



## Assessment of Association of Smoking and Periodontal Disease

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### KEYWORDS

Smoking,  
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### ABSTRACT:

**Background:** This study was conducted for the assessment of association of smoking and periodontal disease.

**Material and methods:** This study comprised of overall 100 participants. These participants were examined for the signs of smoking. Following diagnosis, subjects were separated into two groups: smokers (group I) and nonsmokers (group II). If participants were in a smoking group, their smoking duration and number of cigarettes per day would be recorded. The study excluded individuals who had received immunosuppressive, antibiotic, or corticosteroid therapy within the previous six months, patients under the age of 18, pregnant women, patients with blood illness, acute and chronic infections, autoimmune and cardiovascular disease, and former smokers. The periodontal status of these subjects was recorded. Statistical analysis was conducted using SPSS software.

**Results:** The values of all the three indices were higher among smokers as compared to non-smokers. The value of plaque index, gingival index and CPITN index among smokers was  $1.53 \pm 0.7$ ,  $1.42 \pm 0.49$  and  $1.92 \pm 0.5$ , respectively.

**Conclusion:** In this study, the value of plaque index, gingival index and CPITN index was higher among smokers as compared to non-smokers, indicating that smoking is associated with poor quality of periodontal health.

### Introduction

Smoking is one of the biggest threats to public health.<sup>1</sup> According to the World Health Organization, more than 8 million people have been killed, including approximately 1.2 million deaths from exposure to secondhand smoke.<sup>2</sup> Moreover, since tobacco has more than 7000 toxic chemicals<sup>3</sup>, smoking is associated with numerous preventable chronic diseases.<sup>4</sup> In Korea, the smoking rate has been decreasing; however, as of 2018, the prevalence of daily smoking among men in Korea reached 30.5%, the third-highest rate among the Organization for Economic Co-operation and Development (OECD) members.<sup>5</sup> The authorities have made intensive efforts to eliminate tobacco use by implementing strong and effective tobacco control

policies and measures, such as cigarette tax hikes and media campaigns.<sup>6</sup>

Periodontal disease is a heterogeneous group of disorders affecting the periodontium; the most common of which are gingivitis and chronic periodontitis.<sup>7</sup> Chronic periodontitis is a common form of destructive oral disease in adults. Cases of untreated periodontitis inevitably result in teeth loss, impaired mastication, and poor esthetics, coupled with its adverse effects on overall health, quality of life, and the economic productivity.

Hence, this study was conducted for the Assessment of association of smoking and periodontal disease.



## Material and Methods

This study comprised of overall 100 participants. These participants were examined for the signs of smoking. Following diagnosis, subjects were separated into two groups: smokers (group I) and nonsmokers (group II). If participants were in a smoking group, their smoking duration and number of cigarettes per day would be recorded. The study excluded individuals who had received immunosuppressive, antibiotic, or corticosteroid therapy within the previous six months, patients under the age of 18, pregnant women, patients with blood illness, acute and chronic infections, autoimmune and cardiovascular disease, and former smokers. The periodontal status of these subjects was recorded. Statistical analysis was conducted using SPSS software.

## Results

**Table 1:** Distribution of subjects on the basis of smoking.

Groups	Number of subjects	Percentage
Group 1 (Smokers)	50	50%
Group 2 (Non-smokers)	50	50%
Total	100	100%

In this study, 50 subjects were smokers and 50 subjects were non-smokers.

**Table 2:** Periodontal status of smokers and non-smokers.

Parameters	Non-smokers	Smokers
Plaque index	1.21±0.6	1.53±0.7
Gingival index	1.34±0.5	1.42±0.49
CPITN index	1.89±0.6	1.92±0.5
*CPITN: Community Periodontal Index of Treatment Needs		

The values of all the three indices were higher among smokers as compared to non-smokers. The value of plaque index, gingival index and CPITN index among smokers was 1.53±0.7, 1.42±0.49 and 1.92±0.5, respectively.

## Discussion

Periodontal disease is chronic, inflammatory disease followed by destruction of periodontal tissues. Oral biofilm with anaerobic microorganisms represents main etiological factor for occurrence of periodontal disease, but cigarette smoking is basic risk factor for development of chronic periodontal disease. Periodontal disease is three times more frequent in smokers than in non-smokers, regardless the level of oral hygiene.<sup>8</sup> Disease quicker progresses in smokers than in non-smokers.<sup>9</sup> Cigarette smoking is connected with more frequent appearance and progression of aggressive periodontal disease, with deeper periodontal pockets, alveolar bone lost and tooth lost.<sup>10</sup> Cigarette smoking could mask an early inflammatory signs of gingivitis and periodontal disease, particularly the propensity of the gingiva to bleed on brushing, or following periodontal probing.<sup>11</sup>

Cigarette smoking is one of the most significant risk factors for multiple diseases, including periodontal disease.<sup>12,13</sup> In smokers it was reported early onset of disease and increased rates of disease progression.<sup>14-16</sup> Smoking not only impacts the outcome of non-surgical periodontal therapy but also surgical therapy and long-term success of dental implant placement.<sup>17</sup> Periodontitis is considered sixth complications of diabetes mellitus (DM).<sup>18</sup> Individuals with diabetes are more likely to have periodontal disease than without it.<sup>19-22</sup> Research has for long, suggested a two-way relationship between DM and periodontal diseases. Hence, this study was conducted for the Assessment of association of smoking and periodontal disease. In this study there were 50 subjects who were found to be smokers and the remaining 50 were non-smokers. The values of plaque index, gingival index and CPITN index were found to be higher among smokers as compared to non-smokers. The values of all the three indices were higher among smokers as compared to non-smokers. The value of plaque index, gingival index and CPITN index among smokers was 1.53±0.7, 1.42±0.49 and 1.92±0.5, respectively.

**Visvanathan R et al<sup>23</sup>** assessed and compared the effect of smoking on mRNA expression of MMP -8 and TIMP-1 in patients with untreated chronic periodontitis and in periodontally healthy subjects and to examine the correlation of MMP-8 and TIMP-1 levels with clinical



parameters. Out of 60 subjects, 40 were selected subjects for the study, and were divided into Group I (periodontitis subject) and Group II (healthy subjects). Each group was further subdivided into subgroups I-A (chronic periodontitis smokers CPS), and I-B (chronic periodontitis non-smokers CPN), subgroup II-A (healthy smokers HS) and II B (healthy non-smokers HS). Both the groups underwent periodontal examination and clinical parameters were recorded. Tissue samples from both groups were subjected to the isolation of RNA which was then followed by qRT-PCR and the expression of the mRNA levels of MMP-8 and TIMP-1 were analyzed. The mRNA expression of MMP-8 and TIMP-1 was further compared with the periodontal status of all the four groups. The mRNA expression of MMP-8 was compared between the groups and showed that Group I-A (CPS) had higher expression of MMP-8 compared to group I-B (CPN). Group I-B (CPN) vs Group I-A (CPS) showed statistically significant difference in MMP-8/TIMP-1 with higher values for Group I-A (CPS) than Group I-B (CPN). A positive correlation was found between MMP-8 expression and probing depth and clinical attachment level (CAL) among Group I-B (CPN) and Group I-A (CPS) subjects. A significant correlation was also found between MMP-8 and TIMP-1 expression with probing depth and CAL among Group II B(HN) group subjects. TIMP-1 also showed a positive correlation with gingival index (GI) among group II A (HS) subjects. It was concluded that smoking has an impact on the periodontal status and mRNA expression of MMP-8 and TIMP-1 in chronic periodontitis patients. The earlier evaluation of MMP-8 and TIMP-1, can be used as a biomarker in predicting periodontal disease susceptibility.

**Gupta S et al<sup>24</sup>** assessed the prevalence of periodontal disease in dental patients in relation to smoking and diabetes. The study was conducted among 522 patients visiting the Periodontics Department, Kantipur Dental College. Individuals willing to participate had to sign an informed consent and undergo interview and clinical examination. Data collection, done on a structured proforma, was analysed using SPSS 20.0. Prevalence of periodontitis was 372 (71.3%), diabetes 33 (6.3%) and smoking as 138 (26.4%). Hypertension was observed in 64 (12.3%) patients and family history of diabetes among 94 (18%). Among the 372 periodontitis patients,

smoking behaviour was present in 120 (32.3%), diabetes in 32 (8.6%), family history of diabetes in 72 (19.4%) and hypertension in 62 (16.7%). Conversely, 120 (87%) smokers, 33 (97%) diabetics, 72 (76.6%) with family history of diabetes, 62 (96.9%) hypertensive, 216 (41.4%) male and 156 (29.9%) female participants had periodontitis. Smoking behaviour was more in males: 115 (39.4%) compared to 23 (10%) females. Periodontitis was significantly associated with smoking, diabetes, hypertension and age. It is recommended that tobacco cessation and diabetes control be promoted as an integral component of periodontal therapy and oral health be included as an essential element of general health when conducting national health surveys.

### Conclusion

In this study, the value of plaque index, gingival index and CPITN index was higher among smokers as compared to non-smokers, indicating that smoking is associated with poor quality of periodontal health.

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