

Original Article

Tobacco Smoking and its harmful effects on Oral Health in Amritsar- A Cross sectional Study

Bikramjeet Dhaliwal¹, Amanpreet Kaur Chinna², Avineet Singh Saggi³, Vipanpreet Kaur⁴, Paviterjot Kaur⁵, Manjot Kaur⁶

^{1,2,3,4}Intern, SGRD Institute of Dental Science and Research, Amritsar, Punjab

^{5,6}BDS, Private Practitioner, Amritsar, Punjab

Abstract

Aims : The aim of the study was to evaluate the periodontal health status in the cigarette smokers and non-cigarette smokers, and oral hygiene measures undertaken.

Materials and method: The sample size of the study included 600 male (300 cigarette smokers and 300 non smokers) aged 20-60 years. The sample for the study was randomly selected from the patients visiting OPD of SGRD Institute of Dental Science and Research, Amritsar, Punjab. Community Periodontal Index (CPI) score was recorded for each subject and a questionnaire was filled by each patient.

Results: CPI score showed that there was statistically significant difference in the reportings between the sample i.e cigarette smokers and non-smokers.

Conclusions: Established association was observed between periodontal disease and cigarette smoking. It was reported that cigarette smoking was associated with lesser gingival bleeding and deeper periodontal pockets as compared to non-smokers.

Key Words

Smoking, Smoker, CPI, Periodontal Disease

Introduction

Periodontal disease is the most common chronic diseases of the oral cavity and is most prevalent cause for the tooth loss after dental in developing as well as developed countries.^[1,2]

Tobacco Smoking is found as the most common environmental risk factor in periodontitis and is thought to impair the immune response and compromises the periodontal tissue's ability to heal, following a period of disease activity.^[3,4]

Periodontal diseases are a dynamic phenomenon with cyclical patterns of progression and resolution at any given site.^[5]

The population impact of smoking on periodontitis also varies according to the frequency of exposure to tobacco smoking in populations.^[6]

Smoking leads to heavy gingival keratinization and vasoconstriction resulting in less gingival bleeding in the smokers^[7], however Pocket depth measurements are found to be greater in smokers due to increased alveolar bone loss.^[8,9]

Smoking impacts negatively on the regenerative therapy, including osseous grafting, guided tissue regeneration, or a combination of this treatment.^[10]

Periodontal breakdown has been shown to be more severe among current smokers in comparison to those who have never smoked.^[11]

During periodontitis, cigarette smoking affect neutrophil function, thereby preventing elimination of periodontal pathogens and also stimulates reactive oxygen species release and oxidative stress mediated tissue damage.^[12] The studies conducted by Tynkiwet al.,^[13] concluded that periodontitis subjects had significantly elevated cytokine and chemokine

profiles. Smokers exhibited a decrease in several pro-inflammatory cytokines and chemokines and certain regulators of T-cells and natural killer cells. This reflected that the immunosuppressant effects of smoking which may contribute to an enhanced susceptibility to periodontitis.

Materials and Methods

A cross sectional study was conducted among 600 male subjects (300 smokers and 300 non-smokers) in the age group of 20-60 years attending the OPD of SGRD Institute of Dental Science and Research, Amritsar, Punjab. Community Periodontal Index (CPI) was used as an epidemiological tool. Patients were randomly selected from the age group of 20-60 years with more than 10 natural teeth present. The subjects with any Chronic pathologies were excluded from the study.

The clinical examination included an assessment of periodontal condition using the CPI on the index teeth. Each subject was examined on dental chair using a mouth mirror and CPI Probe. The examination was performed in a systemic manner beginning from maxillary right sextant.

The following CPI codes and criteria were used to record periodontal status: Code 0: healthy periodontium, Code 1: bleeding observed, directly or by using a mouth mirror, after probing, Code 2: calculus detected during probing, but the entire black band on the probe visible, Code 3: Pocket 4-5mm (gingival margin within the black band on the probe), Code 4: Pocket 6mm or more (black band on the probe not visible), Code X: Excluded Segment(Less than two teeth present) and Code 9: Not recorded.

Chi Square test was applied for comparing the associations. A p value of less than 0.05 was considered as significant.

In the present study, a total number of 300 subjects were examined for assessing their periodontal status. The subjects were 15 to 74 years of age. Of the 300 subject, 151(50.3%) were males and 149(49.7%) were females (Figure 1) and 199(66.3%) were non smokers and 101(33.7%) were smokers (Figure 2). In this study, 39.6% smoked less than 10 years, 40.6% smoked for more than 10 years but less than 20 years and 19.8% smoked for more than 20 years (Figure 3).

Quick Response Code



Address For Correspondence:

Bikramjeet Dhaliwal
Intern, SGRD Institute of Dental Science and
Research, Amritsar, Punjab
Email: bikramjeetdhaliwal@gmail.com

Among non smokers, 1% had healthy periodontium, 44.2% had bleeding on probing, 49.2% had calculus, 5% had shallow pockets and 0.5% had deep pockets. Among smokers, 11.9% had bleeding on probing, 32.6% had calculus, 30.7% had shallow pockets and 24.8% had deep pockets (Table 1). It can thus be concluded that the non smokers had better periodontal status than smokers. This association was highly significant. ($p < 0.001$)

Among the subjects who smoked for less than 10 years, 12.5% had bleeding on probing, 42.5%

had calculus, 15% had shallow pockets and 30% had deep pockets, who smoked for 10-20 years, 12.2% had bleeding on probing, 31.7% had calculus, 41.5% had shallow pockets and 14.6% had deep pockets and who smoked more than 20 years, 10% had bleeding on probing, 15% had calculus, 40% had shallow pockets and 35% had deep pockets (Table 2). The results thus suggest that those who smoked for lesser duration of time had less periodontal destruction than the subjects who smoked for longer duration. However this association was statistically not significant.

Results

In this, a total number of 600 subjects were included which were further divided into two groups of 300 smokers and 300 non-smokers for assessing their periodontal status. The subjects were 20 to 60 years of age. In this study, 37.6% smoked less than 10 years, 35% smoked for more than 10 years but less than 20 years and 27.3% smoked for more than 20 years.

Among non-smokers, 2 % had healthy periodontium, 44.66 % had bleeding on probing, 49.3% had calculus, 3.6 % had shallow pockets and 0.3% had deep pockets. Among smokers, 14.6% had bleeding on probing, 30.3% had calculus, 29.6% had shallow pockets and 25.3% had deep pockets. It can thus be concluded that the non- smokers had better periodontal status than smokers. This association was highly significant. ($p < 0.001$) (Table 1)

Among the subjects who smoked for less than 10 years, 12.4% had bleeding on probing, 42.5% had calculus, 15% had shallow pockets and 30.1% had deep pockets, who smoked for 10-20 years, 12.4% had bleeding on probing, 31.4% had calculus, 41.9% had shallow pockets and 14.3% had deep pockets and who smoked more than 20 years, 10.9% had bleeding on probing, 15.9% had calculus, 40.2% had shallow pockets and 32.93% had deep pockets (Table 2). The results conclude that those who smoked for lesser duration of time had less periodontal destruction than the subjects who smoked for longer duration. However this association was statistically not significant.

Table 1 CPITN scores comparison

Highest CPI Score	0	1	2	3	4	Total	p value
	%	%	%	%	%	%	
Non Smoker	6	134	148	11	1	300	<0.001*
	2%	44.66%	49.3%	3.6%	0.3%	100%	
Smoker	0	44	91	89	76	300	
	0%	14.6%	30.3	29.6%	25.3	100%	
Total	6	178	239	100	77	600	
	1%	29.66%	39.8%	16.66%	12.83%	100%	

*Highly Significant

Table 2 CPITN score comparison with duration of smoking

Highest CPI Score	1	2	3	4	Total	p value
	%	%	%	%	%	
≤ 10 Years	14	48	17	34	113	p>0.05
	12.4%	42.5%	15%	30.1%	100%	
≥ 10 Years & ≤ 20 Years	13	33	44	15	105	
	12.4%	31.4%	41.9%	14.3%	100%	
≥ 20 Years	9	13	33	27	82	
	10.9%	15.9%	40.2%	32.93%	100%	
Total	36	94	94	76	300	
	12%	31.33%	31.33%	25.33%	100%	

*Not Significant

Discussion

Smoking is on the rise in the developing world, but falling in developed nations. About 15 billion cigarettes are sold daily or 10 million every minute. Smoking has clearly been implicated contributing to periodontal breakdown and in impeding healing of periodontal tissues.^[14,15]

The findings in the present study are consistent with the study of Feldman et al.,^[16] showed that smokers with periodontal disease had less clinical inflammation and gingival bleeding when compared with non smokers. This may be explained by the fact that one of numerous tobacco smoke by-products, nicotine, exerts local vasoconstriction, reducing blood flow, edema and acts to inhibit what are normally early signs of periodontal problems by decreasing gingival inflammation, redness, and bleeding.

The combined effect of bacterial colonization and the local and systemic effect of smoking are responsible for the greater severity of periodontal destruction in smokers of the current study. These results of the current study are similar to those reported by Linden and Mullally,^[17] Harberet al.,^[18] Schenkein et al.,^[19] and Haffajee.^[20] All of these studies have shown that compared to non-smokers, young adult smokers have a higher prevalence and severity of periodontitis. At the same time, results of the present study showed that the gingival bleeding and gingival in ammatory symptoms appeared to be suppressed in smokers. These results are parallel to those reported by Schuller,^[21] Bergström and Boström^[22] and Chen et al.^[23]

In the present study, we used the CPI as recommended by the World Health Organization. CPI is not a perfect measure of periodontal disease and excludes measurement of attachment loss, gingival recession, alveolar bone level, and other clinical periodontal parameters. Nevertheless, it was originally proposed as an appropriate estimation of disease in large epidemiological surveys and has contributed to an understanding of the epidemiology of periodontal disease on a global level.^[24]

The result of this study confirms a consistent association between smoking and periodontal status. However, smoking duration was not recorded and this determinant could not be included in the analyses. It should be noted that given the small difference between smokers and non-smokers, other factors should have been considered such as socio-economic status and stress.

Conclusion

In conclusion, the current study shows that smoking is a major

environmental factor associated with increased periodontal destruction. The findings highlight the need for preventive strategies aimed at young individuals, many of who take up smoking as a habit, early in life. Dental public health efforts, therefore, need to include and emphasize the role of smoking and not only oral hygiene in primary preventive efforts.

References

1. Lung ZH, Kelleher MG, Porter RW, Gonzalez J, Lung RF. Poor patient awareness of the relationship between smoking and periodontal diseases. *Br Dent J* 2005;199:731-7.
2. Abdulkarim AA, Mokuolu OA, Adeniyi A. Drug use among adolescents in Ilorin, Nigeria. *Trop Doct* 2005;35:225-8.
3. Palmer RM, Wilson RF, Hasan AS. Mechanism of action of environmental factors- tobacco smoking. *J ClinPeriodontol* 2005;32:180-95.
4. Johnson GK, Hill M. Cigarette smoking and the periodontal patient. *J Periodontol* 2004;75:196-209.
5. Locker D, Leake JL. Risk factors and risk markers for periodontal disease experience in older adults living independently in Ontario, Canada. *J Dent Res* 1993;72:9-17.
6. Loc G, Gary S. Smoking attributable periodontal disease in the Australian adult population. *J ClinPeriodontol* 2008;35:398-404.
7. Nijerya'li E. Oral hygiene status and periodontal treatment needs of Nigerian Male smokers. *TAF Prev Med Bull* 2010;9:107-12.
8. Stoltenberg J, Osborn JB, Pihlstrom BL, Herzberg MC, Aeppli DM, Wolff LF, et al. Association between cigarette smoking, bacterial pathogens and periodontal status. *J Periodontol* 1993;64:242-6.
9. Bergstrom J. Cigarette smoking and periodontal bone loss. *J Periodontol* 1991;62:242-6.
10. Johnson G. Impact of tobacco use on periodontal status. Impact of tobacco use on periodontal status. *J Dent Educ* 2001;65:313-32.
11. Gabriel C, Totolic I, Girdia M, Dumitriu SA, Hanganu C. Tobacco smoking and periodontal conditions in an adult population from Constanta, Romania. *OHDMBSC* 2009;8:25-32.
12. Matthews JB, Chen FM, Milward MR, Wright HJ, Carter K, McDonagh A, et al. Effect of nicotine, cotinine and cigarette smoke extract on the neutrophil respiratory burst. *J ClinPeriodontol* 2011;38:208-18.
13. Tymkiw KD, Thunhell DH, Johnson GK, Joly S, Burnell KK, Cavanaugh JE, et al. Influence of smoking on gingival crevicular fluid cytokines in severe chronic periodontitis. *J ClinPeriodontol* 2011;38:219-28.
14. World health organization Western Pacific Region, Fact sheets 28 May, 2002.
15. Johnson NW, Bain CA. Tobacco and oral disease. EU-Working Group on tobacco and oral health. *Br Dent J* 2000;189:200-6.
16. Feldman RS, Bravacos JS, Rose CL. Associations between smoking, different tobacco products and periodontal disease indexes. *J Periodontol* 1983;54:481-7.
17. Linden GJ, Mullally BH. Cigarette smoking and periodontal destruction in young adults. *J Periodontol* 1994;65:718-23.
18. Haber. Cigarette smoking: A major risk factor for periodontitis. *Compend Continuing Educ Dent* 1994;15:1002-14.
19. Schenkein HA, Gunsolley JC, Koertge TE, Schenkein JG, Tew JG. Smoking and its effects on early onset periodontitis. *J Am Dent Assoc* 1995;126:1107-13.
20. Haffajee AD, Socransky SS. Relationship of cigarette smoking to attachment level pro les. *J ClinPeriodontol* 2001;28:283-95. 33.
21. Schuler RL. Effect of cigarette smoking on the circulation of the oral mucosa. *J Dent Res* 1968;47:910-5. 34.
22. Bergström J, Boström L. Tobacco smoking and periodontal hemorrhagic responsiveness. *J ClinPeriodontol* 2001;28:680-5. 35.
23. Chen X, Wolff L, Aeppli D, Guo Z, Luan W, Baelum V, et al. Cigarette smoking, salivary/gingival crevicular fluid cotinine and periodontal status. A 10-yr old longitudinal study. *J ClinPeriodontol* 2001;28:331-9.
24. Cutress TW, Ainamo J, Sardo J. The community periodontal index of treatment needs (CPITN) procedure for population groups and individuals. *Int Dent J* 1987;37:222-33.