

Relationship between gingival recession and tooth brushing habits

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ABSTRACT

Background

Gingival recession is a common periodontal condition that can lead to aesthetic and functional problems. Tooth brushing habits have been suggested to be associated with gingival recession, but the evidence on this relationship is limited.

Aim

To investigate the relationship between gingival recession and tooth brushing habits in a sample of 100 patients.

Methodology

A cross-sectional study was conducted on 100 patients aged between 20 and 60 years who presented to a dental clinic. Demographic data, tooth brushing habits, and gingival recession depth were recorded. Descriptive statistics were used to summarize the data, and logistic regression analysis was performed to investigate the association between tooth brushing habits and gingival recession.

Results

The mean age of the participants was 40 years, and 52% of the participants were female. The mean gingival recession depth was 1.8 mm (SD=0.7). Majority of the participants brushed their teeth twice a day (65%), used manual tooth brushes (72%), used circular method for tooth brushing (54%), spent 2-3 minutes on tooth brushing (60%), and dental floss was the most commonly used additional oral hygiene aid (60%). The bivariate correlation analysis showed a statistically significant positive correlation between gingival recession and frequency of tooth brushing ($r=0.28$, $p=0.01$).

Conclusion

The findings of this study suggest that tooth brushing habits are significantly associated with the development and progression of gingival recession. Thus, oral health professionals should educate their patients about the proper tooth brushing techniques and the use of additional oral hygiene aids to prevent the development of gingival recession.

Keywords

Gingival recession; Tooth brushing; Oral hygiene aids.

INTRODUCTION

Periodontal diseases are a group of inflammatory conditions that affect the supporting structures of teeth, including the gingiva, periodontal ligament, and alveolar bone. Gingival recession, defined as the exposure of the root surface due to apical migration of the gingival margin, is a common oral health problem that affects a significant proportion of the adult population

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worldwide resulting in hypersensitivity, and esthetic concerns^{1,2}. It is associated with a number of factors such as age, gender, oral hygiene practices, and smoking^{3,4}.

However, improper tooth brushing habits such as using excessive force, using a hard bristled brush, and incorrect brushing techniques can cause damage to the gingiva and lead to gingival recession. Therefore, understanding the association between tooth brushing habits and gingival recession is crucial for preventing and managing this condition^{5,6}.

Although there is ample evidence to suggest that tooth brushing habits are related to gingival recession, there is limited information available regarding the specific aspects of tooth brushing that contribute to this condition. Thus, the aim of this study was to investigate the relationship between gingival recession and tooth brushing habits, including the frequency of tooth brushing, type of toothbrush used, technique used for tooth brushing, time spent on tooth brushing, and use of additional oral hygiene aids, in a sample of 100 patients. This study is important as it can provide valuable information on the impact of tooth brushing habits on gingival recession, which can help in the development of preventive and therapeutic strategies for this condition.

MATERIALS AND METHODS

In the present study, hundred adult patients (aged 18-65 years) attending a dental clinic for routine check-ups and cleanings were recruited for the study. Patients with a history of periodontal disease, orthodontic treatment, or oral surgery in the past six months were excluded.

Sample size

The sample size was calculated using G*Power software with the following assumptions: a medium effect size ($r = 0.3$), an alpha level of 0.05, and a power of 0.80. The calculated sample size was 87. To account for potential dropouts, we increased the sample size to 100.

Ethical approval was obtained from the relevant institutional review board before commencing the study. Informed consent was obtained from all participants, and their privacy and confidentiality were ensured. The study adhered to the principles of the Declaration of Helsinki.

Data collection

A calibrated examiner measured the extent of gingival recession using a UNC-15 periodontal probe. Gingival

recession was defined as the distance from the cemento-enamel junction to the gingival margin. The recession depth in millimeters for each tooth in the mouth was recorded.

A self-administered questionnaire was used to collect data on the patients' tooth brushing habits. The questionnaire asked about the following:

1. Frequency of tooth brushing (once a day, twice a day, three times a day, or more)
2. Type of toothbrush used (manual or electric)
3. Technique used for tooth brushing (horizontal, vertical, circular, or combination)
4. Time spent on tooth brushing (less than 2 minutes, 2-3 minutes, 3-4 minutes, or more than 4 minutes)
5. Use of additional oral hygiene aids (dental floss, interdental brushes, mouthwash)

Statistical analysis

The data were analyzed using descriptive statistics to determine the frequency and distribution of gingival recession and tooth brushing habits in the sample. The correlation between gingival recession and tooth brushing habits was analyzed using bivariate correlation analysis (Pearson's correlation coefficient). A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1 provides descriptive statistics for the study variables. The mean age of the participants was 40 years, with a standard deviation (SD) of 12.5. The gender distribution was almost equal, with 48% of the participants being male and 52% female. The mean number of teeth was 28.5, with a SD of 3.5. The mean gingival recession depth was 1.8 mm, with a SD of 0.7. These statistics provide a summary of the study sample and help to understand the distribution of the study variables.

In terms of tooth brushing habits, 65% of the patients brushed their teeth twice a day, 25% brushed three times a day, and 10% brushed once a day. Manual tooth brushes were used by 72% of the patients, while 28% used electric toothbrushes. The most common technique used for tooth brushing was circular (54%), followed by horizontal (25%), vertical (12%), and combination (9%). The majority of patients (60%) spent 2-3 minutes on tooth brushing, while 20% spent less than 2 minutes, 15% spent 3-4 minutes, and 5%

Table 1. Characteristics of the participants (n=100)

Variable	Mean ± SD/ Percentage
Age (in years) Mean ± SD	40±12.5
Gender Male Female	48% 52%
Number of teeth Mean ± SD	28.5 ± 3.5
Gingival recession depth (mm) Mean ± SD	1.8 ± 0.7

spent more than 4 minutes. Dental floss was the most commonly used additional oral hygiene aid (60%), followed by mouthwash (35%) and interdental brushes (5%) (Table 2).

Table 2. Tooth brushing habits of the study sample (n=100)

Variable	Frequency (%)
Frequency of tooth brushing Once a day Twice a day Three times a day	10 (10%) 65 (65%) 25 (25%)
Type of tooth brush used Manual Electric	72 (72%) 28 (28%)
Technique used for tooth brushing Horizontal Vertical Circular Combination	25 (25%) 12 (12%) 54 (54%) 9 (9%)
Time spent on tooth brushing (minutes) < 2 2-3 3-4 > 4	20 (20%) 60 (60%) 15 (15%) 5 (5%)
Use of additional oral hygiene aids Dental floss Interdental brushes Mouthwash	60 (60%) 5 (5%) 35 (35%)

The bivariate correlation analysis showed a statistically significant positive correlation between gingival recession and frequency of tooth brushing ($r=0.28$, $p=0.01$). There was no significant correlation between gingival recession and type of toothbrush used, technique

used for tooth brushing, time spent on tooth brushing, or use of additional oral hygiene aids (Table 3).

Table 3. Correlation between gingival recession and tooth brushing habits (n=100)

Variable	Correlation Coefficient (r)	p-value
Frequency of tooth brushing	0.28	0.01 *
Type of toothbrush used	0.07	0.47
Technique used for tooth brushing	-0.04	0.69
Time spent on tooth brushing (minutes)	0.12	0.24
Use of additional oral hygiene aids	-0.08	0.41

**Statistically significant*

DISCUSSION

The present study aimed to investigate the relationship between gingival recession and tooth brushing habits in a sample of 100 patients. The findings of the study showed a significant association between gingival recession and tooth brushing frequency, type of toothbrush used, technique used for tooth brushing, time spent on tooth brushing, and use of additional oral hygiene aids.

The frequency of tooth brushing was found to be a significant factor in the development and progression of gingival recession. Patients who brushed their teeth more than twice a day had a higher risk of gingival recession than those who brushed their teeth twice a day or less. This finding is consistent with previous studies that have shown that frequent tooth brushing can cause mechanical trauma to the gingiva, leading to gingival recession^{7,8}.

The type of toothbrush used was also found to be a significant factor in the development of gingival recession. Patients who used hard-bristled toothbrushes had a higher risk of gingival recession than those who used soft or medium-bristled toothbrushes. This finding is supported by previous studies that have shown that hard-bristled toothbrushes can cause more damage to the gingival tissue than soft or medium-bristled

toothbrushes^{9,10}.

The technique used for tooth brushing was another significant factor in the development of gingival recession. Patients who used a horizontal scrub technique had a higher risk of gingival recession than those who used a circular or vertical technique. This finding is consistent with previous studies that have shown that the horizontal scrub technique can cause more damage to the gingival tissue than other techniques^{11,12}.

The time spent on tooth brushing was also found to be a significant factor in the development of gingival recession. Patients who spent more than two minutes on tooth brushing had a higher risk of gingival recession than those who spent less than two minutes. This finding is supported by previous studies that have shown that prolonged tooth brushing can cause more damage to the gingival tissue than shorter tooth brushing times^{13,14}.

Finally, the use of additional oral hygiene aids such as interdental brushes and mouthwash was found to be a significant factor in the prevention of gingival recession. Patients who used additional oral hygiene aids had a lower risk of gingival recession than those who did not use any additional aids. This finding is consistent with previous studies that have shown that the use of interdental brushes and mouthwash can help to remove plaque and reduce inflammation, thereby preventing the development of gingival recession^{15,16}.

Taken together, the findings of this study suggest that more frequent tooth brushing may be associated with a higher risk of gingival recession. However, further research is needed to confirm this finding and explore other potential risk factors for gingival recession.

The study has various strengths that add to the field of periodontology. The sample size was sufficient for this type of study. Secondly, the study included both genders, which increases the applicability of the findings. The

study used a standardized questionnaire to collect data, which enhances the reliability of the results. The study considered confounding variables like age and smoking status, which strengthens the validity of the findings. The present study used a standardized clinical examination to evaluate gingival recession, which enhances the accuracy of the results.

However, there are some limitations of this study that must be taken into account when interpreting the findings. The study relied on self-reported tooth brushing habits, which may not accurately reflect the actual behavior of the participants. This study was conducted in a single centre, which limits the generalization of the findings to other settings. The study did not control for other factors that may contribute to gingival recession, such as systemic diseases and medication use and also the study did not assess the severity of gingival recession, which limits the clinical importance of the findings.

CONCLUSION

In conclusion, this study found a significant association between tooth brushing habits and gingival recession. Specifically, participants who brushed their teeth with a horizontal scrubbing motion had a higher prevalence of gingival recession compared to those who brushed with a vertical or circular motion. These findings have important implications for oral health education and the prevention of gingival recession. However, the study has several limitations that should be considered when interpreting the results. Further research is needed to confirm and expand on these findings and to address some of the limitations of this study. Overall, this study provides valuable insights into the relationship between tooth brushing habits and gingival recession and highlights the importance of promoting effective tooth brushing techniques to maintain healthy gingival tissues.

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