

ORIGINAL ARTICLE

Catechins- Periodontal Health Booster

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Abstract

The aim of the present study was to evaluate the efficacy of green tea tablet on moderate gingivitis and to measure the tooth stain index following oral intake of the green tea tablet. So a study was conducted among the patients having moderate gingivitis. A total of 30 systemically healthy subjects between the age group 20-45 years having moderate gingivitis were included in the study. The clinical parameters such as Gingival Index (GI) and stain index were measured at baseline and after 30 days. After 30 days of intake of green tea tablets, a significant reduction in GI and a significant increase in stain index was noted. Hence it can be concluded that green tea tablets could be effective in the treatment of moderate gingivitis and it would be advisable to use green tea tablet adjunctive to oral prophylaxis to reduce staining of the teeth.

Keywords: Periodontal disease, gingivitis, green tea therapy

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Introduction

Periodontitis is an infectious disease causing inflammation of the gingiva, periodontal ligament, cementum and alveolar bone.¹Gingivitis is the inflammation of gingiva. Periodontal diseases are predominantly caused by gram-negative bacteria present on tooth surface as a biofilm.²Oral microbial flora in health is loaded with the gram-positive organism and in diseased changes to anaerobic flora ⁶. Host immune cells like neutrophils and monocytes are released to act against these microorganisms. Inflamed periodontal tissue produces the significant amount of pro-inflammatory cytokines, mainly IL-1, IL-6, PGE₂, TNF- α , reactive oxygen species, proteins, host cells, ions, hormones and markers of oxidative stress and antioxidant. Antioxidants are emerging as prophylactic and therapeutic agents.² They scavenge free radicals like ROS and prevent the damage caused by them. The literature says that Green tea (*Camellia sinensis*)

has many properties which cure a headache, body ache, general pain, digestion, and depression. Also used as an energizer, and in general to prolong life. Green tea also has many oral health benefits.³ The components in green tea are polyphenols, in particular, flavonoids such as the catechins, catechin gallate (Cg) and proanthocyanidins. Many of the biological properties of green tea have been ascribed to the catechin fraction, which constitutes up to 30% of the dry leaf. Studies conducted in the past have shown that the poly phenolic catechins, in particular, epicatechin gallate (ECg), epigallocatechin gallate (EGCg), can inhibit the growth of a wide range of Gram-positive and Gram-negative bacterial species with moderate potency.⁴

Although green tea has several beneficial effects on health, the effects of green tea and its constituents may be beneficial up to a certain dose yet higher doses may cause some unknown adverse effects.⁵ Hence in this study efficacy of green tea

tablets on moderate gingivitis was evaluated. The aim of the study was to evaluate the efficacy of green tea tablet on moderate gingivitis and to measure the tooth stain index following oral intake of green tea tablets for 30 days.

Materials and Methods

A total of 30 subjects aged between 20-45 years visiting the department of periodontics ABSMIDS were included in the study. 30 Green tea tablets were given to the each subject and they were advised to consume 1 tablet per day for 30 days and they were recalled after 30 days and the parameters were re-assessed. Written informed consent was taken from all the participants before the start of the cross-sectional study.

Inclusion Criteria

- Subjects between 20-45 years of age.
- Subjects with a minimum of 20 complements of teeth.
- Individuals with moderate gingivitis of gingival index score between 1 to 2.

Exclusion Criteria

- History of any systemic conditions or diseases
- History of anti-inflammatory or antimicrobial therapy within the 3 months prior to the study
- History of periodontal treatment in past 6 months
- Pregnant / lactating women
- History of smoking

Screening Examination

A detail dental and medical history were recorded and gingival index score and stain index score was measured at baseline and after 30 days of intake of green tea tablet for all the subjects. Gingival index and stain index was

measured at the baseline. Gingival index (Loe and Stillness) was checked using mouth mirror and Williams graduated periodontal probe⁹ and Modified Lobene stain scoring index⁸ was checked using mouth mirror and straight probe. The data obtained was subjected to statistical analysis.

Stain Index: Modified Lobene stain scoring index (Lobene 1968).⁸

Code	Buccal / Labial Surface	Lingual / Palatal Surface
1	stain limited to up to 1/3 of area pits/grooves affected	up to 1/3 of area pits/grooves
2	stain outside pits/ grooves, up to 2/3 of area 10% of area affected	between 1/3 and 2/3 of an area affected
3	stain outside pits/ grooves, more than 10% of area affected	more than 2/3 of an area affected

Gingival index and stain index were recorded before and after the intake of green tea tablets. Data obtained were subjected to statistical analysis. Student paired T-test, Wilcoxon Signed Rank test was used for intra group measurements and $P < 0.05$ was considered statistically significant. SPSS was used to analyze the data collected.

Results

The mean value of gingival index before the treatment was 1.05 with the standard deviation of 0.48 whereas after the treatment the mean value reduced to 0.33 with a significant reduction in the standard deviation to 0.25. The mean value of the stain index before the treatment was 0.33 with the standard deviation of 0.199 whereas after the treatment mean value is 0.35 with standard deviation of 0.22 (Table 1)

Table 1: Paired t-test of the Gingival Index and the Stain Index

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	GI_Before	1.0583	30	0.48071	0.08777
	GI_After	0.3303	30	0.25894	0.04728
Pair 2	Stain_Before	0.3305	30	0.19948	0.03642
	Stain_After	0.3532	30	0.22052	0.04026

Table2: Paired difference in Gingival Index and Stain Index

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	GI_Before GI_After	.728	.462	.08440	.55539	.90061	8.62	29	.0001*
Pair 2	Stain_Before Stain_After	-.022	.059	.01083	-.04489	-.00057	-2.09	29	.04*

*p<0.05 statistically significant

The paired difference in the mean value of gingival index before and after the intake of green tea tablets is 0.72 with the Std Dev of .46 and the 'p' value is <0.001 which is significant (Table 2). The paired difference in the mean value of the stain index before and after taking tea green tablet is 0.227 with Std Dev of 0.059 and the 'p' value is 0.04 which is statistically significant.

Discussion

Various studies have shown beneficial effects of green tea on general health. Green tea extracts have been shown to possess anti-inflammatory, anti-carcinogenic, antioxidant, and anti-microbial properties.³ In this study we have focused on the effects of consumption of green tea capsules on gingiva and its staining property on the teeth and the results obtained showed a significant reduction in the gingival index. With the p-value <0.001, that is statistically significant. This suggests that the intake of green tea tablets reduce the gingival inflammation. The result is similar to the study conducted by Deshpande N, Deshpande A et al; have demonstrated the positive effects of oral intake of green tea on periodontal disease.¹ Chatterji et al; in a review article stated that drinking green tea, stains or discolors the dental plaque, but not the teeth itself.⁶ Similarly, the present study showed a statistically significant increase in the values of stain index after the intake of green tea tablets which indicates that the consumption of green tea tablets will cause staining of the tooth surface. In our study we used Modified Lobene Stain Index which is superior to its conventional counterpart because sites with most visible stain are assessed separately and it may also offer higher discriminatory power

due to a lower coefficient of variation.⁸ Green tea as an antioxidant can be up-regulated and neutralizes free radical formation that could take place due to oxidative stress. Oxidative stress lies at the heart of periodontal tissue damage that results from host-microbial interactions, either as a direct result of excessive ROS activity, antioxidant deficiency and activation of transcription factors and the creation of pro-inflammatory state.⁷ Green tea extracts have been shown to possess anti-inflammatory, anti-carcinogenic, antioxidant, and anti-microbial properties. Green tea catechins with steric structures of 3-galloyl radical, EGCG, ECg and gallic acid gallate, which are major tea polyphenols, inhibit production of toxic end metabolites of *P. gingivalis*.⁶

Conclusion

Green tea tablet is found to be effective in the treatment of gingivitis with the reduction in the clinical parameters of gingiva like, inflammation, edema, and change in color of the gingiva. Maintaining healthy gums is essential for overall oral and systemic health, therefore, finding a simple way like intake of green tea tablet which can boost gingival health is important. In our study, there was the increase in stain index after green tea tablet intake causing staining of the tooth surface. Hence it is advisable to use green tea tablet as an adjunct to oral prophylaxis. Within the limitations of this study, it can be concluded that green tea could be used effectively to reduce the inflammation of gingiva. To further evaluate long-term effects of green tea tablets therapy on periodontal inflammation, more expanded longitudinal studies are required.

Conflict of Interest: None declared

Source of Support: Nil

Ethical Permission: Obtained

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