

Original Research

Effect of White Tea in Patients with chronic Generalised Periodontitis

Sanjay Kumar Singh¹, Sulekha Kumari², Jhankar Shah³, Jitendra Acharya⁴

¹Senior Resident, Department of Dentistry, Patna Medical College, Patna, Bihar, India;

²Dental surgeon, Civil Hospital, Samastipur, Bihar, India;

³Senior Resident, Department of Periodontology, Karnavati School of Dentistry, Gandhinagar, Gujarat, India;

⁴Senior demonstrator Department of Dentistry S.P. Medical College Bikaner Rajasthan

ABSTRACT

Periodontal diseases, if left unchecked, can lead to major health problems. There are a number of traditional herbal remedies for the treatment and management of diseases related to periodontium and oral hygiene. Tea, the commonly consumed beverage, is gaining increased attention in promoting overall health. It is a very popular beverage, and studies have shown that tea polyphenols inhibit the growth and cellular adherence of periodontal pathogens and their production of virulence factors. In this study we investigated the effect of intake of white tea and periodontal disease. **Aims and objectives:** To evaluate the effect of white tea in chronic generalized periodontitis patients. **Materials and methods:** 20 patients, who consented to be a part of the study, were analysed. Plaque Index, modified Gingival Index and probing depth were used to assess the periodontal parameters at baseline and 3 months. The intake of white tea was defined as the number of cups consumed per day. **Results:** It was observed that every cup of white tea/day was associated with a decrease in periodontitis. **Conclusion:** there is an inverse association between intake of white tea and periodontitis. **Key words:** White tea, periodontal condition, dentistry.

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Correspondence author: Dr. Sanjay Kumar Singh, Senior Resident, Department of Dentistry, Patna Medical College, Patna, Bihar, India

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INTRODUCTION:

Tea is the most popular beverage in the world after water, consumed by over two thirds of the world's population (Yang and others 2002). The majority of commercial teas comes from the dried leaf material of a shrub, *Camellia sinensis*, belonging to the Theaceae family. This plant was native to China, but later spread to India and Japan, then to Europe and Russia, arriving in the New World in the late 17th century (Carr 1972). For the past three decades, epidemiologists have observed lower risks of cancer, cardiovascular disease and osteoporosis in populations that drink tea frequently.

Periodontal diseases are the chronic inflammatory diseases of the periodontium, characterized by inflammatory destruction of gingiva and periodontal ligament. Dental plaque is the primary etiologic factor in periodontal disease.¹

It was believed that nutritional habits do not have any effects on periodontal disease. But now it is confirmed that eating habits and nutritional habits affects the periodontal disease.² According to its method of

processing tea is classified into different types namely white tea, green tea and black tea.

Most abundant catechin like Epigallocatechin gallate (EGCG) in tea and is a potent antioxidant and have therapeutic properties for many disorders including cancer³ and cardiovascular disease⁴.

Green tea catechins have been shown to inhibit the growth of *Porphyromonas gingivalis*, *Prevotella intermedia* and *Prevotellanigrescens*, which are common periodontal pathogens. The adherence of *P. gingivalis* on to human buccal epithelial cells is also inhibited by white tea catechins⁵.

White tea is the least processed type of tea and has the highest catechins content because white tea is made of young tea leaves or buds steamed immediately after harvesting to inactivate polyphenols oxidase, the enzyme that destroys catechins. Thus, in this clinical study, we aimed to see the effect of white tea consumption in patients with chronic generalized gingivitis as an adjunct to scaling when compared with scaling alone.

MATERIALS AND METHOD:

The study population consisted of 20 participants randomly chosen from patients attending the department, who consented to be a part of study and fulfil the following criteria:

- Subjects who did not use tobacco or smoke.
- No known systemic diseases or antibiotic therapy in the previous 3 months
- Patients with clinical signs of periodontitis and presence of atleast three teeth per sextant showing probing depth >5mm
- Pregnant and breastfeeding women were excluded
- No periodontal treatment including scaling and rootplaning or periodontal surgery in previous 6 months

The selected participants were randomly assigned to two groups:

Group A (patients who underwent scaling and root planing) and to

Group B (patients who underwent scaling and were advised consumption of 1 cup of white tea per day for 3months).

All participants were subjected to clinical examination at baseline and at 1months, 2months and 3months postoperatively. The clinical measurements assessed included Plaqueindex (Silness and Løe 1964), modified Gingival Index(turesky-gilmore-glickman modification of quigleyhein plaque index) and probing depth.

All participants underwent supragingival scaling and root planing. They were advised regarding oral hygiene practices to be followed at home. No chemical plaque control agents were prescribed. Participants in Group B were advised to consume one cup of white tea once a day for 3months. The white tea was made using one sachet of white tea that was added to 150 ml cup of hot water. Each sachet contained 2 g of white tea.

RESULTS

The statistical analysis was performed using the paired *t*-test. Result shows that there is a definite improvement in the modified gingival index, plaque index and probing depth in both the groups following the treatment, when assessed 1, 2 and 3 months postmechanical therapy as shown in table 1 and 2. However, the intergroup comparison between Group A and Group B showed that although there were better results in the Group B as compared to Group A, it was not statistically significant as shown in Table3.

Table 1: Intragroup comparison of test site of probing depth, plaque index and modified gingival index

TEST SITE		Mean	N	Std. Deviation	Std. Error Mean	Mean Difference	P Value
probing depth	baseline	4.71	10	0.30	0.096	-1.65	<0.001
	3months	3.06	10	0.30	0.093		
plaque index	baseline	2.10	10	0.17	0.054	-0.97	<0.001
	3months	1.13	10	0.18	0.057		
modified gingival index	baseline	2.09	10	0.14	0.043	-0.80	<0.001
	3months	1.29	10	0.24	0.075		

Table 2 : Intragroup comparison of control site of probing depth, plaque index and modified gingival index

CONTROL SITE		Mean	N	Std. Deviation	Std. Error Mean	Mean Difference	P Value
probing depth	baseline	4.73	10	0.21	0.065	-1.35	<0.001
	3months	3.38	10	0.42	0.133		
plaque index	baseline	1.98	10	0.13	0.042	-0.78	<0.001
	3months	1.20	10	0.31	0.097		
modified gingival index	baseline	2.07	10	0.18	0.058	-0.76	<0.001
	3months	1.31	10	0.19	0.059		

Table 3: Intergroup comparison of probing depth, plaque index and modified gingival index

		SITE	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	P Value
PROBING DEPTH	baseline	TEST	10	4.71	0.30	0.096	-0.02	0.865
		CONTROL	10	4.73	0.21	0.065	-0.02	
	3months	TEST	10	3.06	0.30	0.093	-0.32	0.067
		CONTROL	10	3.38	0.42	0.133	-0.32	
PLAQUE INDEX	baseline	TEST	10	2.10	0.17	0.054	0.12	0.096
		CONTROL	10	1.98	0.13	0.042	0.12	
	3months	TEST	10	1.13	0.18	0.057	-0.07	0.542
		CONTROL	10	1.20	0.31	0.097	-0.07	
MODIFIED GINGIVAL INDEX	baseline	TEST	10	2.09	0.14	0.043	0.02	0.775
		CONTROL	10	2.07	0.18	0.058	0.02	
	3months	TEST	10	1.29	0.24	0.075	-0.02	0.804
		CONTROL	10	1.31	0.19	0.059	-0.02	

DISCUSSION

Periodontal disease is the inflammation of the supporting tissue of the teeth, usually progressively destructive changes occur leading to loss of bone and periodontal ligament. Periodontitis is preceded and accompanied by gingivitis. However, gingivitis may persist without progression to periodontitis leading to the loss of supporting structure of tooth and the deeper periodontal tissues which affect the supportive structures of teeth (Lisgarten – 1987)

White tea is a least processed type of tea and has the highest catechins content as it is made of young tea leaves or buds steamed immediately after harvesting to inactivate polyphenols oxidase, the enzyme that destroys catechins.⁶

Hirasawa et al⁷ demonstrated bactericidal activity of green tea catechins against *Prevotella* and *P. gingivalis* at concentration of 1 mg/ml. White tea catechins inhibit the growth of *P. gingivalis* and *P. intermedia*. The polyphenols present in the white tea have shown to inhibit the toxic metabolites of *P. gingivalis*. In addition, EGCG inhibited osteoclast formation in a coculture of primary osteoblastic cells and bone marrow cells⁸ and it induced apoptotic cell death of osteoclast like multinucleated cell in the dose dependent manner.⁹

These properties are very beneficial to the periodontium. The majority of periodontal diseases are of

infectious and leading to gingival inflammation and destruction of periodontal ligament. The destruction seen in periodontal disease is host mediated destruction.

The periodontal pathogens produce matrix metalloproteinases (MMPs) and exhibit collagenase activity¹⁰. so cytokines like interleukin-1, interleukin-6, and tumor necrosis factor is produced in the host. These inflammatory mediators play direct role in periodontal destruction and they stimulate fibroblast, osteoclast and macrophages for increased production of MMPs, leading to more destruction of periodontal tissue.¹¹ This collagenase activity is inhibited by tea catechins.

Nakamura et al. (2009) have demonstrated that osteoclastic bone resorption and osteoclast formation is inhibited by green tea catechin either by suppression of LPS-induced alveolar bone resorption or by blocking interleukin-1 β production^{12, 13}. Various studies have demonstrated the beneficial effect of green tea extracts on periodontal diseases in past, but very few studies have correlated the daily dietary oral intake of white tea to the periodontal status of patients.

Study done by Jalayer *et al.* has indicated that some GCF enzymes activity are inhibited by green tea. Hence, there is a growing amount of research identifying tea's potential oral health benefits. However, further longer term, well controlled trials are required as tea is being consumed by a wide range of population.

In our study it was observed that regularly intake of white tea 2-3 cups per day is more beneficial to the patients with periodontitis.

CONCLUSION

Present study showing beneficial effects of white tea to some extent and is also suggestive of the positive effect of daily oral intake of white tea on periodontal disease. There was an inverse relationship between intake of white tea and periodontitis. Since there is positive association between daily intake of white tea and gingival disease, the application of concentrated white tea components such as catechin, may be expected to have a more beneficial effect on gingiva. However since the white tea extracts are not widely available and are expensive and to administer on daily basis, further studies with larger sample sizes and longer follow-up periods are required.

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