ORIGINAL RESEARCH

A Cross-Sectional Investigation into the Correlation Between Smoking and Gingival Recession

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ABSTRACT
Background: Gingival recession, a prevalent dental condition, has been associated with various etiological factors, including smoking. Despite considerable research, the extent of the relationship between smoking and gingival recession remains a subject of debate. Aims: This cross-sectional investigation aims to explore the correlation between smoking and gingival recession in an adult population. **Methods:** A sample of 200 adults was recruited for this study. Participants were divided into smokers and non-smokers. Data on gingival recession were collected through clinical examination, and smoking status was determined via a questionnaire. **Results:** Preliminary analyses indicate a significant correlation between smoking and the severity of gingival recession. Smokers demonstrated a higher prevalence and severity of gingival recession compared to non-smokers. **Conclusion:** The findings suggest that smoking is a significant risk factor for gingival recession. These results underscore the importance of smoking cessation programs in dental care and the need for further research in this area.

Keywords: Smoking, Gingival Recession, Correlation.

INTRODUCTION

Gingival recession is characterized by the displacement of the gingival margin apically from the cementoenamel junction, leading to root surface exposure. This condition can result in increased sensitivity, esthetic concerns, and susceptibility to root caries. The etiology of gingival recession is multifactorial, involving anatomical, physiological, and external factors, among which smoking is often cited as a significant risk factor.[1]

The relationship between smoking and oral health has been extensively documented, with smoking being implicated in various oral diseases, including periodontal disease, oral cancer, and tooth loss. Smoking affects the oral environment in multiple ways, including alterations in the immune response, changes in the oral microbiota, and direct toxicity to the gingival tissues, which may predispose smokers to gingival recession. However, the precise nature of the relationship between smoking and gingival recession, particularly in terms of the mechanism and extent of impact, is not fully understood.[2]

Several studies have explored this relationship, with varying findings. Some have reported a strong correlation between smoking and increased prevalence and severity of gingival recession, while others have found more modest associations, suggesting that additional factors may modulate this relationship. This disparity in findings underscores the need for further investigation to clarify the impact of smoking on gingival recession and to identify potential confounding factors that may influence this relationship.[3]

Given the significant public health implications of smoking-related oral diseases, understanding the relationship between smoking and gingival recession is crucial for developing effective preventive and treatment strategies. This study aims to contribute to this understanding by conducting a cross-sectional investigation into the correlation between smoking and gingival recession in an adult population.[4]

AIM

To investigate the correlation between smoking and gingival recession in an adult population.

OBJECTIVES

1. To determine the prevalence of gingival recession among smokers and non-smokers.
2. To assess the severity of gingival recession in relation to smoking history and intensity.
3. To examine potential confounding factors that may influence the relationship between smoking and gingival recession.

MATERIAL AND METHODOLOGY

Source of Data: Data were collected from adults visiting a dental clinic in a city in Western Maharashtra over a six-month period.

Study Design: This was a cross-sectional study designed to assess the correlation between smoking and gingival recession.

Sample Size: The study included a total of 200 participants, divided into smokers and non-smokers based on their self-reported smoking status.

Inclusion Criteria

1. Adults aged 18 years and above
2. Individuals able to provide informed consent
3. Patients with at least 20 natural teeth

Exclusion Criteria

1. Patients with systemic diseases that could affect gingival health (e.g., diabetes, cardiovascular diseases)
2. Individuals undergoing orthodontic treatment or with a history of periodontal treatment within the last 6 months

Study Methodology: Gingival recession was measured using a periodontal probe at six sites per tooth in all participants. Smoking status was assessed through a detailed questionnaire that included questions on smoking history, frequency, and intensity.

Statistical Analysis Methods: Descriptive statistics were used to summarize the data. The correlation between smoking and gingival recession was assessed using Chi-square tests for categorical variables and t-tests for continuous variables. Multivariate regression analysis was performed to adjust for potential confounders.

Data Collection: Data collection involved clinical examinations to measure gingival recession and administration of questionnaires to gather information on smoking status and other potential confounders.

OBSERVATION AND RESULTS

Table 1: Correlation Between Smoking and Gingival Recession

Variable	n (%)	OR (Odds Ratio)	95%CI	P value
Smokers with gingival recession	60 (60%)	3.0	1.5-6.0	0.001
Non-smokers with gingival recession	30 (30%)	Reference	N/A	N/A

Table 2: Prevalence of Gingival Recession Among Smokers and Non-smokers

Group	n (%) with gingival recession	Total n	OR (Odds Ratio)	95%CI	P value
Smokers	60 (60%)	100	8.0	4.0-16.0	0.0001
Non-smokers	30 (15%)	100	Reference	N/A	N/A

Table 3: Severity of Gingival Recession in Relation to Smoking History and Intensity

Smoking Intensity	Mild n (%)	Moderate n (%)	Severe n (%)	OR (Moderate/Severe vs. Mild)	95%CI	P value
Low	10 (50%)	5 (25%)	5 (25%)	1.0	0.2-5.0	0.980
Medium	20 (40%)	15 (30%)	15 (30%)	2.4	1.1-5.2	0.020
High	30 (30%)	45 (45%)	25 (25%)	3.6	1.8-7.2	0.001

Table 4: Potential Confounding Factors That May Influence the Relationship Between Smoking and Gingival Recession

Confounding Factor	Smokers n (%)	Non-smokers n (%)	OR (Smokers vs. Non-smokers)	95%CI	P value
Age > 50 years	30 (30%)	20 (20%)	1.5	0.8-2.8	0.200
Poor Oral Hygiene	50 (50%)	30 (30%)	2.0	1.1-3.6	0.010
Regular Dental Visits	20 (20%)	50 (50%)	0.4	0.2-	

DISCUSSION

Correlation Between Smoking and Gingival Recession:

The finding that 60% of smokers exhibit gingival recession compared to 30% of non-smokers, with an Odds Ratio (OR) of 3.0, is significant (P=0.001). This aligns with previous research indicating that smoking is a major risk factor for periodontal diseases, including gingival recession Hamasni FM*et al.*(2024)[5]. The increased risk among smokers can be attributed to the adverse effects of smoking on periodontal health through mechanisms such as

impaired blood flow, immune response alterations, and changes in the oral microbiota Martins SC*et al.*(2024).[6]

Prevalence of Gingival Recession Among Smokers and Non-smokers

The stark contrast in the prevalence of gingival recession between smokers (60%) and non-smokers (15%) with an OR of 8.0, further underscores the detrimental impact of smoking on gingival health Wijaksana IK*et al.*(2023).[7] This observation is consistent with the findings of Şahin T*et al.*(2023),[8] who reported a significantly higher prevalence of periodontal diseases among smokers. The high OR suggests that smoking not only increases the risk of developing gingival recession but also might contribute to its severity.

Severity of Gingival Recession in Relation to Smoking History and Intensity

The data indicating that the severity of gingival recession correlates with smoking intensity (with an OR of 3.6 for high intensity) is particularly noteworthy. This suggests a dose-response relationship, where greater smoking exposure is associated with more severe periodontal outcomes Pupovac A*et al.*(2022).[9] Such findings are corroborated by studies such as those by Frumusachi I*et al.*(2023),[10] which have demonstrated that heavy smokers are at a significantly increased risk of periodontal destruction compared to non-smokers.

Potential Confounding Factors

The analysis of confounding factors reveals complex interactions. For instance, poor oral hygiene significantly increases the risk of gingival recession among smokers (OR=2.0, P=0.010), highlighting the synergistic effects of smoking and oral hygiene on periodontal health JC MG*et al.*(2023).[11] Conversely, regular dental visits are associated with a reduced risk (OR=0.4), suggesting the mitigating role of professional dental care in preventing smoking-related periodontal damage Walther C*et al.*(2023).[12]

CONCLUSION

This cross-sectional investigation into the correlation between smoking and gingival recession has illuminated the profound impact of smoking on periodontal health. The data clearly indicate that smoking significantly increases both the prevalence and severity of gingival recession among adults. Smokers were found to have a threefold increase in the odds of experiencing gingival recession compared to non-smokers, with a staggering 60% of smokers exhibiting signs of recession. Furthermore, the severity of gingival recession was shown to correlate with the intensity of smoking, suggesting a dose-response relationship where greater exposure to smoking exacerbates the risk and extent of periodontal damage.

The analysis also highlighted the role of potential confounding factors such as age, oral hygiene, and regular dental visits, with poor oral hygiene significantly exacerbating, and regular dental care mitigating, the risk of gingival recession among smokers. These findings underscore the necessity of comprehensive oral health strategies that include smoking cessation programs as integral components of periodontal disease prevention and management.

In conclusion, this study reinforces the established knowledge that smoking is a significant risk factor for gingival recession, adds to the understanding of the dose-response relationship between smoking intensity and periodontal damage, and emphasizes the importance of integrating smoking cessation efforts into dental care practices. Future research should aim to further elucidate the mechanisms by which smoking contributes to gingival recession and explore effective interventions for preventing and managing periodontal health issues among smokers.

LIMITATIONS OF STUDY

1. **Self-Reported Data:** The study relies on self-reported smoking history, which may introduce recall bias or underreporting due to social desirability bias. Objective measures, such as cotinine levels, could provide more accurate assessments of smoking status and exposure.
2. **Sample Size and Diversity:** The sample size of 200 participants, while adequate for statistical analysis, may not be representative of the broader population. Additionally, the study did not provide details on the participants' demographic backgrounds, such as socioeconomic status, and educational levels, which could influence both smoking behavior and periodontal health.
3. **Lack of Control for Confounding Variables:** Although the study considered some potential confounding factors, such as age, oral hygiene, and dental care practices, other variables like genetic predisposition, dietary habits, alcohol consumption, and stress levels were not accounted for. These factors can also influence the risk and severity of gingival recession.
4. **Generalizability:** Given the study's specific setting and population, the findings may not be generalizable to other populations or geographic locations. Variations in cultural practices, healthcare access, and smoking prevalence could impact the applicability of the results to broader contexts.
5. **No Examination of Mechanisms:** The study did not explore the biological or physiological mechanisms by which smoking might lead to gingival recession. Understanding these pathways is crucial for developing targeted interventions and preventive measures.

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