</sup> It presented an antiplaque property similar to that of chlorhexidine and was more effective in inhibiting plaque formation with lesser or no side effects. *Sushruta Samhita* has emphasized that triphala has hemostatic, anti-inflammatory, analgesic, and wound-healing properties.<sup>(9)</sup>

Jagadish *et al.*<sup>(14)</sup> conducted a study to determine the effect of triphala on dental bio-films and concluded that triphala had potent antioxidant and antimicrobial activity and inhibited the growth of *Streptococcus mutans* and gram-positive cocci involved in plaque formation when it was adsorbed on the tooth surface. Tandon *et al.* suggested the use of triphala mouthwash for preventing the development of incipient lesions. Being an Ayurvedic product, it has no side effects and hence is safer for long-term use.<sup>(15)</sup>

Chlorhexidine is an ideal broad-spectrum antimicrobial agent. It has been used by hospitals and clinics as a disinfectant and antiseptic for topical and hard-surface applications for nearly 60 years. It is used as a powerful adjuvant to mechanical oral

hygiene. It is available as mouthwash, gel, aerosol, spray and disks.<sup>(3)</sup> It is considered as a safe compound, with minimal and transitory local and systemic side effects.

Based on all the studies above and taking into consideration the properties of triphala gel and chlorhexidine gel, we evaluated and compared the role of triphala and chlorhexidine on plaque index and gingival index in the present study.

#### limitations

The groups were not supervised in the application during the therapy. The duration and frequency of application was difficult in few patients. The reassessment which was performed after 3 weeks was based on the previous studies conducted.<sup>(7,16)</sup> Longer duration of follow up should be considered in the future research. The lack of significance between the group could be due to smaller sample size. The mechanical disruption of the biofilm could be solely due to gingival massage. The group of only gingival massage should have been included in order to verify this hypothesis.

#### CONCLUSION

Triphala containing gel and chlorhexidine gel can be used as an adjuvant to mechanical plaque control methods. Due to the antiplaque and anti-gingivitis properties of triphala it can be used as an alternative to chlorhexidine in plaque induced gingivitis patients.

#### References

1. Murakami S, Mealey BL, Mariotti A, Chapple IL. Dental plaque-induced gingival conditions. *J. Clin. Periodontol.* 2018; 45:S17-27.
2. Løe H, Theilade E, Jensen SB. Experimental gingivitis in man. *J Periodontol.* 1965; 36:177-187.
3. Kumar S. Chlorhexidine Mouthwash- A Review. *J. Pharm. Sci. & Res.* Vol. 9(9), 2017, 1450-52
4. Sajjan P, Laxminarayan N, Kar PP, Sajjanar M. Chlorhexidine as an antimicrobial agent in dentistry—a review. *Oral Health Dent Manag.* 2016;15(2):93-100.
5. Prakash S, Shelke AU. Role of Triphala in dentistry. *J Indian Soc Periodontol* 2014;18:132-5.

6. Naiktari RS, Dharmadhikari C, Gurav AN, Kakade S. Determining the antibacterial substantivity of Triphala mouthwash and comparing it with 0.2% chlorhexidine gluconate after a single oral rinse: A crossover clinical trial. *J Indian Soc Periodontol* 2018; 22:498-502.
7. Indurkar MS, Verma R. Effect of ozonated oil and chlorhexidine gel on plaque induced gingivitis: A randomized control clinical trial. *J Indian Soc Periodontol* 2016; 20:32-5.
8. Naiktari RS, Gaonkar P, Gurav AN, Khiste SV. A randomized clinical trial to evaluate and compare the efficacy of triphala mouthwash with 0.2% chlorhexidine in hospitalized patients with periodontal diseases. *J Periodontal Implant Sci.* 2014;44(3):134-40.
9. Mariotti A. Sex steroid hormones and cell dynamics in the periodontium. *Crit Rev Oral Biol Med.* 1994; 5:27-53.
10. Mariotti A, Mawhinney MG. Endocrinology of sex steroid hormones and cell dynamics in the periodontium. *Periodontol* 2000.2013; 61:69-88.
11. Ervasti T, Knuutila M, Pohjamo L, Haukipuro K. Relation between control of diabetes and gingival bleeding. *J Periodontol.* 1985;56:154-157.
12. Irfan M, Kumar S, Amin V, Cuevas-Suárez CE. Evaluation of the efficacy of triphala mouth rinse as coadjuvant in the treatment of chronic generalized periodontitis: a randomized clinical trial. *Mouth Teeth* 2017; Volume 1(1): 2-6
13. Bajaj N, Tandon S. The effect of triphala and chlorhexidine mouthwash on dental plaque, gingival inflammation, and microbial growth. *Int J Ayurveda Res* 2011;2:29-36.
14. Jagadish L, Anand Kumar VK, Kaviyaran V. Effect of Triphala on dental bio-film. *Indian J Sci Technol* 2009;2:30-3.
15. Tandon S, Gupta K, Rao S, Malagi KJ. Effect of triphala mouthwash on the caries status. *Int J Ayurveda Res* 2010;1:93-9
16. Asokan S, Emmadi P, Chamundeswari R. Effect of oil pulling on plaque induced gingivitis: A randomized, controlled, triple-blind study. *Indian J Dent Res* 2009;20:47-51

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