

Evaluating the Efficacy of Green Tea and Chamomile Mouthwash in Reducing Plaque Index and Gingival Bleeding: A Randomised Control Trial

Dr. Smarth Khanna,* Dr. Sumeet Khanna,* Dr. Parul Goel,* Dr. Vishesh Dhir, **
Dr. (Prof) Ram Rattan Goyal, *** Dr. Vikram Bali, ****

*PG Student, Department Of Periodontology and Implantology, Desh Bhagat Dental College and Hospital, Gobindgarh, Punjab.

** Senior Lecturer Department Of Periodontology and Implantology, Desh Bhagat Dental College and Hospital, Gobindgarh, Punjab.

*** Department Of prosthodontics and Implantology, Desh Bhagat Dental College and Hospital, Gobindgarh, Punjab.

**** Professor and HOD, Department of Periodontics, Desh Bhagat Dental College and Hospital, Gobindgarh, Punjab.

ABSTRACT:

Oral infections are significant medical issues among which dental caries and periodontal diseases are the main preventable diseases. At the point when these conditions are not arrested, they cause formation of periodontal pockets. The need to develop an elective counteraction and treatment option to antibacterial agents is to avoid side-effects of the antibiotic agents and increased resistance of the microbes. Subsequently, medicinal plants represent significant remedial assets to health restoration, including the utilization of home grown items in the oral treatment.

AIM: the main aim of the study was to compare the efficacy of two mouthwashes namely green tea and chamomile plant extracts in controlling plaque and gingival bleeding when compared with chlorhexidene.

MATERIAL AND METHODOLOGY: Thirty subjects determined to have mild to moderate form of chronic periodontitis were selected randomly and divided into three groups. Group 1: green tea mouthwash, group 2: chamomile extracts mouthwash and group 3: chlorhexidene

mouthwash. Patients were recommended to use mouthwash for 15 days. Clinical parameters including plaque index and bleeding on probing were analyzed at standard 7 days and 15 days.

RESULTS: mouth rinses with herbal products including green tea and chamomile plants extracts were found to be effective in controlling plaque and gingival bleeding and can be used as an alternative to chlorhexidine mouthwash.

CONCLUSION: herbal mouthwashes can be used for a prolonged period of time with fewer side effects as an alternative for chlorhexidine mouthwash.

KEYWORDS: CHAMOMILE PLANT EXTRACTS, CHLORHEXIDENE, GREEN TEA, PERIODONTITIS.

INTRODUCTION: With the remarkable headway in the field of dentistry, different preventive measures have arisen focusing on the causative variables of the oral diseases.¹ Plaque collection is one such factor which inclines the person to both dental caries and periodontal disease.² Salivary microfloras like *Streptococcus mutans* and other inclining factors play a significant part in the inception and movement of dental infections.³ Chemotherapeutic and antimicrobial specialists focusing on these inclining factors, thusly play, a critical function in counteraction of these oral diseases and dramatically affect improving the oral soundness of the individual.⁴

Among the plenty of oral cleanliness items accessible, chlorhexidine has been the mouthwash of choice attributable to its sensational helpful impact, yet its different results like taste adjustment, supragingival calculus formation, and desquamation of oral mucosa have confined its prolonged use.⁵ Moreover, it additionally causes outward discoloration by appending to the polyphenolic and tannin gathering of refreshments like tea and espresso.

Different natural concentrates like chamomile, pomegranate, green tea, ocimum, Echinacea and many more are known to give restorative advantages in the oral depression when utilized topically. Chamomile, due to its spasmolytic and calming properties is much recognized in the western world. It is one of the common ingredients used in herbal teas and beauty products for its soothing and anti-inflammatory effects. In case of periodontal conditions, chamomile helps in reducing inflammation and levels of unhealthy bacteria in the mouth when used as mouth rinses and toothpastes.⁶

During recent years, the health benefit of green tea has been extensively studied. Catechin, an antioxidant compound found in green tea exerts an anti-inflammatory effect.⁷ It

inhibits the bacterial growth and prevent the plaque from sticking to the teeth enamel thus reducing the risks of dental caries and gingival inflammatory conditions.⁸ Some varieties of green tea also contain fluoride which helps in strengthen the teeth.⁹

Therefore, in this study, attempt has been made to clinically evaluate the synergistic effect of herbal mouthwashes on clinical parameters like plaque accumulation and gingival bleeding as compared to chlorhexidene mouthwash.

MATERIAL AND METHODOLOGY

A double blind randomized controlled trial was done on 30 subjects with mild to moderate form of chronic periodontitis in the department of periodontology in Desh Bhagat Dental College. Subjects with age ranging from 18-50 years, with no systemic diseases, not taking any medications including antibiotics, and no periodontal treatment were selected for the study. Three bottles containing green tea, chamomile extracts and chlorhexidine mouthwash were labeled A, B and C respectively. An informed consent was signed by the patients before their enrollment in study. The subjects and examiner were blind to allocation to the type of mouthwash. The subjects were randomly allocated to the groups and clinical parameter including plaque index by Turskey Gilmore Glickman modification of Quigley Hein plaque index¹⁰ and bleeding on probing by Ainamo and Bay¹¹ were recorded at baseline, 7 days and 15 days.

GROUP 1 (n=10): subjects were handed bottle A (green tea mouthwash) to rinse twice daily for 15 days.

GROUP 2 (n=10): subjects were handled bottle B (chamomile plant extract mouthwash) to rinse twice daily for 15 days.

GROUP 3 (n=10): bottle C (chlorhexidene mouthwash) twice daily for 15 days.

PREPERATION OF GREEN TEA MOUTHWASH

Fragmentation of green tea leaves was done and broken into small pieces and each 100g of leaves were soaked into 500ml of ethanol for 48 hours. The leaves were filtered, kept on plate, placed in hot air oven at 50°C for 3-4 days. Finally, green tea mouth wash of 5% was prepared by adding 0.5g of the extract to 100 ml of distilled water and poured into bottle.¹²

PREPERATION OF CHAMOMILE PLANT EXTRACT MOUTHWASH

Sun dried and powdered flower heads of chamomile were percolated at room temperature with 55% EtOH. The extracts were filtered and evaporated under vacuum at low temperature and dried residue was suspended in water thus obtaining concentrated liquid extract.¹³

STATISTICAL ANALYSIS: the results were recorded accordingly at baseline, after 7 days and after 15 days. F test (ANOVA) with Tukey comparison was done when the hypothesis of equal variance was verified. The test was performed using SPSS software package for windows 15 with the significance level of 0.05.

RESULTS:

Table 1: Socio-demographic profile of study patients

VARIABLE		N	%
TOTAL		30	100
GENDER	MALE	12	40
	FEMALE	18	60
AGE	18-28	2	6.67
	29-39	25	83.33
	40-50	3	10

The age of the study patients ranged from 18-50 years, with a maximum of 83.33% in the range from 29-39 years, 10% in 40-50 years and 6.67% in 18-28 years of age. Out of 30 subjects, 40% were males and 60% were females. (Table 1)

Table 2: gingival bleeding index evaluation according to groups

EVALUATION	GROUPS			p-value ¹
	GROUP 1	GROUP 2	GROUP 3	
	Mean±SD	Mean±SD	Mean±SD	
Baseline	6.50±2.96	6.67±2.45	6.28±2.50	0.52
7 days	2.67±2.08	3.80±2.15	3.48±2.41	0.25
15 days	1.97±0.98	1.88±1.67	1.67±1.07	0.11
p-value ²	0.000*	0.000*	0.000*	
Absolute difference between the groups				

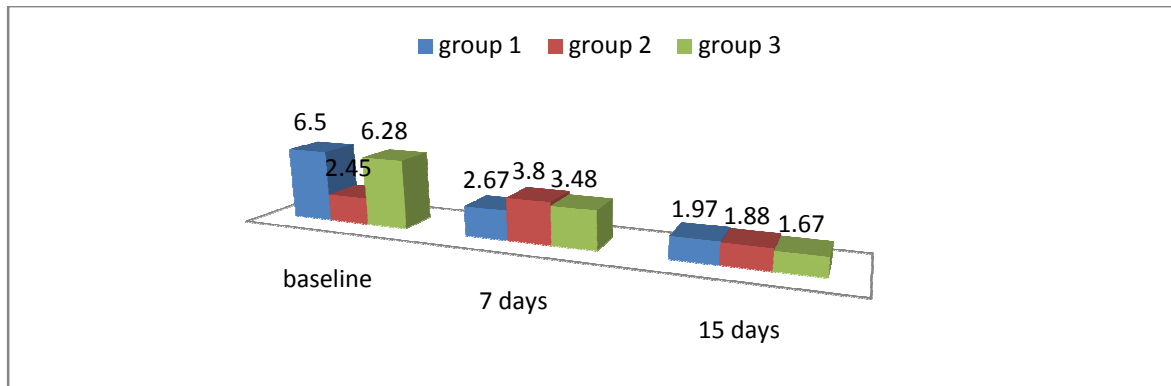
0-7 days	3.38±0.88	2.87±0.30	2.80±0.09	0.31
0-15 days	4.56±1.98	4.76±0.78	4.64±0.10	0.22
7-15 days	0.70±1.11	1.92±0.48	1.81±1.34	0.19

*statistically significant

p¹ ANOVA TEST

p² REPEATED ANOVA TEST

Graph 1



Regarding the assessment of gingival bleeding index (**Table 2**), represents the statistical results for evaluation of groups and time as well as the difference between the groups. In the different periods of evaluation all the study groups had statistically significant reduction in gingival bleeding index ($p < 0.05$). **Graph 1** represents the difference among the groups.

Table 3: plaque index evaluation according to groups

EVALUATION	GROUPS			p-value ¹
	GROUP 1	GROUP 2	GROUP 3	
	Mean±SD	Mean±SD	Mean±SD	
Baseline	5.85±1.57	3.85±2.85	3.99±2.15	0.35
7 days	3.02±0.42	2.25±1.75	2.55±1.58	0.02
15 days	1.98±0.25	1.75±0.85	1.78±0.75	0.20
p-value ²	0.000*	0.000*	0.000*	
Absolute difference between the groups				
0-7 days	2.80±1.15	1.6±1.1	1.84±0.57	0.31

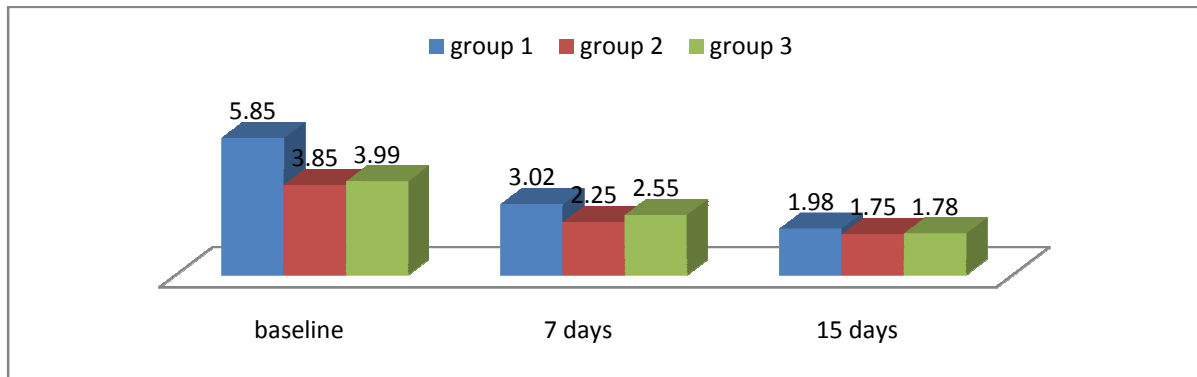
0-15 days	3.87±1.32	1.6±2.0	2.21±1.4	0.25
7-15 days	1.04±0.17	0.5±0.9	0.77±0.83	0.32

*statistically significant

p¹ ANOVA TEST

p² REPEATED ANOVA TEST

Graph 2:



In assessment of plaque index (**Table 3**), a statistical significant reduction in plaque index ($p < 0.05$) was found. **Graph 2** represents the difference among the groups in case of plaque index.

Within the time evaluation in case of gingival and plaque index from baseline to 7 days and baseline to 15 days, a significant reduction was evaluated in both the two groups (green tea and chamomile extract) when compared to the chlorhexidine mouthwash. Hence, proving to be effective alternatives to chlorhexidine with minimum or no side-effects.

DISCUSSION

The present study was formulated to determine the efficacy of herbal mouthwashes containing green tea and chamomile plant extracts with that of chlorhexidine on plaque accumulation and gingival bleeding. A double blind, randomized control trial was done in order to avoid any biasness in case of the operator. Each trial period was for 15 days in order to prevent any side-effects relating to prolonged use chlorhexidine. The results obtained in our study were in conjugation with that of a study done by Pourabbas et al (2005)¹³ who found a significant reduction in plaque scores using herbal mouthwash containing chamomile extracts. Similar

studies conducted by Mullay et al (1995)¹⁴ and Pannuti et al (2003)¹⁵ concluded the significant antiplaque effect using herbal based dentrifice comparable to standard ones. On the other hand Grossman et al (1989)¹⁶ was contradictory with the study, as they found chlorhexidene to have better effect on plaque controls than the extract of chamomile.

Otogoto et al (2007)¹⁷ in their study showed that the green tea extracts at the concentrations of 0.05% with 0.2% ethanol decreased dental plaque formation by 40%. The results were conclusive with our study in which a significant decrease in plaque and bleeding was found using green tea mouth wash with statistically significant results $p < 0.05$. Similar results were found by Hirasawa et al (2006)¹⁸, who found that the compounds present in green tea are effective in reducing dental plaque. Ooshima et al (1994)¹⁹ also demonstrated a significant difference between placebo and green tea groups with 52% reduced plaque formation in green tea group. A significant reduction in plaque formation and bleeding index was found in herbal mouthwashes with statistically significant results in both the cases.

One of the normal outcomes in the investigation was the occurrence of discoloration and discontinued use of chlorhexidene due to unpleasant taste. Because of the brief timeframe trial period (15 days only), it was not attainable to contrast changes in taste observation related with the utilization of green tea, chamomile extract and chlorhexidine mouthwash. None of the patients complained about the taste and adverse effect of the herbal mouthwashes, except non participation due to some religious affairs.

CONCLUSION

In the present study, both the herbal mouthwashes showed a beneficial effect on treating and reducing plaque accumulation and gingival bleeding when compared to chlorhexidene. Green tea when compared with chlorhexidene was found to be much more effective in reducing plaque accumulation and bleeding than chamomile plant extract mouthwash. Both the herbal mouthwashes were effective with minimal side-effects and can be used for prolonged period of time.

REFERENCES:

1. Carounanidy U, Satyanarayan R, Velmurugan A. Use of an aqueous extract of Terminalia chebula asan anticaries agent: A clinical study. Indian J Dent Res. 2007;18:152–6.

2. Rasooli I, Shayegh S, Astaneh S. The effects of *Mentha spicata* and *Eucalyptus camaldulensis* essential oils on dental biofilm. *Int J Dent Hyg.* 2009;7:196–203.
3. Vyas YK, Bhatnagar M, Sharma K. *In vitro* evaluation of antibacterial activity of an herbal dentrifice against *Streptococcus mutans* and *Lactobacillus acidophilus*. *Indian J Dent Res.* 2008;19:26–8.
4. Allaker RP, Douglas CW. Novel anti-microbial therapies for dental plaque-related disease. *Int J Antimicrob Agents.* 2009;33:8–13.
5. Eley BM. Antibacterial agents in the control of supragingival plaque :A review. *Br Dent J.* 1999;186:286–96.
6. Renuka S, Muralidharan NP. Comparison in benefits of herbal mouthwashes with chlorhexidine mouthwash: A review. *Asian J Pharm Clin Res.* 2017;10(2):3-7.
7. Soukoulis S, Hirsch R. The effect of tea tree oil containing gel on plaque and chronic gingivitis. *Aust Dent J.* 2004;49(2):78–83.
8. Sakanaka S, Shimura N, Aizawa M, et al. Preventive effect of green tea polyphenols against dental caries in conventional rats. *Biosci Biotechnol Biochem.* 1992;56(4):592–594.
9. Killoy W. The use of locally-derived chlorhexidine in the treatment of periodontitis: Clinical results. *J Clin Periodontol.* 1998;25(11pt2):953–958.
10. Turskey S, Gilmore ND, Glickman I. Reduced plaque formation by the chloromethyl analogue of vitamin C. *J Periodontol* 1970;41:41-3.
11. Ainamo J, Bay I. Problems and proposals for recording gingivitis and plaque. *Int Dent J* 1975;25:229-35.
12. Arab H, Maroofian A, Golestani S, Shafae H, Sohrabi K, Forouzanfar A. Review of the therapeutic effects of *Camellia sinensis* (green tea) on oral and periodontal health. *J Med Plants Res.* 2011;5:5465–9.
13. Pourabbas R, Delazar A. The effect of German chamomile mouthwash on dental plaque and gingival inflammation. *Iranian Journal of Pharmaceutical Research.* 2010 Nov 20(2):105-9.
14. Mullaly BH, James JA, Coulter WA, Linden GJ. The efficacy of an herbal-based toothpaste on the control of plaque and gingivitis. *J Clin Periodontol.* 1995;22:686–9.

15. Pannuti CM, Mattos JP, Ranoya PN, Jesus AM, Lotufo RF, Romito GA. Clinical effect of a herbal dentifrice on the control of plaque and gingivitis: A double-blind study. *Pesqui Odontol Bras.* 2003;17:314–8.
16. Grossman E, Meckel AH, Isaacs RL, Ferretti GA, Sturzenberger OP, Bollmer BW, et al. A clinical comparison of antibacterial mouthrinses: Effects of chlorhexidine, phenolics, and sanguinarine on dental plaque and gingivitis. *J Periodontol.* 1989;60:435–40
17. Otogoto J, Sato SH, Igarashi T, et al. Effect of an oral rinse extracted from green tea on plaque formation, gingivitis and halitosis. 2007;676–684.
18. Hirasawa K, Takada S, Otake. Inhibition of acid production in dental plaque bacteria by green tea catechins. *Caries Res.* 2006;40(3):265–270.
19. Ooshima T, Minami T, Aono W, et al. Reduction of dental plaque deposition in humans by oolong tea extract. *Caries Res.* 1994;28(3):146–149.