

# Effect of Green Tea Consumption on Chronic Periodontitis Patients

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**Abstract:** **Background:** Green tea is primarily abundant in health-promoting flavonoids involving catechins and their derivatives (which assess for 30% of the weight of a leaf). Epigallocatechin-3-gallate is the most copious catechin found in green tea, which is believed to act a central role in the green tea's antioxidant and anticancer effects. Catechins should be regarded right side by side of the better antioxidants such as vitamins C and E as potent scavengers for free radical and for this reason is health-supportive. By preventing bone resorption, reducing inflammation and restricted certain bacteria growth related to disease of periodontium, it has been found that green tea also encourage periodontal health. **Aim of the study:** This study was undertaken to determine clinically the green tea effect on chronic periodontitis. **Material and methods:** The persons enrolled in this study were taken from the patients attending the dentistry college, University of Baghdad. The whole sample of study composed of 33 chronic periodontitis patients (male and female) with age range from 35 to 60 years. For all patients PL, GI, PPD were measured before scaling then after 2 weeks. Those patients were separated into two groups: First group composed of 20 patients (males and females) only scaling was performed. And the Second group composed of 13 patients (males and females) scaling was performed and told the patients to drink daily 3 cups of green tea. **Results:** The study revealed that there is positive effect on periodontitis from the green tea clinically it has positive effects on periodontal health status. GI, PLI and PPD for participants consuming green tea was lower than those without consuming green tea with highly significant differences for PPD and PLI and no differences statistically for GI. **Conclusion:** Consumption of green tea after scaling has very advantageous effect on treatment of chronic periodontitis.

**Keywords:** green tea, periodontitis, catechin and plant extract.

## 1. Introduction

Tea is one of the most extensively depleted drinks in the world, after water, tea come in the second state, daily drunk more than two billion cups from it<sup>(1)</sup>. It is regarded one of the most popular and ancient therapeutic drinks depleted around the world and its medical properties have been widely discovered. It can be used as medications prepared as an extract from the foliage or can be made as a drink, with many systemic health effects<sup>(2)</sup>. This plant suggested to use for body aches, headache, general pain, depression, digestion, as energizer and to prolong life in the traditional Chinese medicine<sup>(3)</sup>. Green tea also has other Phenolic acids such as caffeic acid, chlorogenic acid, and flavanoids such as asmyricetin, kaempferol and quercetin<sup>(4)</sup>. Periodontal diseases can influence one or more of the periodontal structures (e.g. periodontal ligament, alveolar bone, gingiva and cementum). While these tooth-supporting structures may be affected by different periodontal diseases, the most frequent ones are plaque-induced inflammatory disease, such as periodontitis and gingivitis<sup>(5)</sup> often the name periodontal disease is refer to periodontitis, especially chronic periodontitis. Periodontal disease extends from the mildest stage, famous as gingivitis, to severe stage, famous as periodontitis<sup>(6)</sup>. The progression and incidence of periodontal disease are associated causally to pathogens of periodontium<sup>(7)</sup> in addition to different environmental and host factors<sup>(8)</sup>. Nutritional intake and eating habits affect periodontal disease. Several studies have advised that intake of calcium and vitamin C is connected to periodontal health status<sup>(9)</sup>. The aim of the present study was to reveal the effect of clinically intake green tea on patients with chronic periodontitis.

## 2. Materials and Methods

### Human samples

All the human samples consist of 33 (male and female) subjects; they were informed about the goal of the test carefully. Entire samples were chosen from persons attending dentistry college, University of Baghdad, department of periodontology.

### Study design

Chronic periodontitis patients (male and female) with age range from 35 to 60 years. Those patients were divided into two groups:

- 1) First one composed of 20 patients (females and males) only scaling was performed.
- 2) Second one composed of 13 patients (females and males) we did scaling and instructed them to drink daily 3 cups of green tea for about two week.

### Inclusion criteria

- 1) Patient without any history of systemic diseases.
- 2) Patient doesn't taking antibiotic therapy in the last three months.
- 3) Patients have chronic periodontitis.

### Exclusion criteria

- 1) Smoker's persons.
- 2) Pregnant women.
- 3) Women taking contraceptive pills.
- 4) Periodontal treatment for last three months before study.

### Clinical Periodontal parameters

The examination of clinical periodontal parameters was carried out by Michigan O probe; entire periodontal variables were calculated on four sites (Buccal, lingual, mesial and distal) for entire teeth exclude the third molar.

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The clinical parameters: include gingival index(GI) of Loe(1967) , plaque index(PL)of Silness&Loe,1964 and probing pocket depth( PPD).For all patients were taking PL,GI,PPD as baseline data befor treatment then after two weeks another data were be taking for both groups.

Results from Figure 2, Tables 3 and 4 shows that the alteration of the parameters of periodontal health from the first visit to the second visit for those persons at both groups with highly significant difference for entire these parameters when Paired samples Test was used.

**Statistical analysis**

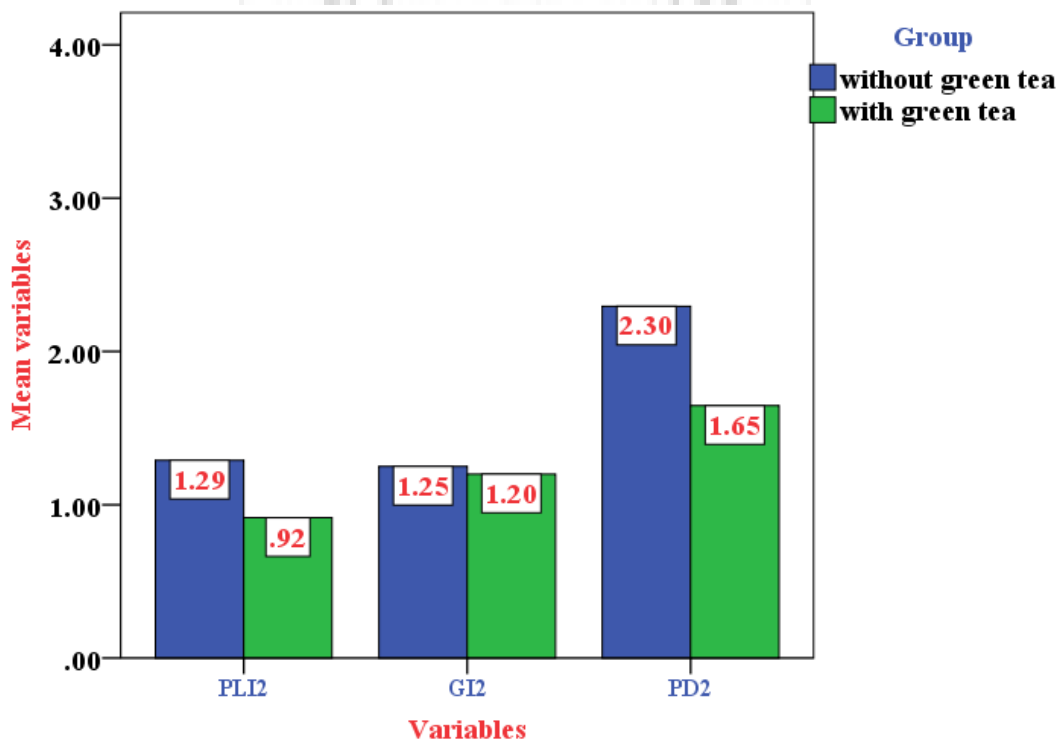
Either inferential and description statistics were carried out: Inferential statistic involves T test and p-value the level of significant was accepted at p{ 0.05, highly significant at P{0.01 and non significant at P}0.05. Descriptive statistics: involved Standard deviation (SD),percentages and Mean.

**3. Results**

Figure 1 and Table 2 revealed that the mean of clinical periodontal parameters involving (GI, PLI and PPD) for participants consuming green tea was lower than those without consuming green tea with highly significant differences for PPD and PLI and no differences statistically for GI when using Independent sample T-test.

**Table 1:** Distribution of human sample according to groups and gender

		Gender		Total	
		Male	Female		
Group	Scaling	NO.	9	11	20
		% within group	45.00	55.00	100.00
		% within gender	56.25	64.71	60.61
	Scaling+ green tea	NO.	7	6	13
		% within group	53.85	46.15	100.00
		% within gender	43.75	35.29	39.39
Total	% of Total	27.27	33.33	60.61	
	NO.	16	17	33	
	% within group	48.48	51.52	100.00	
	% within gender	100.00	100.00	100.00	
		% of Total	48.48	51.52	100.00



**Figure 1:** Mean of clinical periodontal parameters (PLI, GI and PPD) among groups in the second visit

**Table 2:** Descriptive and statistical tests of studied variables among groups in the second visit using Independent sample T test

Clinical periodontal parameters	Groups						Statistical test		
	Scaling			Scaling+ green tea			T-value	df	P-value Sig.
	No.	Mean	±SD	No.	Mean	±SD			
PLI2	20	1.29	.23	13	0.92	.37	3.620	31	.001**
GI2	20	1.25	.18	13	1.20	.44	.387	14.578	.705#
PD2	20	2.30	.51	13	1.65	.45	3.732	31	.001**

#=Not significant at P>0.05, \*\*=highly Significant at P<0.01.

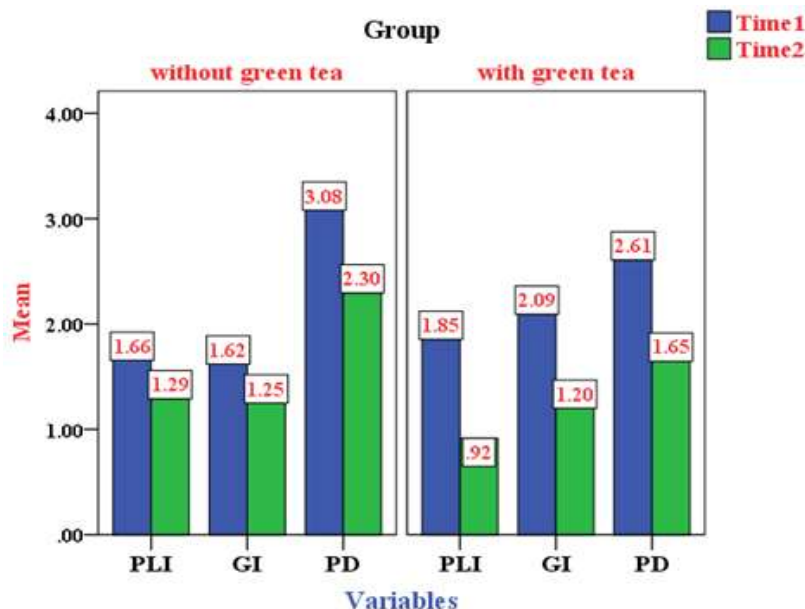


Figure 2: Mean of clinical Periodontal parameters (PLI, GI and PPD) for the two groups at two visits.

Table 3: Descriptive and comparison of clinical periodontal parameters between two visits at scaling group using Paired Sample test

Group	Variables	Mean	±SD	Paired Sampled test		
				value	Df	Sig.
Scaling	PLI1	1.66	0.39	7.241	19	.000**
	PLI2	1.29	0.23			
	GI1	1.62	0.44	4.951	19	000**
	GI2	1.25	0.18			
	PD1	3.08	0.69	11.086	19	000**
PD2	2.30	0.51				

\*\*=highly Significant at P<0.01.

Table 4: Descriptive and comparison of clinical periodontal parameters between two visits at scaling + green tea group using Paired Sample test

Group	Variables	Mean	±SD	Paired Sampled test		
				value	Df	Sig.
Scing+ green tea	PLI1	1.85	0.40	8.392	12	000**
	PLI2	.92	0.37			
	GI1	2.09	0.53	6.512	12	000**
	GI2	1.20	0.44			
	PD1	2.61	0.49	8.306	12	000**
	PD2	1.65	0.45			

\*\*=highly Significant at P<0.01.

#### 4. Discussion

The results of the current study revealed the clear effect of green tea in decreasing the gingival index (GI), plaque index (PL) in addition to periodontal pocket after drinking daily three times after scaling when compared with scaling only. This truth is agree with all the studies in this topic. **Reygaert, 2014**<sup>(10)</sup> found that mechanisms of the antimicrobial effect of the green tea are: bacterial fatty acid synthesis inhibition, the bacterial cell membrane damage, inhibition of other enzymes (e.g., cysteine proteinases, protein tyrosine kinase, Adenosine triphosphate ATP synthase and Deoxyribonucleic acid DNA gyrase), and efflux pump activity inhibition<sup>(10)</sup>. **Sakanaka et al., 1996**<sup>(11)</sup> found polyphenols of green tea restrain the collagenase activity of oral bacteria<sup>(11)</sup>. Green tea

polyphenols has controlling component which is Epigallocatechingallate (EGCGs), this component restrains both prokaryotic and eukaryotic cell derived collagenase activity. The EGCG at concentration of 250 or 500 µg/ml inhibits completely the development of three strains of *Porphyromonas gingivalis* and at MICs (minimum inhibitory concentrations) of 2000 µg/ml inhibits the development of *P. melaninogenicus*. Another decision of **Ali et al., 2012** found an analysis of the data show the significant effect of mouthwash of green tea on decreasing, Gingival Index (GI), Plaque index (PI) and Bleeding on probing (BOP)<sup>(12)</sup>. As a consequence it would be suggested as a safe, anti-microbial, anti-inflammatory effect. **Babu et al, 2011** proved that the green tea consumption in comparability to other beverages may be widely suggested<sup>(13)</sup>. **Kushiyaama et al in 2009 and Kato et al in 2009, Awadalla et al in 2011, Gaur and Agnihotri in 2014.** All those scientists show that consumption of green tea has been found to lead to reducing loss of the tooth, and restrain the progression and development of periodontitis. Consumption of green tea also has advantage effects on periodontal health when assessed as to attachment loss, probing depth, dentin erosion, gingival bleeding. As well as to the antimicrobial effects on the chief bacteria included in gingivitis, *Porphyromonas gingivalis*, EGCG has been found to restrain the bacteria ability to bind via fimbriae to oral epithelial cells, and has also been found to inactivate collagenases of bacteria. EGCG also restrains production of IL-8 and matrix metalloproteinase, which are responsible for starting destruction of the tissue<sup>(14, 15, 16 and 17)</sup>.

#### 5. Conclusion

Consumption of green tea has very beneficial effect on periodontal health status, and can be considered as a cheap, safe, and effective treatment for patients with chronic periodontitis in conjunction with scaling.

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